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<?xml version="1.0" encoding="UTF-8" ?>
<sbml xmlns="http://www.sbml.org/sbml/level2" level="2" version="1">
  <model id="iBsu1147" name="iBsu1147">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>COBRA_Toolbox</p></html>
    </notes>
    <listOfSpecies>
      <species id="M_C00001_c" name="H2O|Water|HO-|OH-|h2o" compartment="C_c">
        <notes>
          <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: H2O</p></html>
        </notes>
      </species>
      <species id="M_C00001_e" name="H2O|Water|HO-|OH-|h2o, extracellular"
        compartment="C_e">
        <notes>
          <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: H2O,
extracellular</p></html>
        </notes>
      </species>
      <species id="M_C00002_c" name="ATP|Adenosine 5'-triphosphate|atp"
        compartment="C_c">
        <notes>
          <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C10H13N5O13P3</p></html>
        </notes>
      </species>
      <species id="M_C00003_c" name="NAD+|NAD|Nicotinamide adenine
dinucleotide|DPN|Diphosphopyridine nucleotide|Nadide|Nicotinamideadeninedinucleotide|nad"
        compartment="C_c">
        <notes>
          <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C21H26N7O14P2</p></html>
        </notes>
      </species>
      <species id="M_C00004_c" name="NADH|DPNH|Nicotinamide adenine dinucleotide -
reduced|Nicotinamideadeninedinucleotide-reduced|nadh" compartment="C_c">
        <notes>
          <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C21H27N7O14P2</p></html>
        </notes>
      </species>
      <species id="M_C00005_c" name="NADPH|TPNH|Nicotinamide adenine dinucleotide
phosphate - reduced|Nicotinamideadeninedinucleotidephosphate-reduced|nadph"
        compartment="C_c">

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    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C21H27N7O17P3</p></html>
    </notes>
  </species>
  <species id="M_C00006_c" name="NADP+|NADP|Nicotinamide adenine dinucleotide
phosphate|beta-Nicotinamide adenine dinucleotide phosphate|TPN|Triphosphopyridine
nucleotide|Nicotinamide adenine dinucleotide phosphate
-[Nicotinamideadeninedinucleotidephosphate|nadp" compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C21H26N7O17P3</p></html>
    </notes>
  </species>
  <species id="M_C00007_c" name="Oxygen|O2|o2|dioxygen" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: O2</p></html>
    </notes>
  </species>
  <species id="M_C00007_e" name="Oxygen|O2|o2|dioxygen, extracellular"
compartment="C_e">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: O2,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C00008_c" name="ADP|Adenosine 5'-diphosphate|adp"
compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C10H13N5O10P2</p></html>
    </notes>
  </species>
  <species id="M_C00009_c" name="Orthophosphate|Phosphate|Phosphoric
acid|Orthophosphoric acid|phosphate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: HO4P</p></html>
    </notes>
  </species>
  <species id="M_C00009_e" name="Orthophosphate|Phosphate|Phosphoric
acid|Orthophosphoric acid|phosphate, extracellular" compartment="C_e">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: HO4P,
extracellular</p></html>

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    </notes>
</species>
  <species id="M_C00010_c" name="CoA|Coenzyme A|CoA-SH|CoenzymeA|coA|coenzyme
a" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C21H33N7O16P3S</p></html>
    </notes>
</species>
  <species id="M_C00011_c" name="CO2|Carbon dioxide|co2" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: CO2</p></html>
    </notes>
</species>
  <species id="M_C00011_e" name="CO2|Carbon dioxide|co2, extracellular"
compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: CO2,
extracellular</p></html>
    </notes>
</species>
  <species id="M_C00013_c" name="Pyrophosphate|Pyrophosphoric
acid|Diphosphate|PPi|diphosphate|pyrophosphate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: H2O7P2</p></html>
    </notes>
</species>
  <species id="M_C00013_e" name="Pyrophosphate|Pyrophosphoric
acid|Diphosphate|PPi|diphosphate|pyrophosphate, extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: H2O7P2,
extracellular</p></html>
    </notes>
</species>
  <species id="M_C00014_c" name="NH3|Ammonia|Ammonium|NH4+|NH4plus|nh4+"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: H4N</p></html>
    </notes>
</species>
  <species id="M_C00014_e" name="NH3|Ammonia|Ammonium|NH4+|NH4plus|nh4+,
extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: H4N,

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extracellular</p></html>

</notes>

</species>

<species id="M\_C00015\_c" name="UDP|Uridine 5'-diphosphate|udp" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C9H12N2O12P2</p></html>

</notes>

</species>

<species id="M\_C00016\_c" name="FAD|Flavin adenine dinucleotide|Flavin adenine dinucleotide oxidized|Flavinadeninedinucleotideoxidized|fad" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C27H31N9O15P2</p></html>

</notes>

</species>

<species id="M\_C00017\_c" name="Protein" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C4H5N2O3R2</p></html>

</notes>

</species>

<species id="M\_C00019\_c" name="S-Adenosyl-L-methionine|S-Adenosylmethionine|Acylcarnitine|S-adenosyl-L-methionine|AdoMet|SAM|s-adenosyl-l-methionine" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C15H23N6O5S</p></html>

</notes>

</species>

<species id="M\_C00020\_c" name="AMP|Adenosine 5'-monophosphate|Adenylic acid|Adenylate|5'-AMP|5'-Adenylic acid|5'-Adenosine monophosphate|Adenosine 5'-phosphate|amp" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C10H13N5O7P</p></html>

</notes>

</species>

<species id="M\_C00020\_e" name="AMP|Adenosine 5'-monophosphate|Adenylic acid|Adenylate|5'-AMP|5'-Adenylic acid|5'-Adenosine monophosphate|Adenosine 5'-phosphate|amp, extracellular" compartment="C\_e">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C10H13N5O7P,  
extracellular</p></html>



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    </notes>
</species>
    <species id="M_C00021_c"
name="S-Adenosyl-L-homocysteine|S-Adenosylhomocysteine|S-adenosyl-L-homocysteine|s-adenosyl-homocysteine" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C14H20N6O5S</p></html>
    </notes>
</species>
    <species id="M_C00022_c" name="Pyruvate|Pyruvic acid|2-Oxopropanoate|2-Oxopropanoic acid|Pyroracemic acid|pyruvate" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H3O3</p></html>
    </notes>
</species>
    <species id="M_C00022_e" name="Pyruvate|Pyruvic acid|2-Oxopropanoate|2-Oxopropanoic acid|Pyroracemic acid|pyruvate, extracellular" compartment="C_e">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H3O3,
extracellular</p></html>
    </notes>
</species>
    <species id="M_C00024_c" name="Acetyl-CoA|Acetyl coenzyme A|acetyl-coA|acetyl-CoA|acetyl-coa" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C23H35N7O17P3S</p></html>
    </notes>
</species>
    <species id="M_C00025_c" name="L-Glutamate|L-Glutamic acid|L-Glutaminic acid|L-glutamate|GLU|Glutamate|l-glutamate|Glutaminic acid|2-Aminoglutaric acid|glutamate|DL-Glutamate|DL-Glutaminic acid" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H8NO4</p></html>
    </notes>
</species>
    <species id="M_C00025_e" name="L-Glutamate|L-Glutamic acid|L-Glutaminic acid|L-glutamate|GLU|Glutamate|l-glutamate|Glutaminic acid|2-Aminoglutaric acid|glutamate|DL-Glutamate|DL-Glutaminic acid, extracellular" compartment="C_e">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H8NO4,
extracellular</p></html>
    </notes>

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</species>
  <species id="M_C00026_c" name="2-Oxoglutarate|Oxoglutaric acid|2-Ketoglutaric
acid|alpha-Ketoglutaric acid|2-oxoglutarate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H4O5</p></html>
    </notes>
  </species>
  <species id="M_C00026_e" name="2-Oxoglutarate|Oxoglutaric acid|2-Ketoglutaric
acid|alpha-Ketoglutaric acid|2-oxoglutarate, extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H4O5,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C00027_c" name="H2O2|Hydrogen
peroxide|Oxydol|Hydrogenperoxide|h2o2" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: H2O2</p></html>
    </notes>
  </species>
  <species id="M_C00029_c" name="UDP-glucose|UDPglucose|UDP-D-glucose|Uridine
diphosphate glucose|UDP-alpha-D-glucose|udp-d-glucose" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C15H22N2O17P2</p></html>
    </notes>
  </species>
  <species id="M_C00032_c" name="Heme|Haem|Protoheme|Heme B|Protoheme
IX|protoheme" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C34H30FeN4O4</p></html>
    </notes>
  </species>
  <species id="M_C00032_e" name="Heme|Haem|Protoheme|Heme B|Protoheme
IX|protoheme, extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C34H30FeN4O4,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C00033_c" name="Acetate|Acetic acid|Ethanoic acid|Glacial acetic
acid|acetate|ACET" compartment="C_c">
    <notes>

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    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C2H3O2</p></html>
  </notes>
</species>
  <species id="M_C00033_e" name="Acetate|Acetic acid|Ethanoic acid|Glacial acetic
acid|acetate|ACET, extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C2H3O2,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C00034_c" name="Manganese|Mn2+|Mn(II)|Mn(III)" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: Mn</p></html>
    </notes>
  </species>
  <species id="M_C00034_e" name="Manganese|Mn2+|Mn(II)|Mn(III), extracellular"
compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: Mn,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C00035_c" name="GDP|Guanosine 5'-diphosphate|Guanosine
diphosphate|gdp" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C10H13N5O11P2</p></html>
    </notes>
  </species>
  <species id="M_C00036_c" name="Oxaloacetate|Oxalacetic acid|Oxaloacetic
acid|2-Oxobutanedioic acid|Oxosuccinic acid|keto-Oxaloacetate|oxaloacetate"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H2O5</p></html>
    </notes>
  </species>
  <species id="M_C00037_c" name="Glycine|Aminoacetic acid|Gly|glycine"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C2H5NO2</p></html>
    </notes>
  </species>
  <species id="M_C00037_e" name="Glycine|Aminoacetic acid|Gly|glycine, extracellular"
compartment="C_e">

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    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C2H5NO2,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C00038_c" name="Zinc|Zn2+|Zn(II)" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: Zn</p></html>
    </notes>
  </species>
  <species id="M_C00038_e" name="Zinc|Zn2+|Zn(II), extracellular" compartment="C_e">
    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      Zn,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C00039_c"
name="DNA|DNAn|DNAn+1|(Deoxyribonucleotide)n|(Deoxyribonucleotide)m|(Deoxyribonucleo
tide)n+m|Deoxyribonucleic acid" compartment="C_c">
    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C15H23O13P2R3</p></html>
    </notes>
  </species>
  <species id="M_C00041_c" name="L-Alanine|L-2-Aminopropionic
acid|L-alpha-Alanine|L-alanine|ALA|l-alanine" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H7NO2</p></html>
    </notes>
  </species>
  <species id="M_C00041_e" name="L-Alanine|L-2-Aminopropionic
acid|L-alpha-Alanine|L-alanine|ALA|l-alanine, extracellular" compartment="C_e">
    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C3H7NO2,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C00042_c" name="Succinate|Succinic      acid|Butanedionic
acid|Ethylenesuccinic acid|succinate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H4O4</p></html>
    </notes>
  </species>
  <species id="M_C00042_e" name="Succinate|Succinic      acid|Butanedionic

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acid|Ethylenesuccinic acid|succinate, extracellular" compartment="C\_e">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H4O4, extracellular</p></html>

</notes>

</species>

<species id="M\_C00043\_c" name="UDP-N-acetyl-D-glucosamine|UDP-N-acetylglucosamine|udp-n-acetyl-d-glucosamine" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C17H25N3O17P2</p></html>

</notes>

</species>

<species id="M\_C00044\_c" name="GTP|Guanosine 5'-triphosphate|gtp" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C10H13N5O14P3</p></html>

</notes>

</species>

<species id="M\_C00047\_c" name="L-Lysine|Lysine acid|2,6-Diaminohexanoic acid|L-lysine|Lysine|lysine|l-lysine" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H15N2O2</p></html>

</notes>

</species>

<species id="M\_C00047\_e" name="L-Lysine|Lysine acid|2,6-Diaminohexanoic acid|L-lysine|Lysine|lysine|l-lysine, extracellular" compartment="C\_e">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H15N2O2, extracellular</p></html>

</notes>

</species>

<species id="M\_C00048\_c" name="Glyoxylate|Glyoxalate|Glyoxylic acid|glyoxylate" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C2HO3</p></html>

</notes>

</species>

<species id="M\_C00048\_e" name="Glyoxylate|Glyoxalate|Glyoxylic acid|glyoxylate, extracellular" compartment="C\_e">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C2HO3,

extracellular</p></html>  
 </notes>  
</species>  
 <species id="M\_C00049\_c" name="L-Aspartate|L-Aspartic acid|2-Aminosuccinic acid|L-aspartate|Aspartate|Aspartic acid|aspartate|l-aspartate" compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H6NO4</p></html>  
 </notes>  
</species>  
 <species id="M\_C00049\_e" name="L-Aspartate|L-Aspartic acid|2-Aminosuccinic acid|L-aspartate|Aspartate|Aspartic acid|aspartate|l-aspartate, extracellular" compartment="C\_e">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H6NO4, extracellular</p></html>  
 </notes>  
</species>  
 <species id="M\_C00051\_c" name="Glutathione|Reduced glutathione|5-L-Glutamyl-L-cysteinylglycine|N-(N-gamma-L-Glutamyl-L-cysteinyl)glycine|gamma-L-Glutamyl-L-cysteinyl-glycine|GSH|Reducedglutathione|glutathione|reduced glutathione" compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C10H16N3O6S</p></html>  
 </notes>  
</species>  
 <species id="M\_C00052\_c" name="UDP-D-galactose|UDP-galactose|UDP-D-galactopyranose|UDPgalactose|udp-galactose" compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C15H22N2O17P2</p></html>  
 </notes>  
</species>  
 <species id="M\_C00053\_c" name="3'-Phosphoadenylyl sulfate|3'-Phosphoadenosine 5'-phosphosulfate|3'-Phospho-5'-adenylyl sulfate|PAPS|3-Phosphoadenylylsulfate|3-phospho-adenylylsulfate|3-phosphoadenylyl sulfate" compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C10H12N5O13P2S</p></html>  
 </notes>  
</species>  
 <species id="M\_C00054\_c" name="Adenosine 3',5'-bisphosphate|PAP|3'-Phosphoadenylate|Phosphoadenosine phosphate|adenosine

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3',5'-bisphosphate|Adenosine3-5-bisphosphate" compartment="C_c">
  <notes>
    <html
      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C10H13N5O10P2</p></html>
    </notes>
  </species>
  <species id="M_C00055_c" name="CMP|Cytidine-5'-monophosphate|Cytidylic acid|cmp"
compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C9H13N3O8P</p></html>
      </notes>
    </species>
    <species id="M_C00055_e" name="CMP|Cytidine-5'-monophosphate|Cytidylic acid|cmp,
extracellular" compartment="C_e">
      <notes>
        <html
          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C9H13N3O8P,
extracellular</p></html>
        </notes>
      </species>
      <species id="M_C00058_c" name="Formate|Methanoic acid|Formic acid|formate|FORM"
compartment="C_c">
        <notes>
          <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: CHO2</p></html>
          </notes>
        </species>
        <species id="M_C00058_e" name="Formate|Methanoic acid|Formic acid|formate|FORM,
extracellular" compartment="C_e">
          <notes>
            <html
              xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      CHO2,
extracellular</p></html>
            </notes>
          </species>
          <species id="M_C00059_c" name="Sulfate|Sulfuric acid|sulfate|SLF" compartment="C_c">
            <notes>
              <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: O4S</p></html>
              </notes>
            </species>
            <species id="M_C00059_e" name="Sulfate|Sulfuric acid|sulfate|SLF, extracellular"
compartment="C_e">
              <notes>
                <html
                  xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      O4S,
extracellular</p></html>
                </notes>
              </species>

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</species>
  <species id="M_C00061_c" name="FMN|Riboflavin-5-phosphate|Flavin
mononucleotide|flavin mononucleotide|fmn" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C17H20N4O9P</p></html>
    </notes>
  </species>
  <species id="M_C00062_c" name="L-Arginine|(S)-2-Amino-5-guanidinovaleric
acid|L-arginine|l-arginine" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H15N4O2</p></html>
    </notes>
  </species>
  <species id="M_C00062_e" name="L-Arginine|(S)-2-Amino-5-guanidinovaleric
acid|L-arginine|l-arginine, extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H15N4O2,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C00063_c" name="CTP|Cytidine 5'-triphosphate|Cytidine triphosphate|ctp"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C9H13N3O14P3</p></html>
    </notes>
  </species>
  <species id="M_C00064_c" name="L-Glutamine|L-2-Aminoglutaramic
acid|L-glutamine|l-glutamine" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H10N2O3</p></html>
    </notes>
  </species>
  <species id="M_C00064_e" name="L-Glutamine|L-2-Aminoglutaramic
acid|L-glutamine|l-glutamine, extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H10N2O3,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C00065_c" name="L-Serine|L-2-Amino-3-hydroxypropionic
acid|L-3-Hydroxy-alanine|L-serine|Serine|l-serine|2-Amino-3-hydroxypropionic
acid|3-Hydroxyalanine|serine|DL-Serine" compartment="C_c">

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    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H7NO3</p></html>
    </notes>
  </species>
  <species id="M_C00065_e" name="L-Serine|L-2-Amino-3-hydroxypropionic
acid|L-3-Hydroxy-alanine|L-serine|Serine|l-serine|2-Amino-3-hydroxypropionic
acid|3-Hydroxyalanine|serine|DL-Serine, extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H7NO3,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C00067_c"
name="Formaldehyde|Methanal|Oxomethane|Oxomethylene|Methylene
oxide|Formalin|formaldehyde" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: CH2O</p></html>
    </notes>
  </species>
  <species id="M_C00068_c" name="Thiamin diphosphate|Thiamine diphosphate|Thiamin
pyrophosphate|TPP|ThPP|Thiaminediphosphate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C12H17N4O7P2S</p></html>
    </notes>
  </species>
  <species id="M_C00070_c"
name="Copper2|Cu2+|Cu(II)|Cu(II)|Copper1|Cu1+|Cu(I)|Cu+|Copper" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: Cu</p></html>
    </notes>
  </species>
  <species id="M_C00070_e"
name="Copper2|Cu2+|Cu(II)|Cu(II)|Copper1|Cu1+|Cu(I)|Cu+|Copper,
extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: Cu,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C00073_c" name="L-Methionine|Methionine|L-2-Amino-4methylthiobutyric
acid|2-Amino-4-(methylthio)butyric acid|L-methionine|methionine|l-methionine"
compartment="C_c">
    <notes>

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    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H11NO2S</p></html>
  </notes>
</species>
  <species id="M_C00073_e" name="L-Methionine|Methionine|L-2-Amino-4methylthiobutyric
acid|2-Amino-4-(methylthio)butyric acid|L-methionine|methionine|l-methionine, extracellular"
compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H11NO2S,
extracellular</p></html>
    </notes>
</species>
  <species id="M_C00074_c" name="Phosphoenolpyruvate|Phosphoenolpyruvic
acid|PEP|phosphoenolpyruvate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H3O6P</p></html>
    </notes>
</species>
  <species id="M_C00074_e" name="Phosphoenolpyruvate|Phosphoenolpyruvic
acid|PEP|phosphoenolpyruvate, extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H3O6P,
extracellular</p></html>
    </notes>
</species>
  <species id="M_C00075_c" name="UTP|Uridine 5'-triphosphate|Uridine triphosphate|utp"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C9H12N2O15P3</p></html>
    </notes>
</species>
  <species id="M_C00076_c" name="Calcium|Ca2+|Ca(2+)" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: Ca</p></html>
    </notes>
</species>
  <species id="M_C00076_e" name="Calcium|Ca2+|Ca(2+), extracellular"
compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: Ca,
extracellular</p></html>
    </notes>
</species>
  <species id="M_C00077_c" name="L-Ornithine|(S)-2,5-Diaminovaleric

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acid|(S)-2,5-Diaminopentanoic acid|(S)-2,5-Diaminopentanoate|Ornithine|2,5-Diaminovaleric acid|2,5-Diaminopentanoic acid|2,5-Diaminopentanoate|L-ornithine|ornithine|l-ornithine" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H13N2O2</p></html>

</notes>

</species>

<species id="M\_C00077\_e" name="L-Ornithine|(S)-2,5-Diaminovaleric acid|(S)-2,5-Diaminopentanoic acid|(S)-2,5-Diaminopentanoate|Ornithine|2,5-Diaminovaleric acid|2,5-Diaminopentanoic acid|2,5-Diaminopentanoate|L-ornithine|ornithine|l-ornithine, extracellular" compartment="C\_e">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H13N2O2, extracellular</p></html>

</notes>

</species>

<species id="M\_C00078\_c" name="L-Tryptophan|Tryptophan|(S)-alpha-Amino-beta-(3-indolyl)-propionic acid|alpha-Amino-beta-(3-indolyl)-propionic acid|L-tryptophan|tryptophan|l-tryptophan" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C11H12N2O2</p></html>

</notes>

</species>

<species id="M\_C00078\_e" name="L-Tryptophan|Tryptophan|(S)-alpha-Amino-beta-(3-indolyl)-propionic acid|alpha-Amino-beta-(3-indolyl)-propionic acid|L-tryptophan|tryptophan|l-tryptophan, extracellular" compartment="C\_e">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C11H12N2O2, extracellular</p></html>

</notes>

</species>

<species id="M\_C00079\_c" name="L-Phenylalanine|(S)-alpha-Amino-beta-phenylpropionic acid|L-phenylalanine|l-phenylalanine" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C9H11NO2</p></html>

</notes>

</species>

<species id="M\_C00079\_e" name="L-Phenylalanine|(S)-alpha-Amino-beta-phenylpropionic acid|L-phenylalanine|l-phenylalanine, extracellular" compartment="C\_e">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C9H11NO2,

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extracellular</p></html>
</notes>
</species>
<species id="M_C00080_c" name="H+|h+" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: H</p></html>
  </notes>
</species>
<species id="M_C00080_e" name="H+|h+, extracellular" compartment="C_e">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: H,
extracellular</p></html>
  </notes>
</species>
<species id="M_C00081_c" name="ITP|Inosine 5'-triphosphate|Inosine triphosphate|Inosine
tripolyphosphate" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C10H12N4O14P3</p></html>
  </notes>
</species>
<species id="M_C00082_c"
name="L-Tyrosine|(S)-3-(p-Hydroxyphenyl)alanine|(S)-2-Amino-3-(p-hydroxyphenyl)propionic
acid|L-tyrosine|Tyrosine|l-tyrosine|3-(p-Hydroxyphenyl)alanine|2-Amino-3-(p-hydroxyphenyl)pro
pionic acid|tyrosine|DL-Tyrosine" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C9H11NO3</p></html>
  </notes>
</species>
<species id="M_C00082_e"
name="L-Tyrosine|(S)-3-(p-Hydroxyphenyl)alanine|(S)-2-Amino-3-(p-hydroxyphenyl)propionic
acid|L-tyrosine|Tyrosine|l-tyrosine|3-(p-Hydroxyphenyl)alanine|2-Amino-3-(p-hydroxyphenyl)pro
pionic acid|tyrosine|DL-Tyrosine, extracellular" compartment="C_e">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C9H11NO3,
extracellular</p></html>
  </notes>
</species>
<species id="M_C00083_c" name="Malonyl-CoA|Malonyl coenzyme
A|malonyl-CoA|malonyl-coa" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C24H34N7O19P3S</p></html>
  </notes>

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</species>
  <species id="M_C00084_c" name="Acetaldehyde|Ethanal|acetaldehyde|AALD"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C2H4O</p></html>
  </notes>
</species>
  <species id="M_C00086_c" name="Urea|Carbamide|urea" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: CH4N2O</p></html>
  </notes>
</species>
  <species id="M_C00086_e" name="Urea|Carbamide|urea, extracellular"
compartment="C_e">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: CH4N2O,
extracellular</p></html>
  </notes>
</species>
  <species id="M_C00087_c" name="Sulfur|S|Sulfur, precipitated" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: S</p></html>
  </notes>
</species>
  <species id="M_C00088_c" name="Nitrite|nitrite" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: NO2</p></html>
  </notes>
</species>
  <species id="M_C00088_e" name="Nitrite|nitrite, extracellular" compartment="C_e">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: NO2,
extracellular</p></html>
  </notes>
</species>
  <species id="M_C00089_c" name="Sucrose|Cane
sugar|Saccharose|1-alpha-D-Glucopyranosyl-2-beta-D-fructofuranoside|sucrose|SUCR"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C12H22O11</p></html>
  </notes>
</species>
  <species id="M_C00089_e" name="Sucrose|Cane
sugar|Saccharose|1-alpha-D-Glucopyranosyl-2-beta-D-fructofuranoside|sucrose|SUCR,

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extracellular" compartment="C\_e">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C12H22O11, extracellular</p></html>

</notes>

</species>

<species id="M\_C00090\_c" name="Catechol|1,2-Benzenediol|o-Benzenediol|1,2-Dihydroxybenzene|Brenzcatechin|Pyrocatechol|catechol" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H6O2</p></html>

</notes>

</species>

<species id="M\_C00091\_c" name="Succinyl-CoA|Succinyl coenzyme A|succinyl-CoA|succinyl-coa" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C25H36N7O19P3S</p></html>

</notes>

</species>

<species id="M\_C00093\_c" name="sn-Glycerol 3-phosphate|Glycerophosphoric acid|sn-Gro-1-P|Glycerol-3-phosphate|Glycerol 3-phosphate|Glycerol3-phosphate|glycerol-3-phosphate|glycerol 3-phosphate|GLYC-3-P|D-Glycerol 1-phosphate|Glycerol 1-phosphate|sn-Glycerol 1-phosphate|L-Glycerol 1-phosphate" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H8O6P</p></html>

</notes>

</species>

<species id="M\_C00093\_e" name="sn-Glycerol 3-phosphate|Glycerophosphoric acid|sn-Gro-1-P|Glycerol-3-phosphate|Glycerol 3-phosphate|Glycerol3-phosphate|glycerol-3-phosphate|glycerol 3-phosphate|GLYC-3-P|D-Glycerol 1-phosphate|Glycerol 1-phosphate|sn-Glycerol 1-phosphate|L-Glycerol 1-phosphate, extracellular" compartment="C\_e">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H8O6P, extracellular</p></html>

</notes>

</species>

<species id="M\_C00095\_c" name="D-Fructose|Levulose|Fruit sugar|D-arabino-Hexulose|beta-D-Fructose|beta-Fruit sugar|beta-D-arabino-Hexulose|beta-Levulose|Fructose|arabino-Hexulose|D-fructose|fructose" compartment="C\_c">

<notes>

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    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O6</p></html>
  </notes>
</species>
  <species          id="M_C00095_e"          name="D-Fructose|Levulose|Fruit
sugar|D-arabino-Hexulose|beta-D-Fructose|beta-Fruit
sugar|beta-D-arabino-Hexulose|beta-Levulose|Fructose|arabino-Hexulose|D-fructose|fructose,
extracellular" compartment="C_e">
    <notes>
      <html          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:          C6H12O6,
extracellular</p></html>
    </notes>
</species>
  <species          id="M_C00097_c"          name="L-Cysteine|L-2-Amino-3-mercaptopropionic
acid|L-cysteine|l-cysteine" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H7NO2S</p></html>
    </notes>
</species>
  <species          id="M_C00097_e"          name="L-Cysteine|L-2-Amino-3-mercaptopropionic
acid|L-cysteine|l-cysteine, extracellular" compartment="C_e">
    <notes>
      <html          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:          C3H7NO2S,
extracellular</p></html>
    </notes>
</species>
  <species          id="M_C00099_c"          name="beta-Alanine|3-Aminopropionic
acid|3-Aminopropanoate|beta-alanine" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H7NO2</p></html>
    </notes>
</species>
  <species          id="M_C00099_e"          name="beta-Alanine|3-Aminopropionic
acid|3-Aminopropanoate|beta-alanine, extracellular" compartment="C_e">
    <notes>
      <html          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:          C3H7NO2,
extracellular</p></html>
    </notes>
</species>
  <species          id="M_C00100_c"          name="Propanoyl-CoA|Propionyl-CoA|Propionyl coenzyme
A|propionyl-CoA|propionyl-coa" compartment="C_c">
    <notes>
      <html          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C24H37N7O17P3S</p></html>
    </notes>

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</species>
  <species id="M_C00101_c" name="Tetrahydrofolate|5,6,7,8-Tetrahydrofolate|Tetrahydrofolic
acid|THF|(6S)-Tetrahydrofolate|(6S)-Tetrahydrofolic
acid|(6S)-THFA|tetrahydrofolate|5-6-7-8-Tetrahydrofolate|thf" compartment="C_c">
    <notes>
      <html
                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C19H21N7O6</p></html>
    </notes>
</species>
  <species      id="M_C00103_c"      name="D-Glucose      1-phosphate|alpha-D-Glucose
1-phosphate|Cori                                  ester|D-Glucose
alpha-1-phosphate|alpha-D-Glucose-1-phosphate|D-Glucose 1-phosphate|alpha-D-glucose-1-phosp
hate|D-glucose-1-phosphate|D-glucose 1-phosphate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O9P</p></html>
    </notes>
</species>
  <species      id="M_C00103_e"      name="D-Glucose      1-phosphate|alpha-D-Glucose
1-phosphate|Cori                                  ester|D-Glucose
alpha-1-phosphate|alpha-D-Glucose-1-phosphate|D-Glucose 1-phosphate|alpha-D-glucose-1-phosp
hate|D-glucose-1-phosphate|D-glucose 1-phosphate, extracellular" compartment="C_e">
    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C6H12O9P,
extracellular</p></html>
    </notes>
</species>
  <species      id="M_C00104_c"      name="IDP|Inosine      5'-diphosphate|Inosine      diphosphate"
compartment="C_c">
    <notes>
      <html
                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C10H12N4O11P2</p></html>
    </notes>
</species>
  <species      id="M_C00105_c"      name="UMP|Uridylic      acid|Uridine      monophosphate|Uridine
5'-monophosphate|5'Uridylic acid|ump" compartment="C_c">
    <notes>
      <html
                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C9H12N2O9P</p></html>
    </notes>
</species>
  <species      id="M_C00105_e"      name="UMP|Uridylic      acid|Uridine      monophosphate|Uridine
5'-monophosphate|5'Uridylic acid|ump, extracellular" compartment="C_e">
    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C9H12N2O9P,

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extracellular</p></html>
</notes>
</species>
<species id="M_C00106_c" name="Uracil|uracil" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H4N2O2</p></html>
  </notes>
</species>
<species id="M_C00106_e" name="Uracil|uracil, extracellular" compartment="C_e">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H4N2O2,
extracellular</p></html>
  </notes>
</species>
<species id="M_C00108_c" name="Anthranilate|Anthranilic acid|o-Aminobenzoic
acid|Vitamin L1|2-Aminobenzoate|anthranilate|2-aminobenzoate" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H6NO2</p></html>
  </notes>
</species>
<species id="M_C00109_c" name="2-Oxobutanoate|2-Ketobutyric acid|2-Oxobutyric
acid|2-Oxobutyrate|2-Oxobutanoic acid|alpha-Ketobutyric
acid|alpha-Ketobutyrate|2-oxobutanoate" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H5O3</p></html>
  </notes>
</species>
<species id="M_C00111_c" name="Glycerone phosphate|Dihydroxyacetone
phosphate|Dihydroxyacetonephosphate|glycerone-phosphate|glycerone
phosphate|dihydroxy-acetone-phosphate" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H6O6P</p></html>
  </notes>
</species>
<species id="M_C00112_c" name="CDP|Cytidine 5'-diphosphate|Cytidine diphosphate|cdp"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C9H13N3O11P2</p></html>
  </notes>
</species>
<species id="M_C00114_c" name="Choline|Bileneurine|choline" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H14NO</p></html>

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    </notes>
</species>
    <species      id="M_C00114_e"      name="Choline|Bileneurine|choline,      extracellular"
compartment="C_e">
    <notes>
    <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C5H14NO,
extracellular</p></html>
    </notes>
</species>
    <species      id="M_C00116_c"
name="Glycerol|Glycerin|1,2,3-Trihydroxypropane|1,2,3-Propanetriol|glycerol|GLYC"
compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H8O3</p></html>
    </notes>
</species>
    <species      id="M_C00116_e"
name="Glycerol|Glycerin|1,2,3-Trihydroxypropane|1,2,3-Propanetriol|glycerol|GLYC,
extracellular" compartment="C_e">
    <notes>
    <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C3H8O3,
extracellular</p></html>
    </notes>
</species>
    <species      id="M_C00117_c"      name="D-Ribose      5-phosphate|Ribose
5-phosphate|alpha-D-Ribose
5-phosphate|alpha-D-Ribose5-phosphate|D-ribose-5-phosphate|D-ribose
5-phosphate|ribose-5-phosphate" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H10O8P</p></html>
    </notes>
</species>
    <species      id="M_C00118_c"
name="(2R)-2-Hydroxy-3-(phosphonoxy)-propanal|D-Glyceraldehyde
3-phosphate|Glyceraldehyde
3-phosphate|Glyceraldehyde3-phosphate|D-glyceraldehyde-3-phosphate|D-glyceraldehyde
3-phosphate|Glyceraldehyde-3-phosphate|glyceraldehyde-3-phosphate" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H6O6P</p></html>
    </notes>
</species>
    <species      id="M_C00119_c"      name="5-Phospho-alpha-D-ribose
1-diphosphate|5-Phosphoribosyl      diphosphate|5-Phosphoribosyl
1-pyrophosphate|PRPP|5-Phospho-alpha-D-ribose 1-diphosphate|5-phosphoribosyl-1-pyrophosphat

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e|5-phospho-alpha-D-ribose 1-diphosphate|prpp" compartment="C_c">
  <notes>
    <html
      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C5H10O14P3</p></html>
    </notes>
</species>
<species id="M_C00120_c" name="Biotin|D-Biotin|Vitamin H|Coenzyme R|BIOT|biotin"
compartment="C_c">
  <notes>
    <html
      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C10H15N2O3S</p></html>
    </notes>
</species>
<species id="M_C00120_e" name="Biotin|D-Biotin|Vitamin H|Coenzyme R|BIOT|biotin,
extracellular" compartment="C_e">
  <notes>
    <html
      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C10H15N2O3S,
extracellular</p></html>
    </notes>
</species>
<species id="M_C00121_c" name="D-Ribose|D-ribose" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H10O5</p></html>
    </notes>
</species>
<species id="M_C00121_e" name="D-Ribose|D-ribose, extracellular" compartment="C_e">
  <notes>
    <html
      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H10O5,
extracellular</p></html>
    </notes>
</species>
<species id="M_C00122_c" name="Fumarate|Fumaric acid|trans-Butenedioic acid|fumarate"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H2O4</p></html>
    </notes>
</species>
<species id="M_C00122_e" name="Fumarate|Fumaric acid|trans-Butenedioic acid|fumarate,
extracellular" compartment="C_e">
  <notes>
    <html
      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H2O4,
extracellular</p></html>
    </notes>
</species>

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    <species          id="M_C00123_c"          name="L-Leucine|2-Amino-4-methylvaleric
acid|(2S)-alpha-2-Amino-4-methylvaleric          acid|(2S)-alpha-Leucine|L-leucine|l-leucine"
compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H13NO2</p></html>
    </notes>
</species>
    <species          id="M_C00123_e"          name="L-Leucine|2-Amino-4-methylvaleric
acid|(2S)-alpha-2-Amino-4-methylvaleric          acid|(2S)-alpha-Leucine|L-leucine|l-leucine,
extracellular" compartment="C_e">
    <notes>
    <html          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:          C6H13NO2,
extracellular</p></html>
    </notes>
</species>
    <species id="M_C00124_c" name="D-Galactose|D-galactose|GALC" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O6</p></html>
    </notes>
</species>
    <species id="M_C00124_e" name="D-Galactose|D-galactose|GALC, extracellular"
compartment="C_e">
    <notes>
    <html          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:          C6H12O6,
extracellular</p></html>
    </notes>
</species>
    <species id="M_C00125_c" name="Ferricytochrome c|Cytochrome c3+"
compartment="C_c">
    <notes>
    <html          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C42H52FeN8O6S2</p></html>
    </notes>
</species>
    <species id="M_C00126_c" name="Ferrocyclochrome c|Cytochrome c2+|Reduced cytochrome
c" compartment="C_c">
    <notes>
    <html          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C42H52FeN8O6S2</p></html>
    </notes>
</species>
    <species id="M_C00127_c" name="Glutathione disulfide|GSSG|Oxiglutathione|Oxidized
glutathione|oxidized glutathione|Oxidized glutathione glucose substituted" compartment="C_c">
    <notes>

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    <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C20H30N6O12S2</p></html>
    </notes>
</species>
    <species id="M_C00128_c" name="CMP-N-acetylneuraminate" compartment="C_c">
    <notes>
    <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C20H29N4O16P</p></html>
    </notes>
</species>
    <species id="M_C00129_c" name="Isopentenyl diphosphate|delta3-Isopentenyl
diphosphate|delta3-Methyl-3-butenyl diphosphate|Isopentenyl diphosphate|isopentenyl
diphosphate" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H10O7P2</p></html>
    </notes>
</species>
    <species id="M_C00130_c" name="IMP|Inosinic acid|Inosine monophosphate|Inosine
5'-monophosphate|Inosine 5'-phosphate|5'-Inosinate|5'-Inosinic acid|5'-Inosine
monophosphate|5'-IMP|imp" compartment="C_c">
    <notes>
    <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C10H12N4O8P</p></html>
    </notes>
</species>
    <species id="M_C00131_c" name="dATP|2'-Deoxyadenosine 5'-triphosphate|Deoxyadenosine
5'-triphosphate|Deoxyadenosine triphosphate|datp" compartment="C_c">
    <notes>
    <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C10H13N5O12P3</p></html>
    </notes>
</species>
    <species id="M_C00132_c" name="Methanol|Methyl alcohol" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: CH4O</p></html>
    </notes>
</species>
    <species id="M_C00133_c" name="D-Alanine|D-2-Aminopropionic
acid|D-Ala|D-alanine|d-alanine" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H7NO2</p></html>
    </notes>
</species>
    <species id="M_C00133_e" name="D-Alanine|D-2-Aminopropionic

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acid|D-Ala|D-alanine|d-alanine, extracellular" compartment="C\_e">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H7NO2, extracellular</p></html>

</notes>

</species>

<species id="M\_C00134\_c" name="Putrescine|1,4-Butanediamine|1,4-Diaminobutane|Tetramethylenediamine|putrescine|PUT R" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H14N2</p></html>

</notes>

</species>

<species id="M\_C00134\_e" name="Putrescine|1,4-Butanediamine|1,4-Diaminobutane|Tetramethylenediamine|putrescine|PUT R, extracellular" compartment="C\_e">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H14N2, extracellular</p></html>

</notes>

</species>

<species id="M\_C00135\_c" name="L-Histidine|(S)-alpha-Amino-1H-imidazole-4-propionic acid|L-histidine|l-histidine" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H9N3O2</p></html>

</notes>

</species>

<species id="M\_C00135\_e" name="L-Histidine|(S)-alpha-Amino-1H-imidazole-4-propionic acid|L-histidine|l-histidine, extracellular" compartment="C\_e">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H9N3O2, extracellular</p></html>

</notes>

</species>

<species id="M\_C00136\_c" name="Butanoyl-CoA|Butyryl-CoA|butanoyl-coa" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C25H39N7O17P3S</p></html>

</notes>

</species>

<species id="M\_C00137\_c" name="myo-Inositol|D-myo-Inositol|1D-myo-Inositol|L-myo-Inositol|1L-myo-Inositol|meso-Inositol|Inositol|Dambosel|Cyclohexitol|Meat sugar|Bios I|L-Inositol|(-)-Inositol|inositol"

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compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O6</p></html>
  </notes>
</species>
  <species id="M_C00137_e"
name="myo-Inositol|D-myo-Inositol|1D-myo-Inositol|L-myo-Inositol|1L-myo-Inositol|meso-Inosi
tol|Inositol|Dambose|Cyclohexitol|Meat sugar|Bios I|L-Inositol|(-)-Inositol|inositol, extracellular"
compartment="C_e">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O6,
extracellular</p></html>
  </notes>
</species>
  <species id="M_C00138_c" name="Reduced ferredoxin|Reducedferredoxin"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: Fe2R4S6</p></html>
  </notes>
</species>
  <species id="M_C00139_c" name="Oxidized ferredoxin|Oxidizedferredoxin"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: Fe2R4S6</p></html>
  </notes>
</species>
  <species id="M_C00140_c"
name="N-Acetyl-D-glucosamine|N-Acetylchitosamine|2-Acetamido-2-deoxy-D-glucose|GlcNAc"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C8H15NO6</p></html>
  </notes>
</species>
  <species id="M_C00140_e"
name="N-Acetyl-D-glucosamine|N-Acetylchitosamine|2-Acetamido-2-deoxy-D-glucose|GlcNAc,
extracellular" compartment="C_e">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C8H15NO6,
extracellular</p></html>
  </notes>
</species>
  <species id="M_C00141_c" name="3-Methyl-2-oxobutanoic acid|3-Methyl-2-oxobutyric
acid|3-Methyl-2-oxobutanoate|2-Oxo-3-methylbutanoate|2-Oxoisovalerate|2-Oxoisopentanoate|alp
ha-Ketovaline|2-Ketovaline|2-Keto-3-methylbutyric

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acid|3-methyl-2-oxobutanoate|3MOB|2-keto-isovalerate" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H7O3</p></html>
  </notes>
</species>
  <species id="M_C00143_c"
name="5,10-Methylenetetrahydrofolate|(6R)-5,10-Methylenetetrahydrofolate|5,10-Methylene-TH
F|5,10-methylenetetrahydrofolate|5-10-Methylenetetrahydrofolate|5,10-methylene-thf"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C20H21N7O6</p></html>
  </notes>
</species>
  <species id="M_C00144_c" name="GMP|Guanosine 5'-phosphate|Guanosine
monophosphate|Guanosine 5'-monophosphate|Guanylic acid|gmp" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C10H13N5O8P</p></html>
  </notes>
</species>
  <species id="M_C00144_e" name="GMP|Guanosine 5'-phosphate|Guanosine
monophosphate|Guanosine 5'-monophosphate|Guanylic acid|gmp, extracellular"
compartment="C_e">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C10H13N5O8P,
extracellular</p></html>
  </notes>
</species>
  <species id="M_C00147_c" name="Adenine|6-Aminopurine|adenine" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H5N5</p></html>
  </notes>
</species>
  <species id="M_C00147_e" name="Adenine|6-Aminopurine|adenine, extracellular"
compartment="C_e">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H5N5,
extracellular</p></html>
  </notes>
</species>
  <species id="M_C00148_c" name="L-Proline|2-Pyrrolidinecarboxylic
acid|L-proline|l-proline" compartment="C_c">
  <notes>

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    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H8NO2</p></html>
  </notes>
</species>
  <species id="M_C00148_e" name="L-Proline|2-Pyrrolidinecarboxylic acid|L-proline|l-proline,
extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H8NO2,
extracellular</p></html>
    </notes>
</species>
  <species id="M_C00149_c" name="(S)-Malate|L-Malate|L-Apple acid|L-Malic
acid|L-2-Hydroxybutanedioic acid|(S)-malate|MALA|Malate|Malic acid|2-Hydroxybutanedioic
acid|malate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H4O5</p></html>
    </notes>
</species>
  <species id="M_C00149_e" name="(S)-Malate|L-Malate|L-Apple acid|L-Malic
acid|L-2-Hydroxybutanedioic acid|(S)-malate|MALA|Malate|Malic acid|2-Hydroxybutanedioic
acid|malate, extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H4O5,
extracellular</p></html>
    </notes>
</species>
  <species id="M_C00152_c" name="L-Asparagine|2-Aminosuccinamic
acid|L-asparagine|l-asparagine" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H8N2O3</p></html>
    </notes>
</species>
  <species id="M_C00152_e" name="L-Asparagine|2-Aminosuccinamic
acid|L-asparagine|l-asparagine, extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H8N2O3,
extracellular</p></html>
    </notes>
</species>
  <species id="M_C00153_c" name="Nicotinamide|Nicotinic acid amide|Niacinamide|Vitamin
PP|nicotinamide|NICO|niacinamide" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H6N2O</p></html>
    </notes>
</species>

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    <species id="M_C00154_c" name="Palmitoyl-CoA|Hexadecanoyl-CoA|Palmitoyl-CoA
(n-C16:0CoA)|hexadecanoyl-coa" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C37H63N7O17P3S</p></html>
    </notes>
</species>
    <species id="M_C00155_c" name="L-Homocysteine|L-2-Amino-4-mercaptobutyric
acid|L-homocysteine" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H9NO2S</p></html>
    </notes>
</species>
    <species id="M_C00156_c" name="4-Hydroxybenzoate|Hydroxybenzoic
acid|4-Hydroxybenzoic acid|Hydroxybenzenecarboxylic acid" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H5O3</p></html>
    </notes>
</species>
    <species id="M_C00158_c" name="Citrate|Citric acid|2-Hydroxy-1,2,3-propanetricarboxylic
acid|2-Hydroxytricarballic acid|citrate" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H5O7</p></html>
    </notes>
</species>
    <species id="M_C00158_e" name="Citrate|Citric acid|2-Hydroxy-1,2,3-propanetricarboxylic
acid|2-Hydroxytricarballic acid|citrate, extracellular" compartment="C_e">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H5O7,
extracellular</p></html>
    </notes>
</species>
    <species id="M_C00159_c"
name="D-Mannose|Mannose|Seminose|Carubiose|D-mannose|mannose|MANN"
compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O6</p></html>
    </notes>
</species>
    <species id="M_C00159_e"
name="D-Mannose|Mannose|Seminose|Carubiose|D-mannose|mannose|MANN, extracellular"
compartment="C_e">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O6,

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extracellular</p></html>
</notes>
</species>
<species id="M_C00160_c" name="Glycolate|Glycolic acid|Hydroxyacetic acid|glycolate"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C2H3O3</p></html>
  </notes>
</species>
<species id="M_C00160_e" name="Glycolate|Glycolic acid|Hydroxyacetic acid|glycolate,
extracellular" compartment="C_e">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C2H3O3,
extracellular</p></html>
  </notes>
</species>
<species id="M_C00163_c" name="Propanoate|Propionate|Propanoic acid|Propionic
acid|Propionate (n-C3:0)|propionate" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H5O2</p></html>
  </notes>
</species>
<species id="M_C00163_e" name="Propanoate|Propionate|Propanoic acid|Propionic
acid|Propionate (n-C3:0)|propionate, extracellular" compartment="C_e">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H5O2,
extracellular</p></html>
  </notes>
</species>
<species id="M_C00164_c" name="Acetoacetate|3-Oxobutanoic acid|beta-Ketobutyric
acid|Acetoacetic acid|acetoacetate" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H5O3</p></html>
  </notes>
</species>
<species id="M_C00164_e" name="Acetoacetate|3-Oxobutanoic acid|beta-Ketobutyric
acid|Acetoacetic acid|acetoacetate, extracellular" compartment="C_e">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H5O3,
extracellular</p></html>
  </notes>
</species>
<species id="M_C00166_c" name="Phenylpyruvate|Phenylpyruvic
acid|alpha-Ketohydrocinnamic

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acid|keto-Phenylpyruvate|3-Phenyl-2-oxopropanoate|phenylpyruvate" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C<sub>9</sub>H<sub>7</sub>O<sub>3</sub></p></html>

</notes>

</species>

<species id="M\_C00167\_c"

name="UDP-glucuronate|UDPglucuronate|UDP-D-glucuronate|UDP-alpha-D-glucuronate|udp-d-glucuronate" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C<sub>15</sub>H<sub>19</sub>N<sub>2</sub>O<sub>18</sub>P<sub>2</sub></p></html>

</notes>

</species>

<species id="M\_C00168\_c" name="Hydroxypyruvate|Hydroxypyruvic acid|3-Hydroxypyruvate|3-Hydroxypyruvic acid|hydroxypyruvate" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C<sub>3</sub>H<sub>3</sub>O<sub>4</sub></p></html>

</notes>

</species>

<species id="M\_C00169\_c" name="Carbamoyl phosphate|Carbamoylphosphate|carbamoyl-phosphate|carbamoyl phosphate" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: CH<sub>3</sub>NO<sub>5</sub>P</p></html>

</notes>

</species>

<species id="M\_C00169\_e" name="Carbamoyl phosphate|Carbamoylphosphate|carbamoyl-phosphate|carbamoyl phosphate, extracellular" compartment="C\_e">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: CH<sub>3</sub>NO<sub>5</sub>P, extracellular</p></html>

</notes>

</species>

<species id="M\_C00170\_c"

name="5'-Methylthioadenosine|Methylthioadenosine|S-Methyl-5'-thioadenosine|5-Methylthioadenosine|5'-Deoxy-5'-(methylthio)adenosine|Thiomethyladenosine|MTA|methylthioadenosine" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C<sub>11</sub>H<sub>15</sub>N<sub>5</sub>O<sub>3</sub>S</p></html>

</notes>

</species>

<species id="M\_C00175\_c" name="Cobalt|Co<sup>2+</sup>" compartment="C\_c">

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    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: Co</p></html>
    </notes>
  </species>
  <species id="M_C00175_e" name="Cobalt|Co2+, extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: Co,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C00178_c" name="Thymine|5-Methyluracil|thymine" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H6N2O2</p></html>
    </notes>
  </species>
  <species id="M_C00179_c" name="Agmatine|(4-Aminobutyl) guanidine|agmatine"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H16N4</p></html>
    </notes>
  </species>
  <species id="M_C00180_c" name="Benzoate|Benzoic acid|Benzenecarboxylic
acid|Phenylformic acid|Dracylic acid|benzoate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H5O2</p></html>
    </notes>
  </species>
  <species id="M_C00181_c" name="D-Xylose|Wood sugar|D-xylose|Xylose|xylose"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H10O5</p></html>
    </notes>
  </species>
  <species id="M_C00181_e" name="D-Xylose|Wood sugar|D-xylose|Xylose|xylose,
extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H10O5,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C00182_c" name="Glycogen|glycogen" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C30H52O26</p></html>
    </notes>
  </species>

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</species>
  <species id="M_C00182_e" name="Glycogen|glycogen, extracellular" compartment="C_e">
    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C30H52O26,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C00183_c" name="L-Valine|2-Amino-3-methylbutyric acid|L-valine|l-valine"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H11NO2</p></html>
    </notes>
  </species>
  <species id="M_C00183_e" name="L-Valine|2-Amino-3-methylbutyric acid|L-valine|l-valine,
extracellular" compartment="C_e">
    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C5H11NO2,
extracellular</p></html>
    </notes>
  </species>
  <species
                                                                id="M_C00184_c"
name="Glycerone|Dihydroxyacetone|1,3-Dihydroxyacetone|1,3-Dihydroxy-2-propanone|1,3-Dihy
droxypropan-2-one" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H6O3</p></html>
    </notes>
  </species>
  <species
                                                                id="M_C00184_e"
name="Glycerone|Dihydroxyacetone|1,3-Dihydroxyacetone|1,3-Dihydroxy-2-propanone|1,3-Dihy
droxypropan-2-one, extracellular" compartment="C_e">
    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C3H6O3,
extracellular</p></html>
    </notes>
  </species>
  <species
                                                                id="M_C00185_c"
name="Cellobiose|1-beta-D-Glucopyranosyl-4-D-glucopyranose|cellobiose|CELB"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C12H22O11</p></html>
    </notes>
  </species>
  <species
                                                                id="M_C00185_e"
name="Cellobiose|1-beta-D-Glucopyranosyl-4-D-glucopyranose|cellobiose|CELB,  extracellular"

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compartment="C_e">
  <notes>
    <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C12H22O11,
extracellular</p></html>
  </notes>
</species>
  <species id="M_C00186_c" name="(S)-Lactate|L-Lactate|L-Lactic acid|(S)-lactate|LCTT"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H5O3</p></html>
  </notes>
</species>
  <species id="M_C00186_e" name="(S)-Lactate|L-Lactate|L-Lactic acid|(S)-lactate|LCTT,
extracellular" compartment="C_e">
  <notes>
    <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C3H5O3,
extracellular</p></html>
  </notes>
</species>
  <species      id="M_C00188_c"      name="L-Threonine|2-Amino-3-hydroxybutyric
acid|L-threonine|threonine|l-threonine" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H9NO3</p></html>
  </notes>
</species>
  <species      id="M_C00188_e"      name="L-Threonine|2-Amino-3-hydroxybutyric
acid|L-threonine|threonine|l-threonine, extracellular" compartment="C_e">
  <notes>
    <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C4H9NO3,
extracellular</p></html>
  </notes>
</species>
  <species      id="M_C00189_c"
name="Ethanolamine|Aminoethanol|2-Hydroxyethylamine|ethanol-amine" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C2H8NO</p></html>
  </notes>
</species>
  <species      id="M_C00189_e"
name="Ethanolamine|Aminoethanol|2-Hydroxyethylamine|ethanol-amine,      extracellular"
compartment="C_e">
  <notes>
    <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C2H8NO,
extracellular</p></html>

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    </notes>
</species>
  <species          id="M_C00191_c"          name="D-Glucuronate|Glucuronic
acid|Glucuronate|D-Glucuronic acid|D-glucuronate|glucuronate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H9O7</p></html>
    </notes>
  </species>
  <species          id="M_C00191_e"          name="D-Glucuronate|Glucuronic
acid|Glucuronate|D-Glucuronic          acid|D-glucuronate|glucuronate,          extracellular"
compartment="C_e">
    <notes>
      <html          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:          C6H9O7,
extracellular</p></html>
    </notes>
  </species>
  <species          id="M_C00196_c"          name="2,3-Dihydroxybenzoate|2,3-Dihydroxybenzoic
acid|2,3-dihydroxybenzoate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H5O4</p></html>
    </notes>
  </species>
  <species          id="M_C00197_c"          name="3-Phospho-D-glycerate|D-Glycerate
3-phosphate|3-Phospho-(R)-glycerate|3-phospho-D-glycerate|Glycerate
3-phosphate|3-Phosphoglycerate|3-Phospho-DL-glycerate|DL-Glycerate
3-phosphate|3-phosphoglycerate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H5O7P</p></html>
    </notes>
  </species>
  <species          id="M_C00197_e"          name="3-Phospho-D-glycerate|D-Glycerate
3-phosphate|3-Phospho-(R)-glycerate|3-phospho-D-glycerate|Glycerate
3-phosphate|3-Phosphoglycerate|3-Phospho-DL-glycerate|DL-Glycerate
3-phosphate|3-phosphoglycerate, extracellular" compartment="C_e">
    <notes>
      <html          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:          C3H5O7P,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C00198_c" name="D-Glucono-1,5-lactone|Gluconic lactone|Gluconic acid
lactone|1,5-Gluconolactone|delta-Gluconolactone|D-Gluconolactone|Gluconolactone|D-Aldonolac
tone|D-threo-Aldono-1,5-lactone|D-glucono-1,5-lactone" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H10O6</p></html>

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    </notes>
</species>
    <species id="M_C00199_c" name="D-Ribulose
5-phosphate|D-Ribulose5-phosphate|D-ribulose 5-phosphate" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H10O8P</p></html>
    </notes>
</species>
    <species id="M_C00203_c" name="UDP-N-acetyl-D-galactosamine" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C17H25N3O17P2</p></html>
    </notes>
</species>
    <species id="M_C00204_c"
name="2-Dehydro-3-deoxy-D-gluconate|2-dehydro-3-deoxy-D-gluconate|2-keto-3-deoxygluconat
e" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H9O6</p></html>
    </notes>
</species>
    <species id="M_C00204_e"
name="2-Dehydro-3-deoxy-D-gluconate|2-dehydro-3-deoxy-D-gluconate|2-keto-3-deoxygluconat
e, extracellular" compartment="C_e">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H9O6,
extracellular</p></html>
    </notes>
</species>
    <species id="M_C00206_c" name="dADP|2'-Deoxyadenosine 5'-diphosphate|dadp"
compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C10H13N5O9P2</p></html>
    </notes>
</species>
    <species id="M_C00208_c" name="Maltose|Malt
sugar|1-alpha-D-Glucopyranosyl-4-alpha-D-glucopyranose|maltose" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C12H22O11</p></html>
    </notes>
</species>
    <species id="M_C00208_e" name="Maltose|Malt
sugar|1-alpha-D-Glucopyranosyl-4-alpha-D-glucopyranose|maltose,
extracellular"

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compartment="C_e">
  <notes>
    <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C12H22O11,
extracellular</p></html>
  </notes>
</species>
  <species id="M_C00209_c" name="Oxalate|Oxalic acid|Ethanedioic acid|oxalate"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C2O4</p></html>
  </notes>
</species>
  <species id="M_C00212_c" name="Adenosine|adenosine" compartment="C_c">
  <notes>
    <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C10H13N5O4</p></html>
  </notes>
</species>
  <species id="M_C00212_e" name="Adenosine|adenosine, extracellular"
compartment="C_e">
  <notes>
    <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C10H13N5O4,
extracellular</p></html>
  </notes>
</species>
  <species id="M_C00214_c" name="Thymidine|Deoxythymidine|thymidine"
compartment="C_c">
  <notes>
    <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C10H14N2O5</p></html>
  </notes>
</species>
  <species id="M_C00214_e" name="Thymidine|Deoxythymidine|thymidine, extracellular"
compartment="C_e">
  <notes>
    <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C10H14N2O5,
extracellular</p></html>
  </notes>
</species>
  <species id="M_C00216_c" name="D-Arabinose" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H10O5</p></html>
  </notes>
</species>

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<species id="M_C00216_e" name="D-Arabinose, extracellular" compartment="C_e">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H10O5,
extracellular</p></html>
  </notes>
</species>
<species id="M_C00217_c" name="D-Glutamate|D-Glutamic acid|D-Glutaminic
acid|D-2-Aminoglutaric acid|D-glutamate|d-glutamate" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H8NO4</p></html>
  </notes>
</species>
<species id="M_C00217_e" name="D-Glutamate|D-Glutamic acid|D-Glutaminic
acid|D-2-Aminoglutaric acid|D-glutamate|d-glutamate, extracellular" compartment="C_e">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H8NO4,
extracellular</p></html>
  </notes>
</species>
<species id="M_C00221_c" name="beta-D-Glucose|beta-D-glucose|beta-d-glucose"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O6</p></html>
  </notes>
</species>
<species id="M_C00222_c" name="3-Oxopropanoate|Malonate
semialdehyde|3-oxopropanoate" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H3O3</p></html>
  </notes>
</species>
<species id="M_C00224_c" name="Adenylyl sulfate|Adenosine
5'-phosphosulfate|APS|5'-Adenylyl sulfate|adenylylsulfate|adenylyl
sulfate|Adenosine5-phosphosulfate|aps" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C10H12N5O10PS</p></html>
  </notes>
</species>
<species id="M_C00227_c" name="Acetyl
phosphate|Acetylphosphate|acetyl-phosphate|acetyl
phosphate|acetylphosphate"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C2H4O5P</p></html>

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</notes>

</species>

<species id="M\_C00229\_c" name="Acyl-carrier protein|ACP|[Acyl-carrier protein]|Holo-[acyl-carrie-protein]|acyl carrier protein|acylcarrierprotein" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C11H21N2O7PRS</p></html>

</notes>

</species>

<species id="M\_C00231\_c" name="D-Xylulose 5-phosphate|D-Xylulose5-phosphate|D-xylulose 5-phosphate|D-xylulose-5-phosphate" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H10O8P</p></html>

</notes>

</species>

<species id="M\_C00232\_c" name="Succinate semialdehyde|Succinic semialdehyde|4-Oxobutanoate|succinate semialdehyde" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H5O3</p></html>

</notes>

</species>

<species id="M\_C00233\_c" name="4-Methyl-2-oxopentanoate|2-Oxoisocaproate|4-methyl-2-oxopentanoate|4MOP|2-ketoisocaproate" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H9O3</p></html>

</notes>

</species>

<species id="M\_C00234\_c" name="10-Formyltetrahydrofolate|10-Formyl-THF|10-formyltetrahydrofolate|10-formyl-thf" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C20H21N7O7</p></html>

</notes>

</species>

<species id="M\_C00235\_c" name="Dimethylallyl diphosphate|Prenyl diphosphate|2-Isopentenyl diphosphate|delta2-Isopentenyl diphosphate|delta-Prenyl diphosphate|DMAPP|Dimethylallyldiphosphate|dimethylallyl diphosphate" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H10O7P2</p></html>

</notes>

</species>

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    <species id="M_C00236_c" name="3-Phospho-D-glyceroyl
phosphate|1,3-Bisphospho-D-glycerate|(R)-2-Hydroxy-3-(phosphonoxy)-1-monoanhydride with
phosphoric propanoic acid|3-Phospho-D-glyceroylphosphate|3-phospho-D-glyceroyl
phosphate|3-phospho-d-glyceroyl-phosphate" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H6O10P2</p></html>
    </notes>
</species>
    <species id="M_C00237_c" name="CO|Carbon monoxide" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: CO</p></html>
    </notes>
</species>
    <species id="M_C00238_c" name="Potassium|K+|potassium" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: K</p></html>
    </notes>
</species>
    <species id="M_C00238_e" name="Potassium|K+|potassium, extracellular"
compartment="C_e">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: K,
extracellular</p></html>
    </notes>
</species>
    <species id="M_C00239_c" name="dCMP|Deoxycytidylic acid|Deoxycytidine
monophosphate|Deoxycytidylate|2'-Deoxycytidine 5'-monophosphate|dcmp"
compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C9H13N3O7P</p></html>
    </notes>
</species>
    <species id="M_C00242_c" name="Guanine|2-Amino-6-hydroxypurine|guanine|GNN"
compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H5N5O</p></html>
    </notes>
</species>
    <species id="M_C00242_e" name="Guanine|2-Amino-6-hydroxypurine|guanine|GNN,
extracellular" compartment="C_e">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H5N5O,
extracellular</p></html>

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    </notes>
</species>
    <species id="M_C00243_c"
name="Lactose|1-beta-D-Galactopyranosyl-4-alpha-D-glucopyranose|Milk
sugar|alpha-Lactose|Anhydrous lactose|lactose|LACT" compartment="C_c">
    <notes>
        <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C12H22O11</p></html>
    </notes>
</species>
    <species id="M_C00243_e"
name="Lactose|1-beta-D-Galactopyranosyl-4-alpha-D-glucopyranose|Milk
sugar|alpha-Lactose|Anhydrous lactose|lactose|LACT, extracellular" compartment="C_e">
    <notes>
        <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C12H22O11,
extracellular</p></html>
    </notes>
</species>
    <species id="M_C00244_c" name="Nitrate|Nitric acid|nitrate" compartment="C_c">
    <notes>
        <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: NO3</p></html>
    </notes>
</species>
    <species id="M_C00244_e" name="Nitrate|Nitric acid|nitrate, extracellular"
compartment="C_e">
    <notes>
        <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: NO3,
extracellular</p></html>
    </notes>
</species>
    <species id="M_C00245_c" name="Taurine|2-Aminoethanesulfonic acid|Aminoethylsulfonic
acid|taurine" compartment="C_c">
    <notes>
        <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C2H7NO3S</p></html>
    </notes>
</species>
    <species id="M_C00245_e" name="Taurine|2-Aminoethanesulfonic acid|Aminoethylsulfonic
acid|taurine, extracellular" compartment="C_e">
    <notes>
        <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C2H7NO3S,
extracellular</p></html>
    </notes>
</species>
    <species id="M_C00246_c" name="Butanoic acid|Butanoate|Butyrate|Butyric
acid|M_Butyrate|butanoate" compartment="C_c">

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    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H7O2</p></html>
    </notes>
  </species>
  <species id="M_C00246_e" name="Butanoic acid|Butanoate|Butyrate|Butyric
acid|M_Butyrate|butanoate, extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H7O2,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C00247_c" name="L-Sorbose|L-xylo-Hexulose" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O6</p></html>
    </notes>
  </species>
  <species id="M_C00247_e" name="L-Sorbose|L-xylo-Hexulose, extracellular"
compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O6,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C00249_c" name="Hexadecanoic acid|Hexadecanoate|Hexadecylic
acid|Palmitic acid|Palmitate|Cetylic acid|hexadecanoate|palmitate|Hexadecanoate (n-C16:0)"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C16H31O2</p></html>
    </notes>
  </species>
  <species id="M_C00251_c" name="Chorismate|Chorismic acid|chorismate"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C10H8O6</p></html>
    </notes>
  </species>
  <species id="M_C00251_e" name="Chorismate|Chorismic acid|chorismate, extracellular"
compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C10H8O6,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C00252_c" name="Isomaltose|Brachiose|isomaltose" compartment="C_c">

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    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C12H22O11</p></html>
    </notes>
  </species>
  <species id="M_C00253_c" name="Nicotinate|Nicotinic acid|Niacin|3-Pyridinecarboxylic
acid|nicotinate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H4NO2</p></html>
    </notes>
  </species>
  <species id="M_C00253_e" name="Nicotinate|Nicotinic acid|Niacin|3-Pyridinecarboxylic
acid|nicotinate, extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H4NO2,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C00254_c" name="Prephenate|Prephenic
acid|prephenate|prephenate-phe|prephenate-tyr" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C10H8O6</p></html>
    </notes>
  </species>
  <species id="M_C00255_c"
name="Riboflavin|Lactoflavin|7,8-Dimethyl-10-ribitylisoalloxazine|Vitamin B2|riboflavin|RIBF"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C17H20N4O6</p></html>
    </notes>
  </species>
  <species id="M_C00255_e"
name="Riboflavin|Lactoflavin|7,8-Dimethyl-10-ribitylisoalloxazine|Vitamin B2|riboflavin|RIBF,
extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C17H20N4O6,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C00256_c" name="(R)-Lactate|D-Lactate|D-Lactic
acid|D-2-Hydroxypropanoic acid|D-2-Hydroxypropionic acid|d-lactate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H5O3</p></html>
    </notes>

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</species>
  <species id="M_C00257_c" name="D-Gluconic acid|D-Gluconate|D-gluco-Hexonic
acid|D-gluconate|GLCN" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H11O7</p></html>
    </notes>
  </species>
  <species id="M_C00257_e" name="D-Gluconic acid|D-Gluconate|D-gluco-Hexonic
acid|D-gluconate|GLCN, extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H11O7,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C00258_c" name="D-Glycerate|Glycerate|(R)-Glycerate|Glyceric
acid|glycerate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H5O4</p></html>
    </notes>
  </species>
  <species id="M_C00259_c" name="L-Arabinose|L-Arabinopyranose|L-arabinose"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H10O5</p></html>
    </notes>
  </species>
  <species id="M_C00259_e" name="L-Arabinose|L-Arabinopyranose|L-arabinose,
extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H10O5,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C00262_c" name="Hypoxanthine|Purine-6-ol|hypoxanthine|HYXN"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H4N4O</p></html>
    </notes>
  </species>
  <species id="M_C00262_e" name="Hypoxanthine|Purine-6-ol|hypoxanthine|HYXN,
extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H4N4O,
extracellular</p></html>

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    </notes>
</species>
  <species      id="M_C00263_c"      name="L-Homoserine|2-Amino-4-hydroxybutyric
acid|L-homoserine" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H9NO3</p></html>
    </notes>
</species>
  <species id="M_C00266_c" name="Glycolaldehyde|Hydroxyacetaldehyde|glycolaldehyde"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C2H4O2</p></html>
    </notes>
</species>
  <species      id="M_C00267_c"      name="D-Glucose|Grape
sugar|alpha-D-Glucose|Dextrose|alpha-D-glucose|D-glucose|Glucose|glucose"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O6</p></html>
    </notes>
</species>
  <species      id="M_C00267_e"      name="D-Glucose|Grape
sugar|alpha-D-Glucose|Dextrose|alpha-D-glucose|D-glucose|Glucose|glucose,
extracellular"
compartment="C_e">
    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C6H12O6,
extracellular</p></html>
    </notes>
</species>
  <species      id="M_C00268_c"
name="Dihydrobiopterin|6,7-Dihydrobiopterin|Quinoid-dihydrobiopterin|(6R)-6-(L-erythro-1,2-D
ihydroxypropyl)-7,8-dihydro-6H-pterin" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C9H13N5O3</p></html>
    </notes>
</species>
  <species      id="M_C00270_c"      name="N-Acetylneuraminate|N-Acetylneuraminic
acid|5-Acetamido-3,5-dideoxy-D-glycero-D-galacto-2-nonulosonic
acid|Neu5Ac"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C11H18NO9</p></html>
    </notes>
</species>
  <species      id="M_C00270_e"      name="N-Acetylneuraminate|N-Acetylneuraminic

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acid|5-Acetamido-3,5-dideoxy-D-glycero-D-galacto-2-nonulosonic acid|Neu5Ac, extracellular"  
compartment="C\_e">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C11H18NO9,  
extracellular</p></html>

</notes>

</species>

<species id="M\_C00272\_c"  
name="Tetrahydrobiopterin|5,6,7,8-Tetrahydrobiopterin|2-Amino-6-(1,2-dihydroxypropyl)-5,6,7,8  
-tetrahydro-4(1H)-pteridinone" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C9H15N5O3</p></html>

</notes>

</species>

<species id="M\_C00275\_c" name="D-Mannose  
6-phosphate|D-Mannose6-phosphate|D-mannose-6-phosphate|D-mannose 6-phosphate"  
compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O9P</p></html>

</notes>

</species>

<species id="M\_C00275\_e" name="D-Mannose  
6-phosphate|D-Mannose6-phosphate|D-mannose-6-phosphate|D-mannose 6-phosphate,  
extracellular" compartment="C\_e">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O9P,  
extracellular</p></html>

</notes>

</species>

<species id="M\_C00279\_c" name="D-Erythrose  
4-phosphate|D-Erythrose4-phosphate|D-erythrose 4-phosphate" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H8O7P</p></html>

</notes>

</species>

<species id="M\_C00283\_c" name="Hydrogen  
sulfide|Hydrogen-sulfide|H2S|Hydrogensulfide|Sulfide|h2s|Thioether" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: H2S</p></html>

</notes>

</species>

<species id="M\_C00283\_e" name="Hydrogen  
sulfide|Hydrogen-sulfide|H2S|Hydrogensulfide|Sulfide|h2s|Thioether,  
extracellular"  
compartment="C\_e">

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    <notes>
      <html          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:          H2S,
extracellular</p></html>
    </notes>
  </species>
  <species          id="M_C00286_c"          name="dGTP|2'-Deoxyguanosine
5'-triphosphate|Deoxyguanosine          5'-triphosphate|Deoxyguanosine          triphosphate|dgtp"
compartment="C_c">
    <notes>
      <html          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C10H13N5O13P3</p></html>
    </notes>
  </species>
  <species          id="M_C00288_c"          name="HCO3-|Bicarbonate|Hydrogencarbonate|Acid
carbonate|Carbonic          acid|Dihydrogen          carbonate|H2CO3|carbonic
acid|carbonicacid|HCO(3-)|HCO3(-)" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: CHO3</p></html>
    </notes>
  </species>
  <species id="M_C00291_c" name="Nickel|Ni2+|nickel" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: Ni</p></html>
    </notes>
  </species>
  <species id="M_C00291_e" name="Nickel|Ni2+|nickel, extracellular" compartment="C_e">
    <notes>
      <html          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:          Ni,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C00294_c" name="Inosine|inosine" compartment="C_c">
    <notes>
      <html          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C10H12N4O5</p></html>
    </notes>
  </species>
  <species id="M_C00294_e" name="Inosine|inosine, extracellular" compartment="C_e">
    <notes>
      <html          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:          C10H12N4O5,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C00295_c" name="Orotate|Orotic acid|Uracil-6-carboxylic acid|orotate"

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compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H3N2O4</p></html>
  </notes>
</species>
<species id="M_C00299_c" name="Uridine|uridine" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C9H12N2O6</p></html>
  </notes>
</species>
<species id="M_C00299_e" name="Uridine|uridine, extracellular" compartment="C_e">
  <notes>
    <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C9H12N2O6,
extracellular</p></html>
  </notes>
</species>
<species id="M_C00301_c" name="ADP-ribose|ADPribose" compartment="C_c">
  <notes>
    <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C15H21N5O14P2</p></html>
  </notes>
</species>
<species      id="M_C00305_c"      name="Magnesium|Mg2+|magnesium|Mg|Mg(2+)"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: Mg</p></html>
  </notes>
</species>
<species id="M_C00305_e" name="Magnesium|Mg2+|magnesium|Mg|Mg(2+), extracellular"
compartment="C_e">
  <notes>
    <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      Mg,
extracellular</p></html>
  </notes>
</species>
<species      id="M_C00309_c"
name="D-Ribulose|D-erythro-2-Pentulose|D-Arabinoketose|D-Arabinulose|D-Riboketose"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H10O5</p></html>
  </notes>
</species>
<species id="M_C00310_c" name="D-Xylulose|D-threo-Pentulose|D-Lyxulose|D-xylulose"
compartment="C_c">

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    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H10O5</p></html>
    </notes>
  </species>
  <species id="M_C00311_c" name="Isocitrate|Isocitric acid|1-Hydroxytricarballic
acid|1-Hydroxypropane-1,2,3-tricarboxylic acid|isocitrate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H5O7</p></html>
    </notes>
  </species>
  <species id="M_C00312_c" name="L-Xylulose|L-threo-Pentulose|L-Lyxulose"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H10O5</p></html>
    </notes>
  </species>
  <species id="M_C00315_c"
name="Spermidine|N-(3-Aminopropyl)-1,4-butane-diamine|spermidine" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H22N3</p></html>
    </notes>
  </species>
  <species id="M_C00320_c" name="Thiosulfate|Hyposulfite|H2S2O3|thiosulfate"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: O3S2</p></html>
    </notes>
  </species>
  <species id="M_C00327_c" name="L-Citrulline|2-Amino-5-ureidovaleric
acid|Citrulline|L-citrulline|citrulline" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H13N3O3</p></html>
    </notes>
  </species>
  <species id="M_C00327_e" name="L-Citrulline|2-Amino-5-ureidovaleric
acid|Citrulline|L-citrulline|citrulline, extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H13N3O3,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C00329_c"
name="D-Glucosamine|Chitosamine|2-Amino-2-deoxy-D-glucose|GLUM" compartment="C_c">
    <notes>

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        <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H14NO5</p></html>
    </notes>
</species>
    <species id="M_C00329_e"
name="D-Glucosamine|Chitosamine|2-Amino-2-deoxy-D-glucose|GLUM, extracellular"
compartment="C_e">
        <notes>
            <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H14NO5,
extracellular</p></html>
        </notes>
    </species>
    <species id="M_C00330_c" name="Deoxyguanosine|2'-Deoxyguanosine|deoxyguanosine"
compartment="C_c">
        <notes>
            <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C10H13N5O4</p></html>
        </notes>
    </species>
    <species id="M_C00332_c" name="Acetoacetyl-CoA|Acetoacetyl coenzyme
A|3-Acetoacetyl-CoA|acetoacetyl-CoA|acetoacetyl-coa" compartment="C_c">
        <notes>
            <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C25H37N7O18P3S</p></html>
        </notes>
    </species>
    <species id="M_C00333_c" name="D-Galacturonate|D-Galacturonic acid|D-galacturonate"
compartment="C_c">
        <notes>
            <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H9O7</p></html>
        </notes>
    </species>
    <species id="M_C00333_e" name="D-Galacturonate|D-Galacturonic acid|D-galacturonate,
extracellular" compartment="C_e">
        <notes>
            <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H9O7,
extracellular</p></html>
        </notes>
    </species>
    <species id="M_C00334_c" name="4-Aminobutanoate|4-Aminobutanoic
acid|4-Aminobutyrate|4-Aminobutyric acid|gamma-Aminobutyric
acid|4-Aminobutylate|4-aminobutanoate|GABA|4-aminobutyrate" compartment="C_c">
        <notes>
            <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H9NO2</p></html>
        </notes>
    </species>

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</species>
  <species          id="M_C00334_e"          name="4-Aminobutanoate|4-Aminobutanoic
acid|4-Aminobutyrate|4-Aminobutyric          acid|gamma-Aminobutyric
acid|4-Aminobutylate|4-aminobutanoate|GABA|4-aminobutyrate,          extracellular"
compartment="C_e">
  <notes>
    <html          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:          C4H9NO2,
extracellular</p></html>
  </notes>
</species>
  <species          id="M_C00337_c"
name="(S)-Dihydroorotate|(S)-4,5-Dihydroorotate|L-Dihydroorotate|L-Dihydroorotic
acid|Dihydro-L-orotic acid|S-Dihydroorotate|(S)-dihydroorotate" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H5N2O4</p></html>
  </notes>
</species>
  <species  id="M_C00341_c"  name="Geranyl  diphosphate|Geranyldiphosphate|geranyl
diphosphate" compartment="C_c">
  <notes>
    <html          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C10H18O7P2</p></html>
  </notes>
</species>
  <species          id="M_C00342_c"          name="trdrd|Reduced
thioredoxin|Thioredoxin|Reducedthioredoxin|reduced thioredoxin" compartment="C_c">
  <notes>
    <html          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C6H9NO2R2S2</p></html>
  </notes>
</species>
  <species          id="M_C00343_c"          name="trdox|Oxidized          thioredoxin|Thioredoxin
disulfide|Thioredoxin sulfide|Oxidizedthioredoxin|oxidized thioredoxin" compartment="C_c">
  <notes>
    <html          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C6H7NO2R2S2</p></html>
  </notes>
</species>
  <species          id="M_C00345_c"          name="6-Phospho-D-gluconate|6-phospho-D-gluconate"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H11O10P</p></html>
  </notes>
</species>

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    <species      id="M_C00345_e"      name="6-Phospho-D-gluconate|6-phospho-D-gluconate,
extracellular" compartment="C_e">
    <notes>
    <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C6H11O10P,
extracellular</p></html>
    </notes>
</species>
    <species      id="M_C00346_c"      name="Ethanolamine
phosphate|O-Phosphorylethanolamine|Phosphoethanolamine|O-Phosphoethanolamine"
compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C2H8NO4P</p></html>
    </notes>
</species>
    <species      id="M_C00346_e"      name="Ethanolamine
phosphate|O-Phosphorylethanolamine|Phosphoethanolamine|O-Phosphoethanolamine,
extracellular" compartment="C_e">
    <notes>
    <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C2H8NO4P,
extracellular</p></html>
    </notes>
</species>
    <species      id="M_C00348_c"      name="Undecaprenyl
phosphate|Undecaprenylphosphate|undecaprenyl phosphate" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C55H90O4P</p></html>
    </notes>
</species>
    <species      id="M_C00352_c"      name="D-Glucosamine      6-phosphate|D-Glucosamine
phosphate|D-Glucosamine6-phosphate|D-glucosamine      6-phosphate|d-glucosamine-6-phosphate"
compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H14NO8P</p></html>
    </notes>
</species>
    <species      id="M_C00352_e"      name="D-Glucosamine      6-phosphate|D-Glucosamine
phosphate|D-Glucosamine6-phosphate|D-glucosamine      6-phosphate|d-glucosamine-6-phosphate,
extracellular" compartment="C_e">
    <notes>
    <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C6H14NO8P,
extracellular</p></html>
    </notes>
</species>
    <species      id="M_C00353_c"      name="Geranylgeranyl      diphosphate|Geranylgeranyl

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pyrophosphate|all-trans-Geranylgeranyl diposphate|all-trans-Geranylgeranyl pyrophosphate"  
compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C20H34O7P2</p></html>

</notes>

</species>

<species id="M\_C00356\_c"  
name="(S)-3-Hydroxy-3-methylglutaryl-CoA|Hydroxymethylglutaryl-CoA|Hydroxymethylglutar  
oyl coenzyme  
A|HMG-CoA|3-Hydroxy-3-methylglutaryl-CoA|3-hydroxy-3-methylglutaryl-CoA|(S)-3-hydroxy-  
3-methylglutaryl-CoA" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C27H40N7O20P3S</p></html>

</notes>

</species>

<species id="M\_C00357\_c" name="N-Acetyl-D-glucosamine  
6-phosphate|N-acetyl-D-glucosamine 6-phosphate" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C8H15NO9P</p></html>

</notes>

</species>

<species id="M\_C00360\_c" name="dAMP|2'-Deoxyadenosine  
5'-phosphate|2'-Deoxyadenosine 5'-monophosphate|Deoxyadenylic acid|Deoxyadenosine  
monophosphate|damp" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C10H13N5O6P</p></html>

</notes>

</species>

<species id="M\_C00361\_c" name="dGDP|2'-Deoxyguanosine 5'-diphosphate|dgdp"  
compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C10H13N5O10P2</p></html>

</notes>

</species>

<species id="M\_C00362\_c" name="dGMP|2'-Deoxyguanosine  
5'-monophosphate|2'-Deoxyguanosine 5'-phosphate|Deoxyguanylic acid|Deoxyguanosine  
monophosphate|dgmp" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C10H13N5O7P</p></html>

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    </notes>
</species>
  <species id="M_C00363_c" name="dTDP|Deoxythymidine 5'-diphosphate|dtdp"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C10H14N2O11P2</p></html>
  </notes>
</species>
  <species id="M_C00364_c" name="dTMP|Thymidine 5'-phosphate|Deoxythymidine
5'-phosphate|Thymidylic acid|5'-Thymidylic acid|Thymidine monophosphate|Deoxythymidylic
acid|Thymidylate|dtmp" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C10H14N2O8P</p></html>
  </notes>
</species>
  <species id="M_C00364_e" name="dTMP|Thymidine 5'-phosphate|Deoxythymidine
5'-phosphate|Thymidylic acid|5'-Thymidylic acid|Thymidine monophosphate|Deoxythymidylic
acid|Thymidylate|dtmp, extracellular" compartment="C_e">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C10H14N2O8P,
extracellular</p></html>
  </notes>
</species>
  <species id="M_C00365_c" name="dUMP|Deoxyuridylic acid|Deoxyuridine
monophosphate|Deoxyuridine 5'-phosphate|2'-Deoxyuridine 5'-phosphate|dump"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C9H12N2O8P</p></html>
  </notes>
</species>
  <species id="M_C00366_c" name="Urate|Uric acid|urate" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H4N4O3</p></html>
  </notes>
</species>
  <species id="M_C00366_e" name="Urate|Uric acid|urate, extracellular" compartment="C_e">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H4N4O3,
extracellular</p></html>
  </notes>
</species>

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    <species id="M_C00378_c" name="Thiamin|Thiamine|Vitamin B1|Aneurin|Antiberiberi
factor|thiamine|THI" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C12H17N4OS</p></html>
    </notes>
</species>
    <species id="M_C00378_e" name="Thiamin|Thiamine|Vitamin B1|Aneurin|Antiberiberi
factor|thiamine|THI, extracellular" compartment="C_e">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C12H17N4OS,
extracellular</p></html>
    </notes>
</species>
    <species id="M_C00380_c" name="Cytosine|cytosine" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H5N3O</p></html>
    </notes>
</species>
    <species id="M_C00380_e" name="Cytosine|cytosine, extracellular" compartment="C_e">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H5N3O,
extracellular</p></html>
    </notes>
</species>
    <species id="M_C00385_c" name="Xanthine|xanthine|XAN" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H4N4O2</p></html>
    </notes>
</species>
    <species id="M_C00385_e" name="Xanthine|xanthine|XAN, extracellular"
compartment="C_e">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H4N4O2,
extracellular</p></html>
    </notes>
</species>
    <species id="M_C00387_c" name="Guanosine|guanosine" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C10H13N5O5</p></html>
    </notes>
</species>
    <species id="M_C00387_e" name="Guanosine|guanosine, extracellular"

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compartment="C_e">
  <notes>
    <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C10H13N5O5,
extracellular</p></html>
  </notes>
</species>
  <species                                     id="M_C00389_c"
name="Quercetin|3,3',4,5,7-Pentahydroxyflavone|3,5,7,3',4'-Pentahydroxyflavone"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C15H9O7</p></html>
  </notes>
</species>
  <species      id="M_C00392_c"      name="Mannitol|D-Mannitol|mannitol|MNTL"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H14O6</p></html>
  </notes>
</species>
  <species id="M_C00392_e" name="Mannitol|D-Mannitol|mannitol|MNTL, extracellular"
compartment="C_e">
  <notes>
    <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C6H14O6,
extracellular</p></html>
  </notes>
</species>
  <species id="M_C00395_c" name="Penicillin|Penam" compartment="C_c">
  <notes>
    <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C9H10N2O4RS</p></html>
  </notes>
</species>
  <species id="M_C00402_c" name="D-Aspartate|D-Aspartic acid" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H7NO4</p></html>
  </notes>
</species>
  <species      id="M_C00407_c"      name="L-Isoleucine|2-Amino-3-methylvaleric
acid|L-isoleucine|l-iso-leucine" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H13NO2</p></html>
  </notes>
</species>
  <species      id="M_C00407_e"      name="L-Isoleucine|2-Amino-3-methylvaleric

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acid|L-isoleucine|l-iso-leucine, extracellular" compartment="C\_e">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C<sub>6</sub>H<sub>13</sub>NO<sub>2</sub>, extracellular</p></html>

</notes>

</species>

<species id="M\_C00412\_c" name="Stearoyl-CoA|Stearyl-CoA|Stearyl coenzyme A|Stearyl-CoA (n-C18:0CoA)|strcoa|Stearoyl-CoA (n-C18:0CoA)" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C<sub>39</sub>H<sub>67</sub>N<sub>7</sub>O<sub>17</sub>P<sub>3</sub>S</p></html>

</notes>

</species>

<species id="M\_C00415\_c" name="Dihydrofolate|Dihydrofolic acid|7,8-Dihydrofolate|7,8-Dihydrofolic acid|7,8-Dihydropteroylglutamate|dihydrofolate|7-8-Dihydrofolate|7,8-dihydrofolate" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C<sub>19</sub>H<sub>19</sub>N<sub>7</sub>O<sub>6</sub></p></html>

</notes>

</species>

<species id="M\_C00417\_c" name="cis-Aconitate|cis-Aconitic acid|cis-aconitate" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C<sub>6</sub>H<sub>3</sub>O<sub>6</sub></p></html>

</notes>

</species>

<species id="M\_C00424\_c" name="(S)-Lactaldehyde|L-Lactaldehyde|L-2-Hydroxypropionaldehyde" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C<sub>3</sub>H<sub>6</sub>O<sub>2</sub></p></html>

</notes>

</species>

<species id="M\_C00430\_c" name="5-Aminolevulinate|5-Amino-4-oxopentanoate|5-Amino-4-oxovaleric acid|5-amino-levulinate" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C<sub>5</sub>H<sub>9</sub>NO<sub>3</sub></p></html>

</notes>

</species>

<species id="M\_C00433\_c" name="2,5-Dioxopentanoate|2-Oxoglutarate semialdehyde|2,5-dioxopentanoate" compartment="C\_c">

<notes>

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    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H5O4</p></html>
  </notes>
</species>
  <species id="M_C00437_c"
name="N-Acetylornithine|N2-Acetyl-L-ornithine|N2-acetyl-L-ornithine|N-acetyl-L-ornithine"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H14N2O3</p></html>
  </notes>
</species>
  <species id="M_C00438_c" name="N-Carbamoyl-L-aspartate|N-carbamoyl-L-aspartate"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H6N2O5</p></html>
  </notes>
</species>
  <species id="M_C00439_c"
name="N-Formimino-L-glutamate|N-Formimidoyl-L-glutamate|N-formimino-L-glutamate"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H9N2O4</p></html>
  </notes>
</species>
  <species id="M_C00440_c" name="5-Methyltetrahydrofolate|5-methyltetrahydrofolate"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C20H23N7O6</p></html>
  </notes>
</species>
  <species id="M_C00441_c" name="L-Aspartate 4-semialdehyde|Aspartate
beta-semialdehyde|L-Aspartic 4-semialdehyde|L-Aspartate4-semialdehyde|L-aspartate
4-semialdehyde" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H7NO3</p></html>
  </notes>
</species>
  <species id="M_C00445_c"
name="5,10-Methenyltetrahydrofolate|5,10-methenyltetrahydrofolate|5-10-Methenyltetrahydrofol
ate" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C20H20N7O6</p></html>
  </notes>

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</species>
  <species id="M_C00446_c" name="alpha-D-Galactose 1-phosphate|alpha-D-Galactopyranose
1-phosphate|alpha-D-Galactose 1-phosphate|alpha-D-galactose-1-phosphate|alpha-D-galactose
1-phosphate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O9P</p></html>
    </notes>
  </species>
  <species id="M_C00447_c" name="D-Sedoheptulose 1,7-bisphosphate|D-altro-Heptulose
1,7-biphosphate" compartment="C_c">
    <notes>
      <html
                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C7H14O13P2</p></html>
    </notes>
  </species>
  <species id="M_C00448_c" name="trans,trans-Farnesyl diphosphate|Farnesyl
diphosphate|Farnesyl pyrophosphate|2-trans,6-trans-Farnesyl
diphosphate|Farnesyl diphosphate|trans,trans-farnesyl diphosphate|trans,
trans-farnesyl diphosphate" compartment="C_c">
    <notes>
      <html
                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C15H26O7P2</p></html>
    </notes>
  </species>
  <species id="M_C00450_c"
name="2,3,4,5-Tetrahydropyridine-2-carboxylate|delta 1-Piperidine-6-L-carboxylate|2,3,4,5-tetra
hydropyridine-2-carboxylate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H8NO2</p></html>
    </notes>
  </species>
  <species id="M_C00455_c" name="Nicotinamide D-ribonucleotide|NMN|Nicotinamide
mononucleotide|Nicotinamide ribonucleotide|Nicotinamide nucleotide|beta-Nicotinamide
D-ribonucleotide|beta-Nicotinamide ribonucleotide|beta-Nicotinamide
mononucleotide|nicotinamide ribonucleotide|nicotinamide nucleotide" compartment="C_c">
    <notes>
      <html
                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C11H15N2O8P</p></html>
    </notes>
  </species>
  <species id="M_C00458_c" name="dCTP|Deoxycytidine 5'-triphosphate|Deoxycytidine
triphosphate|2'-Deoxycytidine 5'-triphosphate|dctp" compartment="C_c">
    <notes>
      <html
                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:

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C9H13N3O13P3</p></html>  
 </notes>  
 </species>  
 <species id="M\_C00459\_c" name="dTTP|Deoxythymidine triphosphate|Deoxythymidine 5'-triphosphate|TTP|ttp" compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
 C10H14N2O14P3</p></html>  
 </notes>  
 </species>  
 <species id="M\_C00460\_c" name="dUTP|2'-Deoxyuridine 5'-triphosphate|dutp" compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
 C9H12N2O14P3</p></html>  
 </notes>  
 </species>  
 <species id="M\_C00463\_c" name="Indole|2,3-Benzopyrrole|indole|indol" compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C8H7N</p></html>  
 </notes>  
 </species>  
 <species id="M\_C00469\_c" name="Ethanol|Ethyl alcohol|Methylcarbinol|Dehydrated ethanol|ethanol|ETOH" compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C2H6O</p></html>  
 </notes>  
 </species>  
 <species id="M\_C00469\_e" name="Ethanol|Ethyl alcohol|Methylcarbinol|Dehydrated ethanol|ethanol|ETOH, extracellular" compartment="C\_e">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C2H6O,  
 extracellular</p></html>  
 </notes>  
 </species>  
 <species id="M\_C00475\_c" name="Cytidine|cytidine" compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C9H13N3O5</p></html>  
 </notes>  
 </species>  
 <species id="M\_C00475\_e" name="Cytidine|cytidine, extracellular" compartment="C\_e">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C9H13N3O5,

extracellular</p></html>

</notes>

</species>

<species id="M\_C00476\_c" name="D-Lyxose" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H10O5</p></html>

</notes>

</species>

<species id="M\_C00479\_c" name="Propanal|Propionaldehyde" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H6O</p></html>

</notes>

</species>

<species id="M\_C00487\_c"

name="L-Carnitine|L-gamma-Trimethyl-beta-hydroxybutyrobetaine|Vitamin

BT|3-Carboxy-2-hydroxy-N,N,N-trimethyl-1-propanaminium hydroxide, inner

salt|Levocarnitine|(R)-Carnitine|Carnitine|gamma-Trimethyl-hydroxybutyrobetaine|3-Hydroxy-4-t

rimethylammoniobutanoate|l-carnitine" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H15NO3</p></html>

</notes>

</species>

<species id="M\_C00487\_e"

name="L-Carnitine|L-gamma-Trimethyl-beta-hydroxybutyrobetaine|Vitamin

BT|3-Carboxy-2-hydroxy-N,N,N-trimethyl-1-propanaminium hydroxide, inner

salt|Levocarnitine|(R)-Carnitine|Carnitine|gamma-Trimethyl-hydroxybutyrobetaine|3-Hydroxy-4-t

rimethylammoniobutanoate|l-carnitine, extracellular" compartment="C\_e">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H15NO3,

extracellular</p></html>

</notes>

</species>

<species id="M\_C00488\_c" name="Formamide|Methanamide|formamide"

compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: CH3NO</p></html>

</notes>

</species>

<species id="M\_C00491\_c"

name="L-Cystine|L-Dicysteine|L-alpha-Diamino-beta-dithiolactic acid|L-cystine"

compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:

C6H12N2O4S2</p></html>

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    </notes>
</species>
    <species id="M_C00491_e"
name="L-Cystine|L-Dicysteine|L-alpha-Diamino-beta-dithiolactic acid|L-cystine, extracellular"
compartment="C_e">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12N2O4S2,
extracellular</p></html>
    </notes>
</species>
    <species id="M_C00492_c"
name="Raffinose|Melitose|Melitriose|Gossypose|6G-alpha-D-galactosylsucrose"
compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C18H32O16</p></html>
    </notes>
</species>
    <species id="M_C00492_e"
name="Raffinose|Melitose|Melitriose|Gossypose|6G-alpha-D-galactosylsucrose, extracellular"
compartment="C_e">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C18H32O16,
extracellular</p></html>
    </notes>
</species>
    <species id="M_C00493_c" name="Shikimate|Shikimic
acid|3,4,5-Trihydroxy-1-cyclohexenecarboxylic acid|shikimate" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H9O5</p></html>
    </notes>
</species>
    <species id="M_C00497_c" name="(R)-Malate|D-Malate|D-Malic acid"
compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H4O5</p></html>
    </notes>
</species>
    <species id="M_C00497_e" name="(R)-Malate|D-Malate|D-Malic acid, extracellular"
compartment="C_e">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H4O5,
extracellular</p></html>
    </notes>
</species>

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    <species id="M_C00498_c" name="ADP-glucose|Adenosine diphosphoglucose|ADPglucose"
    compartment="C_c">
      <notes>
        <html
          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C16H23N5O15P2</p></html>
        </notes>
      </species>
    <species
      id="M_C00499_c"
      name="Allantoate|Allantoic
      acid|allantoate"
    compartment="C_c">
      <notes>
        <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H7N4O4</p></html>
        </notes>
      </species>
    <species id="M_C00501_c" name="CDP-glucose|CDP-D-Glucose" compartment="C_c">
      <notes>
        <html
          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C15H23N3O16P2</p></html>
        </notes>
      </species>
    <species id="M_C00504_c" name="Folate|Pteroylglutamic
      acid|Folic
      acid|folate|FOL"
    compartment="C_c">
      <notes>
        <html
          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C19H17N7O6</p></html>
        </notes>
      </species>
    <species id="M_C00504_e" name="Folate|Pteroylglutamic
      acid|Folic
      acid|folate|FOL,
      extracellular" compartment="C_e">
      <notes>
        <html
          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C19H17N7O6,
      extracellular</p></html>
        </notes>
      </species>
    <species
      id="M_C00506_c"
      name="L-Cysteate|L-Cysteic
      acid|3-Sulfoalanine|2-Amino-3-sulfopropionic acid" compartment="C_c">
      <notes>
        <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H6NO5S</p></html>
        </notes>
      </species>
    <species
      id="M_C00506_e"
      name="L-Cysteate|L-Cysteic
      acid|3-Sulfoalanine|2-Amino-3-sulfopropionic acid, extracellular" compartment="C_e">
      <notes>
        <html
          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C3H6NO5S,
      extracellular</p></html>

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    </notes>
</species>
  <species id="M_C00507_c" name="L-Rhamnose|6-Deoxy-L-mannose|L-Mannomethylose"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O5</p></html>
    </notes>
</species>
  <species id="M_C00507_e" name="L-Rhamnose|6-Deoxy-L-mannose|L-Mannomethylose,
extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O5,
extracellular</p></html>
    </notes>
</species>
  <species id="M_C00508_c"
name="L-Ribulose|L-erythro-Pentulose|L-Arabinoketose|L-Arabinulose|L-Riboketose|L-ribulose"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H10O5</p></html>
    </notes>
</species>
  <species id="M_C00511_c" name="Propenoate|Acrylic acid|Acrylate|2-Propenoic
acid|Vinylformic acid" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H3O2</p></html>
    </notes>
</species>
  <species id="M_C00513_c" name="CDP-glycerol|CDPglycerol" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C12H19N3O13P2</p></html>
    </notes>
</species>
  <species id="M_C00514_c" name="D-Mannonate|D-mannonate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H11O7</p></html>
    </notes>
</species>
  <species id="M_C00522_c" name="(R)-Pantoate|Pantoate|Pantoic
acid|R-Pantoate|(R)-pantoate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H11O4</p></html>
    </notes>

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</species>
<species id="M_C00526_c"
name="Deoxyuridine|2-Deoxyuridine|2'-Deoxyuridine|deoxyuridine" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C9H12N2O5</p></html>
  </notes>
</species>
<species id="M_C00530_c"
name="p-Benzenediol|Hydroquinone|1,4-Benzenediol|1,4-Dihydroxybenzene|Benzene-1,4-diol|Q
uinol|4-Hydroxyphenol|Benzosemiquinone|p-Benzosemiquinone|hydroquinone"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H6O2</p></html>
  </notes>
</species>
<species id="M_C00530_e"
name="p-Benzenediol|Hydroquinone|1,4-Benzenediol|1,4-Dihydroxybenzene|Benzene-1,4-diol|Q
uinol|4-Hydroxyphenol|Benzosemiquinone|p-Benzosemiquinone|hydroquinone, extracellular"
compartment="C_e">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H6O2,
extracellular</p></html>
  </notes>
</species>
<species id="M_C00532_c" name="L-Arabitol|L-Arabinol|L-Arabinitol|L-Lyxitol"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H12O5</p></html>
  </notes>
</species>
<species id="M_C00532_e" name="L-Arabitol|L-Arabinol|L-Arabinitol|L-Lyxitol,
extracellular" compartment="C_e">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H12O5,
extracellular</p></html>
  </notes>
</species>
<species id="M_C00533_c" name="Nitric oxide|NO|Nitrogen monoxide|Nitricoxide"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: NO</p></html>
  </notes>
</species>
<species id="M_C00536_c" name="Triphosphate|Inorganic triphosphate|Tripolyphosphate"

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compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: HO10P3</p></html>
  </notes>
</species>
  <species id="M_C00536_e" name="Triphosphate|Inorganic triphosphate|Tripolyphosphate,
extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: HO10P3,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C00541_c" name="Cob(II)alamin|Vitamin B12r" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C62H89CoN13O14P</p></html>
    </notes>
  </species>
  <species id="M_C00541_e" name="Cob(II)alamin|Vitamin B12r, extracellular"
compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C62H89CoN13O14P,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C00543_c" name="Dimethylamine|(CH3)2NH|dimethylamine"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C2H8N</p></html>
    </notes>
  </species>
  <species id="M_C00546_c" name="Methylglyoxal|Pyruvaldehyde|Pyruvic
aldehyde|2-Ketopropionaldehyde|2-Oxopropanal|methylglyoxal" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H4O2</p></html>
    </notes>
  </species>
  <species id="M_C00552_c" name="meso-Tartaric acid|meso-Tartrate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H4O6</p></html>
    </notes>
  </species>
  <species id="M_C00552_e" name="meso-Tartaric acid|meso-Tartrate, extracellular"
compartment="C_e">

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    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C4H4O6,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C00555_c" name="4-Aminobutanal|4-Aminobutyraldehyde|Butyraldehyde,
4-amino-" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H10NO</p></html>
    </notes>
  </species>
  <species id="M_C00558_c" name="D-Tagaturonate|D-tagaturonate|D-Tagaturonic acid"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H9O7</p></html>
    </notes>
  </species>
  <species id="M_C00559_c" name="Deoxyadenosine|2'-Deoxyadenosine|deoxyadenosine"
compartment="C_c">
    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C10H13N5O3</p></html>
    </notes>
  </species>
  <species id="M_C00559_e" name="Deoxyadenosine|2'-Deoxyadenosine|deoxyadenosine,
extracellular" compartment="C_e">
    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C10H13N5O3,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C00568_c" name="4-Aminobenzoate|ABEE|4-Aminobenzoic
acid|p-Aminobenzoate|4-aminobenzoate|p-aminobenzoate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H6NO2</p></html>
    </notes>
  </species>
  <species id="M_C00575_c" name="3',5'-Cyclic AMP|Cyclic adenylic acid|Cyclic
AMP|Adenosine 3',5'-phosphate|cAMP" compartment="C_c">
    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C10H11N5O6P</p></html>
    </notes>
  </species>

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    <species      id="M_C00576_c"      name="Betaine      aldehyde|betaine      aldehyde"
compartment="C_c">
    <notes>
        <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H12NO</p></html>
    </notes>
</species>
    <species id="M_C00577_c" name="D-Glyceraldehyde" compartment="C_c">
    <notes>
        <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H6O3</p></html>
    </notes>
</species>
    <species      id="M_C00588_c"      name="Choline
phosphate|Phosphorylcholine|Phosphocholine|O-Phosphocholine" compartment="C_c">
    <notes>
        <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H14NO4P</p></html>
    </notes>
</species>
    <species      id="M_C00588_e"      name="Choline
phosphate|Phosphorylcholine|Phosphocholine|O-Phosphocholine,      extracellular"
compartment="C_e">
    <notes>
        <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C5H14NO4P,
extracellular</p></html>
    </notes>
</species>
    <species      id="M_C00601_c"
name="Phenylacetaldehyde|alpha-Tolualdehyde|phenylacetaldehyde" compartment="C_c">
    <notes>
        <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C8H8O</p></html>
    </notes>
</species>
    <species      id="M_C00601_e"
name="Phenylacetaldehyde|alpha-Tolualdehyde|phenylacetaldehyde,      extracellular"
compartment="C_e">
    <notes>
        <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C8H8O,
extracellular</p></html>
    </notes>
</species>
    <species      id="M_C00603_c"
name="(-)-Ureidoglycolate|(S)-Ureidoglycolate|Ureidoglycolate|ureidoglycolate|(s)-ureidoglycolat
e" compartment="C_c">
    <notes>
        <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H5N2O4</p></html>

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    </notes>
</species>
<species id="M_C00612_c" name="N1-Acetylspermidine" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C9H23N3O</p></html>
  </notes>
</species>
<species id="M_C00615_c" name="Protein histidine|Protein L-histidine|[Protein]-L-histidine"
compartment="C_c">
  <notes>
    <html
                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C7H8N4O2R2</p></html>
  </notes>
</species>
<species
      id="M_C00620_c"
      name="alpha-D-Ribose
1-phosphate|Ribose
1-phosphate|D-Ribose
1-phosphate|alpha-D-Ribose 1-phosphate|D-ribose-1-phosphate|D-ribose
1-phosphate" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H10O8P</p></html>
  </notes>
</species>
<species
      id="M_C00624_c"
      name="N-Acetyl-L-glutamate|N-Acetyl-L-glutamic
acid|N-acetyl-L-glutamate|n-acetyl-l-glutamate" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H9NO5</p></html>
  </notes>
</species>
<species
                                id="M_C00630_c"
name="2-Methylpropanoyl-CoA|2-Methylpropionyl-CoA|Isobutyryl-CoA|isobutyryl-CoA"
compartment="C_c">
  <notes>
    <html
                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C25H39N7O17P3S</p></html>
  </notes>
</species>
<species
      id="M_C00631_c"
      name="2-Phospho-D-glycerate|D-Glycerate
2-phosphate|D-Glycerate2-phosphate|2-phospho-D-glycerate" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H5O7P</p></html>
  </notes>
</species>
<species
      id="M_C00631_e"
      name="2-Phospho-D-glycerate|D-Glycerate
2-phosphate|D-Glycerate2-phosphate|2-phospho-D-glycerate, extracellular" compartment="C_e">
  <notes>

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        <html          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:          C3H5O7P,
extracellular</p></html>
    </notes>
</species>
    <species      id="M_C00636_c"      name="D-Mannose      1-phosphate|alpha-D-Mannose
1-phosphate|D-Mannose1-phosphate" compartment="C_c">
        <notes>
            <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O9P</p></html>
        </notes>
    </species>
    <species      id="M_C00636_e"      name="D-Mannose      1-phosphate|alpha-D-Mannose
1-phosphate|D-Mannose1-phosphate, extracellular" compartment="C_e">
        <notes>
            <html          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:          C6H12O9P,
extracellular</p></html>
        </notes>
    </species>
    <species      id="M_C00642_c"      name="4-Hydroxyphenylacetate|4-Hydroxyphenylacetic
acid|4-Hydroxyphenyl acetate|4-hydroxyphenylacetate" compartment="C_c">
        <notes>
            <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C8H7O3</p></html>
        </notes>
    </species>
    <species      id="M_C00644_c"      name="D-Mannitol
1-phosphate|D-mannitol-1-phosphate|D-mannitol 1-phosphate" compartment="C_c">
        <notes>
            <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H14O9P</p></html>
        </notes>
    </species>
    <species      id="M_C00645_c"
name="N-Acetyl-D-mannosamine|2-Acetamido-2-deoxy-D-mannose" compartment="C_c">
        <notes>
            <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C8H15NO6</p></html>
        </notes>
    </species>
    <species      id="M_C00645_e"
name="N-Acetyl-D-mannosamine|2-Acetamido-2-deoxy-D-mannose,      extracellular"
compartment="C_e">
        <notes>
            <html          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:          C8H15NO6,
extracellular</p></html>
        </notes>
    </species>
    <species      id="M_C00655_c"      name="Xanthosine      5'-phosphate|Xanthylic

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acid|XMP|(9-D-Ribosylxanthine)-5'-phosphate|Xanthosine5-phosphate|xanthosine-5-phosphate"

compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C10H12N4O9P</p></html>

</notes>

</species>

<species id="M\_C00663\_c" name="beta-D-Glucose 1-phosphate|beta-D-glucose 1-phosphate" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O9P</p></html>

</notes>

</species>

<species id="M\_C00666\_c" name="LL-2,6-Diaminoheptanedioate|LL-2,6-Diaminopimelate|LL-2,6-Diaminopimelic acid|LL-2,6-diaminopimelate|LL-2,6-diaminoheptanedioate|LL-2-6-Diaminoheptanedioate" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H14N2O4</p></html>

</notes>

</species>

<species id="M\_C00668\_c" name="D-Glucose 6-phosphate|Glucose 6-phosphate|Robison ester|alpha-D-Glucose 6-phosphate|D-Glucose6-phosphate|alpha-D-glucose-6-phosphate|D-glucose-6-phosphate|D-glucose 6-phosphate|glucose-6-phosphate" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O9P</p></html>

</notes>

</species>

<species id="M\_C00668\_e" name="D-Glucose 6-phosphate|Glucose 6-phosphate|Robison ester|alpha-D-Glucose 6-phosphate|D-Glucose6-phosphate|alpha-D-glucose-6-phosphate|D-glucose-6-phosphate|D-glucose 6-phosphate|glucose-6-phosphate, extracellular" compartment="C\_e">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O9P, extracellular</p></html>

</notes>

</species>

<species id="M\_C00670\_c" name="sn-glycero-3-Phosphocholine|Glycerophosphocholine|sn-Glycero-3-phosphocholine" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C8H20NO6P</p></html>

</notes>

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</species>
  <species id="M_C00671_c" name="(S)-3-Methyl-2-oxopentanoic
acid|3-Methyl-2-oxopentanoate|(S)-3-Methyl-2-oxopentanoate|(3S)-3-Methyl-2-oxopentanoic
acid|(3S)-3-Methyl-2-oxopentanoate|S-3-Methyl-2-oxopentanoate|3MOP|2-Oxo-3-methylvalerate|
3-methyl-2-oxopentanoate|2-keto-3-methylvalerate|2-keto-3-methyl-valerate"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H9O3</p></html>
  </notes>
</species>
  <species id="M_C00672_c" name="2-Deoxy-D-ribose 1-phosphate|2-Deoxy-alpha-D-ribose
1-phosphate|2-Deoxy-D-ribose 1-phosphate|2-deoxy-D-ribose
1-phosphate|deoxyribose-1-phosphate" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H10O7P</p></html>
  </notes>
</species>
  <species id="M_C00673_c" name="2-Deoxy-D-ribose
5-phosphate|2-Deoxy-D-ribose 5-phosphate|2-deoxy-D-ribose
5-phosphate|deoxyribose-5-phosphate" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H10O7P</p></html>
  </notes>
</species>
  <species id="M_C00679_c" name="5-Dehydro-4-deoxy-D-glucarate" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H6O7</p></html>
  </notes>
</species>
  <species id="M_C00680_c"
name="meso-2,6-Diaminoheptanedioate|meso-2,6-Diaminopimelate|meso-2,6-Diaminopimelic
acid|meso-Diaminoheptanedioate|meso-2,6-diaminopimelate|meso-2,6-diaminoheptanedioate|mes
o-2-6-Diaminoheptanedioate" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H14N2O4</p></html>
  </notes>
</species>
  <species id="M_C00683_c"
name="(S)-2-Methyl-3-oxopropanoyl-CoA|(S)-2-Methyl-3-oxopropionyl-CoA|(S)-Methylmalonyl
-CoA|(S)-Methylmalonyl-coenzyme
A|(S)-3-Oxo-2-methylpropanoyl-CoA|D-methylmalonyl-CoA|D-Methylmalonyl-CoA"
compartment="C_c">
  <notes>
    <html
      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:

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C25H36N7O19P3S</p></html>

</notes>

</species>

<species id="M\_C00688\_c" name="dTDP-4-dehydro-6-deoxy-L-mannose|dTDP-4-oxo-6-deoxy-L-mannose|dTDP-4-oxo-L-rhamnose" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C16H24N2O15P2</p></html>

</notes>

</species>

<species id="M\_C00689\_c" name="alpha,alpha'-Trehalose 6-phosphate|Trehalose 6-phosphate|trehalose 6-phosphate|D-trehalose-6-phosphate" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C12H22O14P</p></html>

</notes>

</species>

<species id="M\_C00691\_c" name="2,4,6/3,5-Pentahydroxycyclohexanone|scyllo-Inosose|2-Inosose|2-inosose" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H10O6</p></html>

</notes>

</species>

<species id="M\_C00692\_c" name="UDP-N-acetylmuramoyl-L-alanyl-D-glutamate|udp-n-acetylmuramoyl-l-alanyl-d-glutamate" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C28H39N5O23P2</p></html>

</notes>

</species>

<species id="M\_C00695\_c" name="3alpha,7alpha,12alpha-Trihydroxy-5beta-cholanate|Cholate|3alpha,7alpha,12alpha-Trihydroxy-5beta-cholanic acid|Cholic acid" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C24H39O5</p></html>

</notes>

</species>

<species id="M\_C00698\_c" name="Chloride|HCl|Cl-|Chloride ion|Hydrochloric acid|Hydrogen chloride|Hydrochloride" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: Cl</p></html>

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    </notes>
</species>
  <species id="M_C00700_c" name="XTP" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C10H12N4O15P3</p></html>
    </notes>
  </species>
  <species id="M_C00703_c" name="Hg2+|Mercury (charged +2)|Mercury(2+)|Mercuric ion"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: Hg</p></html>
    </notes>
  </species>
  <species id="M_C00703_e" name="Hg2+|Mercury (charged +2)|Mercury(2+)|Mercuric ion,
extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: Hg,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C00704_c" name="O2.-|Superoxide
anion|Superoxide|O2-|Superoxideanion|superoxide" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: HO2</p></html>
    </notes>
  </species>
  <species id="M_C00705_c" name="dCDP|2'-Deoxycytidine diphosphate|2'-Deoxycytidine
5'-diphosphate|dcdp" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C9H13N3O10P2</p></html>
    </notes>
  </species>
  <species id="M_C00718_c" name="Amylose|Amylose
chain|(1,4-alpha-D-Glucosyl)n|(1,4-alpha-D-Glucosyl)n+1|1,4-alpha-D-Glucan|1,4-alpha-D-gluca
n|(1,4-alpha-D-glucosyl)(n+1)|(1,4-alpha-D-glucosyl)(n)|(1,4-alpha-D-Glucosyl)n-1|4-{(1,4)-alph
a-D-Glucosyl}(n-1)-D-glucose" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C30H52O26</p></html>
    </notes>
  </species>
  <species id="M_C00719_c" name="Betaine|Trimethylaminoacetate|Glycine
betaine|N,N,N-Trimethylglycine|Trimethylammonioacetate|betaine|BET" compartment="C_c">

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    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H11NO2</p></html>
    </notes>
  </species>
  <species id="M_C00719_e" name="Betaine|Trimethylaminoacetate|Glycine
betaine|N,N,N-Trimethylglycine|Trimethylammonioacetate|betaine|BET,
extracellular"
compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H11NO2,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C00721_c" name="Dextrin" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C36H62O31</p></html>
    </notes>
  </species>
  <species id="M_C00721_e" name="Dextrin, extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C36H62O31,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C00725_c" name="Lipoate|Lipoic acid|alpha-Lipoic acid|Thioctic acid"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C8H13O2S2</p></html>
    </notes>
  </species>
  <species id="M_C00725_e" name="Lipoate|Lipoic acid|alpha-Lipoic acid|Thioctic acid,
extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C8H13O2S2,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C00740_c" name="D-Serine|d-serine" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H7NO3</p></html>
    </notes>
  </species>
  <species id="M_C00740_e" name="D-Serine|d-serine, extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H7NO3,

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extracellular</p></html>
</notes>
</species>
<species id="M_C00748_c" name="Siroheme|siroheme" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C42H36FeN4O16</p></html>
  </notes>
</species>
<species id="M_C00750_c"
name="Spermine|N,N'-Bis(3-aminopropyl)-1,4-butanediamine|SPRM" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C10H30N4</p></html>
  </notes>
</species>
<species id="M_C00785_c" name="Urocanate|Urocanic acid|urocanate"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H5N2O2</p></html>
  </notes>
</species>
<species id="M_C00787_c" name="tRNA(Tyr)" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: </p></html>
  </notes>
</species>
<species id="M_C00794_c" name="D-Sorbitol|D-Glucitol|L-Gulitol|Sorbitol|D-sorbitol"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H14O6</p></html>
  </notes>
</species>
<species id="M_C00794_e" name="D-Sorbitol|D-Glucitol|L-Gulitol|Sorbitol|D-sorbitol,
extracellular" compartment="C_e">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H14O6,
extracellular</p></html>
  </notes>
</species>
<species id="M_C00805_c" name="Salicylate|o-Hydroxybenzoic acid|Salicylic
acid|SALC|salicylate" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H5O3</p></html>
  </notes>

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</species>
  <species id="M_C00810_c"
name="Acetoin|2-Acetoin|3-Hydroxybutan-2-one|3-Hydroxy-2-butanone|Dimethylketol|acetoin|2-
acetoin|ACTN|(R)-Acetoin|(R)-2-Acetoin|(R)-3-Hydroxy-2-butanone|(R)-Dimethylketol|(R)-3-Hy
droxybutan-2-one" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H8O2</p></html>
  </notes>
</species>
  <species id="M_C00810_e"
name="Acetoin|2-Acetoin|3-Hydroxybutan-2-one|3-Hydroxy-2-butanone|Dimethylketol|acetoin|2-
acetoin|ACTN|(R)-Acetoin|(R)-2-Acetoin|(R)-3-Hydroxy-2-butanone|(R)-Dimethylketol|(R)-3-Hy
droxybutan-2-one,extracellular" compartment="C_e">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H8O2</p></html>
  </notes>
</species>
  <species id="M_C00817_c" name="D-Altronate|D-altronate|D-altronatete"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H11O7</p></html>
  </notes>
</species>
  <species id="M_C00818_c" name="D-Glucarate|D-Glucaric acid|L-Gularic acid|d-Saccharic
acid|D-Glucosaccharic acid|d-glucarate" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H8O8</p></html>
  </notes>
</species>
  <species id="M_C00818_e" name="D-Glucarate|D-Glucaric acid|L-Gularic acid|d-Saccharic
acid|D-Glucosaccharic acid|d-glucarate, extracellular" compartment="C_e">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H8O8,
extracellular</p></html>
  </notes>
</species>
  <species id="M_C00826_c" name="L-Arogenate|L-Arogenic acid|Pretyrosine|l-arogenate"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C10H12NO5</p></html>
  </notes>
</species>
  <species id="M_C00828_c" name="mq17|Menaquinol
7|Menaquinone|Menatetrenone|menaquinone" compartment="C_c">

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    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C46H66O2</p></html>
    </notes>
  </species>
  <species id="M_C00842_c"
name="dTDP-glucose|dTDP-D-glucose|dTDPglucose|dTDP-alpha-D-glucose|dtdp-d-glucose"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C16H24N2O16P2</p></html>
    </notes>
  </species>
  <species id="M_C00855_c" name="D-Methionine|D-2-Amino-4-(methylthio)butyric
acid|d-methionine" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H11NO2S</p></html>
    </notes>
  </species>
  <species id="M_C00855_e" name="D-Methionine|D-2-Amino-4-(methylthio)butyric
acid|d-methionine, extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H11NO2S,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C00857_c"
name="Deamino-NAD+|Deamido-NAD+|Deamido-NAD|deamido-NAD+|deamido-nad"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C21H24N6O15P2</p></html>
    </notes>
  </species>
  <species id="M_C00860_c" name="L-Histidinol|L-histidinol" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12N3O</p></html>
    </notes>
  </species>
  <species id="M_C00861_c" name="L-Rhamnulose" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O5</p></html>
    </notes>
  </species>
  <species id="M_C00864_c" name="Pantothenate|Pantothenic

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acid|(R)-Pantothenate|R-Pantothenate|pantothenate|PAN" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C<sub>9</sub>H<sub>16</sub>NO<sub>5</sub></p></html>

</notes>

</species>

<species id="M\_C00864\_e" name="Pantothenate|Pantothenic acid|(R)-Pantothenate|R-Pantothenate|pantothenate|PAN, extracellular" compartment="C\_e">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C<sub>9</sub>H<sub>16</sub>NO<sub>5</sub>, extracellular</p></html>

</notes>

</species>

<species id="M\_C00870\_c" name="4-Nitrophenol|p-Nitrophenol|PNP|Niphen|4-Hydroxynitrobenzene" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C<sub>6</sub>H<sub>5</sub>NO<sub>3</sub></p></html>

</notes>

</species>

<species id="M\_C00877\_c" name="Crotonoyl-CoA|Crotonyl-CoA|2-Butenoyl-CoA|trans-But-2-enoyl-CoA|But-2-enoyl-CoA|crotonyl-coa" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C<sub>25</sub>H<sub>37</sub>N<sub>7</sub>O<sub>17</sub>P<sub>3</sub>S</p></html>

</notes>

</species>

<species id="M\_C00879\_c" name="D-Galactarate|D-Mucic acid|D-Galactaric acid|d-galactarate" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C<sub>6</sub>H<sub>8</sub>O<sub>8</sub></p></html>

</notes>

</species>

<species id="M\_C00879\_e" name="D-Galactarate|D-Mucic acid|D-Galactaric acid|d-galactarate, extracellular" compartment="C\_e">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C<sub>6</sub>H<sub>8</sub>O<sub>8</sub>, extracellular</p></html>

</notes>

</species>

<species id="M\_C00881\_c" name="Deoxycytidine|2'-Deoxycytidine|deoxycytidine" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C<sub>9</sub>H<sub>13</sub>N<sub>3</sub>O<sub>4</sub></p></html>

</notes>

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</species>
  <species id="M_C00881_e" name="Deoxycytidine|2'-Deoxycytidine|deoxycytidine,
extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C9H13N3O4,
extracellular</p></html>
    </notes>
</species>
  <species id="M_C00882_c" name="Dephospho-CoA|dephospho-CoA|dephospho-coa"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C21H33N7O13P2S</p></html>
    </notes>
</species>
  <species id="M_C00885_c" name="Isochorismate|Isochorismic acid|isochorismate"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C10H8O6</p></html>
    </notes>
</species>
  <species id="M_C00886_c" name="L-Alanyl-tRNA|L-Alanyl-tRNA(Ala)"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C13H22NO11PR2(C5H8O6PR)n</p></html>
    </notes>
</species>
  <species id="M_C00898_c" name="(R,R)-Tartaric acid|(R,R)-Tartrate|L-Tartaric acid|Tartaric
acid|Tartrate|2,3-Dihydroxybutanedioic acid|(2R,3R)-Tartaric acid|(+-)-Tartaric
acid|L-tartrate|(S,S)-Tartaric acid|(S,S)-Tartrate|D-Tartrate|D-Tartaric acid|(2S,3S)-Tartaric
acid|(-)-Tartaric acid|L-tartarate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H4O6</p></html>
    </notes>
</species>
  <species id="M_C00898_e" name="(R,R)-Tartaric acid|(R,R)-Tartrate|L-Tartaric acid|Tartaric
acid|Tartrate|2,3-Dihydroxybutanedioic acid|(2R,3R)-Tartaric acid|(+-)-Tartaric
acid|L-tartrate|(S,S)-Tartaric acid|(S,S)-Tartrate|D-Tartrate|D-Tartaric acid|(2S,3S)-Tartaric
acid|(-)-Tartaric acid|L-tartarate, extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H4O6,
extracellular</p></html>
    </notes>

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</species>
<species id="M_C00900_c"
name="2-Acetolactate|(S)-2-Acetolactate|(S)-2-Hydroxy-2-methyl-3-oxobutanoate|S-2-Acetolactate|2-acetolactate|ALCTT|2-aceto-lactate" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H7O4</p></html>
  </notes>
</species>
<species id="M_C00905_c" name="D-Fructuronate|D-fructuronate|D-Fructuronic acid"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H9O7</p></html>
  </notes>
</species>
<species id="M_C00916_c" name="Cephalosporin C" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C16H20N3O8S</p></html>
  </notes>
</species>
<species id="M_C00919_c" name="Choline sulfate" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H13NO4S</p></html>
  </notes>
</species>
<species id="M_C00919_e" name="Choline sulfate, extracellular" compartment="C_e">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H13NO4S,
extracellular</p></html>
  </notes>
</species>
<species id="M_C00921_c"
name="Dihydropteroate|7,8-Dihydropteroate|dihydropteroate|7,8-dihydropteroate"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C14H13N6O3</p></html>
  </notes>
</species>
<species id="M_C00931_c" name="Porphobilinogen|porphobilinogen" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C10H13N2O4</p></html>
  </notes>

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</species>
  <species id="M_C00944_c" name="3-Dehydroquinate|5-Dehydroquinate|3-Dehydroquinic
acid|5-Dehydroquinic acid|3-dehydroquinate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H9O6</p></html>
    </notes>
  </species>
  <species id="M_C00946_c" name="Adenosine 2'-phosphate|2'-Adenylic
acid|Adenosine-2'-monophosphate|AMP 2'-phosphate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C10H13N5O7P</p></html>
    </notes>
  </species>
  <species id="M_C00946_e" name="Adenosine 2'-phosphate|2'-Adenylic
acid|Adenosine-2'-monophosphate|AMP 2'-phosphate, extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C10H13N5O7P,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C00954_c" name="Indole-3-acetate|Indole-3-acetic
acid|(Indol-3-yl)acetate|Indoleacetate|Indoleacetic acid" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C10H8NO2</p></html>
    </notes>
  </species>
  <species id="M_C00966_c" name="2-Dehydropantoate|2-dehydropantoate"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H9O4</p></html>
    </notes>
  </species>
  <species id="M_C00979_c"
name="O-Acetyl-L-serine|O3-Acetyl-L-serine|O-acetyl-L-serine|o-acetyl-l-serine"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H9NO4</p></html>
    </notes>
  </species>
  <species id="M_C00988_c" name="2-Phosphoglycolate|Phosphoglycolic
acid|2-phosphoglycolate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C2H3O6P</p></html>
    </notes>
  </species>

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    </notes>
</species>
    <species          id="M_C00988_e"          name="2-Phosphoglycolate|Phosphoglycolic
acid|2-phosphoglycolate, extracellular" compartment="C_e">
    <notes>
        <html          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:          C2H3O6P,
extracellular</p></html>
    </notes>
</species>
    <species          id="M_C00993_c"
name="D-Alanyl-D-alanine|D-Ala-D-Ala|D-alanyl-D-alanine|d-alanyl-d-alanine"
compartment="C_c">
    <notes>
        <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12N2O3</p></html>
    </notes>
</species>
    <species          id="M_C01005_c"
name="phosphoserine|O-Phospho-L-serine|L-O-Phosphoserine|3-Phosphoserine|Dexfosfoserine|3-
phospho-serine" compartment="C_c">
    <notes>
        <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H7NO6P</p></html>
    </notes>
</species>
    <species          id="M_C01005_e"
name="phosphoserine|O-Phospho-L-serine|L-O-Phosphoserine|3-Phosphoserine|Dexfosfoserine|3-
phospho-serine, extracellular" compartment="C_e">
    <notes>
        <html          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:          C3H7NO6P,
extracellular</p></html>
    </notes>
</species>
    <species id="M_C01007_c" name="Reduced riboflavin" compartment="C_c">
    <notes>
        <html          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C17H22N4O6</p></html>
    </notes>
</species>
    <species          id="M_C01010_c"          name="Urea-1-carboxylate|Allophanate|Allophanic
acid|urea-1-carboxylate" compartment="C_c">
    <notes>
        <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C2H3N2O3</p></html>
    </notes>
</species>
    <species id="M_C01019_c" name="6-Deoxy-L-galactose|L-Fucose" compartment="C_c">

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    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O5</p></html>
    </notes>
  </species>
  <species id="M_C01019_e" name="6-Deoxy-L-galactose|L-Fucose, extracellular"
    compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O5,
      extracellular</p></html>
    </notes>
  </species>
  <species id="M_C01024_c" name="Hydroxymethylbilane|hydroxymethylbilane"
    compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
      C40H38N4O17</p></html>
    </notes>
  </species>
  <species id="M_C01035_c" name="4-Guanidinobutanoate|4-guanidinobutanoate"
    compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H11N3O2</p></html>
    </notes>
  </species>
  <species id="M_C01037_c"
    name="7,8-Diaminononanoate|7-8-Diaminononanoate|7,8-diaminononanoate"
    compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C9H21N2O2</p></html>
    </notes>
  </species>
  <species id="M_C01040_c"
    name="L-Gulono-1,4-lactone|L-Gulono-gamma-lactone|gamma-Gulonolactone|L-Gulonic acid
    gamma-lactone|L-Gulonolactone" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H10O6</p></html>
    </notes>
  </species>
  <species id="M_C01040_e"
    name="L-Gulono-1,4-lactone|L-Gulono-gamma-lactone|gamma-Gulonolactone|L-Gulonic acid
    gamma-lactone|L-Gulonolactone, extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H10O6,
      extracellular</p></html>

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    </notes>
</species>
<species id="M_C01044_c" name="N-Formyl-L-aspartate" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H5NO5</p></html>
  </notes>
</species>
<species id="M_C01045_c" name="N-Formyl-L-glutamate" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H7NO5</p></html>
  </notes>
</species>
<species id="M_C01050_c" name="UDP-N-acetylmuramate|UDP-N-acetylmuramic
acid|UDP-MurNAc|udp-n-acetylmuramate" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C20H28N3O19P2</p></html>
  </notes>
</species>
<species id="M_C01051_c" name="Uroporphyrinogen
III|UroporphyrinogenIII|uroporphyrinogen-iii" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C40H36N4O16</p></html>
  </notes>
</species>
<species id="M_C01063_c"
name="6-Carboxyhexanoyl-CoA|Pimeloyl-CoA|6-carboxyhexanoyl-coa" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C28H42N7O19P3S</p></html>
  </notes>
</species>
<species id="M_C01079_c" name="Protoporphyrinogen IX|ProtoporphyrinogenIX"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C34H38N4O4</p></html>
  </notes>
</species>
<species id="M_C01081_c" name="Thiamin monophosphate|Thiamine
monophosphate|Thiamin phosphate|Thiamine phosphate|TMP|Thiaminmonophosphate|thiamine
monophosphate|thiamine-phosphate" compartment="C_c">
  <notes>

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    <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C12H17N4O4PS</p></html>
  </notes>
</species>
  <species      id="M_C01081_e"      name="Thiamin      monophosphate|Thiamine
monophosphate|Thiamin phosphate|Thiamine phosphate|TMP|Thiaminmonophosphate|thiamine
monophosphate|thiamine-phosphate, extracellular" compartment="C_e">
    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C12H17N4O4PS,
extracellular</p></html>
    </notes>
</species>
  <species                                          id="M_C01083_c"
name="alpha,alpha-Trehalose|alpha,alpha'-Trehalose|Trehalose|trehalose|TRHL"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C12H22O11</p></html>
    </notes>
</species>
  <species                                          id="M_C01083_e"
name="alpha,alpha-Trehalose|alpha,alpha'-Trehalose|Trehalose|trehalose|TRHL,      extracellular"
compartment="C_e">
    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C12H22O11,
extracellular</p></html>
    </notes>
</species>
  <species      id="M_C01089_c"      name="(R)-3-Hydroxybutanoate|(R)-3-Hydroxybutanoic
acid|(R)-3-Hydroxybutyric acid|(r)-3-hydroxybutanoate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H7O3</p></html>
    </notes>
</species>
  <species      id="M_C01092_c"      name="8-Amino-7-oxononanoate|8-Amino-7-oxononanoic
acid|8-amino-7-oxononanoate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C9H17NO3</p></html>
    </notes>
</species>
  <species      id="M_C01094_c"      name="D-Fructose
1-phosphate|D-Fructose1-phosphate|D-fructose-1-phosphate|D-fructose      1-phosphate|Fructose
1-phosphate|fructose-1-phosphate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O9P</p></html>

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    </notes>
</species>
  <species id="M_C01097_c" name="D-Tagatose 6-phosphate|D-tagatose 6-phosphate"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O9P</p></html>
    </notes>
</species>
  <species id="M_C01100_c" name="L-Histidinol
phosphate|L-histidinol-phosphate|l-histidinol-phosphate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C6H12N3O4P</p></html>
    </notes>
</species>
  <species id="M_C01101_c" name="L-Ribulose 5-phosphate|L-ribulose-5-phosphate"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H10O8P</p></html>
    </notes>
</species>
  <species id="M_C01102_c"
name="O-Phospho-L-homoserine|O-phospho-L-homoserine|o-phospho-l-homoserine"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H9NO6P</p></html>
    </notes>
</species>
  <species id="M_C01103_c" name="Orotidine 5'-phosphate|Orotidylic
acid|Orotidine5-phosphate|orotidine 5-phosphate|orotidine-5'-phosphate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C10H11N2O11P</p></html>
    </notes>
</species>
  <species id="M_C01118_c" name="O-Succinyl-L-homoserine|O-succinyl-L-homoserine"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C8H12NO6</p></html>
    </notes>
</species>
  <species id="M_C01131_c" name="L-Rhamnulose 1-phosphate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O8P</p></html>

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    </notes>
</species>
    <species                                id="M_C01132_c"
name="N-Acetyl-D-galactosamine|N-Acetyl-D-chondrosamine|2-Acetamido-2-deoxy-D-galactose
" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C8H15NO6</p></html>
    </notes>
</species>
    <species                                id="M_C01134_c"                name="Pantetheine
4'-phosphate|4'-Phosphopantetheine|Phosphopantetheine|D-Pantetheine 4'-phosphate|pantetheine
4'-phosphate|Pantetheine4-phosphate" compartment="C_c">
    <notes>
    <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C11H22N2O7PS</p></html>
    </notes>
</species>
    <species                                id="M_C01137_c"
name="S-Adenosylmethioninamine|(5-Deoxy-5-adenosyl)(3-aminopropyl)methylsulfonium
salt|S-Adenosyl-(5')-3-methylthiopropylamine" compartment="C_c">
    <notes>
    <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C14H24N6O3S</p></html>
    </notes>
</species>
    <species                                id="M_C01142_c"                name="(3S)-3,6-Diaminohexanoate|L-beta-Lysine"
compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H15N2O2</p></html>
    </notes>
</species>
    <species id="M_C01144_c" name="(S)-3-Hydroxybutanoyl-CoA|(S)-3-Hydroxybutyryl-CoA"
compartment="C_c">
    <notes>
    <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C25H39N7O18P3S</p></html>
    </notes>
</species>
    <species                                id="M_C01146_c"                name="2-Hydroxy-3-oxopropanoate|Tartronate
semialdehyde|tartronate semialdehyde" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H3O4</p></html>
    </notes>
</species>

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<species id="M\_C01161\_c" name="3,4-Dihydroxyphenylacetate|3,4-Dihydroxyphenylacetic acid|3,4-Dihydroxyphenyl acetate|3,4-Dihydroxyphenyl acetic acid|Homoprotocatechuate" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C<sub>8</sub>H<sub>7</sub>O<sub>4</sub></p></html>

</notes>

</species>

<species id="M\_C01165\_c" name="L-Glutamate 5-semialdehyde|L-Glutamate gamma-semialdehyde|L-Glutamate5-semialdehyde|L-glutamate-gamma-semialdehyde|L-glutamate 5-semialdehyde|l-glutamate gamma-semialdehyde" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C<sub>5</sub>H<sub>9</sub>NO<sub>3</sub></p></html>

</notes>

</species>

<species id="M\_C01170\_c" name="UDP-N-acetyl-D-mannosamine" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C<sub>17</sub>H<sub>25</sub>N<sub>3</sub>O<sub>17</sub>P<sub>2</sub></p></html>

</notes>

</species>

<species id="M\_C01172\_c" name="beta-D-Glucose 6-phosphate|beta-D-glucose 6-phosphate" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C<sub>6</sub>H<sub>12</sub>O<sub>9</sub>P</p></html>

</notes>

</species>

<species id="M\_C01177\_c" name="Inositol 1-phosphate|myo-Inositol 1-phosphate|1D-myo-Inositol 1-phosphate|D-myo-Inositol 1-phosphate|1D-myo-Inositol 1-monophosphate" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C<sub>6</sub>H<sub>12</sub>O<sub>9</sub>P</p></html>

</notes>

</species>

<species id="M\_C01179\_c" name="3-(4-Hydroxyphenyl)pyruvate|4-Hydroxyphenylpyruvate|p-Hydroxyphenylpyruvic acid|3--4-Hydroxyphenylpyruvate|4-hydroxyphenylpyruvate|p-hydroxyphenylpyruvate" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C<sub>9</sub>H<sub>7</sub>O<sub>4</sub></p></html>

</notes>

</species>

<species id="M\_C01180\_c" name="4-Methylthio-2-oxobutanoic acid|2-keto-4-methylthiobutyrate|4-Methylthio-2-oxobutanoate|4-methylthio 2-oxobutyrate" compartment="C\_c">

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    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H7O3S</p></html>
    </notes>
  </species>
  <species id="M_C01181_c" name="4-Trimethylammoniobutanoate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H15NO2</p></html>
    </notes>
  </species>
  <species id="M_C01181_e" name="4-Trimethylammoniobutanoate, extracellular"
compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H15NO2,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C01185_c" name="Nicotinate D-ribonucleotide|beta-Nicotinate
D-ribonucleotide|Nicotinate ribonucleotide|Nicotinic acid
ribonucleotide|NicotinateD-ribonucleotide|nicotinate ribonucleotide" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C11H13NO9P</p></html>
    </notes>
  </species>
  <species id="M_C01204_c" name="myo-Inositol hexakisphosphate|Phytic
acid|Phytate|1D-myo-Inositol 1,2,3,4,5,6-hexakisphosphate|D-myo-Inositol
1,2,3,4,5,6-hexakisphosphate|myo-Inositol 1,2,3,4,5,6-hexakisphosphate|Inositol
1,2,3,4,5,6-hexakisphosphate|1D-myo-Inositol hexakisphosphate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C6H12O24P6</p></html>
    </notes>
  </species>
  <species id="M_C01209_c" name="Malonyl-[acyl-carrier protein]|malonyl-[acyl-carrier
protein]|Malonyl-acyl-carrierprotein-" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C14H22N2O10PRS</p></html>
    </notes>
  </species>
  <species id="M_C01212_c"
name="UDP-N-acetylmuramoyl-L-alanine|udp-n-acetylmuramoyl-l-alanine"
compartment="C_c">
    <notes>

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    <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C23H33N4O20P2</p></html>
    </notes>
</species>
    <species          id="M_C01219_c"          name="CDP-4-dehydro-6-deoxy-D-glucose"
compartment="C_c">
    <notes>
    <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C15H21N3O15P2</p></html>
    </notes>
</species>
    <species id="M_C01230_c" name="all-trans-Hexaprenyl diphosphate" compartment="C_c">
    <notes>
    <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C30H50O7P2</p></html>
    </notes>
</species>
    <species                                id="M_C01233_c"
name="sn-glycero-3-Phosphoethanolamine|Glycerophosphoethanolamine|sn-Glycero-3-phosphoet
hanolamine" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H14NO6P</p></html>
    </notes>
</species>
    <species          id="M_C01236_c"          name="D-Glucono-1,5-lactone
6-phosphate|6-Phospho-D-glucono-1,5-lactone|6-phospho-D-glucono-1,5-lactone|D-glucono-1,5-l
actone 6-phosphate|6-phospho-D-glucono-1-5-lactone" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H10O9P</p></html>
    </notes>
</species>
    <species          id="M_C01250_c"          name="N-Acetyl-L-glutamate
5-semialdehyde|2-Acetamido-5-oxopentanoate|N-acetyl-L-glutamate          5-semialdehyde"
compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H10NO4</p></html>
    </notes>
</species>
    <species          id="M_C01267_c"          name="3-(Imidazol-4-yl)-2-oxopropyl
phosphate|Imidazole-acetol          phosphate|imidazole-acetol-
phosphate|imidazole-acetol-phosphate|3-(imidazol-4-yl)-2-oxopropyl          phosphate|imidazole
acetol-phosphate" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H8N2O5P</p></html>

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    </notes>
</species>
    <species id="M_C01268_c"
name="5-Amino-6-(5'-phosphoribosylamino)uracil|5-Amino-6-(riboseylamino)-2,4-(1H,3H)-pyrim
idinedione
5'-phosphate|5-Amino-6-(5-phosphoribosylamino)uracil|5-Amino-6--5-phosphoribosylaminouraci
l|5-amino-6-(5-phosphoribosylamino)uracil|5-amino-6-(riboseylamino)-2,4-(1h,3h)-pyrimidinedion
e 5'-phosphate" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C9H14N4O9P</p></html>
    </notes>
</species>
    <species id="M_C01269_c"
name="5-O-(1-Carboxyvinyl)-3-phosphoshikimate|O5-(1-Carboxyvinyl)-3-phosphoshikimate|5-O
--1-Carboxyvinyl-3-phosphoshikimate|5-O-(1-carboxyvinyl)-3-phosphoshikimate"
compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C10H10O10P</p></html>
    </notes>
</species>
    <species id="M_C01279_c"
name="4-Amino-5-hydroxymethyl-2-methylpyrimidine|Toxopyrimidine|4-Amino-2-methyl-5-pyri
midinemethanol" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H9N3O</p></html>
    </notes>
</species>
    <species id="M_C01289_c"
name="N-Acetyl-D-glucosaminyldiphosphoundecaprenol|Undecaprenyl
N-acetyl-glucosamine" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C63H103NO12P2</p></html>
    </notes>
</species>
    <species id="M_C01290_c"
name="beta-D-Galactosyl-1,4-beta-D-glucosylceramide|Lactosylceramide|Gal-beta1->4Glc-beta1
->1'Cer|LacCer|Lactosyl-N-acylsphingosine|D-Galactosyl-1,4-beta-D-glucosylceramide"
compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C31H56NO13R</p></html>

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    </notes>
</species>
    <species id="M_C01300_c"
name="2-Amino-4-hydroxy-6-hydroxymethyl-7,8-dihydropteridine|2-amino-4-hydroxy-6-hydroxymethyl-7,8-dihydropteridine|2-Amino-4-hydroxy-6-hydroxymethyl-7-8-dihydropteridine|6-hydroxymethyl dihydropterin" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H9N5O2</p></html>
    </notes>
</species>
    <species id="M_C01302_c" name="1-(2-Carboxyphenylamino)-1'-deoxy-D-ribulose
5'-phosphate|1-(2-carboxyphenylamino)-1-deoxyribulose
5-phosphate|1-(2-Carboxyphenylamino)-1-deoxy-D-ribulose
5-phosphate|1--2-Carboxyphenylamino-1-deoxy-D-ribulose5-phosphate|1-(2-carboxyphenylamino)-1-deoxy-D-ribulose 5-phosphate" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C12H14NO9P</p></html>
    </notes>
</species>
    <species id="M_C01304_c"
name="2,5-Diamino-6-(5'-phosphoribosylamino)-4-pyrimidineone|2,5-Diamino-6-hydroxy-4-(5'-phosphoribosylamino)-pyrimidine|2-5-Diamino-6-hydroxy-4--5-phosphoribosylamino-pyrimidine|2,5-Diamino-6-(ribosylamino)-4-(3H)-pyrimidinone
5'-phosphate|2,5-diamino-6-(ribosylamino)-4-(3h)-pyrimidinone
5'-phosphate|2,5-diamino-6-hydroxy-4-(5-phosphoribosylamino)pyrimidine"
compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C9H15N5O8P</p></html>
    </notes>
</species>
    <species id="M_C01330_c" name="Sodium|Na+|na+" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: Na</p></html>
    </notes>
</species>
    <species id="M_C01330_e" name="Sodium|Na+|na+, extracellular" compartment="C_e">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: Na,
extracellular</p></html>
    </notes>
</species>
    <species id="M_C01337_c" name="XDP" compartment="C_c">

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    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C10H12N4O12P2</p></html>
    </notes>
  </species>
  <species id="M_C01344_c" name="dIDP|2'-Deoxyinosine-5'-diphosphate|2'-Deoxyinosine
5'-diphosphate" compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C10H12N4O10P2</p></html>
    </notes>
  </species>
  <species id="M_C01345_c" name="dITP|2'-Deoxyinosine-5'-triphosphate|2'-Deoxyinosine
5'-triphosphate" compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C10H12N4O13P3</p></html>
    </notes>
  </species>
  <species id="M_C01346_c" name="dUDP|2'-Deoxyuridine 5'-diphosphate|dudp"
compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C9H12N2O11P2</p></html>
    </notes>
  </species>
  <species id="M_C01352_c" name="FADH2|Flavin adenine dinucleotide
reduced|Flavinadeninedinucleotidereduced|fadh2" compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C27H33N9O15P2</p></html>
    </notes>
  </species>
  <species id="M_C01367_c" name="3'-AMP|3'-Adenylic acid|3'-Adenosine
monophosphate|Adenosine-3'-monophosphate|Adenosine 3'-phosphate|AMP 3'-phosphate"
compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C10H13N5O7P</p></html>
    </notes>
  </species>
  <species id="M_C01367_e" name="3'-AMP|3'-Adenylic acid|3'-Adenosine
monophosphate|Adenosine-3'-monophosphate|Adenosine 3'-phosphate|AMP 3'-phosphate,
extracellular" compartment="C_e">

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    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C10H13N5O7P,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C01368_c" name="3'-UMP|Uridine 3'-monophosphate|Uridine 3'-phosphate"
compartment="C_c">
    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C9H12N2O9P</p></html>
    </notes>
  </species>
  <species id="M_C01368_e" name="3'-UMP|Uridine 3'-monophosphate|Uridine 3'-phosphate,
extracellular" compartment="C_e">
    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C9H12N2O9P,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C01412_c" name="Butanal|Butyraldehyde" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H8O</p></html>
    </notes>
  </species>
  <species id="M_C01413_c" name="Cadmium|Cd2+" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: Cd</p></html>
    </notes>
  </species>
  <species id="M_C01413_e" name="Cadmium|Cd2+, extracellular" compartment="C_e">
    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      Cd,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C01419_c" name="Cys-Gly|L-Cysteinyglycine" compartment="C_c">
    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C5H10N2O3S</p></html>
    </notes>
  </species>
  <species      id="M_C01419_e"      name="Cys-Gly|L-Cysteinyglycine,      extracellular"
compartment="C_e">
    <notes>

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    <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C5H10N2O3S,
extracellular</p></html>
  </notes>
</species>
  <species id="M_C01451_c" name="Salicin|Salicoside|salicin" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C13H18O7</p></html>
    </notes>
  </species>
  <species      id="M_C01451_e"      name="Salicin|Salicoside|salicin,      extracellular"
compartment="C_e">
    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C13H18O7,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C01487_c" name="D-Allose" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O6</p></html>
    </notes>
  </species>
  <species id="M_C01487_e" name="D-Allose, extracellular" compartment="C_e">
    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C6H12O6,
extracellular</p></html>
    </notes>
  </species>
  <species      id="M_C01530_c"      name="Octadecanoic      acid|Stearate|Stearic
acid|octadecanoate|stearate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C18H35O2</p></html>
    </notes>
  </species>
  <species      id="M_C01563_c"      name="Carbamate|Carbamic      acid|Aminoformic      acid"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: CH2NO2</p></html>
    </notes>
  </species>
  <species id="M_C01610_c" name="Puromycin" compartment="C_c">
    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C22H30N7O5</p></html>
    </notes>

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</species>
  <species id="M_C01610_e" name="Puromycin, extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C22H30N7O5,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C01613_c" name="Stachyose" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C24H42O21</p></html>
    </notes>
  </species>
  <species id="M_C01613_e" name="Stachyose, extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C24H42O21,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C01635_c" name="tRNA(Ala)" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: </p></html>
    </notes>
  </species>
  <species id="M_C01636_c" name="L-Alanyl-tRNA|L-Alanyl-tRNA(Ala)"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C13H22NO11PR2(C5H8O6PR)n</p></html>
    </notes>
  </species>
  <species id="M_C01637_c" name="tRNA(Asn)" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: </p></html>
    </notes>
  </species>
  <species id="M_C01638_c" name="tRNA(Asp)" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: </p></html>
    </notes>
  </species>
  <species id="M_C01639_c" name="tRNA(Cys)" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: </p></html>
    </notes>
  </species>

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</species>
  <species id="M_C01640_c" name="tRNA(Gln)" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: </p></html>
    </notes>
  </species>
  <species id="M_C01641_c" name="tRNA(Glu)|tRNA (Glu)|tRNA-Glu"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C10H12N5O3R</p></html>
    </notes>
  </species>
  <species id="M_C01642_c" name="tRNA(Gly)" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: </p></html>
    </notes>
  </species>
  <species id="M_C01643_c" name="tRNA(His)" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: </p></html>
    </notes>
  </species>
  <species id="M_C01644_c" name="tRNA(Ile)" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: </p></html>
    </notes>
  </species>
  <species id="M_C01645_c" name="tRNA(Leu)" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: </p></html>
    </notes>
  </species>
  <species id="M_C01646_c" name="tRNA(Lys)" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: </p></html>
    </notes>
  </species>
  <species id="M_C01647_c" name="tRNA(Met)" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: </p></html>
    </notes>
  </species>
  <species id="M_C01648_c" name="tRNA(Phe)" compartment="C_c">

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    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: </p></html>
    </notes>
  </species>
  <species id="M_C01649_c" name="tRNA(Pro)" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: </p></html>
    </notes>
  </species>
  <species id="M_C01650_c" name="tRNA(Ser)" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: </p></html>
    </notes>
  </species>
  <species id="M_C01651_c" name="tRNA(Thr)" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: </p></html>
    </notes>
  </species>
  <species id="M_C01652_c" name="tRNA(Trp)" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: </p></html>
    </notes>
  </species>
  <species id="M_C01653_c" name="tRNA(Val)" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: </p></html>
    </notes>
  </species>
  <species id="M_C01659_c" name="Acrylamide|2-Propenamide|acrylamide"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H5NO</p></html>
    </notes>
  </species>
  <species id="M_C01672_c"
name="Cadaverine|1,5-Pentanediamine|1,5-Diaminopentane|Pentamethylenediamine"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H16N2</p></html>
    </notes>
  </species>
  <species id="M_C01674_c" name="Chitobiose" compartment="C_c">
    <notes>

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    <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C16H28N2O11</p></html>
    </notes>
</species>
    <species id="M_C01697_c" name="Galactitol|Dulcitol|Dulcose" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H14O6</p></html>
    </notes>
</species>
    <species      id="M_C01697_e"      name="Galactitol|Dulcitol|Dulcose,      extracellular"
compartment="C_e">
    <notes>
    <html          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:          C6H14O6,
extracellular</p></html>
    </notes>
</species>
    <species id="M_C01722_c" name="L-Glucitol|L-Sorbitol|D-Gulitol" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H14O6</p></html>
    </notes>
</species>
    <species      id="M_C01722_e"      name="L-Glucitol|L-Sorbitol|D-Gulitol,      extracellular"
compartment="C_e">
    <notes>
    <html          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:          C6H14O6,
extracellular</p></html>
    </notes>
</species>
    <species                                id="M_C01742_c"
name="Palatinose|6-O-alpha-D-Glucopyranosyl-D-fructofuranose" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C12H22O11</p></html>
    </notes>
</species>
    <species                                id="M_C01742_e"
name="Palatinose|6-O-alpha-D-Glucopyranosyl-D-fructofuranose,                                extracellular"
compartment="C_e">
    <notes>
    <html          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:          C12H22O11,
extracellular</p></html>
    </notes>
</species>
    <species id="M_C01762_c" name="Xanthosine|xanthosine" compartment="C_c">
    <notes>

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        <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C10H12N4O6</p></html>
    </notes>
</species>
    <species      id="M_C01762_e"      name="Xanthosine|xanthosine,      extracellular"
compartment="C_e">
    <notes>
        <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C10H12N4O6,
extracellular</p></html>
    </notes>
</species>
    <species id="M_C01769_c" name="(S)-acetoin" compartment="C_c">
    <notes>
        <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H8O2</p></html>
    </notes>
</species>
    <species id="M_C01769_e" name="(S)-acetoin,extracellular" compartment="C_e">
    <notes>
        <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H8O2</p></html>
    </notes>
</species>
    <species                                  id="M_C01801_c"
name="Deoxyribose|2-Deoxy-beta-D-erythro-pentose|Thyminose|2-Deoxy-D-ribose|2-Deoxy-D-e
rythro-pentose" compartment="C_c">
    <notes>
        <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H10O4</p></html>
    </notes>
</species>
    <species                                  id="M_C01801_e"
name="Deoxyribose|2-Deoxy-beta-D-erythro-pentose|Thyminose|2-Deoxy-D-ribose|2-Deoxy-D-e
rythro-pentose, extracellular" compartment="C_e">
    <notes>
        <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C5H10O4,
extracellular</p></html>
    </notes>
</species>
    <species      id="M_C01832_c"      name="Lauroyl-CoA|Lauroyl      coenzyme
A|Dodecanoyl-CoA|ddcoa|Dodecanoyl-CoA      (n-C12:0CoA)|dodecanoyl-coa"
compartment="C_c">
    <notes>
        <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C33H55N7O17P3S</p></html>
    </notes>
</species>

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<species id="M_C01835_c" name="Maltotriose|Amylotriose" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C18H32O16</p></html>
  </notes>
</species>
<species id="M_C01835_e" name="Maltotriose|Amylotriose, extracellular"
compartment="C_e">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C18H32O16,
extracellular</p></html>
  </notes>
</species>
<species id="M_C01847_c" name="flavin mononucleotide reduced|Reduced
FMN|FMNH2|ReducedFMN|fmnh2" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C17H22N4O9P</p></html>
  </notes>
</species>
<species id="M_C01879_c" name="5-Oxoproline|Pyroglutamic
acid|5-Pyrrolidone-2-carboxylic acid|Pyroglutamate|5-Oxo-L-proline|L-Pyroglutamic
acid|L-5-Pyrrolidone-2-carboxylic acid" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H6NO3</p></html>
  </notes>
</species>
<species id="M_C01879_e" name="5-Oxoproline|Pyroglutamic
acid|5-Pyrrolidone-2-carboxylic acid|Pyroglutamate|5-Oxo-L-proline|L-Pyroglutamic
acid|L-5-Pyrrolidone-2-carboxylic acid, extracellular" compartment="C_e">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H6NO3,
extracellular</p></html>
  </notes>
</species>
<species id="M_C01888_c" name="Aminoacetone|1-Amino-2-propanone"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H8NO</p></html>
  </notes>
</species>
<species id="M_C01909_c" name="Dethiobiotin|Desthiobiotin|dethiobiotin"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:

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C10H17N2O3</p></html>

</notes>

</species>

<species id="M\_C01921\_c" name="Glycocholate|Glycocholic acid|3alpha,7alpha,12alpha-Trihydroxy-5beta-cholan-24-oylglycine" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C26H42NO6</p></html>

</notes>

</species>

<species id="M\_C01929\_c" name="L-Histidinal|L-histidinal" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H10N3O</p></html>

</notes>

</species>

<species id="M\_C01931\_c" name="L-Lysyl-tRNA|L-Lysyl-tRNA(Lys)" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C16H29N2O11PR2(C5H8O6PR)n</p></html>

</notes>

</species>

<species id="M\_C01944\_c" name="Octanoyl-CoA|Octanoyl-CoA (n-C8:0CoA)|octanoyl-coa" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C29H47N7O17P3S</p></html>

</notes>

</species>

<species id="M\_C02047\_c" name="L-Leucyl-tRNA|L-Leucyl-tRNA(Leu)" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C21H32N6O11PR(C5H8O6PR)n</p></html>

</notes>

</species>

<species id="M\_C02086\_c" name="Thioglycolate|Mercaptoacetic acid|Mercaptoethanoic acid|Thioglycolic acid" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C2H3O2S</p></html>

</notes>

</species>

<species id="M\_C02086\_e" name="Thioglycolate|Mercaptoacetic acid|Mercaptoethanoic acid|Thioglycolic acid, extracellular" compartment="C\_e">

<notes>

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    <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C2H3O2S,
extracellular</p></html>
  </notes>
</species>
  <species id="M_C02091_c" name="Ureidoglycine|ureidoglycine" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H7N3O3</p></html>
    </notes>
  </species>
  <species id="M_C02130_c" name="Acetyl-maltose" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C14H24O12</p></html>
    </notes>
  </species>
  <species      id="M_C02163_c"      name="L-Arginyl-tRNA(Arg)|L-Arginyl-tRNA"
compartment="C_c">
    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C21H33N9O11PR(C5H8O6PR)n</p></html>
    </notes>
  </species>
  <species id="M_C02166_c" name="Leukotriene C4" compartment="C_c">
    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C30H45N3O9S</p></html>
    </notes>
  </species>
  <species id="M_C02191_c" name="Protoporphyrin|Protoporphyrin IX|Porphyrinogen
IX|protoporphyrin ix" compartment="C_c">
    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C34H32N4O4</p></html>
    </notes>
  </species>
  <species      id="M_C02225_c"
name="2-Methylcitrate|2-Hydroxybutane-1,2,3-tricarboxylate|(2R,3S)-2-Hydroxybutane-1,2,3-tri
carboxylate|2-methyl-citrate|2-methylcitrate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H7O7</p></html>
    </notes>
  </species>
  <species id="M_C02232_c" name="3-Oxoadipyl-CoA" compartment="C_c">
    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:

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C27H38N7O20P3S</p></html>

</notes>

</species>

<species id="M\_C02265\_c" name="D-Phenylalanine|D-alpha-Amino-beta-phenylpropionic acid" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C9H11NO2</p></html>

</notes>

</species>

<species id="M\_C02282\_c" name="GlutaminyI-tRNA|L-GlutaminyI-tRNA(Gln)|GlutaminyI-tRNA(Gln)|Gln-tRNA(Gln)" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C20H29N7O12PR(C5H8O6PR)n</p></html>

</notes>

</species>

<species id="M\_C02291\_c" name="Cystathionine|L-Cystathionine|cystathionine" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H14N2O4S</p></html>

</notes>

</species>

<species id="M\_C02315\_c" name="Protein dithiol" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H11N3O3R2S2</p></html>

</notes>

</species>

<species id="M\_C02323\_c" name="Salicyl alcohol|Saligenin|2-Hydroxybenzyl alcohol|2-(Hydroxymethyl)phenol|2-(hydroxymethyl)phenol|salicyl alcohol" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H8O2</p></html>

</notes>

</species>

<species id="M\_C02323\_e" name="Salicyl alcohol|Saligenin|2-Hydroxybenzyl alcohol|2-(Hydroxymethyl)phenol|2-(hydroxymethyl)phenol|salicyl alcohol, extracellular" compartment="C\_e">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H8O2, extracellular</p></html>

</notes>

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</species>
  <species id="M_C02330_c" name="UDP-L-iduronate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C15H19N2O18P2</p></html>
    </notes>
  </species>
  <species id="M_C02348_c" name="(R)(-)-Allantoin|(R)-Allantoin" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H6N4O3</p></html>
    </notes>
  </species>
  <species id="M_C02350_c" name="Allantoin|(S)-Allantoin|5-Ureidohydantoin|Glyoxyldiureide|(S)(+)-Allantoin|allantoin" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H6N4O3</p></html>
    </notes>
  </species>
  <species id="M_C02350_e" name="Allantoin|(S)-Allantoin|5-Ureidohydantoin|Glyoxyldiureide|(S)(+)-Allantoin|allantoin, extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H6N4O3, extracellular</p></html>
    </notes>
  </species>
  <species id="M_C02353_c" name="2',3'-Cyclic AMP" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C10H11N5O6P</p></html>
    </notes>
  </species>
  <species id="M_C02353_e" name="2',3'-Cyclic AMP, extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C10H11N5O6P, extracellular</p></html>
    </notes>
  </species>
  <species id="M_C02354_c" name="2',3'-Cyclic CMP" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C9H11N3O7P</p></html>
    </notes>
  </species>

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</species>
  <species id="M_C02354_e" name="2',3'-Cyclic CMP, extracellular" compartment="C_e">
    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C9H11N3O7P,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C02355_c" name="2',3'-Cyclic UMP" compartment="C_c">
    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C9H10N2O8P</p></html>
    </notes>
  </species>
  <species id="M_C02355_e" name="2',3'-Cyclic UMP, extracellular" compartment="C_e">
    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C9H10N2O8P,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C02412_c" name="Glycyl-tRNA(Gly)" compartment="C_c">
    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C12H20NO11PR2(C5H8O6PR)n</p></html>
    </notes>
  </species>
  <species      id="M_C02430_c"      name="L-Methionyl-tRNA|L-Methionyl-tRNA(Met)"
compartment="C_c">
    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C20H30N6O11PSR(C5H8O6PR)n</p></html>
    </notes>
  </species>
  <species      id="M_C02463_c"      name="Precorrin
2|Dihydrosirohydrochlorin|dihydrosirohydrochlorin" compartment="C_c">
    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C42H40N4O16</p></html>
    </notes>
  </species>
  <species id="M_C02466_c" name="Trimetaphosphate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: O9P3</p></html>
    </notes>
  </species>

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<species id="M_C02466_e" name="Trimetaphosphate, extracellular" compartment="C_e">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: O9P3,
extracellular</p></html>
  </notes>
</species>
<species id="M_C02474_c" name="alpha-L-Arabinan|alpha-L-Araban|Arabinan"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C15H26O13</p></html>
  </notes>
</species>
<species id="M_C02504_c"
name="(2S)-2-Isopropylmalate|2-Isopropylmalate|2-Isopropylmalic
acid|3-Carboxy-3-hydroxy-4-methylpentanoate|3-Carboxy-3-hydroxy-isocaproate|3-Carboxy-3-hy
droxyisocaproate|2-Hydroxy-2-isopropylbutanedioate|3-Hydroxy-4-methyl-3-carboxypentanoate|2
-isopropylmalate|3-carboxy-3-hydroxy-isocaproate" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H10O5</p></html>
  </notes>
</species>
<species id="M_C02505_c" name="2-Phenylacetamide" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C8H9NO</p></html>
  </notes>
</species>
<species id="M_C02512_c"
name="3-Cyano-L-alanine|L-3-Cyanoalanine|L-beta-Cyanoalanine" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H6N2O2</p></html>
  </notes>
</species>
<species id="M_C02527_c" name="Butanoylphosphate|Butanoyl phosphate"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H8O5P</p></html>
  </notes>
</species>
<species id="M_C02528_c" name="Chenodeoxycholate|Chenodeoxycholic
acid|3alpha,7alpha-Dihydroxy-5beta-cholanic acid|Chenodiol" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C24H39O4</p></html>
  </notes>
</species>

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<species id="M_C02532_c" name="D-O-Phosphoserine" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H7NO6P</p></html>
  </notes>
</species>
<species id="M_C02532_e" name="D-O-Phosphoserine, extracellular" compartment="C_e">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H7NO6P,
extracellular</p></html>
  </notes>
</species>
<species id="M_C02553_c" name="L-Seryl-tRNA(Ser)" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C13H22NO12PR2(C5H8O6PR)n</p></html>
  </notes>
</species>
<species id="M_C02554_c" name="L-Valyl-tRNA(Val)" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C20H30N6O11PR(C5H8O6PR)n</p></html>
  </notes>
</species>
<species id="M_C02582_c" name="Protein disulfide" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C7H9N3O3R2S2</p></html>
  </notes>
</species>
<species id="M_C02593_c" name="Tetradecanoyl-CoA|Myristoyl-CoA|Tetradecanoyl-CoA
(n-C14:0CoA)|tetradecanoyl-coa" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C35H59N7O17P3S</p></html>
  </notes>
</species>
<species id="M_C02631_c"
name="2-Isopropylmaleate|beta-Isopropylmaleate|2-isopropylmaleate" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H8O4</p></html>
  </notes>
</species>
<species id="M_C02637_c"
name="3-Dehydroshikimate|3-dehydroshikimate|3-dehydro-shikimate" compartment="C_c">

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    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H7O5</p></html>
    </notes>
  </species>
  <species id="M_C02656_c" name="6-Carboxyhexanoate|Pimelate|Pimelic acid|Heptanedioic
acid|pimelate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H10O4</p></html>
    </notes>
  </species>
  <species id="M_C02693_c" name="Indole-3-acetamide" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C10H10N2O</p></html>
    </notes>
  </species>
  <species id="M_C02702_c" name="L-Prolyl-tRNA(Pro)" compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C15H24NO11PR2(C5H8O6PR)n</p></html>
    </notes>
  </species>
  <species
    id="M_C02720_c"
    name="N-Hydroxyarylamine|Hydroxylaminobenzene|(Hydroxyamino)benzene"
    compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H7NO</p></html>
    </notes>
  </species>
  <species
    id="M_C02730_c"
    name="2-Succinylbenzoate|o-Succinylbenzoate|Succinylbenzoate|2-succinylbenzoate"
    compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C11H8O5</p></html>
    </notes>
  </species>
  <species
    id="M_C02739_c"
    name="Phosphoribosyl-ATP|N1-(5-Phospho-D-ribose)-ATP|1-(5-Phosphoribosyl)-ATP|phosphori
bosyl-ATP|1-(5-phospho-D-ribose)-ATP|1-(5-Phospho-D-ribose)-ATP|phosphoribosyl-atp"
    compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C15H21N5O20P4</p></html>
    </notes>
  </species>

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    <species id="M_C02741_c"
name="Phosphoribosyl-AMP|N1-(5-Phospho-D-ribosyl)-AMP|1-(5-Phosphoribosyl)-AMP|phosp
horibosyl-AMP|phosphoribosyl-amp|1-(5-phospho-D-ribosyl)-AMP" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C15H21N5O14P2</p></html>
    </notes>
</species>
    <species id="M_C02835_c" name="Imidazole-4-acetate|Imidazoleacetic
acid|4-Imidazoleacetate" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H5N2O2</p></html>
    </notes>
</species>
    <species id="M_C02839_c" name="L-Tyrosyl-tRNA(Tyr)" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C24H30N6O12PR(C5H8O6PR)n</p></html>
    </notes>
</species>
    <species id="M_C02876_c" name="Propanoyl phosphate|Propionyl phosphate"
compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H6O5P</p></html>
    </notes>
</species>
    <species id="M_C02923_c" name="2,3-Dihydroxytoluene|3-Methylcatechol"
compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H8O2</p></html>
    </notes>
</species>
    <species id="M_C02939_c" name="3-Methylbutanoyl-CoA|Isovaleryl-CoA|isovaleryl-CoA"
compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C26H41N7O17P3S</p></html>
    </notes>
</species>
    <species id="M_C02949_c" name="4-Hydroxybenzoyl-CoA" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C28H37N7O18P3S</p></html>
    </notes>

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</species>
  <species id="M_C02984_c" name="L-Aspartyl-tRNA(Asp)" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C14H22NO13PR2(C5H8O6PR)n</p></html>
    </notes>
  </species>
  <species id="M_C02987_c" name="L-Glutamyl-tRNA(Glu)|L-Glutamyl-tRNA-Glu"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C15H19N6O6R</p></html>
    </notes>
  </species>
  <species id="M_C02988_c" name="L-Histidyl-tRNA(His)" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C16H24N3O11PR2(C5H8O6PR)n</p></html>
    </notes>
  </species>
  <species id="M_C02989_c" name="L-Methionine S-oxide" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H11NO3S</p></html>
    </notes>
  </species>
  <species id="M_C02992_c" name="L-Threonyl-tRNA(Thr)" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C14H24NO12PR2(C5H8O6PR)n</p></html>
    </notes>
  </species>
  <species id="M_C02995_c" name="Maltose 6'-phosphate|D-maltose-6-phosphate|Maltose
6-phosphate|maltose-6-phosphate|maltose 6-phosphate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C12H22O14P</p></html>
    </notes>
  </species>
  <species id="M_C02999_c"
name="N-Acetylmuramoyl-Ala|N-Acetyl-D-muramoyl-L-alanine" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C14H23N2O9</p></html>
    </notes>
  </species>

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</species>
  <species id="M_C03012_c"
name="Naphthalene-1,2-diol|1,2-Naphthalenediol|beta-Naphthohydroquinone|1,2-Dihydroxynaphthalene" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C10H8O2</p></html>
    </notes>
  </species>
  <species id="M_C03031_c" name="Uridine 2'-phosphate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C9H12N2O9P</p></html>
    </notes>
  </species>
  <species id="M_C03031_e" name="Uridine 2'-phosphate, extracellular"
compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C9H12N2O9P,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C03044_c"
name="(R,R)-Butane-2,3-diol|(R,R)-2,3-Butanediol|(R,R)-2,3-Butylene glycol|(R,R)-butane-2,3-diol|BDOH" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H10O2</p></html>
    </notes>
  </species>
  <species id="M_C03044_e"
name="(R,R)-Butane-2,3-diol|(R,R)-2,3-Butanediol|(R,R)-2,3-Butylene glycol|(R,R)-butane-2,3-diol|BDOH, extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H10O2,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C03069_c"
name="3-Methylcrotonyl-CoA|3-Methylbut-2-enoyl-CoA|3-Methylcrotonoyl-CoA|Dimethylacryloyl-CoA|3-methylcrotonyl-CoA" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C26H39N7O17P3S</p></html>
    </notes>
  </species>

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<species id="M_C03078_c" name="4-Guanidinobutanamide" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H13N4O</p></html>
  </notes>
</species>
<species id="M_C03082_c" name="4-Phospho-L-aspartate|L-4-Aspartyl
phosphate|4-phospho-L-aspartate" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H7NO7P</p></html>
  </notes>
</species>
<species id="M_C03089_c"
name="5-Methylthio-D-ribose|S-Methyl-5-thio-D-ribose|methylthioribose" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O4S</p></html>
  </notes>
</species>
<species id="M_C03089_e"
name="5-Methylthio-D-ribose|S-Methyl-5-thio-D-ribose|methylthioribose, extracellular"
compartment="C_e">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O4S,
extracellular</p></html>
  </notes>
</species>
<species id="M_C03090_c"
name="5-Phosphoribosylamine|5-Phospho-beta-D-ribosylamine|5-Phospho-D-ribosylamine|5-Pho
sphoribosyl-1-amine|5-phospho-beta-D-ribosylamine|5-phosphoribosylamine"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H12NO7P</p></html>
  </notes>
</species>
<species id="M_C03104_c" name="Cytidine 2'-phosphate|2'-Cytidylic acid|Cytidine
2'-monophosphate" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C9H13N3O8P</p></html>
  </notes>
</species>
<species id="M_C03104_e" name="Cytidine 2'-phosphate|2'-Cytidylic acid|Cytidine
2'-monophosphate, extracellular" compartment="C_e">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C9H13N3O8P,

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extracellular</p></html>  
 </notes>  
</species>  
 <species id="M\_C03112\_c" name="Deacetylcephalosporin C" compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
 C14H18N3O7S</p></html>  
 </notes>  
</species>  
 <species id="M\_C03125\_c" name="L-Cysteinyl-tRNA(Cys)" compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
 C18H26N6O11PSR(C5H8O6PR)n</p></html>  
 </notes>  
</species>  
 <species id="M\_C03127\_c" name="L-Isoleucyl-tRNA(Ile)" compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
 C21H32N6O11PR(C5H8O6PR)n</p></html>  
 </notes>  
</species>  
 <species id="M\_C03145\_c" name="N-Formyl-L-methionine" compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H10NO3S</p></html>  
 </notes>  
</species>  
 <species id="M\_C03150\_c"  
 name="N-Ribosylnicotinamide|1-(beta-D-Ribofuranosyl)nicotinamide" compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
 C11H15N2O5</p></html>  
 </notes>  
</species>  
 <species id="M\_C03160\_c"  
 name="2-Succinylbenzoyl-CoA|o-Succinylbenzoyl-CoA|Succinylbenzoyl-CoA|O-Succinylbenzoyl-CoA|2-succinylbenzoyl-CoA" compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
 C32H40N7O20P3S</p></html>  
 </notes>  
</species>  
 <species id="M\_C03175\_c" name="Shikimate 3-phosphate|Shikimate 5-phosphate|Shikimate5-phosphate|shikimate-3-phosphate|3-phosphoshikimate" compartment="C\_c">



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    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H9O8P</p></html>
    </notes>
  </species>
  <species id="M_C03203_c" name="1-Hydroxy-2-naphthoate|1-Hydroxy-2-naphthoic
acid|1-Naphthol-2-carboxylic acid" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C11H7O3</p></html>
    </notes>
  </species>
  <species id="M_C03221_c"
name="2-trans-Dodecenoyl-CoA|trans-Dodec-2-enoyl-CoA|(2E)-Dodec-2-enoyl-CoA|(2E)-Dodec
enoyl-CoA|trans-dodec-2-enoyl-coa" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C33H53N7O17P3S</p></html>
    </notes>
  </species>
  <species id="M_C03231_c"
name="3-Methylglutaconyl-CoA|trans-3-Methylglutaconyl-CoA|3-methylglutaconyl-CoA"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C27H38N7O19P3S</p></html>
    </notes>
  </species>
  <species id="M_C03232_c" name="3-Phosphonooxypyruvate|3-Phosphonooxypyruvic
acid|3-Phosphohydroxypyruvate|3-Phosphohydroxypyruvic
acid|3-phosphohydroxypyruvate|3-phospho-hydroxypyruvate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H3O7P</p></html>
    </notes>
  </species>
  <species id="M_C03239_c" name="6-Amino-2-oxohexanoate|2-Oxo-6-aminocaproate"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H11NO3</p></html>
    </notes>
  </species>
  <species id="M_C03263_c" name="Coproporphyrinogen
III|CoproporphyrinogenIII|coproporphyrinogen iii" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C36H40N4O8</p></html>

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    </notes>
</species>
<species id="M_C03274_c" name="Glycerophosphoglycerol" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H14O8P</p></html>
  </notes>
</species>
<species id="M_C03287_c" name="L-Glutamyl 5-phosphate|L-Glutamate
5-phosphate|L-glutamate-5-phosphate|l-glutamate-5-phosphate|L-gamma-glutamyl 5-phosphate"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H9NO7P</p></html>
  </notes>
</species>
<species id="M_C03294_c" name="N-Formylmethionyl-tRNA" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C21H30N6O12PSR(C5H8O6PR)n</p></html>
  </notes>
</species>
<species id="M_C03319_c" name="dTDP-6-deoxy-L-mannose|dTDP-L-rhamnose"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C16H26N2O15P2</p></html>
  </notes>
</species>
<species id="M_C03340_c" name="L-2,3-Dihydrodipicolinate|Dihydrodipicolinic
acid|Dihydrodipicolinate|2,3-Dihydrodipicolinate|2,3-dihydrodipicolinate|2-3-Dihydrodipicolinate
" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H5NO4</p></html>
  </notes>
</species>
<species id="M_C03344_c"
name="2-Methylacetoacetyl-CoA|2-Methyl-3-acetoacetyl-CoA|2-methyl-acetoacetyl-CoA"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C26H39N7O18P3S</p></html>
  </notes>
</species>
<species id="M_C03345_c"
name="2-Methylbut-2-enoyl-CoA|trans-2-Methylbut-2-enoyl-CoA|Tiglyl-CoA|(E)-2-Methylcroto

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noyl-CoA|Methylcrotonoyl-CoA|Methylcrotonyl-CoA|Tigloyl-CoA|2-Methylcrotonoyl-CoA"

compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C26H39N7O17P3S</p></html>

</notes>

</species>

<species id="M\_C03360\_c" name="4-Nitrophenyl phosphate" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H5NO6P</p></html>

</notes>

</species>

<species id="M\_C03373\_c" name="Aminoimidazole  
ribotide|AIR|1-(5'-Phosphoribosyl)-5-aminoimidazole|5'-Phosphoribosyl-5-aminoimidazole|1-(5-P  
hospho-D-ribosyl)-5-aminoimidazole|5-Amino-1-(5-phospho-D-ribosyl)imidazole|5-amino-1-(5-p  
hospho-D-ribosyl)imidazole|5-amino-1--5-phospho-D-ribosylimidazole|5'-phosphoribosyl-5-amin  
oimidazole|1-(5-phosphoribosyl)-5-aminoimidazole" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C8H14N3O7P</p></html>

</notes>

</species>

<species id="M\_C03402\_c"  
name="L-AsparaginyI-tRNA(Asn)|Asn-tRNA(Asn)|AsparaginyI-tRNA(Asn)"  
compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C14H23N2O12PR2(C5H8O6PR)n</p></html>

</notes>

</species>

<species id="M\_C03406\_c"  
name="N-(L-Arginino)succinate|N(omega)-(L-Arginino)succinate|L-Argininosuccinate|L-Arginin  
osuccinic acid|L-Arginosuccinic  
acid|N-omega-(L-Arginino)succinate|L-argininosuccinate|2-(Nomega-L-Arginino)succinate|l-argin  
ino-succinate" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C10H17N4O6</p></html>

</notes>

</species>

<species id="M\_C03413\_c" name="N1,N12-Diacetylspermine" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C14H32N4O2</p></html>

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    </notes>
</species>
  <species id="M_C03427_c" name="Prephytoene diphosphate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C40H66O7P2</p></html>
    </notes>
  </species>
  <species id="M_C03451_c" name="(R)-S-Lactoylglutathione" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C13H20N3O8S</p></html>
    </notes>
  </species>
  <species id="M_C03459_c" name="2-Hydroxy-3-oxosuccinate|Oxaloglycolate"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H2O6</p></html>
    </notes>
  </species>
  <species id="M_C03460_c"
name="2-Methylprop-2-enoyl-CoA|Methacrylyl-CoA|Methylacrylyl-CoA|methylacrylyl-CoA"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C25H37N7O17P3S</p></html>
    </notes>
  </species>
  <species id="M_C03479_c"
name="5-Formyltetrahydrofolate|L(-)-5-Formyl-5,6,7,8-tetrahydrofolic acid|Folinic acid"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C20H21N7O7</p></html>
    </notes>
  </species>
  <species id="M_C03492_c"
name="D-4'-Phosphopantothenate|(R)-4'-Phosphopantothenate|D-4-Phosphopantothenate"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C9H16NO8P</p></html>
    </notes>
  </species>
  <species id="M_C03506_c" name="Indoleglycerol phosphate|1-C-(Indol-3-yl)glycerol

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3-phosphate|(3-Indolyl)-glycerol phosphate|C1-(3-Indolyl)-glycerol  
3-phosphate|(1S,2R)-1-C-(Indol-3-yl)glycerol 3-phosphate|Indole-3-glycerol  
phosphate|C'-(3-Indolyl)-glycerol  
3-phosphate|indole-3-glycerol-phosphate|C--3-Indolyl-glycerol3-phosphate|1-(indol-3-yl)glycerol  
3-phosphate" compartment="C\_c">  
<notes>  
<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C11H13NO6P</p></html>  
</notes>  
</species>  
<species id="M\_C03508\_c" name="L-2-Amino-3-oxobutanoic  
acid|L-2-Amino-3-oxobutanoate|L-2-Amino-acetoacetate|(S)-2-Amino-3-oxobutanoic acid"  
compartment="C\_c">  
<notes>  
<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H7NO3</p></html>  
</notes>  
</species>  
<species id="M\_C03511\_c" name="L-Phenylalanyl-tRNA(Phe)" compartment="C\_c">  
<notes>  
<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C19H26NO11PR2(C5H8O6PR)n</p></html>  
</notes>  
</species>  
<species id="M\_C03512\_c" name="L-Tryptophanyl-tRNA(Trp)" compartment="C\_c">  
<notes>  
<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C26H31N7O11PR(C5H8O6PR)n</p></html>  
</notes>  
</species>  
<species id="M\_C03539\_c"  
name="S-Ribosyl-L-homocysteine|S-D-Ribosyl-L-homocysteine|Ribose-5-S-homocysteine|S-Rib  
osylhomocysteine|S-(5-Deoxy-D-ribos-5-yl)-L-homocysteine|S-ribosyl-L-homocysteine|s-d-ribos  
yl-l-homocysteine" compartment="C\_c">  
<notes>  
<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C9H17NO6S</p></html>  
</notes>  
</species>  
<species id="M\_C03546\_c" name="myo-Inositol 4-phosphate|D-myo-Inositol  
4-phosphate|1D-myo-Inositol 4-phosphate|1D-myo-Inositol 4-monophosphate|Inositol  
4-phosphate" compartment="C\_c">  
<notes>  
<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O9P</p></html>  
</notes>  
</species>

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    <species id="M_C03570_c" name="D-Mannosamine|2-Amino-2-deoxy-D-mannose"
compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H14NO5</p></html>
    </notes>
</species>
    <species id="M_C03570_e" name="D-Mannosamine|2-Amino-2-deoxy-D-mannose,
extracellular" compartment="C_e">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H14NO5,
extracellular</p></html>
    </notes>
</species>
    <species id="M_C03619_c" name="Methyl beta-D-galactoside|Methyl
beta-D-galactopyranoside" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H14O6</p></html>
    </notes>
</species>
    <species id="M_C03619_e" name="Methyl beta-D-galactoside|Methyl
beta-D-galactopyranoside, extracellular" compartment="C_e">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H14O6,
extracellular</p></html>
    </notes>
</species>
    <species id="M_C03626_c"
name="NG,NG-Dimethyl-L-arginine|Nomega, Nomega'-Dimethyl-L-arginine"
compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C8H19N4O2</p></html>
    </notes>
</species>
    <species id="M_C03657_c"
name="1,4-Dihydroxy-2-naphthoate|1,4-dihydroxy-2-naphthoate|1-4-Dihydroxy-2-naphthoate"
compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C11H7O4</p></html>
    </notes>
</species>
    <species id="M_C03680_c" name="4-Imidazolone-5-propanoate|4-Imidazolone-5-propionic
acid|4,5-Dihydro-4-oxo-5-imidazolepropanoate" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H7N2O3</p></html>

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    </notes>
</species>
    <species id="M_C03684_c"
name="6-Pyruvoyltetrahydropterin|6-(1,2-Dioxopropyl)-5,6,7,8-tetrahydropterin|6-Pyruvoyl-5,6,7,8-tetrahydropterin" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C9H11N5O3</p></html>
    </notes>
</species>
    <species id="M_C03688_c" name="Apo-[acyl-carrier-protein]|apo-ACP|apoprotein [acyl carrier protein]" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: HOR</p></html>
    </notes>
</species>
    <species id="M_C03722_c" name="Pyridine-2,3-dicarboxylate|Quinolinic acid|Quinolate|2,3-Pyridinedicarboxylic acid|quinolate" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H3NO4</p></html>
    </notes>
</species>
    <species id="M_C03741_c" name="(S)-4-Amino-5-oxopentanoate|L-Glutamate 1-semialdehyde|L-Glutamate 1-semialdehyde" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H9NO3</p></html>
    </notes>
</species>
    <species id="M_C03785_c" name="D-Tagatose 1,6-bisphosphate|D-tagatose 1,6-bisphosphate|D-Tagatose 1,6-biphosphate" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O12P2</p></html>
    </notes>
</species>
    <species id="M_C03794_c"
name="N6-(1,2-Dicarboxyethyl)-AMP|Adenylosuccinate|Adenylosuccinic acid|adenylosuccinate|N6--1-2-Dicarboxyethyl-AMP|adenylo-succinate" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C14H15N5O11P</p></html>
    </notes>
</species>
    <species id="M_C03838_c"
name="5'-Phosphoribosylglycinamide|GAR|N1-(5-Phospho-D-ribosyl)glycinamide|Glycinamide

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ribonucleotide|N1--5-Phospho-D-ribosylglycinamide|5'-phosphoribosylglycinamide"  
 compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
 C7H15N2O8P</p></html>  
 </notes>  
</species>  
 <species id="M\_C03871\_c"  
 name="L-2-Amino-6-oxoheptanedioate|L-2-Amino-6-oxopimelate" compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H10NO5</p></html>  
 </notes>  
</species>  
 <species id="M\_C03912\_c"  
 name="(S)-1-Pyrroline-5-carboxylate|L-1-Pyrroline-5-carboxylate|1-Pyrroline-5-carboxylate|1-py  
 rroline-5-carboxylate" compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H6NO2</p></html>  
 </notes>  
</species>  
 <species id="M\_C03921\_c" name="2-Dehydro-3-deoxy-D-glucarate" compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H6O7</p></html>  
 </notes>  
</species>  
 <species id="M\_C03939\_c" name="Acetyl-[acyl-carrier  
 protein]|Acetyl-ACP|acetyl-ACP|acetyl-acp" compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
 C13H23N2O8PRS</p></html>  
 </notes>  
</species>  
 <species id="M\_C03972\_c"  
 name="2,3,4,5-Tetrahydrodipicolinate|delta1-Piperidine-2,6-dicarboxylate|L-2,3,4,5-Tetrahydrodi  
 picolinate|(S)-2,3,4,5-Tetrahydropyridine-2,6-dicarboxylate|2-3-4-5-Tetrahydrodipicolinate|tetrahy  
 drodipicolinate" compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H7NO4</p></html>  
 </notes>  
</species>  
 <species id="M\_C04006\_c" name="1D-myo-Inositol 3-phosphate|D-myo-Inositol  
 3-phosphate|myo-Inositol 3-phosphate|Inositol 3-phosphate|1D-myo-Inositol  
 3-monophosphate|D-myo-Inositol 3-monophosphate|myo-Inositol 3-monophosphate|Inositol  
 3-monophosphate|1L-myo-Inositol 1-phosphate|L-myo-Inositol 1-phosphate"



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compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O9P</p></html>
  </notes>
</species>
  <species id="M_C04030_c" name="(2,3-Dihydroxybenzoyl)adenylate" compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C17H17N5O10P</p></html>
    </notes>
  </species>
  <species
    id="M_C04039_c"
name="2,3-Dihydroxy-3-methylbutanoate|2,3-Dihydroxy-isovalerate|2,3-Dihydroxy-isovaleric
acid|2,3-dihydroxy-3-methylbutanoate|(R)-2,3-Dihydroxy-3-methylbutanoate|(R)-2,3-Dihydroxy-i
sovalerate|(R)-2,3-Dihydroxy-isovaleric
acid|(2R)-2,3-Dihydroxy-3-methylbutanoate|R-2-3-Dihydroxy-3-methylbutanoate|2,3-dihydroxy-i
sovalerate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H9O4</p></html>
    </notes>
  </species>
  <species
    id="M_C04053_c"
name="5-Dehydro-4-deoxy-D-glucuronate|4-Deoxy-L-threo-5-hexosulose
uronate"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H7O6</p></html>
    </notes>
  </species>
  <species id="M_C04076_c" name="L-2-Aminoadipate 6-semialdehyde|2-Aminoadipate
6-semialdehyde" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H11NO3</p></html>
    </notes>
  </species>
  <species
    id="M_C04089_c"
name="UDP-4-dehydro-6-deoxy-D-glucose|UDP-4-keto-6-deoxy-D-glucose|UDP-4-oxo-6-deoxy
-D-glucose" compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C15H20N2O16P2</p></html>
    </notes>
  </species>
  <species
    id="M_C04092_c"
name="1,2-Didehydropiperidine-2-carboxylate|delta1-Piperideine-2-carboxylate"

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compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H8NO2</p></html>
  </notes>
</species>
  <species id="M_C04133_c" name="N-Acetyl-L-glutamate 5-phosphate|N-Acetyl-L-glutamyl
5-phosphate|N-acetyl-glutamyl-phosphate|N-acetyl-5-glutamyl
phosphate|n-acetylglutamyl-phosphate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H10NO8P</p></html>
    </notes>
  </species>
  <species id="M_C04144_c" name="Tetrahydropteroyltri-L-glutamate" compartment="C_c">
    <notes>
      <html
                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C29H37N9O12</p></html>
    </notes>
  </species>
  <species
                                id="M_C04171_c"
name="2,3-Dihydro-2,3-dihydroxybenzoate|2,3-Dihydroxy-2,3-dihydrobenzoate|2,3-dihydro-2,3-
dihydroxybenzoate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H7O4</p></html>
    </notes>
  </species>
  <species
                                id="M_C04181_c"
                                name="3-Hydroxy-3-methyl-2-oxobutanoic
acid|3-Hydroxy-3-methyl-2-oxobutanoate|2-Oxo-3-hydroxyisovalerate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H7O4</p></html>
    </notes>
  </species>
  <species
                                id="M_C04188_c"
                                name="S-Methyl-5-thio-D-ribose
1-phosphate|5-Methylthio-5-deoxy-D-ribose
                                1-phosphate|S-Methyl-5-thio-alpha-D-ribose
1-phosphate|S-Methyl-5-thio-5-deoxy-D-ribose
1-phosphate|5-Methylthio-5-deoxy-D-ribose 1-phosphate|methylthioribose-1-phosphate"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O7PS</p></html>
    </notes>
  </species>
  <species id="M_C04216_c" name="all-trans-Heptaprenyl diphosphate" compartment="C_c">
    <notes>
      <html
                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C35H58O7P2</p></html>

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    </notes>
</species>
  <species id="M_C04217_c" name="all-trans-Pentaprenyl diphosphate|pendp"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C25H42O7P2</p></html>
    </notes>
</species>
  <species id="M_C04225_c"
name="(Z)-But-2-ene-1,2,3-tricarboxylate|2-methyl-cis-aconitase|cis-2-Methyлаconitate"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H5O6</p></html>
    </notes>
</species>
  <species id="M_C04236_c"
name="(2S)-2-Isopropyl-3-oxosuccinate|3-Carboxy-4-methyl-2-oxopentanoate|2-Oxo-4-methyl-3-
carboxypentanoate|2-isopropyl-3-oxosuccinate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H8O5</p></html>
    </notes>
</species>
  <species id="M_C04246_c" name="But-2-enoyl-[acyl-carrier protein]" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C15H25N2O8PRS</p></html>
    </notes>
</species>
  <species id="M_C04261_c" name="Protein N(pi)-phospho-L-histidine|Protein
N-pros-phospho-L-histidine|Protein N-pros-phosphohistidine|Protein Npi-phospho-L-histidine"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C7H9N4O5PR2</p></html>
    </notes>
</species>
  <species id="M_C04281_c"
name="L-1-Pyrroline-3-hydroxy-5-carboxylate|3-Hydroxy-L-1-pyrroline-5-carboxylate|(3R,5S)-1
-Pyrroline-3-hydroxy-5-carboxylate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H6NO3</p></html>
    </notes>
</species>

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<species id="M\_C04287\_c" name="3,5/4-Trihydroxycyclohexa-1,2-dione|D-2,3-Diketo 4-deoxy-epi-inositol|DKDI|D-2,3-diketo-4-deoxy-epi-inositol|3D-(3,5/4)-Trihydroxycyclohexa-1, 2-dione|D-2,3-Diketo-4-deoxy-epi-inositol|(3R,4S,5R)-3,4,5-Trihydroxy-1,2-cyclohexanedione" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C<sub>6</sub>H<sub>8</sub>O<sub>5</sub></p></html>

</notes>

</species>

<species id="M\_C04294\_c" name="5-(2-Hydroxyethyl)-4-methylthiazole|4-Methyl-5-(2'-hydroxyethyl)-thiazole|4-Methyl-5-( 2-hydroxyethyl)-thiazole|4-Methyl-5--2-hydroxyethyl-thiazole|4-methyl-5-(2-hydroxyethyl)-thiaz ole" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C<sub>6</sub>H<sub>9</sub>NOS</p></html>

</notes>

</species>

<species id="M\_C04302\_c" name="N-(5-Phospho-D-ribosyl)anthranilate|N-(5-Phospho-beta-D-ribosyl)anthranilate|N-(5-Phos phoribosyl)anthranilic acid|N--5-Phospho-D-ribosylanthranilate|N-5-phosphoribosyl-anthranilate|N-(5-phospho-beta-D-ri bosyl)-anthranilate" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C<sub>12</sub>H<sub>14</sub>NO<sub>9</sub>P</p></html>

</notes>

</species>

<species id="M\_C04327\_c" name="4-Methyl-5-(2-phosphoethyl)-thiazole|4-Methyl-5-(2-phosphono-oxyethyl)-thiazole|4-Met hyl-5--2-phosphoethyl-thiazole|4-methyl-5-(2- phosphoethyl)-thiazole" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C<sub>6</sub>H<sub>9</sub>NO<sub>4</sub>PS</p></html>

</notes>

</species>

<species id="M\_C04332\_c" name="6,7-Dimethyl-8-(1-D-ribityl)lumazine|6,7-dimethyl-8-(1-D-ribityl)lumazine|6-7-Dimethyl- 8--1-D-ribityllumazine|6,7-dimethyl-8-(1-d-ribityl)lumazine" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C<sub>13</sub>H<sub>18</sub>N<sub>4</sub>O<sub>6</sub></p></html>

</notes>

</species>

<species id="M\_C04349\_c" name="(4S)-4,6-Dihydroxy-2,5-dioxohexanoate|3-Deoxy-D-glycero-2,5-hexodiulosonate|2,5-Dik

eto-3-deoxy-D-gluconate" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C<sub>6</sub>H<sub>7</sub>O<sub>6</sub></p></html>

</notes>

</species>

<species id="M\_C04352\_c"

name="(R)-4'-Phosphopantothenoyl-L-cysteine|N-((R)-4-Phosphopantothenoyl)-L-cysteine|N-[(R)-4'-Phosphopantothenoyl]-L-cysteine|N-(-R-4-Phosphopantothenoyl)-L-cysteine"

compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C<sub>12</sub>H<sub>21</sub>N<sub>2</sub>O<sub>9</sub>PS</p></html>

</notes>

</species>

<species id="M\_C04376\_c"

name="5'-Phosphoribosyl-N-formylglycinamide|N-Formyl-GAR|N-Formylglycinamide ribonucleotide|N2-Formyl-N1-(5-phospho-D-ribose)glycinamide|N2-Formyl-N1--5-phospho-D-ribose|glycinamide|5'-phosphoribosyl-N-formylglycinamide|5'-phosphoribosylformylglycinamide"

compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C<sub>8</sub>H<sub>14</sub>N<sub>2</sub>O<sub>9</sub>P</p></html>

</notes>

</species>

<species id="M\_C04390\_c"

name="N6-Acetyl-LL-2,6-diaminoheptanedioate|N2-Acetyl-LL-2,6-diaminoheptanedioate|N6-Acetyl-LL-2,6-diaminopimelate|N2-Acetyl-LL-2,6-diaminopimelate|N6-Acetyl-L-2,6-diaminoheptanedioate|N6-Acetyl-L-2,6-diaminopimelate|N-Acetyl-LL-2,6-diaminoheptanedioate|N-acetyl-LL-2,6-diaminopimelate" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C<sub>9</sub>H<sub>15</sub>N<sub>2</sub>O<sub>5</sub></p></html>

</notes>

</species>

<species id="M\_C04405\_c"

name="(2S,3S)-3-Hydroxy-2-methylbutanoyl-CoA|(S)-3-Hydroxy-2-methylbutyryl-CoA"

compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C<sub>26</sub>H<sub>41</sub>N<sub>7</sub>O<sub>18</sub>P<sub>3</sub>S</p></html>

</notes>

</species>

<species id="M\_C04411\_c"

name="(2R,3S)-3-Isopropylmalate|3-Isopropylmalate|3-Carboxy-2-hydroxy-4-methylpentanoate|2-D-threo-Hydroxy-3-carboxy-isocaproate|3-isopropylmalate|2-d-threo-hydroxy-3-carboxy-isocapr

oate" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H10O5</p></html>

</notes>

</species>

<species id="M\_C04419\_c" name="Carboxybiotin-carboxyl-carrier protein" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C18H26N5O6R2S</p></html>

</notes>

</species>

<species id="M\_C04421\_c" name="N-Succinyl-LL-2,6-diaminoheptanedioate|N-Succinyl-LL-2,6-diaminopimelate|N-Succinyl-L-2,6-diaminoheptanedioate|N-Succinyl-L-2,6-diaminopimelate|N-succinyl-LL-2,6-diaminoheptanedioate|N-Succinyl-LL-2-6-diaminoheptanedioate|n-succinyl-ll-2,6-diaminopimelate" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C11H16N2O7</p></html>

</notes>

</species>

<species id="M\_C04425\_c" name="S-Adenosyl-4-methylthio-2-oxobutanoate|s-adenosyl-4-methylthio-2-oxobutanoate" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C15H19N5O6S</p></html>

</notes>

</species>

<species id="M\_C04442\_c" name="2-Dehydro-3-deoxy-6-phospho-D-gluconate|6-Phospho-2-dehydro-3-deoxy-D-gluconate|2-Keto-3-deoxy-6-phosphogluconate|2-Dehydro-3-deoxy-D-gluconate 6-phosphate|2-Dehydro-3-deoxy-D-gluconate6-phosphate|2-keto-3-deoxy-6-phosphogluconate|2-dehydro-3-deoxy-D-gluconate 6-phosphate|2-keto-3-deoxy-6-phospho-gluconate" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H9O9P</p></html>

</notes>

</species>

<species id="M\_C04454\_c" name="5-Amino-6-(5'-phosphoribitylamino)uracil|5-Amino-2,6-dioxy-4-(5'-phosphoribitylamino)pyrimidine|5-Amino-6-(5-phosphoribitylamino)uracil|5-Amino-6--5-phosphoribitylaminouracil|5-amino-6-(5-phosphoribitylamino)uracil|5-amino-2,6-dioxy-4-(5'-phosphoribitylamino)pyrimidine"

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compartment="C_c">
  <notes>
    <html
      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C9H16N4O9P</p></html>
    </notes>
  </species>
  <species id="M_C04483_c" name="3alpha,12alpha-Dihydroxy-5beta-cholanate|Deoxycholic
acid|Deoxycholate|3alpha,12alpha-Dihydroxy-5beta-cholanic acid" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C24H39O4</p></html>
    </notes>
  </species>
  <species id="M_C04489_c" name="5-Methyltetrahydropteroyltri-L-glutamate"
compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C30H39N9O12</p></html>
    </notes>
  </species>
  <species id="M_C04494_c" name="Guanosine 3'-diphosphate 5'-triphosphate|Guanosine
5'-triphosphate,3'-diphosphate" compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C10H13N5O20P5</p></html>
    </notes>
  </species>
  <species id="M_C04501_c" name="N-Acetyl-D-glucosamine
1-phosphate|N-Acetyl-alpha-D-glucosamine
1-phosphate|N-Acetyl-D-glucosamine 1-phosphate|N-acetyl-alpha-D-glucosamine 1-phosphate"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C8H15NO9P</p></html>
    </notes>
  </species>
  <species id="M_C04524_c"
name="2-Protocatechoylphloroglucinolcarboxylate|2-(3,4-Dihydroxybenzoyloxy)-4,6-dihydroxyb
enzoate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C14H9O8</p></html>
    </notes>
  </species>
  <species id="M_C04534_c"
name="6-Phospho-beta-D-glucosyl-(1,4)-D-glucose|cellobiose-6-phoshate|6-phospho-beta-D-gluc
oside-(1,4)-D-glucose|cellobiose 6-phoshate" compartment="C_c">

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    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C12H22O14P</p></html>
    </notes>
  </species>
  <species id="M_C04556_c"
name="4-Amino-2-methyl-5-phosphomethylpyrimidine|4-Amino-5-phosphomethyl-2-methylpyri
midine|4-amino-2-methyl-5-phosphomethylpyrimidine" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H9N3O4P</p></html>
    </notes>
  </species>
  <species id="M_C04563_c" name="D-myo-Inositol
1,2,4,5,6-pentakisphosphate|1D-myo-Inositol 1,2,4,5,6-pentakisphosphate|myo-Inositol
1,2,4,5,6-pentakisphosphate|Inositol 1,2,4,5,6-pentakisphosphate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C6H12O21P5</p></html>
    </notes>
  </species>
  <species id="M_C04574_c" name="Undecaprenyl
diphosphate|Undecaprenyldiphosphate|undecaprenyl diphosphate|di-trans,poly-cis-Undecaprenyl
diphosphate|Bactoprenyl diphosphate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C55H90O7P2</p></html>
    </notes>
  </species>
  <species id="M_C04582_c" name="S-Methyl-5-thio-D-ribulose
1-phosphate|5-Methylthio-5-deoxy-D-ribulose
1-phosphate|5-Methylthio-5-deoxy-D-ribulose1-phosphate|methylthioribulose-1-phosphate"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O7PS</p></html>
    </notes>
  </species>
  <species id="M_C04593_c"
name="(2S,3R)-3-Hydroxybutane-1,2,3-tricarboxylate|Methylisocitrate|Methylisocitric
acid|methylisocitrate|(2S,3R)-3-hydroxybutane-1,2,3-tricarboxylate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H7O7</p></html>
    </notes>
  </species>
  <species id="M_C04618_c" name="(3R)-3-Hydroxybutanoyl-[acyl-carrier

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protein]](R)-3-Hydroxybutanoyl-[acyl-carrier protein]" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C15H27N2O9PRS</p></html>

</notes>

</species>

<species id="M\_C04619\_c" name="(3R)-3-Hydroxydecanoyl-[acyl-carrier protein]](R)-3-Hydroxydecanoyl-[acyl-carrier protein]" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C21H39N2O9PRS</p></html>

</notes>

</species>

<species id="M\_C04620\_c" name="(3R)-3-Hydroxyoctanoyl-[acyl-carrier protein]](R)-3-Hydroxyoctanoyl-[acyl-carrier protein]" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C19H35N2O9PRS</p></html>

</notes>

</species>

<species id="M\_C04631\_c" name="UDP-N-acetyl-3-(1-carboxyvinyl)-D-glucosamine|UDP-N-acetyl-3-O-(1-carboxyvinyl)-D-glucosamine|UDP-N-acetylglucosamine-3-O-pyruvateether|UDP-N-acetylglucosamine enolpyruvate|UDP-N-acetyl-3-O--1-carboxyvinyl-D-glucosamine|udp-n-acetyl-3-(1-carboxyvinyl)-d-glucosamine" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C20H26N3O19P2</p></html>

</notes>

</species>

<species id="M\_C04633\_c" name="(3R)-3-Hydroxypalmitoyl-[acyl-carrier protein]](R)-3-Hydroxypalmitoyl-[acyl-carrier protein]](3R)-3-Hydroxyhexadecanoyl-[acyl-carrier protein]](R)-3-Hydroxyhexadecanoyl-[acyl-carrier protein]]R-3-hydroxypalmitoyl-[acyl-carrier protein]]R-3-hydroxypalmitoyl-acyl-carrierprotein-" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C27H51N2O9PRS</p></html>

</notes>

</species>

<species id="M\_C04640\_c" name="2-(Formamido)-N1-(5'-phosphoribosyl)acetamidine|1-(5'-Phosphoribosyl)-N-formylglycin amidine|5'-Phosphoribosyl-N-formylglycinamidine|5'-Phosphoribosylformylglycinamidine|2-(Formamido)-N1-(5-phospho-D-riboseyl)acetamidine|2--Formamido-N1-(5-phospho-D-riboseyl)acetamidine|5'-phosphoribosyl-N-formylglycinamidine|5'-phosphoribosylformylglycinamidine"

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compartment="C_c">
  <notes>
    <html
      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C8H16N3O8P</p></html>
    </notes>
</species>
<species
  id="M_C04666_c"
  name="D-erythro-1-(Imidazol-4-yl)glycerol
3-phosphate|D-erythro-Imidazole-glycerol
3-phosphate|D-erythro-Imidazole-glycerol
phosphate|D-erythro-1-(imidazol-4-yl)glycerol
3-phosphate|D-erythro-imidazol-glycerol-phosphate|d-erythro-imidazole-glycerol-phosphate"
compartment="C_c">
  <notes>
    <html
      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C6H10N2O6P</p></html>
    </notes>
</species>
<species
  id="M_C04677_c"
  name="1-(5'-Phosphoribosyl)-5-amino-4-imidazolecarboxamide|5'-Phosphoribosyl-5-amino-4-imidazolecarboxamide|5'-Phospho-ribosyl-5-amino-4-imidazolecarboxamide|AICAR|5-Aminoimidazole-4-carboxamide ribotide|5-Phosphoribosyl-4-carbamoyl-5-aminoimidazole|5-Amino-1-(5-phospho-D-ribosyl)imidazole-4-carboxamide|5-Amino-1-(5-Phospho-D-ribosyl)imidazole-4-carboxamide|5-Amino-1--5-Pospho-D-ribosylimidazole-4-carboxamide|aicar" compartment="C_c">
  <notes>
    <html
      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C9H14N4O8P</p></html>
    </notes>
</species>
<species
  id="M_C04688_c"
  name="(3R)-3-Hydroxytetradecanoyl-[acyl-carrier protein]|(R)-3-Hydroxytetradecanoyl-[acyl-carrier protein]|beta-Hydroxymyristyl-[acyl-carrier protein]|HMA|R-3-hydroxy-myristoyl-ACP" compartment="C_c">
  <notes>
    <html
      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C25H47N2O9PRS</p></html>
    </notes>
</species>
<species
  id="M_C04691_c"
  name="2-Dehydro-3-deoxy-D-arabino-heptonate 7-phosphate|3-Deoxy-D-arabino-hept-2-ulosonate 7-phosphate|3-Deoxy-arabino-heptulonate 7-phosphate|3-Deoxy-D-arabino-heptulosonic acid 7-phosphate|DAHP|2-Dahp|2-Dehydro-3-deoxy-D-arabino-heptonate 7-phosphate|2-dehydro-3-deoxy-D-arabino-heptonate 7-phosphate|3-deoxy-d-arabino-heptulosonate-7-phosphate"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H11O10P</p></html>

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    </notes>
</species>
    <species id="M_C04732_c"
name="4-(1-D-Ribitylamino)-5-amino-2,6-dihydroxypyrimidine|4-(1-D-Ribitylamino)-5-aminour
acil|4--1-D-Ribitylamino-5-aminouracil|4-(1-D-ribitylamino)-5-amino-2,6-dihydroxypyrimidine"
compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C9H16N4O6</p></html>
    </notes>
</species>
    <species id="M_C04734_c"
name="1-(5'-Phosphoribosyl)-5-formamido-4-imidazolecarboxamide|5'-Phosphoribosyl-5-formam
ido-4-imidazolecarboxamide|5-Formamido-1-(5-phosphoribosyl)imidazole-4-carboxamide|5-For
mamido-1-(5-phospho-D-ribosyl)imidazole-4-carboxamide|5-Formamido-1--5-phospho-D-ribosyl
imidazole-4-carboxamide|5-formamido-1-(5-phospho-D-ribosyl)imidazole-4-carboxamide|FAICA
R" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C10H14N4O9P</p></html>
    </notes>
</species>
    <species id="M_C04751_c"
name="1-(5-Phospho-D-ribosyl)-5-amino-4-imidazolecarboxylate|1-(5'-Phosphoribosyl)-5-amino-
4-imidazolecarboxylate|1-(5'-Phosphoribosyl)-5-amino-4-carboxyimidazole|5'-Phosphoribosyl-5-a
mino-4-imidazolecarboxylate|1-(5'-Phosphoribosyl)-4-carboxy-5-aminoimidazole|5'-Phosphoribos
yl-4-carboxy-5-aminoimidazole|5-Amino-1-(5-phospho-D-ribosyl)imidazole-4-carboxylate|5-ami
no-1-(5-phospho-D-ribosyl)imidazole-4-carboxylate|5-amino-1--5-phospho-D-ribosylimidazole-4-
carboxylate|1-(5-phosphoribosyl)-5-amino-4-imidazolecarboxylate" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C9H13N3O9P</p></html>
    </notes>
</species>
    <species id="M_C04752_c" name="2-Methyl-4-amino-5-hydroxymethylpyrimidine
diphosphate|4-Amino-2-methyl-5-diphosphomethylpyrimidine|2-Methyl-4-amino-5-hydroxymeth
ylpyrimidinediphosphate|4-amino-2-methyl-5-diphosphomethylpyrimidine" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C6H9N3O7P2</p></html>
    </notes>
</species>
    <species id="M_C04807_c"
name="2-Amino-7,8-dihydro-4-hydroxy-6-(diphosphooxymethyl)pteridine|2-Amino-4-hydroxy-6
-hydroxymethyl-7,8-dihydropteridine
diphosphate|7,8-Dihydropterin

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pyrophosphate|2-amino-4-hydroxy-6-hydroxymethyl-7,8-dihydropteridine  
diphosphate|2-Amino-4-hydroxy-6-hydroxymethyl-7-8-dihydropteridinediphosphate|6-hydroxyme  
thyl-dihydropterin pyrophosphate" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C7H9N5O8P2</p></html>

</notes>

</species>

<species id="M\_C04823\_c"  
name="1-(5-Phosphoribosyl)-4-(N-succinocarboxamide)-5-aminoimidazole|1-(5-phosphoribosyl)-  
4-(N-succino-carboxamide)-  
5-aminoimidazole|1-(5'-Phosphoribosyl)-5-amino-4-(N-succinocarboxamide)-imidazole|1-(5'-Pho  
sphoribosyl)-4-(N-succinocarboxamide)-5-aminoimidazole|5'-Phosphoribosyl-4-(N-succinocarbox  
amide)-5-aminoimidazole|(S)-2-[5-Amino-1-(5-phospho-D-ribosyl)imidazole-4-  
carboxamido]succinate|SAICAR|(S)-2-[5-Amino-1-(5-phospho-D-ribosyl)imidazole-4-carboxami  
do]succinate|S-2-5-Amino-1-(5-phospho-D-ribosyl)imidazole-4-carboxamido-succinate|5-phosph  
oribosyl-4-(N-succino-carboxamide)-  
5-aminoimidazole|5'-phosphoribosyl-4-(n-succinocarboxamide)-5-aminoimidazole"  
compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C13H16N4O12P</p></html>

</notes>

</species>

<species id="M\_C04874\_c"  
name="2-Amino-4-hydroxy-6-(D-erythro-1,2,3-trihydroxypropyl)-7,8-  
dihydropteridine|Dihydroneopterin|2-Amino-4-hydroxy-6-(D-erythro-1,2,3-trihydroxypropyl)-7,8-  
dihydropteridine|2-amino-4-hydroxy-6-(erythro-1,2,3-trihydroxypropyl)dihydropteridine|dihydro-  
neo-pterin" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C9H13N5O4</p></html>

</notes>

</species>

<species id="M\_C04877\_c"  
name="UDP-N-acetylmuramoyl-L-alanyl-D-gamma-glutamyl-meso-2,6-  
diaminopimelate|UDP-N-acetylmuramoyl-L-alanyl-D-gamma-glutamyl-meso-2,6-diamino-  
heptanedioate|UDP-N-acetylmuramoyl-L-alanyl-D-gamma-glutamyl-meso-2,6-diaminopimelate|  
UDP-N-acetylmuramoyl-L-alanyl-D-gamma-glutamyl-meso-2-6-diaminopimelate"  
compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C35H51N7O26P2</p></html>

</notes>

</species>

<species id="M\_C04881\_c" name="N-Acetyl-beta-D-mannosaminyl-1,4-N-acetyl-D-glucosaminyl diphosphoundecaprenol" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C71H116N2O17P2</p></html>

</notes>

</species>

<species id="M\_C04882\_c"  
name="UDP-N-acetylmuramoyl-L-alanyl-D-glutamyl-6-carboxy-L-lysyl-D-alanyl-D-alanine|UDP-N-acetylmuramoyl-L-alanyl-D-glutamyl-meso-2,6-diaminopimeloyl-D-alanyl-D-alanine|UDP-N-acetylmuramoyl-L-alanyl-D-glutamyl-meso-2,6-diaminopimeloyl-D-alanyl-D-alanine|UDP-N-acetylmuramoyl-L-alanyl-D-glutamyl-meso-2,6-diaminopimeloyl-D-alanyl-D-alanine" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C41H61N9O28P2</p></html>

</notes>

</species>

<species id="M\_C04895\_c"  
name="2-Amino-4-hydroxy-6-(erythro-1,2,3-trihydroxypropyl)dihydropteridine triphosphate|6-(L-erythro-1,2-Dihydroxypropyl 3-triphosphate)-7,8-dihydropterin|6-[(1S,2R)-1,2-Dihydroxy-3-triphosphooxypropyl]-7,8-dihydropterin|2-amino-4-hydroxy-6-(erythro-1,2,3-trihydroxypropyl)dihydropteridine triphosphate|2-Amino-4-hydroxy-6-erythro-1-2-3-trihydroxypropyldihydropteridinetriphosphate|7,8-Dihydroneopterin 3'-triphosphate" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C9H13N5O13P3</p></html>

</notes>

</species>

<species id="M\_C04896\_c"  
name="5-(5-Phospho-D-ribosylaminoformimino)-1-(5-phosphoribosyl)-imidazole-4-carboxamide|N-(5'-Phospho-D-ribosylformimino)-5-amino-1-(5"-phospho-D-ribosyl)-4-imidazolecarboxamide|N-(5'-Phosphoribosylformimino)-5-amino-1-(5"-phosphoribosyl)-4-imidazolecarboxamide|Phosphoribosyl-formimino-AICAR-phosphate|1-(5-Phosphoribosyl)-5-[(5-phosphoribosylamino)methylideneamino]imidazole-4-carboxamide|1-(5-Phosphoribosyl)-5-[(5-phosphoribosylamino)methylideneamino]imidazole-4-carboxamide|phosphoribosylformimino-AICAR-phosphate|phosphoribosylformiminoaicar-phosphate|N-(5'-phospho-D-ribosylformimino)-5-amino-1-(5"-phosphoribosyl)-4-imidazolecarboxamide" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C15H23N5O15P2</p></html>

</notes>

</species>

<species id="M\_C04916\_c"  
name="N-(5'-Phospho-D-1'-ribulosylformimino)-5-amino-1-(5"-phospho-D-  
ribosyl)-4-imidazolecarboxamide|5-[(5-Phospho-1-deoxyribulos-1-ylamino)methylideneamino]-1-  
(5-  
phosphoribosyl)imidazole-4-carboxamide|Phosphoribulosyl-formimino-AICAR-phosphate|5-[(5-p  
hospho-1-deoxyribulos-1-ylamino)methylideneamino]-1-(5-phosphoribosyl)imidazole-4-carboxa  
mide|phosphoribulosylformimino-AICAR-phosphate|N-(5'-phospho-D-1'-ribulosylformimino)-5-a  
mino-1-(5"-phosphoribosyl)-4-imidazolecarboxamide" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C15H23N5O15P2</p></html>

</notes>

</species>

<species id="M\_C05042\_c"  
name="Glufosinate|Phosphinothricin|2-Amino-4-(hydroxymethylphosphinyl)butanoic acid"  
compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H12NO4P</p></html>

</notes>

</species>

<species id="M\_C05123\_c" name="2-Hydroxyethanesulfonate|2-Hydroxyethanesulfonic  
acid|2-Hydroxyethane-1-sulfonic acid|Isethionic acid|Isethionate" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C2H5O4S</p></html>

</notes>

</species>

<species id="M\_C05123\_e" name="2-Hydroxyethanesulfonate|2-Hydroxyethanesulfonic  
acid|2-Hydroxyethane-1-sulfonic acid|Isethionic acid|Isethionate, extracellular"  
compartment="C\_e">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C2H5O4S,  
extracellular</p></html>

</notes>

</species>

<species id="M\_C05125\_c" name="2-(alpha-Hydroxyethyl)thiamine  
diphosphate|2-Hydroxyethyl-ThPP" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C14H21N4O8P2S</p></html>

</notes>

</species>

<species id="M\_C05130\_c" name="Imidazole-4-acetaldehyde|Imidazole acetaldehyde"  
compartment="C\_c">

<notes>

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    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H6N2O</p></html>
  </notes>
</species>
  <species id="M_C05198_c" name="5'-Deoxyadenosine" compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C10H13N5O3</p></html>
      </notes>
    </species>
    <species
      id="M_C05223_c"
      name="Dodecanoyl-[acyl-carrier
protein]|Dodecanoyl-[acp]|Lauroyl-[acyl-carrier
protein]|Dodecanoyl-ACP|Dodecanoyl-ACP
(n-C12:0ACP)|dodecanoyl-acp" compartment="C_c">
      <notes>
        <html
          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C23H43N2O8PRS</p></html>
        </notes>
      </species>
      <species id="M_C05258_c" name="(S)-3-Hydroxyhexadecanoyl-CoA" compartment="C_c">
        <notes>
          <html
            xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C37H63N7O18P3S</p></html>
          </notes>
        </species>
        <species
          id="M_C05259_c"
          name="3-Oxopalmitoyl-CoA|3-Ketopalmitoyl-CoA|3-Oxohexadecanoyl-CoA|3-oxohexadecanoyl
-coa" compartment="C_c">
          <notes>
            <html
              xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C37H61N7O18P3S</p></html>
            </notes>
          </species>
          <species id="M_C05260_c" name="(S)-3-Hydroxytetradecanoyl-CoA" compartment="C_c">
            <notes>
              <html
                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C35H59N7O18P3S</p></html>
              </notes>
            </species>
            <species
              id="M_C05261_c"
              name="3-Oxotetradecanoyl-CoA|3-oxotetradecanoyl-coa"
              compartment="C_c">
              <notes>
                <html
                  xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C35H57N7O18P3S</p></html>
                </notes>
              </species>

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    <species id="M_C05262_c" name="(S)-3-Hydroxydodecanoyl-CoA" compartment="C_c">
      <notes>
        <html
          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C33H55N7O18P3S</p></html>
        </notes>
      </species>
    <species id="M_C05263_c" name="3-Oxododecanoyl-CoA|3-oxododecanoyl-coa"
      compartment="C_c">
      <notes>
        <html
          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C33H53N7O18P3S</p></html>
        </notes>
      </species>
    <species id="M_C05264_c"
      name="(S)-Hydroxydecanoyl-CoA|(S)-3-Hydroxydecanoyl-CoA" compartment="C_c">
      <notes>
        <html
          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C31H51N7O18P3S</p></html>
        </notes>
      </species>
    <species id="M_C05265_c" name="3-Oxodecanoyl-CoA|3-oxodecanoyl-coa"
      compartment="C_c">
      <notes>
        <html
          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C31H49N7O18P3S</p></html>
        </notes>
      </species>
    <species id="M_C05266_c" name="(S)-Hydroxyoctanoyl-CoA|(S)-3-Hydroxyoctanoyl-CoA"
      compartment="C_c">
      <notes>
        <html
          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C29H47N7O18P3S</p></html>
        </notes>
      </species>
    <species id="M_C05267_c" name="3-Oxoctanoyl-CoA|3-oxooctanoyl-coa"
      compartment="C_c">
      <notes>
        <html
          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C29H45N7O18P3S</p></html>
        </notes>
      </species>
    <species id="M_C05268_c"
      name="(S)-Hydroxyhexanoyl-CoA|(S)-3-Hydroxyhexanoyl-CoA" compartment="C_c">
      <notes>

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    <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C27H43N7O18P3S</p></html>
    </notes>
</species>
    <species      id="M_C05269_c"      name="3-Oxohehexanoyl-CoA|3-Ketohexanoyl-CoA"
compartment="C_c">
    <notes>
    <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C27H41N7O18P3S</p></html>
    </notes>
</species>
    <species id="M_C05270_c" name="Hexanoyl-CoA|hexanoyl-coa" compartment="C_c">
    <notes>
    <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C27H43N7O17P3S</p></html>
    </notes>
</species>
    <species                                           id="M_C05271_c"
name="trans-Hex-2-enoyl-CoA|(2E)-Hexenoyl-CoA|trans-hex-2-enoyl-coa"
compartment="C_c">
    <notes>
    <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C27H41N7O17P3S</p></html>
    </notes>
</species>
    <species                                           id="M_C05272_c"
name="trans-Hexadec-2-enoyl-CoA|trans-2-Hexadecenoyl-CoA|(2E)-Hexadecenoyl-CoA|trans-he
xadec-2-enoyl-coa" compartment="C_c">
    <notes>
    <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C37H61N7O17P3S</p></html>
    </notes>
</species>
    <species                                           id="M_C05273_c"
name="trans-Tetradec-2-enoyl-CoA|(2E)-Tetradecenoyl-CoA|trans-Tetradec-2-enoyl-CoA
phosphate, n=30)|trans-tetradec-2-enoyl-coa" compartment="C_c">
    <notes>
    <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C35H57N7O17P3S</p></html>
    </notes>
</species>
    <species      id="M_C05274_c"      name="Decanoyl-CoA|Decanoyl-CoA
(n-C10:0CoA)|decanoyl-coa" compartment="C_c">
    <notes>

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        <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C31H51N7O17P3S</p></html>
    </notes>
</species>
    <species                                id="M_C05275_c"
name="trans-Dec-2-enoyl-CoA|(2E)-Decenoyl-CoA|trans-dec-2-enoyl-coa" compartment="C_c">
    <notes>
        <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C31H49N7O17P3S</p></html>
    </notes>
</species>
    <species            id="M_C05276_c"            name="trans-Oct-2-enoyl-CoA|(2E)-Octenoyl-CoA"
compartment="C_c">
    <notes>
        <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C29H45N7O17P3S</p></html>
    </notes>
</species>
    <species                                id="M_C05332_c"
name="Phenethylamine|2-Phenylethylamine|beta-Phenylethylamine|Phenylethylamine"
compartment="C_c">
    <notes>
        <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C8H12N</p></html>
    </notes>
</species>
    <species                                id="M_C05332_e"
name="Phenethylamine|2-Phenylethylamine|beta-Phenylethylamine|Phenylethylamine,
extracellular" compartment="C_e">
    <notes>
        <html            xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:            C8H12N,
extracellular</p></html>
    </notes>
</species>
    <species id="M_C05335_c" name="L-Selenomethionine" compartment="C_c">
    <notes>
        <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C5H11NO2Se</p></html>
    </notes>
</species>
    <species id="M_C05336_c" name="Selenomethionyl-tRNA(Met)" compartment="C_c">
    <notes>
        <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C20H30N6O11PSeR(C5H8O6PR)n</p></html>
    </notes>

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</species>
  <species id="M_C05345_c" name="D-Fructose 6-phosphate|D-Fructose 6-phosphoric
acid|Neuberg ester|beta-D-Fructose
6-phosphate|D-Fructose6-phosphate|D-fructose-6-phosphate|D-fructose 6-phosphate"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O9P</p></html>
  </notes>
</species>
  <species id="M_C05345_e" name="D-Fructose 6-phosphate|D-Fructose 6-phosphoric
acid|Neuberg ester|beta-D-Fructose
6-phosphate|D-Fructose6-phosphate|D-fructose-6-phosphate|D-fructose 6-phosphate,
extracellular" compartment="C_e">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O9P,
extracellular</p></html>
  </notes>
</species>
  <species id="M_C05378_c" name="D-Fructose 1,6-bisphosphate|beta-D-Fructose
1,6-bisphosphate|D-fructose-1,6-bisphosphate|D-fructose
1,6-bisphosphate|D-Fructose1-6-bisphosphate" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C6H12O12P2</p></html>
  </notes>
</species>
  <species id="M_C05379_c" name="Oxalosuccinate|Oxalosuccinic acid"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H3O7</p></html>
  </notes>
</species>
  <species id="M_C05381_c" name="3-Carboxy-1-hydroxypropyl-ThPP"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C16H22N4O10P2S</p></html>
  </notes>
</species>
  <species id="M_C05382_c" name="Sedoheptulose 7-phosphate|altro-Heptulose
7-phosphate|D-Sedoheptulose 7-phosphate|D-altro-Heptulose
7-phosphate|Sedoheptulose7-phosphate|sedoheptulose 7-phosphate|sedoheptulose-7-phosphate"
compartment="C_c">
  <notes>

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    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H14O10P</p></html>
  </notes>
</species>
  <species id="M_C05385_c" name="D-Glucuronate 1-phosphate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H9O10P</p></html>
    </notes>
  </species>
  <species id="M_C05402_c"
name="Melibiose[6-O-(alpha-D-Galactopyranosyl)-D-glucopyranose|D-Gal-alpha1->6D-Glucose|
D-Gal-alpha-1->6D-Glucose" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C12H22O11</p></html>
    </notes>
  </species>
  <species id="M_C05402_e"
name="Melibiose[6-O-(alpha-D-Galactopyranosyl)-D-glucopyranose|D-Gal-alpha1->6D-Glucose|
D-Gal-alpha-1->6D-Glucose, extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C12H22O11,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C05404_c" name="D-Gal alpha 1->6D-Gal alpha
1->6D-Glucose|D-Gal-alpha1->6D-Gal-alpha1->6D-Glucose|Manninotriose"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C18H32O16</p></html>
    </notes>
  </species>
  <species id="M_C05413_c" name="Phytoene" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C40H64</p></html>
    </notes>
  </species>
  <species id="M_C05421_c" name="15-cis-Phytoene" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C40H64</p></html>
    </notes>
  </species>
  <species id="M_C05464_c" name="Glycodeoxycholate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C26H42NO5</p></html>
    </notes>

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</species>
  <species id="M_C05466_c" name="Glycochenodeoxycholate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C26H42NO5</p></html>
    </notes>
  </species>
  <species id="M_C05512_c" name="Deoxyinosine|deoxyinosine" compartment="C_c">
    <notes>
      <html
                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C10H12N4O4</p></html>
    </notes>
  </species>
  <species
                                id="M_C05539_c"
name="N-Acetyl-L-2-amino-6-oxopimelate|L-2-Acetamido-6-oxoheptanedioate|L-2-Acetamido-6
-oxopimelate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C9H11NO6</p></html>
    </notes>
  </species>
  <species id="M_C05593_c" name="3-Hydroxyphenylacetate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C8H7O3</p></html>
    </notes>
  </species>
  <species
                                id="M_C05649_c"
                                name="Dihydropteridine|6,7-Dihydropteridine"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H6N4</p></html>
    </notes>
  </species>
  <species
                                id="M_C05650_c"
                                name="Tetrahydropteridine|5,6,7,8-Tetrahydropteridine"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H8N4</p></html>
    </notes>
  </species>
  <species
                                id="M_C05711_c"
                                name="gamma-Glutamyl-beta-cyanoalanine"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C9H12N3O5</p></html>
    </notes>
  </species>
  <species
                                id="M_C05726_c"
                                name="S-Substituted
                                L-cysteine|R-S-Cysteine"
compartment="C_c">

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    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C3H6NO2SR</p></html>
    </notes>
  </species>
  <species id="M_C05729_c" name="R-S-Cysteinyglycine" compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C5H9N2O3SR</p></html>
    </notes>
  </species>
  <species id="M_C05744_c" name="Acetoacetyl-[acp]|Acetoacetyl-[acyl-carrier
protein]|Acetoacetyl-ACP|acetoacetyl-acp" compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C15H25N2O9PRS</p></html>
    </notes>
  </species>
  <species id="M_C05745_c" name="Butyryl-[acp]|Butyryl-[acyl-carrier
protein]|Butyryl-ACP" compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C15H27N2O8PRS</p></html>
    </notes>
  </species>
  <species id="M_C05746_c" name="3-Oxohexanoyl-[acp]|3-Oxohexanoyl-[acyl-carrier
protein]" compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C17H29N2O9PRS</p></html>
    </notes>
  </species>
  <species id="M_C05747_c"
name="(R)-3-Hydroxyhexanoyl-[acp]|(R)-3-Hydroxyhexanoyl-[acyl-carrier
protein]|D-3-Hydroxyhexanoyl-[acp]|D-3-Hydroxyhexanoyl-[acyl-carrier
protein]"
compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C17H31N2O9PRS</p></html>
    </notes>
  </species>
  <species id="M_C05748_c" name="trans-Hex-2-enoyl-[acp]|trans-Hex-2-enoyl-[acyl-carrier
protein]|(2E)-Hexenoyl-[acp]|trans-hex-2-enoyl-acp" compartment="C_c">
    <notes>

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        <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C17H29N2O8PRS</p></html>
    </notes>
</species>
    <species            id="M_C05749_c"            name="Hexanoyl-[acp]|Hexanoyl-[acyl-carrier
protein]|Hexanoyl-ACP|hexanoyl-acp" compartment="C_c">
        <notes>
            <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C17H31N2O8PRS</p></html>
            </notes>
        </species>
            <species            id="M_C05750_c"            name="3-Oxoctanoyl-[acp]|3-Oxoctanoyl-[acyl-carrier
protein]|3-oxooctanoyl-acp" compartment="C_c">
                <notes>
                    <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C19H33N2O9PRS</p></html>
                    </notes>
                </species>
                    <species            id="M_C05751_c"            name="trans-Oct-2-enoyl-[acp]|trans-Oct-2-enoyl-[acyl-carrier
protein]|2-Octenoyl-[acyl-carrier protein]|(2E)-Octenoyl-[acp]" compartment="C_c">
                        <notes>
                            <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C19H33N2O8PRS</p></html>
                            </notes>
                        </species>
                            <species            id="M_C05752_c"            name="Octanoyl-[acp]|Octanoyl-[acyl-carrier
protein]|Octanoyl-ACP|octanoyl-acp" compartment="C_c">
                                <notes>
                                    <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C19H35N2O8PRS</p></html>
                                    </notes>
                                </species>
                                    <species            id="M_C05753_c"            name="3-Oxodecanoyl-[acp]|3-Oxodecanoyl-[acyl-carrier
protein]|3-oxodecanoyl-acp" compartment="C_c">
                                        <notes>
                                            <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C21H37N2O9PRS</p></html>
                                            </notes>
                                        </species>
                                            <species            id="M_C05754_c"            name="trans-Dec-2-enoyl-[acp]|trans-Dec-2-enoyl-[acyl-carrier
protein]|(2E)-Decenoyl-[acp]|trans-2-Decenoyl-[acyl-carrier protein]|trans-dec-2-enoyl-acp"
compartment="C_c">
                                                <notes>
                                                    <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:

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C21H37N2O8PRS</p></html>  
 </notes>  
 </species>  
 <species id="M\_C05755\_c" name="Decanoyl-[acp]|Decanoyl-[acyl-carrier protein]|Decanoyl-ACP|decanoyl-acp" compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
 C21H39N2O8PRS</p></html>  
 </notes>  
 </species>  
 <species id="M\_C05756\_c" name="3-Oxododecanoyl-[acp]|3-Oxododecanoyl-[acyl-carrier protein]|3-oxododecanoyl-acp" compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
 C23H41N2O9PRS</p></html>  
 </notes>  
 </species>  
 <species id="M\_C05757\_c" name="(R)-3-Hydroxydodecanoyl-[acp]|(R)-3-Hydroxydodecanoyl-[acyl-carrier protein]|D-3-Hydroxydodecanoyl-[acp]|D-3-Hydroxydodecanoyl-[acyl-carrier protein]" compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
 C23H43N2O9PRS</p></html>  
 </notes>  
 </species>  
 <species id="M\_C05758\_c" name="trans-Dodec-2-enoyl-[acp]|trans-Dodec-2-enoyl-[acyl-carrier protein]|(2E)-Dodecenoyl-[acp]|trans-dodec-2-enoyl-acp" compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
 C23H41N2O8PRS</p></html>  
 </notes>  
 </species>  
 <species id="M\_C05759\_c" name="3-Oxotetradecanoyl-[acp]|3-Oxotetradecanoyl-[acyl-carrier protein]|3-oxotetradecanoyl-acp" compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
 C25H45N2O9PRS</p></html>  
 </notes>  
 </species>  
 <species id="M\_C05760\_c" name="trans-Tetradec-2-enoyl-[acp]|trans-Tetradec-2-enoyl-[acyl-carrier



protein]](2E)-Tetradecenoyl-[acp]]trans-tetradec-2-enoyl-acp" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C25H45N2O8PRS</p></html>

</notes>

</species>

<species id="M\_C05761\_c" name="Tetradecanoyl-[acp]]Tetradecanoyl-[acyl-carrier  
protein]]Myristoyl-[acyl-carrier protein]]myristoyl-[acyl-carrier  
protein]]Myristoyl-ACP|Myristoyl-ACP  
(n-C14:0ACP)|Myristoyl-ACP-n-C14-0ACP|tetradecanoyl-acp" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C25H47N2O8PRS</p></html>

</notes>

</species>

<species id="M\_C05762\_c"  
name="3-Oxohexadecanoyl-[acp]]3-Oxohexadecanoyl-[acyl-carrier  
protein]]3-oxohexadecanoyl-acp" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C27H49N2O9PRS</p></html>

</notes>

</species>

<species id="M\_C05763\_c"  
name="trans-Hexadec-2-enoyl-[acp]]trans-Hexadec-2-enoyl-[acyl-carrier  
protein]](2E)-Hexadecenoyl-[acp]]trans-hexadec-2-enoyl-acp" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C27H49N2O8PRS</p></html>

</notes>

</species>

<species id="M\_C05764\_c" name="Hexadecanoyl-[acp]]Hexadecanoyl-[acyl-carrier  
protein]]hexadecanoyl-[acyl-carrier protein]]hexadecanoyl-acp" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C27H51N2O8PRS</p></html>

</notes>

</species>

<species id="M\_C05776\_c" name="Vitamin B12|Cobalamin (III)|Cob(III)alamin"  
compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C61H86CoN13O14PR</p></html>

</notes>

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</species>
  <species id="M_C05776_e" name="Vitamin B12|Cobalamin (III)|Cob(III)alamin,
extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C61H86CoN13O14PR,
extracellular</p></html>
    </notes>
</species>
  <species id="M_C05778_c" name="Sirohydrochlorin|sirohydrochlorin" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C42H38N4O16</p></html>
    </notes>
</species>
  <species id="M_C05809_c"
name="3-Octaprenyl-4-hydroxybenzoate|3-octaprenyl-4-hydroxybenzoate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C47H69O3</p></html>
    </notes>
</species>
  <species id="M_C05810_c" name="2-Octaprenylphenol|2-octaprenylphenol"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C46H70O</p></html>
    </notes>
</species>
  <species id="M_C05817_c"
name="2-Succinyl-6-hydroxy-2,4-cyclohexadiene-1-carboxylate|(1S,6R)-6-Hydroxy-2-succinylcy
clohexa-2,4-diene-1-carboxylate|2-succinyl-6-hydroxy-2,4-cyclohexadiene-1-carboxylate|2-Succi
nyl-6-hydroxy-2,4-cyclohexadiene-1-carboxylate|(1R,6R)-6-Hydroxy-2-succinylcyclohexa-2,4-di
ene-1-carboxylate|(1R,6R)-2-Succinyl-6-hydroxy-2,4-cyclohexadiene-1-carboxylate|SHCHC"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C11H10O6</p></html>
    </notes>
</species>
  <species id="M_C05818_c" name="2dmmq7|2-Demethylmenaquinone 7|2-demethyl
menaquinone|2-Demethylmenaquinone" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C45H62O2</p></html>
    </notes>
</species>
  <species id="M_C05820_c" name="(L-Seryl)adenylate" compartment="C_c">
    <notes>

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    <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C13H19N6O9P</p></html>
  </notes>
</species>
  <species      id="M_C05822_c"      name="3'-CMP|Cytidine      3'-phosphate|3'-cmp"
compartment="C_c">
  <notes>
    <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C9H13N3O8P</p></html>
    </notes>
  </species>
  <species id="M_C05822_e" name="3'-CMP|Cytidine 3'-phosphate|3'-cmp, extracellular"
compartment="C_e">
  <notes>
    <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C9H13N3O8P,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C05840_c" name="Iminoaspartate|iminoaspartate" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H3NO4</p></html>
    </notes>
  </species>
  <species id="M_C05841_c" name="Nicotinate D-ribonucleoside" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C11H13NO6</p></html>
    </notes>
  </species>
  <species id="M_C05887_c" name="N-Acetyl-D-muramoate" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C11H18NO8</p></html>
    </notes>
  </species>
  <species
                                id="M_C05897_c"
name="Undecaprenyl-diphospho-N-acetylmuramoyl-L-alanyl-D-glutamyl-meso-
2,6-diaminopimeloyl-D-alanyl-D-alanine|Undecaprenyl-diphospho-N-acetylmuramoyl-L-alanyl-D
-glutamyl-meso-2,6-diaminopimeloyl-D-alanyl-D-alanine|Undecaprenyl-diphospho-N-acetylmura
moyl-L-alanyl-D-glutamyl-meso-2-6-diaminopimeloyl-D-alanyl-D-alanine"
compartment="C_c">
  <notes>
    <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C87H139N7O23P2</p></html>
    </notes>
  </species>

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<species id="M\_C05898\_c" name="Undecaprenyl-diphospho-N-acetylmuramoyl-(N-acetylglucosamine)-L-alanyl-D-glutamyl-meso-2,6-diaminopimeloyl-D-alanyl-D-alanine|Undecaprenyl-diphospho-N-acetylmuramoyl-(N-acetylglucosamine)-L-ala-D-glu-meso-2,6-diaminopimeloyl-D-ala-D-ala|Undecaprenyl-diphospho-N-acetylmuramoyl-(N-acetylglucosamine)-L-alanyl-D-glutamyl-meso-2,6-diaminopimeloyl-D-alanyl-D-alanine|Undecaprenyl-diphospho-N-acetylmuramoyl--N-acetylglucosamine-L-ala-D-glu-meso-2-6-diaminopimeloyl-D-ala-D-ala" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C95H152N8O28P2</p></html>

</notes>

</species>

<species id="M\_C05922\_c" name="Formamidopyrimidine nucleoside triphosphate" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C10H18N5O15P3</p></html>

</notes>

</species>

<species id="M\_C05923\_c" name="2,5-Diaminopyrimidine nucleoside triphosphate" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C9H18N5O14P3</p></html>

</notes>

</species>

<species id="M\_C05928\_c" name="10-Formyltetrahydrofolyl L-glutamate|10-Formyl-THF-L-glutamate" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C25H27N8O10</p></html>

</notes>

</species>

<species id="M\_C05938\_c" name="L-4-Hydroxyglutamate semialdehyde|L-4-Hydroxyglutamatesemialdehyde" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H9NO4</p></html>

</notes>

</species>

<species id="M\_C05945\_c" name="L-Arginine phosphate|N5-[Imino(phosphonoamino)methyl]L-ornithine|omega-N-Phosphoarginine|Arginine phosphate|L-Arginine-NG-phosphoric acid|Phosphoarginine A|N-Phospho-L-arginine|N(omega)-Phospho-L-arginine|Phosphoarginine" compartment="C\_c">

<notes>

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    <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C6H14N4O5P</p></html>
  </notes>
</species>
  <species                                id="M_C05945_e"                                name="L-Arginine
phosphate|N5-[Imino(phosphonoamino)methyl]L-ornithine|omega-N-Phosphoarginine|Arginine
phosphate|L-Arginine-NG-phosphoric                                acid|Phosphoarginine
A|N-Phospho-L-arginine|N(omega)-Phospho-L-arginine|Phosphoarginine,                                extracellular"
compartment="C_e">
    <notes>
      <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C6H14N4O5P,
extracellular</p></html>
    </notes>
</species>
  <species  id="M_C05946_c"  name="4-Hydroxy-2-oxoglutarate|4-Hydroxy-2-oxoglutaric
acid|D-4-Hydroxy-2-oxoglutarate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H4O6</p></html>
    </notes>
</species>
  <species  id="M_C05947_c"  name="4-Hydroxy-L-glutamate|4-Hydroxy-L-glutamic
acid|L-erythro-4-Hydroxyglutamate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H8NO5</p></html>
    </notes>
</species>
  <species id="M_C05951_c" name="Leukotriene D4|LTD4" compartment="C_c">
    <notes>
      <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C25H39N2O6S</p></html>
    </notes>
</species>
  <species id="M_C06000_c" name="(S)-3-Hydroxyisobutyryl-CoA" compartment="C_c">
    <notes>
      <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C25H39N7O18P3S</p></html>
    </notes>
</species>
  <species                                id="M_C06001_c"
name="3-Hydroxy-2-methylpropanoate|3-Hydroxyisobutyrate|3-Hydroxyisobutyric
acid|(S)-3-Hydroxyisobutyrate|3-hydroxy-isobutyrate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H7O3</p></html>
    </notes>

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</species>
  <species id="M_C06002_c"
name="2-Methyl-3-oxopropanoate|3-Oxo-2-methylpropanoate|(S)-Methylmalonate
semialdehyde|Methylmalonate semialdehyde|methylmalonate-semialdehyde"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H5O3</p></html>
  </notes>
</species>
  <species id="M_C06006_c"
name="(S)-2-Aceto-2-hydroxybutanoate|(S)-2-Hydroxy-2-ethyl-3-oxobutanoate|S-2-Aceto-2-hydr
oxybutanoate" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H9O4</p></html>
  </notes>
</species>
  <species id="M_C06007_c"
name="2,3-Dihydroxy-3-methylpentanoate|2,3-Dihydroxy-3-methylvalerate|2,3-dihydroxy-3-met
hylvalerate|2,3-dihydroxy-3-methylpentanoate|(R)-2,3-Dihydroxy-3-methylpentanoate|(R)-2,3-Di
hydroxy-3-methylvalerate|(2R,3R)-2,3-Dihydroxy-3-methylpentanoate|R-2,3-Dihydroxy-3-methy
lpentanoate" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H11O4</p></html>
  </notes>
</species>
  <species id="M_C06008_c" name="(3R)-3-Methyl-2-oxopentanoic
acid|(R)-2-Oxo-3-methylpentanoic acid|(R)-2-Oxo-3-methylpentanoate" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H9O3</p></html>
  </notes>
</species>
  <species id="M_C06019_c" name="D-arabino-3-Hexulose
6-phosphate|D-arabino-6-Phospho-hex-3-ulose" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O9P</p></html>
  </notes>
</species>
  <species id="M_C06054_c"
name="2-Oxo-3-hydroxy-4-phosphobutanoate|alpha-Keto-3-hydroxy-4-phosphobutyrate|(3R)-3-H
ydroxy-2-oxo-4-phosphonooxybutanoate" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H5O8P</p></html>
  </notes>
</species>

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    <species id="M_C06055_c"
name="O-Phospho-4-hydroxy-L-threonine|4-(Phosphonooxy)-threonine|4-(Phosphonooxy)-L-thre
online" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H9NO7P</p></html>
    </notes>
</species>
    <species id="M_C06112_c"
name="L-Glutamyl-tRNA(Gln)|Glu-tRNA(Gln)|Glutamyl-tRNA(Gln)" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C20H28N6O13PR(C5H8O6PR)n</p></html>
    </notes>
</species>
    <species id="M_C06113_c"
name="L-Aspartyl-tRNA(Asn)|Asp-tRNA(Asn)|Aspartyl-tRNA(Asn)" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C14H22NO13PR2(C5H8O6PR)n</p></html>
    </notes>
</species>
    <species id="M_C06114_c"
name="gamma-Glutamyl-beta-aminopropiononitrile|gamma-Glutamyl-3-aminopropiononitrile"
compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C8H13N3O3</p></html>
    </notes>
</species>
    <species id="M_C06135_c"
name="GA2|GalNAc-beta1->4Gal-beta1->4Glc-beta1->1'Cer|GalNAc-beta1->4LacCer"
compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C39H69N2O18R</p></html>
    </notes>
</species>
    <species id="M_C06142_c" name="1-Butanol|n-Butanol" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H10O</p></html>
    </notes>
</species>
    <species id="M_C06148_c"
name="2,5-Diamino-6-(5'-triphosphoryl-3',4'-trihydroxy-2'-oxopentyl)-amino-4-oxopyrimidine"
compartment="C_c">

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    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C9H18N5O14P3</p></html>
    </notes>
  </species>
  <species id="M_C06153_c" name="Scyllo-inositol" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O6</p></html>
    </notes>
  </species>
  <species id="M_C06153_e" name="Scyllo-inositol,extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O6</p></html>
    </notes>
  </species>
  <species id="M_C06156_c" name="alpha-D-Glucosamine 1-phosphate|D-Glucosamine
1-phosphate|D-Glucosamine1-phosphate|D-glucosamine 1-phosphate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H14NO8P</p></html>
    </notes>
  </species>
  <species id="M_C06186_c" name="Arbutin|Ursin|Uvasol|Hydroquinone-O-beta-D-glucopyranoside|arbutin"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C12H16O7</p></html>
    </notes>
  </species>
  <species id="M_C06186_e" name="Arbutin|Ursin|Uvasol|Hydroquinone-O-beta-D-glucopyranoside|arbutin,
extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C12H16O7,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C06187_c" name="Arbutin 6-phosphate|Arbutin-6P|arbutin 6-phosphate"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C12H16O10P</p></html>
    </notes>
  </species>
  <species id="M_C06188_c" name="Salicin 6-phosphate|Salicin-6P|salicin 6-phosphate"

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compartment="C_c">
  <notes>
    <html
      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C13H18O10P</p></html>
    </notes>
  </species>
  <species id="M_C06193_c" name="Guanosine 3'-phosphate|3'-GMP|3'-Guanylic
acid|Guo-3'-P|Gp" compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C10H13N5O8P</p></html>
      </notes>
    </species>
    <species id="M_C06193_e" name="Guanosine 3'-phosphate|3'-GMP|3'-Guanylic
acid|Guo-3'-P|Gp, extracellular" compartment="C_e">
      <notes>
        <html
          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C10H13N5O8P,
extracellular</p></html>
        </notes>
      </species>
      <species id="M_C06194_c" name="2',3'-Cyclic GMP" compartment="C_c">
        <notes>
          <html
            xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C10H11N5O7P</p></html>
          </notes>
        </species>
        <species id="M_C06205_c" name="1,2-Dihydronaphthalene-1,2-diol" compartment="C_c">
          <notes>
            <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C10H10O2</p></html>
          </notes>
        </species>
        <species id="M_C06228_c" name="Ferrichrome" compartment="C_c">
          <notes>
            <html
              xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C27H45FeN9O12</p></html>
            </notes>
          </species>
          <species id="M_C06228_e" name="Ferrichrome, extracellular" compartment="C_e">
            <notes>
              <html
                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C27H45FeN9O12,
extracellular</p></html>
              </notes>
            </species>
            <species id="M_C06231_c" name="Ectoine|L-Ectoine|ectoine" compartment="C_c">

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    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H10N2O2</p></html>
    </notes>
  </species>
  <species id="M_C06231_e" name="Ectoine|L-Ectoine|ectoine, extracellular"
    compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H10N2O2,
    extracellular</p></html>
    </notes>
  </species>
  <species id="M_C06232_c" name="Molybdate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: H2MoO4</p></html>
    </notes>
  </species>
  <species id="M_C06232_e" name="Molybdate, extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: H2MoO4,
    extracellular</p></html>
    </notes>
  </species>
  <species id="M_C06244_c" name="Acetamide|acetamide" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C2H5NO</p></html>
    </notes>
  </species>
  <species id="M_C06250_c" name="Holo-[carboxylase]|Biotin-carboxyl-carrier protein"
    compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
    C17H27N5O4R2S</p></html>
    </notes>
  </species>
  <species id="M_C06311_c" name="Galactitol 1-phosphate|D-Galactitol
    1-phosphate|L-Galactitol 6-phosphate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H14O9P</p></html>
    </notes>
  </species>
  <species id="M_C06369_c" name="2-Deoxy-D-glucose 6-phosphate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O8P</p></html>
    </notes>
  </species>

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</species>
  <species id="M_C06369_e" name="2-Deoxy-D-glucose 6-phosphate, extracellular"
compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O8P,
extracellular</p></html>
    </notes>
</species>
  <species id="M_C06424_c" name="Tetradecanoic acid|Tetradecanoate|Myristic
acid|tetradecanoate (C14:0)|tetradecanoate|tetradecanoate (n-C14:0)" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C14H27O2</p></html>
    </notes>
</species>
  <species id="M_C06441_c" name="L-Xylulose 1-phosphate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H10O8P</p></html>
    </notes>
</species>
  <species id="M_C06468_c"
name="D-Psicose|D-ribo-2-Hexulose|D-ribo-2-Ketohexulose|D-erythro-Hexulose|D-Pseudofructo
se|D-Allulose|D-Altrulose" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O6</p></html>
    </notes>
</species>
  <species id="M_C06468_e"
name="D-Psicose|D-ribo-2-Hexulose|D-ribo-2-Ketohexulose|D-erythro-Hexulose|D-Pseudofructo
se|D-Allulose|D-Altrulose, extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O6,
extracellular</p></html>
    </notes>
</species>
  <species id="M_C06481_c" name="L-Seryl-tRNA(Sec)" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C13H22NO12PR2(C5H8O6PR)n</p></html>
    </notes>
</species>
  <species id="M_C06567_c" name="Penicilloic acid" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C9H11N2O5RS</p></html>

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    </notes>
</species>
<species id="M_C06696_c" name="Lead|Pb|Pb2+" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: Pb</p></html>
  </notes>
</species>
<species id="M_C06696_e" name="Lead|Pb|Pb2+, extracellular" compartment="C_e">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: Pb,
extracellular</p></html>
  </notes>
</species>
<species id="M_C06697_c" name="Arsenite|arsenite" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: H3O3As</p></html>
  </notes>
</species>
<species id="M_C06697_e" name="Arsenite|arsenite, extracellular" compartment="C_e">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: H3O3As,
extracellular</p></html>
  </notes>
</species>
<species id="M_C06730_c"
name="4-Methylcatechol|3,4-Dihydroxytoluene|1,2-Dihydroxy-4-methylbenzene|4-Methyl-1,2-be
nzenediol" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H8O2</p></html>
  </notes>
</species>
<species id="M_C06735_c" name="Aminoacetaldehyde|aminoacetaldehyde"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C2H6NO</p></html>
  </notes>
</species>
<species id="M_C06755_c" name="Chloroacetic acid|Chloroethanoic acid"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C2H2O2Cl</p></html>
  </notes>
</species>
<species id="M_C06892_c" name="2-Deoxy-5-keto-D-gluconic

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acid|DKH|2-deoxy-5-keto-D-gluconic-acid" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H9O6</p></html>
  </notes>
</species>
  <species id="M_C06892_e" name="2-Deoxy-5-keto-D-gluconic
acid|DKH|2-deoxy-5-keto-D-gluconic-acid, extracellular" compartment="C_e">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H9O6,
extracellular</p></html>
  </notes>
</species>
  <species id="M_C06893_c"
name="6-Phospho-5-dehydro-2-deoxy-D-gluconate|5-Dehydro-2-deoxy-D-gluconate
6-phosphate|2-Deoxy-5-keto-D-gluconic acid
6-phosphate|DKHP|2-deoxy-5-keto-D-gluconic-acid-6-phosphate" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H9O9P</p></html>
  </notes>
</species>
  <species id="M_C07086_c" name="Phenyl acetate|Acetylphenol|Acetic acid,phenyl
ester|Phenylacetic acid|Benzylformic acid|Phenylacetate|Benzeneacetiic
acid|Benzylformate|Phenylaceticacid|phenylacetate|PACT" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C8H8O2</p></html>
  </notes>
</species>
  <species id="M_C07335_c"
name="2-Amino-3-oxo-4-phosphonooxybutyrate|L-2-Amino-3-oxo-4-phosphonooxybutyrate|(2S)
-2-Amino-3-oxo-4-phosphonooxybutanoate" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H7NO7P</p></html>
  </notes>
</species>
  <species id="M_C07478_c" name="2-Hydroxy-5-methyl-cis,cis-muconate"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H6O5</p></html>
  </notes>
</species>
  <species id="M_C07479_c"
name="2-Oxo-5-methyl-cis-muconate|2-oxo-5-methyl-cis-muconate" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H6O5</p></html>

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    </notes>
</species>
  <species id="M_C07597_c" name="Ferroxamine|Ferrioxamine|ferrooxamine"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C25H46FeN6O8</p></html>
    </notes>
</species>
  <species id="M_C07597_e" name="Ferroxamine|Ferrioxamine|ferrooxamine, extracellular"
compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C25H46FeN6O8,
extracellular</p></html>
    </notes>
</species>
  <species id="M_C08240_c" name="Gentiobiose" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C12H22O11</p></html>
    </notes>
</species>
  <species id="M_C08240_e" name="Gentiobiose, extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C12H22O11,
extracellular</p></html>
    </notes>
</species>
  <species id="M_C08275_c" name="L-Djenkolic acid|Djenkolic acid|Djenkolate"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C7H14N2O4S2</p></html>
    </notes>
</species>
  <species id="M_C08275_e" name="L-Djenkolic acid|Djenkolic acid|Djenkolate,
extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H14N2O4S2,
extracellular</p></html>
    </notes>
</species>
  <species id="M_C08276_c" name="3-(Methylthio)propionic
acid|3-Methylthiopropionate|3-methylthiopropionate" compartment="C_c">
    <notes>

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    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H7O2S</p></html>
  </notes>
</species>
  <species id="M_C08325_c" name="Amygdalin" compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C20H27NO11</p></html>
    </notes>
  </species>
  <species id="M_C08325_e" name="Amygdalin, extracellular" compartment="C_e">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C20H27NO11,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C09332_c" name="Tetrahydrofolyl-[Glu](2)|THF-L-glutamate"
compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C24H27N8O9</p></html>
    </notes>
  </species>
  <species id="M_C09815_c" name="Benzamide" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H7NO</p></html>
    </notes>
  </species>
  <species id="M_C10172_c" name="Stachydrine|proline betaine" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H13NO2</p></html>
    </notes>
  </species>
  <species id="M_C10172_e" name="Stachydrine|proline betaine, extracellular"
compartment="C_e">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C7H13NO2,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C11145_c" name="Methanesulfonic
acid|methanesulfonate|Methanesulfonate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: CH3O3S</p></html>
    </notes>
  </species>

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</species>
  <species id="M_C11145_e" name="Methanesulfonic acid|methanesulfonate|Methanesulfonate,
extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: CH3O3S,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_C11355_c"
name="4-Amino-4-deoxychorismate|ADC|4-amino-4-deoxychorismate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C10H10NO5</p></html>
    </notes>
  </species>
  <species id="M_C11356_c" name="trans,trans,cis-Geranylgeranyl
diphosphate|trans,trans,cis-Geranylgeranyl pyrophosphate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C20H34O7P2</p></html>
    </notes>
  </species>
  <species id="M_C11434_c" name="2-C-Methyl-D-erythritol
4-phosphate|2-C-methyl-D-erythritol
4-phosphate|2-C-methyl-D-erythritol4-phosphate|2-c-methyl-d-erythritol-4-phosphate"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H12O7P</p></html>
    </notes>
  </species>
  <species id="M_C11435_c" name="4-(Cytidine
5'-diphospho)-2-C-methyl-D-erythritol|4-(cytidine
5'-diphospho)-2-C-methyl-D-erythritol|4--cytidine5-diphospho-2-C-methyl-D-erythritol"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C14H23N3O14P2</p></html>
    </notes>
  </species>
  <species id="M_C11436_c" name="2-Phospho-4-(cytidine
5'-diphospho)-2-C-methyl-D-erythritol|2-phospho-4-(cytidine
5'-diphospho)-2-C-methyl-D-erythritol|2-phospho-4--cytidine5-diphospho-2-C-methyl-D-erythrito
l" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:

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C14H23N3O17P3</p></html>

</notes>

</species>

<species id="M\_C11437\_c" name="1-Deoxy-D-xylulose 5-phosphate|1-deoxy-D-xylulose 5-phosphate|1-deoxy-D-xylulose5-phosphate|1-deoxy-d-xylulose 5-phosphate" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H10O7P</p></html>

</notes>

</species>

<species id="M\_C11453\_c" name="2-C-Methyl-D-erythritol 2,4-cyclodiphosphate|3-Methyl-1,2,3,4-tetrahydroxybutane-1,3-cyclic bisphosphate|2-C-methyl-D-erythritol 2,4-cyclodiphosphate|2-C-methyl-D-erythritol2-4-cyclodiphosphate|2-c-methyl-d-erythritol-2,4-cyclodiphosphate" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H10O9P2</p></html>

</notes>

</species>

<species id="M\_C11458\_c" name="Crotono-betaine|crotonobetaine" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C8H16NO</p></html>

</notes>

</species>

<species id="M\_C11458\_e" name="Crotono-betaine|crotonobetaine, extracellular" compartment="C\_e">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C8H16NO, extracellular</p></html>

</notes>

</species>

<species id="M\_C11459\_c" name="Butyro-betaine" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C8H18NO</p></html>

</notes>

</species>

<species id="M\_C11459\_e" name="Butyro-betaine, extracellular" compartment="C\_e">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C8H18NO, extracellular</p></html>

</notes>

</species>

<species id="M\_C11481\_c" name="Sulfite|Hydrogen sulfite|HSO3-|Sulfite (HSO3)-|Bisulfite|sulfite|H2SO3" compartment="C\_c">

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    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: HO3S</p></html>
    </notes>
  </species>
  <species id="M_C11536_c" name="(2R)-O-Phospho-3-sulfolactate|(2R)-Phosphosulfolactate"
  compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H4O9PS</p></html>
    </notes>
  </species>
  <species id="M_C11537_c" name="(2R)-3-Sulfolactate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H4O6S</p></html>
    </notes>
  </species>
  <species id="M_C11546_c" name="2-(beta-D-Glucosyl)-sn-glycerol" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C9H18O8</p></html>
    </notes>
  </species>
  <species id="M_C11546_e" name="2-(beta-D-Glucosyl)-sn-glycerol, extracellular"
  compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C9H18O8,
      extracellular</p></html>
    </notes>
  </species>
  <species id="M_C11638_c" name="3-Amino-2-oxopropyl
  phosphate|1-Amino-3-(phosphohydroxy)propan-2-one" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C3H8NO5P</p></html>
    </notes>
  </species>
  <species id="M_C11811_c" name="1-Hydroxy-2-methyl-2-butenyl
  4-diphosphate|(E)-4-Hydroxy-3-methylbut-2-en-1-yl
  diphosphate|1-hydroxy-2-methyl-2-(E)-butenyl 4-diphosphate|1-hydroxy-2-methyl-2--butenyl
  4-diphosphate|1-hydroxy-2-methyl-2--E-butenyl|4-diphosphate|1-hydroxy-2-methyl-2-(e)-butenyl
  4-diphosphate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H10O8P2</p></html>
    </notes>
  </species>
  <species id="M_C11821_c" name="5-Hydroxyisourate" compartment="C_c">
    <notes>

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        <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H4N4O4</p></html>
    </notes>
</species>
    <species id="M_C11838_c" name="(S)-4,5-dihydroxypentan-2,3-dione"
compartment="C_c">
    <notes>
        <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H8O4</p></html>
    </notes>
</species>
    <species id="M_C11907_c"
name="dTDP-4-dehydro-6-deoxy-alpha-D-glucose|dTDP-4-oxo-6-deoxy-alpha-D-glucose|4,6-Di
deoxy-4-oxo-dTDP-D-glucose|dTDP-4-oxo-6-deoxy-D-glucose|dTDP-4-dehydro-6-deoxy-D-gluc
ose|dTDP-4-dehydro-6-deoxy-alpha-D-galactose|dTDP-4-dehydro-6-deoxy-D-galactose|dtdp-4-de
hydro-6-deoxy-d-glucose" compartment="C_c">
    <notes>
        <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C16H22N2O15P2</p></html>
    </notes>
</species>
    <species id="M_C12147_c" name="L-Threonine O-3-phosphate|L-Threonine phosphate"
compartment="C_c">
    <notes>
        <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H9NO6P</p></html>
    </notes>
</species>
    <species id="M_C12147_e" name="L-Threonine O-3-phosphate|L-Threonine phosphate,
extracellular" compartment="C_e">
    <notes>
        <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H9NO6P,
extracellular</p></html>
    </notes>
</species>
    <species id="M_C12248_c"
name="5-Hydroxy-2-oxo-4-ureido-2,5-dihydro-1H-imidazole-5-carboxylate"
compartment="C_c">
    <notes>
        <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H5N4O5</p></html>
    </notes>
</species>
    <species id="M_C14088_c" name="3-Methylsalicylate" compartment="C_c">
    <notes>
        <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C8H7O3</p></html>
    </notes>
</species>

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    <species      id="M_C14098_c"      name="2-Methylnaphthalene|beta-Methylnaphthalene"
compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C11H10</p></html>
    </notes>
</species>
    <species      id="M_C14103_c"      name="4-Methylsalicylate|m-Cresotic
acid|2-Hydroxy-4-methylbenzoic acid" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C8H7O3</p></html>
    </notes>
</species>
    <species      id="M_C14109_c"
name="4-Hydroxymethylsalicylate|2-Hydroxy-4-hydroxymethylbenzoic
acid"
compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C8H7O4</p></html>
    </notes>
</species>
    <species id="M_C14110_c" name="4-Hydroxymethylcatechol" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H8O3</p></html>
    </notes>
</species>
    <species id="M_C14115_c" name="Naphthyl-2-methyl-succinic acid" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C15H12O4</p></html>
    </notes>
</species>
    <species id="M_C14145_c" name="(3S)-3-Hydroxyadipyl-CoA" compartment="C_c">
    <notes>
    <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C27H40N7O20P3S</p></html>
    </notes>
</species>
    <species      id="M_C14179_c"      name="Sulfoacetate|Sulfoacetic
acid|sulfoacetate"
compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C2H2O5S</p></html>
    </notes>
</species>
    <species id="M_C14179_e" name="Sulfoacetate|Sulfoacetic acid|sulfoacetate, extracellular"
compartment="C_e">
    <notes>

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    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C2H2O5S,
extracellular</p></html>
  </notes>
</species>
  <species id="M_C14463_c" name="(R)-3-Hydroxy-3-methyl-2-oxopentanoate"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H9O4</p></html>
    </notes>
  </species>
  <species id="M_C14786_c" name="(1R,2S)-Naphthalene 1,2-oxide|(1R,2S)-Naphthalene
epoxide" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C10H8O</p></html>
    </notes>
  </species>
  <species id="M_C14787_c" name="(1S,2R)-Naphthalene 1,2-oxide|(1S,2R)-Naphthalene
epoxide" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C10H8O</p></html>
    </notes>
  </species>
  <species id="M_C14800_c" name="1-Nitronaphthalene-5,6-oxide" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C10H7NO3</p></html>
    </notes>
  </species>
  <species id="M_C14801_c"
name="1-Nitro-5,6-dihydroxy-dihydronaphthalene|1,2-Dihydro-5-nitro-1,2-naphthalenediol"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C10H9NO4</p></html>
    </notes>
  </species>
  <species id="M_C14818_c" name="Fe2+|Fe(II)|Ferrous ion|Iron(2+)" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: Fe</p></html>
    </notes>
  </species>
  <species id="M_C14818_e" name="Fe2+|Fe(II)|Ferrous ion|Iron(2+), extracellular"
compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: Fe,
extracellular</p></html>

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    </notes>
</species>
    <species id="M_C14819_c" name="Fe3+|Fe(III)|Ferric ion|Iron(3+)|fe3"
compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: Fe</p></html>
    </notes>
</species>
    <species id="M_C14819_e" name="Fe3+|Fe(III)|Ferric ion|Iron(3+)|fe3, extracellular"
compartment="C_e">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: Fe,
extracellular</p></html>
    </notes>
</species>
    <species id="M_C14850_c" name="Benzo[a]pyrene-7,8-oxide|Benzo[a]pyrene-7,8-epoxide"
compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C20H12O</p></html>
    </notes>
</species>
    <species id="M_C14852_c"
name="Benzo[a]pyrene-7,8-diol|Benzo[a]pyrene-7,8-dihydrodiol" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C20H14O2</p></html>
    </notes>
</species>
    <species id="M_C15547_c" name="1,4-Dihydroxy-2-naphthoyl-CoA" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C32H39N7O19P3S</p></html>
    </notes>
</species>
    <species id="M_C15556_c" name="3,4-Dihydroxy-2-butanone
4-phosphate|3,4-dihydroxy-2-butanone 4-phosphate|3-4-dihydroxy-2-butanone4-phosphate"
compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H8O6P</p></html>
    </notes>
</species>
    <species id="M_C15586_c" name="Nebularine|Purine riboside|N-D-Ribosylpurine|Purine
nucleoside" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:

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C10H12N4O4</p></html>  
 </notes>  
 </species>  
 <species id="M\_C15587\_c" name="Purine|purine" compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H4N4</p></html>  
 </notes>  
 </species>  
 <species id="M\_C15606\_c" name="1,2-Dihydroxy-5-(methylthio)pent-1-en-3-one|1,2-dihydroxy-3-keto-5-methylthiopentene" compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H9O3S</p></html>  
 </notes>  
 </species>  
 <species id="M\_C15650\_c" name="2,3-Diketo-5-methylthiopentyl-1-phosphate|5-(Methylthio)-2,3-dioxopentyl phosphate|2,3-diketo-5-methylthio-1-phosphopentane|2,3-diketo-5-methylthio-1-phosphopentane|2,3-diketo-5-methylthiopentyl-1-phosphate|2-3-diketo-5-methylthio-1-phosphopentane" compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H10O6PS</p></html>  
 </notes>  
 </species>  
 <species id="M\_C15651\_c" name="2-Hydroxy-3-keto-5-methylthiopentenyl-1-phosphate|2-Hydroxy-5-(methylthio)-3-oxopen t-1-enyl phosphate|2-hydroxy-3-keto-5-methylthiopentenyl-1-phosphate" compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H9O6PS</p></html>  
 </notes>  
 </species>  
 <species id="M\_C15670\_c" name="Heme A|hemeA" compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C49H54FeN4O6</p></html>  
 </notes>  
 </species>  
 <species id="M\_C15672\_c" name="Heme O|hemeO|heme o" compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C49H56FeN4O5</p></html>  
 </notes>  
 </species>  
 <species id="M\_C15811\_c" name="[Enzyme]-cysteine|Thiamine biosynthesis intermediate 2"

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compartment="C_c">
  <notes>
    <html
      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C4H6N2O2SR2</p></html>
    </notes>
</species>
  <species id="M_C15812_c" name="[Enzyme]-S-sulfanylcysteine|Thiamine biosynthesis
intermediate 3" compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C4H6N2O2S2R2</p></html>
      </notes>
    </species>
  <species id="M_C15817_c" name="Heme C" compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C40H44FeN6O8S2</p></html>
      </notes>
    </species>
  <species
    id="M_C15972_c"
    name="Lipoamide|Thioctic acid
amide|lipoamide|Lipoamide-E|Enzyme N6-(lipoyl)lysine" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C8H15NOS2</p></html>
    </notes>
  </species>
  <species
    id="M_C15973_c"
    name="Dihydrolipoamide|Dihydrothioctamide|dihydrolipoamide|Dihydrolipoamide-E|Enzyme
N6-(dihydrolipoyl)lysine" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C8H17NOS2</p></html>
    </notes>
  </species>
  <species
    id="M_C15974_c"
    name="3-Methyl-1-hydroxybutyl-ThPP|3-Methyl-1-hydroxybutyl-TPP" compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C17H27N4O8P2S</p></html>
      </notes>
    </species>
  <species
    id="M_C15975_c"
    name="[Dihydrolipoyllysine-residue
(2-methylpropanoyl)transferase]
S-(3-methylbutanoyl)dihydrolipoyllysine|S-(3-Methylbutanoyl)-dihydrolipoamide-E"
    compartment="C_c">
    <notes>

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<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
 C13H25NO2S2</p></html>  
 </notes>  
 </species>  
 <species id="M\_C15976\_c"  
 name="2-Methyl-1-hydroxypropyl-ThPP|2-Methyl-1-hydroxypropyl-TPP" compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
 C16H25N4O8P2S</p></html>  
 </notes>  
 </species>  
 <species id="M\_C15977\_c"  
 name="S-(2-Methylpropanoyl)-dihydrolipoamide|S-(2-Methylpropionyl)-dihydrolipoamide|[(Dihydrolipoyllysine-residue (2-methylpropanoyl)transferase] S-(2-methylpropanoyl)dihydrolipoyllysine|S-(2-Methylpropanoyl)-dihydrolipoamide-E|S-(2-Methylpropionyl)-dihydrolipoamide-E|Enzyme N6-(S-[2-methylpropanoyl]dihydrolipoyl)lysine" compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
 C12H23NO2S2</p></html>  
 </notes>  
 </species>  
 <species id="M\_C15978\_c"  
 name="2-Methyl-1-hydroxybutyl-ThPP|2-Methyl-1-hydroxybutyl-TPP" compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
 C17H27N4O8P2S</p></html>  
 </notes>  
 </species>  
 <species id="M\_C15979\_c" name="[Dihydrolipoyllysine-residue (2-methylpropanoyl)transferase] S-(2-methylbutanoyl)dihydrolipoyllysine|S-(2-Methylbutanoyl)-dihydrolipoamide-E" compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
 C13H25NO2S2</p></html>  
 </notes>  
 </species>  
 <species id="M\_C15980\_c"  
 name="2-Methylbutanoyl-CoA|2-Methylbutyryl-CoA|2-methylbutyryl-CoA|(S)-2-Methylbutanoyl-CoA|M\_2\_Methyl\_butyryl\_CoA" compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
 C26H41N7O17P3S</p></html>

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    </notes>
</species>
<species id="M_C16237_c" name="Protein N6-(lipoyl)lysine" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C8H14NORS2</p></html>
    </notes>
</species>
<species id="M_C16238_c" name="Lipoyl-AMP" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C18H25N5O8PS2</p></html>
    </notes>
</species>
<species id="M_C16240_c" name="Apoprotein" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: H3NR</p></html>
    </notes>
</species>
<species id="M_C16254_c"
name="S-Succinyldihydrolipoamide|S-Succinyldihydrolipoamide-E|[Dihydrolipoyllysine-residue
succinyltransferase] S-succinyldihydrolipoyllysine" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C12H20NO4S2</p></html>
    </notes>
</species>
<species id="M_C16255_c"
name="S-Acetyldihydrolipoamide|6-S-Acetyldihydrolipoamide|S-acetyldihydrolipoamide|[Dihydr
olipoyllysine-residue acetyltransferase] S-acetyldihydrolipoyllysine|S-Acetyldihydrolipoamide-E"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C10H19NO2S2</p></html>
    </notes>
</species>
<species id="M_C16489_c" name="Fructoselysine 6-phosphate" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C12H25N2O10P</p></html>
    </notes>
</species>
<species id="M_C16519_c"
name="2-Succinyl-5-enolpyruvyl-6-hydroxy-3-cyclohexene-1-carboxylate" compartment="C_c">

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    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C14H13O9</p></html>
    </notes>
  </species>
  <species id="M_C16636_c" name="tRNA(Sec)" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: </p></html>
    </notes>
  </species>
  <species id="M_C16684_c" name="N-Acetoxyarylamine" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C8H9NO2</p></html>
    </notes>
  </species>
  <species
    id="M_C16688_c"
    name="Sucrose
    6-phosphate|Sucrose
    6F-phosphate|sucrose-6-phosphate|sucrose
    6-phosphate|Sucrose-6-phosphate|6-Phosphosucrose|6-O-Phosphonosucrose|beta-D-Fructofuranos
    yl-6-O-phosphono-alpha-D-glucopyranoside" compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
        C12H22O14P</p></html>
    </notes>
  </species>
  <species
    id="M_C17949_c"
    name="N-Acetyldemethylphosphinothricin|N-Adpt"
    compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12NO5P</p></html>
    </notes>
  </species>
  <species
    id="M_C17952_c"
    name="N-Acetylphosphinothricin|L-N-Acetylphosphinothricin|N-Acetyl-L-Glufosinate|N-Acetyl
    phinothricin" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H14NO5P</p></html>
    </notes>
  </species>
  <species
    id="M_C17962_c"
    name="Demethylphosphinothricin|(2S)-2-Amino-4-(hydroxyphosphinyl)butanoic
    acid"
    compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H10NO4P</p></html>
    </notes>
  </species>
  <species id="M_C19891_c" name="D-chiro-Inositol" compartment="C_c">

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    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O6</p></html>
    </notes>
  </species>
  <species id="M_C19891_e" name="D-chiro-Inositol,extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O6</p></html>
    </notes>
  </species>
  <species id="M_cpd01048_c" name="Arsenic acid|Orthoarsenic acid|Arsenate
ion|Arsenate|arsenate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: HO4As</p></html>
    </notes>
  </species>
  <species id="M_cpd01048_e" name="Arsenic acid|Orthoarsenic acid|Arsenate
ion|Arsenate|arsenate, extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: HO4As,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_cpd11430_c" name="fa1|Fatty acid (Iso-C14:0)" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C14H27O2</p></html>
    </notes>
  </species>
  <species id="M_cpd11431_c" name="fa1|Fatty acid (Iso-C17:0)" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C17H33O2</p></html>
    </notes>
  </species>
  <species id="M_cpd11432_c" name="fa1|coA|Iso-C17:0 CoA Isoheptadecanoyl-CoA"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C38H65N7O17P3S</p></html>
    </notes>
  </species>
  <species id="M_cpd11433_c" name="fa12|Fatty acid (Anteiso-C17:0)" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C17H33O2</p></html>
    </notes>
  </species>

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    <species id="M_cpd11434_c" name="fa12coa|Anteiso-C17:0 CoA
Anteisoheptadecanoyl-CoA" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C38H65N7O17P3S</p></html>
    </notes>
</species>
    <species id="M_cpd11435_c" name="fa1coa|Iso-C14:0 CoA Isotetradecanoyl-CoA"
compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C35H59N7O17P3S</p></html>
    </notes>
</species>
    <species id="M_cpd11436_c" name="fa3|Fatty acid (Iso-C15:0)" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C15H29O2</p></html>
    </notes>
</species>
    <species id="M_cpd11437_c" name="fa3coa|Iso-C15:0 CoA Isopentadecanoyl-CoA"
compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C36H61N7O17P3S</p></html>
    </notes>
</species>
    <species id="M_cpd11438_c" name="fa4|Fatty acid (Anteiso-C15:0)" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C15H29O2</p></html>
    </notes>
</species>
    <species id="M_cpd11439_c" name="fa4coa|Anteiso-C15:0 CoA
Anteisopentadecanoyl-CoA" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C36H61N7O17P3S</p></html>
    </notes>
</species>
    <species id="M_cpd11440_c" name="fa6|Fatty acid (iso-C16:0)" compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C16H31O2</p></html>
    </notes>
</species>
    <species id="M_cpd11441_c" name="fa6coa|Iso-C16:0 CoA Isohexadecanoyl-CoA"

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compartment="C_c">
  <notes>
    <html
      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C37H63N7O17P3S</p></html>
    </notes>
</species>
  <species id="M_cpd11459_c" name="tcam|minor teichoic acid (acetylgalactosamine glucose
phosphate, n=30)" compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C420H692N30O391P30</p></html>
      </notes>
</species>
  <species id="M_cpd11462_c" name="mRNA" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: </p></html>
    </notes>
</species>
  <species id="M_cpd11495_c" name="2-methylbutanoyl-ACP|2-methylbutyryl-ACP"
compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C16H29N2O8PRS</p></html>
      </notes>
</species>
  <species id="M_cpd11496_c" name="4-methyl-3-oxo-hexanoyl-ACP" compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C18H31N2O9PRS</p></html>
      </notes>
</species>
  <species id="M_cpd11497_c" name="4-methyl-3-hydroxy-hexanoyl-ACP"
compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C18H33N2O9PRS</p></html>
      </notes>
</species>
  <species id="M_cpd11498_c" name="4-methyl-trans-hex-2-enoyl-ACP"
compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C18H31N2O8PRS</p></html>
      </notes>

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</species>
  <species id="M_cpd11499_c" name="4-methyl-hexanoyl-ACP" compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C18H33N2O8PRS</p></html>
      </notes>
    </species>
    <species id="M_cpd11500_c" name="6-methyl-3-oxo-octanoyl-ACP" compartment="C_c">
      <notes>
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          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C20H35N2O9PRS</p></html>
        </notes>
      </species>
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        id="M_cpd11501_c"
        name="6-methyl-3-hydroxy-octanoyl-ACP"
        compartment="C_c">
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            xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C20H37N2O9PRS</p></html>
          </notes>
        </species>
        <species
          id="M_cpd11502_c"
          name="6-methyl-trans-oct-2-enoyl-ACP"
          compartment="C_c">
          <notes>
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              xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C20H35N2O8PRS</p></html>
            </notes>
          </species>
          <species id="M_cpd11503_c" name="6-methyl-octanoyl-ACP" compartment="C_c">
            <notes>
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C20H37N2O8PRS</p></html>
              </notes>
            </species>
            <species id="M_cpd11504_c" name="8-methyl-3-oxo-decanoyl-ACP" compartment="C_c">
              <notes>
                <html
                  xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C22H39N2O9PRS</p></html>
                </notes>
              </species>
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                id="M_cpd11505_c"
                name="8-methyl-3-hydroxy-decanoyl-ACP"
                compartment="C_c">
                <notes>
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                    xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C22H41N2O9PRS</p></html>

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    </notes>
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compartment="C_c">
  <notes>
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</species>
  <species id="M_cpd11507_c" name="8-methyl-decanoyl-ACP" compartment="C_c">
  <notes>
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  </notes>
</species>
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compartment="C_c">
  <notes>
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C24H43N2O9PRS</p></html>
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</species>
  <species id="M_cpd11509_c" name="10-methyl-3-hydroxy-dodecanoyl-ACP"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C24H45N2O9PRS</p></html>
  </notes>
</species>
  <species id="M_cpd11510_c" name="10-methyl-trans-dodec-2-enoyl-ACP"
compartment="C_c">
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  </notes>
</species>
  <species id="M_cpd11511_c" name="10-methyl-dodecanoyl-ACP" compartment="C_c">
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  </notes>
</species>
  <species id="M_cpd11512_c" name="12-methyl-3-oxo-tetra-decanoyl-ACP"
compartment="C_c">

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    <notes>
      <html
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C26H47N2O9PRS</p></html>
    </notes>
  </species>
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    compartment="C_c">
    <notes>
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        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C26H49N2O9PRS</p></html>
    </notes>
  </species>
  <species id="M_cpd11514_c" name="12-methyl-trans-tetra-dec-2-enoyl-ACP"
    compartment="C_c">
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        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C26H47N2O8PRS</p></html>
    </notes>
  </species>
  <species id="M_cpd11515_c" name="12-methyl-tetra-decanoyl-ACP" compartment="C_c">
    <notes>
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        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C26H49N2O8PRS</p></html>
    </notes>
  </species>
  <species id="M_cpd11516_c" name="14-methyl-3-oxo-hexa-decanoyl-ACP"
    compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C28H51N2O9PRS</p></html>
    </notes>
  </species>
  <species id="M_cpd11517_c" name="14-methyl-3-hydroxy-hexa-decanoyl-ACP"
    compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C28H53N2O9PRS</p></html>
    </notes>
  </species>
  <species id="M_cpd11518_c" name="14-methyl-trans-hexa-dec-2-enoyl-ACP"
    compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C28H51N2O8PRS</p></html>

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    </notes>
</species>
  <species id="M_cpd11519_c" name="14-methyl-hexa-decanoyl-ACP" compartment="C_c">
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      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C28H53N2O8PRS</p></html>
    </notes>
  </species>
  <species id="M_cpd11520_c" name="3-methylbutanoyl-ACP|isovaleryl-ACP"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C16H29N2O8PRS</p></html>
    </notes>
  </species>
  <species id="M_cpd11521_c" name="5-methyl-3-oxo-hexanoyl-ACP" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C18H31N2O9PRS</p></html>
    </notes>
  </species>
  <species id="M_cpd11522_c" name="5-methyl-3-hydroxy-hexanoyl-ACP"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C18H33N2O9PRS</p></html>
    </notes>
  </species>
  <species id="M_cpd11523_c" name="5-methyl-trans-hex-2-enoyl-ACP"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C18H31N2O8PRS</p></html>
    </notes>
  </species>
  <species id="M_cpd11524_c" name="5-methyl-hexanoyl-ACP" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C18H33N2O8PRS</p></html>
    </notes>
  </species>
  <species id="M_cpd11525_c" name="7-methyl-3-oxo-octanoyl-ACP" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:

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C20H35N2O9PRS</p></html>  
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 </species>  
 <species id="M\_cpd11526\_c" name="7-methyl-3-hydroxy-octanoyl-ACP" compartment="C\_c">  
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 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
 C20H37N2O9PRS</p></html>  
 </notes>  
 </species>  
 <species id="M\_cpd11527\_c" name="7-methyl-trans-oct-2-enoyl-ACP" compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
 C20H35N2O8PRS</p></html>  
 </notes>  
 </species>  
 <species id="M\_cpd11528\_c" name="7-methyl-octanoyl-ACP" compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
 C20H37N2O8PRS</p></html>  
 </notes>  
 </species>  
 <species id="M\_cpd11529\_c" name="9-methyl-3-oxo-decanoyl-ACP" compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
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 </species>  
 <species id="M\_cpd11530\_c" name="9-methyl-3-hydroxy-decanoyl-ACP" compartment="C\_c">  
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 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
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 </species>  
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 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
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 </species>  
 <species id="M\_cpd11532\_c" name="9-methyl-decanoyl-ACP" compartment="C\_c">

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      <notes>
        <html
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C22H41N2O8PRS</p></html>
        </notes>
      </species>
      <species
        id="M_cpd11533_c"
        name="11-methyl-3-oxo-dodecanoyl-ACP"
        compartment="C_c">
        <notes>
          <html
            xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C24H43N2O9PRS</p></html>
          </notes>
        </species>
        <species
          id="M_cpd11534_c"
          name="11-methyl-3-hydroxy-dodecanoyl-ACP"
          compartment="C_c">
          <notes>
            <html
              xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C24H45N2O9PRS</p></html>
            </notes>
          </species>
          <species
            id="M_cpd11535_c"
            name="11-methyl-trans-dodec-2-enoyl-ACP"
            compartment="C_c">
            <notes>
              <html
                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C24H43N2O8PRS</p></html>
              </notes>
            </species>
            <species id="M_cpd11536_c" name="11-methyl-dodecanoyl-ACP" compartment="C_c">
            <notes>
              <html
                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C24H45N2O8PRS</p></html>
              </notes>
            </species>
            <species
              id="M_cpd11537_c"
              name="13-methyl-3-oxo-tetra-decanoyl-ACP"
              compartment="C_c">
              <notes>
                <html
                  xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C26H47N2O9PRS</p></html>
                </notes>
              </species>
              <species
                id="M_cpd11538_c"
                name="13-methyl-3-hydroxy-tetra-decanoyl-ACP"
                compartment="C_c">
                <notes>
                  <html
                    xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C26H49N2O9PRS</p></html>

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    </notes>
</species>
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compartment="C_c">
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C26H47N2O8PRS</p></html>
    </notes>
</species>
  <species id="M_cpd11540_c" name="13-methyl-tetra-decanoyl-ACP" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C26H49N2O8PRS</p></html>
    </notes>
</species>
  <species id="M_cpd11541_c" name="15-methyl-3-oxo-hexa-decanoyl-ACP"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C28H51N2O9PRS</p></html>
    </notes>
</species>
  <species id="M_cpd11542_c" name="15-methyl-3-hydroxy-hexa-decanoyl-ACP"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C28H53N2O9PRS</p></html>
    </notes>
</species>
  <species id="M_cpd11543_c" name="15-methyl-trans-hexa-dec-2-enoyl-ACP"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C28H51N2O8PRS</p></html>
    </notes>
</species>
  <species id="M_cpd11544_c" name="15-methyl-hexa-decanoyl-ACP" compartment="C_c">
    <notes>
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C28H53N2O8PRS</p></html>
    </notes>
</species>
  <species id="M_cpd11545_c" name="2-methylpropionyl-ACP|isobutyryl-ACP"
compartment="C_c">

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      <notes>
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          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C15H27N2O8PRS</p></html>
        </notes>
      </species>
      <species id="M_cpd11546_c" name="4-methyl-3-oxo-pentanoyl-ACP" compartment="C_c">
        <notes>
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            xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C17H29N2O9PRS</p></html>
          </notes>
        </species>
        <species
          id="M_cpd11547_c"
          name="4-methyl-3-hydroxy-pentanoyl-ACP"
          compartment="C_c">
          <notes>
            <html
              xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C17H31N2O9PRS</p></html>
            </notes>
          </species>
          <species
            id="M_cpd11548_c"
            name="4-methyl-trans-pent-2-enoyl-ACP"
            compartment="C_c">
            <notes>
              <html
                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C17H29N2O8PRS</p></html>
              </notes>
            </species>
            <species id="M_cpd11549_c" name="4-methyl-pentanoyl-ACP" compartment="C_c">
              <notes>
                <html
                  xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C17H31N2O8PRS</p></html>
                </notes>
              </species>
              <species id="M_cpd11550_c" name="6-methyl-3-oxo-heptanoyl-ACP" compartment="C_c">
                <notes>
                  <html
                    xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C19H33N2O9PRS</p></html>
                  </notes>
                </species>
                <species
                  id="M_cpd11551_c"
                  name="6-methyl-3-hydroxy-heptanoyl-ACP"
                  compartment="C_c">
                  <notes>
                    <html
                      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C19H35N2O9PRS</p></html>
                    </notes>
                  </species>

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    <species          id="M_cpd11552_c"          name="6-methyl-trans-hept-2-enoyl-ACP"
compartment="C_c">
    <notes>
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C19H33N2O8PRS</p></html>
    </notes>
</species>
    <species id="M_cpd11553_c" name="6-methyl-heptanoyl-ACP" compartment="C_c">
    <notes>
    <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C19H35N2O8PRS</p></html>
    </notes>
</species>
    <species id="M_cpd11554_c" name="8-methyl-3-oxo-nonanoyl-ACP" compartment="C_c">
    <notes>
    <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C21H37N2O9PRS</p></html>
    </notes>
</species>
    <species          id="M_cpd11555_c"          name="8-methyl-3-hydroxy-nonanoyl-ACP"
compartment="C_c">
    <notes>
    <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C21H39N2O9PRS</p></html>
    </notes>
</species>
    <species          id="M_cpd11556_c"          name="8-methyl-trans-non-2-enoyl-ACP"
compartment="C_c">
    <notes>
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C21H37N2O8PRS</p></html>
    </notes>
</species>
    <species id="M_cpd11557_c" name="8-methyl-nonanoyl-ACP" compartment="C_c">
    <notes>
    <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C21H39N2O8PRS</p></html>
    </notes>
</species>
    <species          id="M_cpd11558_c"          name="10-methyl-3-oxo-undecanoyl-ACP"
compartment="C_c">
    <notes>
    <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C23H41N2O9PRS</p></html>

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    </notes>
</species>
  <species id="M_cpd11559_c" name="10-methyl-3-hydroxy-undecanoyl-ACP"
compartment="C_c">
    <notes>
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C23H43N2O9PRS</p></html>
    </notes>
</species>
  <species id="M_cpd11560_c" name="10-methyl-trans-undec-2-enoyl-ACP"
compartment="C_c">
    <notes>
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C23H41N2O8PRS</p></html>
    </notes>
</species>
  <species id="M_cpd11561_c" name="10-methyl-undecanoyl-ACP" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C23H43N2O8PRS</p></html>
    </notes>
</species>
  <species id="M_cpd11562_c" name="12-methyl-3-oxo-tridecanoyl-ACP"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C25H45N2O9PRS</p></html>
    </notes>
</species>
  <species id="M_cpd11563_c" name="12-methyl-3-hydroxy-tridecanoyl-ACP"
compartment="C_c">
    <notes>
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C25H47N2O9PRS</p></html>
    </notes>
</species>
  <species id="M_cpd11564_c" name="12-methyl-trans-tridec-2-enoyl-ACP"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C25H45N2O8PRS</p></html>
    </notes>
</species>
  <species id="M_cpd11565_c" name="12-methyl-tridecanoyl-ACP" compartment="C_c">

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      <notes>
        <html
          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C25H47N2O8PRS</p></html>
        </notes>
      </species>
      <species id="M_cpd11566_c" name="14-methyl-3-oxo-pentadecanoyl-ACP"
compartment="C_c">
        <notes>
          <html
            xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C27H49N2O9PRS</p></html>
          </notes>
        </species>
        <species id="M_cpd11567_c" name="14-methyl-3-hydroxy-pentadecanoyl-ACP"
compartment="C_c">
          <notes>
            <html
              xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C27H51N2O9PRS</p></html>
            </notes>
          </species>
          <species id="M_cpd11568_c" name="14-methyl-trans-pentadec-2-enoyl-ACP"
compartment="C_c">
            <notes>
              <html
                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C27H49N2O8PRS</p></html>
              </notes>
            </species>
            <species id="M_cpd11569_c" name="14-methyl-pentadecanoyl-ACP" compartment="C_c">
              <notes>
                <html
                  xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C27H51N2O8PRS</p></html>
                </notes>
              </species>
              <species id="M_cpd11570_c" name="3-Oxo-octodecanoyl-ACP" compartment="C_c">
                <notes>
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                    xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C29H53N2O9PRS</p></html>
                  </notes>
                </species>
                <species id="M_cpd11571_c" name="3-Hydroxy-octodecanoyl-ACP" compartment="C_c">
                  <notes>
                    <html
                      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C29H55N2O9PRS</p></html>
                    </notes>
                  </species>

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<species id="M_cpd11572_c" name="trans-Octodec-2-enoyl-ACP" compartment="C_c">
  <notes>
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      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C29H53N2O8PRS</p></html>
    </notes>
  </species>
  <species id="M_cpd11573_c" name="Octodecanoyl-ACP" compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C29H55N2O8PRS</p></html>
      </notes>
    </species>
    <species id="M_cpd11575_c" name="MOPS|3-(n-Morpholino)Propanesulfonic Acid"
compartment="C_c">
      <notes>
        <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H14NO4S</p></html>
        </notes>
      </species>
      <species id="M_cpd11575_e" name="MOPS|3-(n-Morpholino)Propanesulfonic Acid,
extracellular" compartment="C_e">
        <notes>
          <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H14NO4S,
extracellular</p></html>
          </notes>
        </species>
        <species id="M_cpd11576_c" name="L-methionine R-oxide" compartment="C_c">
          <notes>
            <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H11NO3S</p></html>
            </notes>
          </species>
          <species id="M_cpd11577_c" name="Lanthionine" compartment="C_c">
            <notes>
              <html
                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C6H10N2O4S</p></html>
              </notes>
            </species>
            <species id="M_cpd11577_e" name="Lanthionine, extracellular" compartment="C_e">
              <notes>
                <html
                  xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H10N2O4S,
extracellular</p></html>
                </notes>
              </species>
              <species id="M_cpd11578_c" name="hexanesulfonate" compartment="C_c">
                <notes>

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    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H13O3S</p></html>
  </notes>
</species>
  <species id="M_cpd11578_e" name="hexanesulfonate, extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C6H13O3S,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_cpd11579_c" name="ethanesulfonate|ethane sulfonate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C2H5O3S</p></html>
    </notes>
  </species>
  <species id="M_cpd11579_e" name="ethanesulfonate|ethane sulfonate, extracellular"
compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C2H5O3S,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_cpd11580_c" name="Gly-Gln" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H13N3O4</p></html>
    </notes>
  </species>
  <species id="M_cpd11580_e" name="Gly-Gln, extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C7H13N3O4,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_cpd11581_c" name="gly-asn-L" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H11N3O4</p></html>
    </notes>
  </species>
  <species id="M_cpd11581_e" name="gly-asn-L, extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C6H11N3O4,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_cpd11582_c" name="ala-L-Thr-L" compartment="C_c">

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    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H14N2O4</p></html>
    </notes>
  </species>
  <species id="M_cpd11582_e" name="ala-L-Thr-L, extracellular" compartment="C_e">
    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C7H14N2O4,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_cpd11583_c" name="Ala-Leu" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C9H18N2O3</p></html>
    </notes>
  </species>
  <species id="M_cpd11583_e" name="Ala-Leu, extracellular" compartment="C_e">
    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C9H18N2O3,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_cpd11584_c" name="Ala-His" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C9H14N4O3</p></html>
    </notes>
  </species>
  <species id="M_cpd11584_e" name="Ala-His, extracellular" compartment="C_e">
    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C9H14N4O3,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_cpd11585_c" name="L-alanylglycine" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H10N2O3</p></html>
    </notes>
  </species>
  <species id="M_cpd11585_e" name="L-alanylglycine, extracellular" compartment="C_e">
    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C5H10N2O3,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_cpd11586_c" name="ala-L-glu-L" compartment="C_c">

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    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C8H13N2O5</p></html>
    </notes>
  </species>
  <species id="M_cpd11586_e" name="ala-L-glu-L, extracellular" compartment="C_e">
    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C8H13N2O5,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_cpd11587_c" name="Ala-Gln" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C8H15N3O4</p></html>
    </notes>
  </species>
  <species id="M_cpd11587_e" name="Ala-Gln, extracellular" compartment="C_e">
    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C8H15N3O4,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_cpd11588_c" name="gly-pro-L" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H12N2O3</p></html>
    </notes>
  </species>
  <species id="M_cpd11588_e" name="gly-pro-L, extracellular" compartment="C_e">
    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C7H12N2O3,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_cpd11589_c" name="gly-asp-L" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H9N2O5</p></html>
    </notes>
  </species>
  <species id="M_cpd11589_e" name="gly-asp-L, extracellular" compartment="C_e">
    <notes>
      <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C6H9N2O5,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_cpd11590_c" name="met-L-ala-L" compartment="C_c">

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    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C8H15N2O3S</p></html>
    </notes>
  </species>
  <species id="M_cpd11590_e" name="met-L-ala-L, extracellular" compartment="C_e">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C8H15N2O3S,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_cpd11591_c" name="Gly-Met" compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C7H14N2O3S</p></html>
    </notes>
  </species>
  <species id="M_cpd11591_e" name="Gly-Met, extracellular" compartment="C_e">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C7H14N2O3S,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_cpd11592_c" name="gly-glu-L" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H11N2O5</p></html>
    </notes>
  </species>
  <species id="M_cpd11592_e" name="gly-glu-L, extracellular" compartment="C_e">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C7H11N2O5,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_cpd11593_c" name="ala-L-asp-L" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H11N2O5</p></html>
    </notes>
  </species>
  <species id="M_cpd11593_e" name="ala-L-asp-L, extracellular" compartment="C_e">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C7H11N2O5,
extracellular</p></html>
    </notes>
  </species>

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</species>
  <species id="M_cpd11595_c" name="chromate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: H2O4Cr</p></html>
    </notes>
  </species>
  <species id="M_cpd11595_e" name="chromate, extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: H2O4Cr,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_cpd11596_c" name="butanesulfonate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H9O3S</p></html>
    </notes>
  </species>
  <species id="M_cpd11596_e" name="butanesulfonate, extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H9O3S,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_cpd11597_c" name="ARSENOBETAINE" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H11O2As</p></html>
    </notes>
  </species>
  <species id="M_cpd11597_e" name="ARSENOBETAINE, extracellular"
compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H11O2As,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_cpd11598_c" name="Antimonite" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: Sb</p></html>
    </notes>
  </species>
  <species id="M_cpd11598_e" name="Antimonite, extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: Sb,
extracellular</p></html>

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    </notes>
</species>
  <species id="M_cpd11599_c" name="3-aminobutanoic acid" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H9NO2</p></html>
    </notes>
  </species>
  <species id="M_cpd11599_e" name="3-aminobutanoic acid, extracellular"
compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H9NO2,
extracellular</p></html>
    </notes>
  </species>
  <species id="M_cpd11606_c" name="Menaquinone 7" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C46H64O2</p></html>
    </notes>
  </species>
  <species id="M_cpd15237_c" name="hexadecenoate|Hexadecenoate|Hexadecenoate
(n-C16:1)|hexadecenoate (n-C16:1)" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C16H29O2</p></html>
    </notes>
  </species>
  <species id="M_cpd15238_c" name="Hexadecenoyl-CoA|Hexadecenoyl-CoA (n-C16:1CoA)"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C37H61N7O17P3S</p></html>
    </notes>
  </species>
  <species id="M_cpd15269_c" name="octadecenoate|octadecenoate (n-C18:1)"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C18H33O2</p></html>
    </notes>
  </species>
  <species id="M_cpd15274_c" name="Octadecenoyl-CoA|Octadecenoyl-CoA (n-C18:1CoA)"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C39H65N7O17P3S</p></html>
    </notes>

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</species>
  <species          id="M_cpd15302_c"          name="glycogen(n-1)|glycogenminusone"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C24H42O21</p></html>
  </notes>
</species>
  <species          id="M_cpd15307_c"          name="1,2-Diacyl-sn-glycerol      ditetradecanoyl"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C31H60O5</p></html>
  </notes>
</species>
  <species          id="M_cpd15309_c"          name="1,2-Diacyl-sn-glycerol
dihexadecanoyl|1,2-Diacyl-sn-glycerol (dihexadecanoyl, n-C16:0)" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C35H68O5</p></html>
  </notes>
</species>
  <species          id="M_cpd15311_c"          name="1,2-Diacyl-sn-glycerol      dioctadecanoyl"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C39H76O5</p></html>
  </notes>
</species>
  <species          id="M_cpd15327_c"          name="1-hexadecanoyl-sn-glycerol      3-phosphate"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C19H38O7P</p></html>
  </notes>
</species>
  <species          id="M_cpd15329_c"          name="1-octadecanoyl-sn-glycerol      3-phosphate"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C21H42O7P</p></html>
  </notes>
</species>
  <species          id="M_cpd15331_c"          name="1-tetradecanoyl-sn-glycerol      3-phosphate"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C17H34O7P</p></html>
  </notes>
</species>
  <species id="M_cpd15385_c" name="L-alanine-D-glutamate" compartment="C_c">

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    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C8H13N2O5</p></html>
    </notes>
  </species>
  <species id="M_cpd15388_c" name="L-alanine-L-glutamate" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C8H13N2O5</p></html>
    </notes>
  </species>
  <species id="M_cpd15390_c" name="N-Acetyl-D-galactosamine 1-phosphate"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C8H15NO9P</p></html>
    </notes>
  </species>
  <species id="M_cpd15419_c" name="CDP-1,2-dihexadecanoylglycerol"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C44H79N3O15P2</p></html>
    </notes>
  </species>
  <species id="M_cpd15421_c" name="CDP-1,2-dioctadecanoylglycerol"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C48H87N3O15P2</p></html>
    </notes>
  </species>
  <species id="M_cpd15423_c" name="CDP-1,2-ditetradecanoylglycerol"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C40H71N3O15P2</p></html>
    </notes>
  </species>
  <species id="M_cpd15471_c" name="gamma-butyrobetaine" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H15NO2</p></html>
    </notes>
  </species>
  <species id="M_cpd15471_e" name="gamma-butyrobetaine, extracellular"
compartment="C_e">
    <notes>

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        <html          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C7H15NO2,
extracellular</p></html>
    </notes>
</species>
    <species      id="M_cpd15522_c"      name="1,2-ditetradecanoyl-sn-glycerol      3-phosphate"
compartment="C_c">
    <notes>
        <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C31H60O8P</p></html>
    </notes>
</species>
    <species      id="M_cpd15524_c"      name="1,2-dihexadecanoyl-sn-glycerol      3-phosphate"
compartment="C_c">
    <notes>
        <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C35H68O8P</p></html>
    </notes>
</species>
    <species      id="M_cpd15526_c"      name="1,2-dioctadecanoyl-sn-glycerol      3-phosphate"
compartment="C_c">
    <notes>
        <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C39H76O8P</p></html>
    </notes>
</species>
    <species      id="M_cpd15529_c"      name="phosphatidylethanolamine      ditetradecanoyl"
compartment="C_c">
    <notes>
        <html          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C33H66NO8P</p></html>
    </notes>
</species>
    <species          id="M_cpd15531_c"          name="phosphatidylethanolamine
dihexadecanoyl|phosphatidylethanolamine (dihexadecanoyl, n-C16:0)" compartment="C_c">
    <notes>
        <html          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C37H74NO8P</p></html>
    </notes>
</species>
    <species          id="M_cpd15533_c"          name="phosphatidylethanolamine
dioctadecanoyl|phosphatidylethanolamine (dioctadecanoyl, n-C18:0)" compartment="C_c">
    <notes>
        <html          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C41H82NO8P</p></html>
    </notes>
</species>
    <species      id="M_cpd15536_c"      name="Phosphatidylglycerol      ditetradecanoyl"

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compartment="C_c">
  <notes>
    <html
      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C34H66O10P</p></html>
    </notes>
  </species>
  <species
    id="M_cpd15538_c"
    name="Phosphatidylglycerol
dihexadecanoyl|Phosphatidylglycerol (dihexadecanoyl, n-C16:0)"
    compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C38H74O10P</p></html>
      </notes>
    </species>
    <species
      id="M_cpd15540_c"
      name="Phosphatidylglycerol
dioctadecanoyl"
      compartment="C_c">
      <notes>
        <html
          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C42H82O10P</p></html>
        </notes>
      </species>
      <species
        id="M_cpd15543_c"
        name="Phosphatidylglycerophosphate
ditetradecanoyl"
        compartment="C_c">
        <notes>
          <html
            xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C34H66O13P2</p></html>
          </notes>
        </species>
        <species
          id="M_cpd15545_c"
          name="Phosphatidylglycerophosphate
dihexadecanoyl|Phosphatidylglycerophosphate (dihexadecanoyl, n-C16:0)"
          compartment="C_c">
          <notes>
            <html
              xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C38H74O13P2</p></html>
            </notes>
          </species>
          <species
            id="M_cpd15547_c"
            name="Phosphatidylglycerophosphate
dioctadecanoyl"
            compartment="C_c">
            <notes>
              <html
                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C42H82O13P2</p></html>
              </notes>
            </species>
            <species
              id="M_cpd15553_c"
              name="phosphatidylserine
ditetradecanoyl"
              compartment="C_c">
              <notes>

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        <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C34H64NO10P</p></html>
    </notes>
</species>
    <species id="M_cpd15555_c" name="phosphatidylserine dihexadecanoyl|phosphatidylserine
(dihexadecanoyl, n-C16:0)" compartment="C_c">
        <notes>
            <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C38H72NO10P</p></html>
        </notes>
    </species>
    <species id="M_cpd15557_c" name="phosphatidylserine dioctadecanoyl|phosphatidylserine
(dioctadecanoyl, n-C18:0)" compartment="C_c">
        <notes>
            <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C42H80NO10P</p></html>
        </notes>
    </species>
    <species id="M_cpd15584_c" name="alpha-Methyl-D-glucoside" compartment="C_c">
        <notes>
            <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H14O6</p></html>
        </notes>
    </species>
    <species id="M_cpd15585_c" name="beta-Methylglucoside" compartment="C_c">
        <notes>
            <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H14O6</p></html>
        </notes>
    </species>
    <species      id="M_cpd15585_e"      name="beta-Methylglucoside,      extracellular"
compartment="C_e">
        <notes>
            <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:      C7H14O6,
extracellular</p></html>
        </notes>
    </species>
    <species id="M_cpd15596_c" name="Dipicolinate|dipicolinate" compartment="C_c">
        <notes>
            <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C7H3NO4</p></html>
        </notes>
    </species>
    <species id="M_cpd15607_c" name="Heme D" compartment="C_c">
        <notes>
            <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C34H28FeN4O10</p></html>

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    </notes>
</species>
  <species id="M_cpd15611_c" name="hexanal" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H12O</p></html>
    </notes>
  </species>
  <species id="M_cpd15634_c" name="teichuronic acid (GlcA + GalNac, 45 repeating unit)"
compartment="C_c">
    <notes>
      <html
                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C630H945N45O630P45</p></html>
    </notes>
  </species>
  <species
                                id="M_cpd15661_c"
name="45(Phosphoglyceryl)-N-Acetyl-beta-D-mannosaminy1-1,4-N-acetyl-D-glucosaminyldipho
sphoundecaprenol|Prenol-45n teichoic acid" compartment="C_c">
    <notes>
      <html
                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C206H386N2O242P47</p></html>
    </notes>
  </species>
  <species
                                id="M_cpd15662_c"
name="45(Glucosyl-phosphoglyceryl)-N-Acetyl-beta-D-mannosaminy1-1,4-N-acetyl-D-glucosam
inyldiphosphoundecaprenol|Prenol-45n teichoic acid-glucose substituted" compartment="C_c">
    <notes>
      <html
                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C476H836N2O467P47</p></html>
    </notes>
  </species>
  <species
                                id="M_cpd15663_c"
name="45(Alaninyl-phosphoglyceryl)-N-Acetyl-beta-D-mannosaminy1-1,4-N-acetyl-D-glucosamin
yldiphosphoundecaprenol|Prenol-45n teichoic acid-alanine substituted" compartment="C_c">
    <notes>
      <html
                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C341H611N47O287P47</p></html>
    </notes>
  </species>
  <species id="M_cpd15664_c" name="Cell wall of B. subtilis" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: </p></html>
    </notes>
  </species>
  <species id="M_cpd15665_c" name="Peptidoglycan polymer (n subunits)"

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compartment="C_c">
  <notes>
    <html
      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C80H125N16O42R</p></html>
    </notes>
  </species>
  <species id="M_cpd15666_c" name="Peptidoglycan polymer (n-1 subunits)"
compartment="C_c">
  <notes>
    <html
      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C40H63N8O21R</p></html>
    </notes>
  </species>
  <species id="M_cpd15667_c" name="glycerol teichoic acid (n=45), linked, unsubstituted"
compartment="C_c">
  <notes>
    <html
      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C191H359N10O259P46R</p></html>
    </notes>
  </species>
  <species id="M_cpd15668_c" name="glycerol teichoic acid (n=45), linked, D-ala substituted"
compartment="C_c">
  <notes>
    <html
      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C326H584N55O304P46R</p></html>
    </notes>
  </species>
  <species id="M_cpd15669_c" name="glycerol teichoic acid (n=45), linked, glucose
substituted" compartment="C_c">
  <notes>
    <html
      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C461H809N10O484P46R</p></html>
    </notes>
  </species>
  <species id="M_cpd15670_c" name="Lipoteichoic acid content" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: </p></html>
    </notes>
  </species>
  <species id="M_cpd15671_c" name="1-isoheptadecanoyl-sn-glycerol 3-phosphate"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C20H40O7P</p></html>
    </notes>

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</species>
  <species id="M_cpd15672_c" name="1-anteisoheptadecanoyl-sn-glycerol 3-phosphate"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C20H40O7P</p></html>
  </notes>
</species>
  <species id="M_cpd15673_c" name="1-isotetradecanoyl-sn-glycerol 3-phosphate"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C17H34O7P</p></html>
  </notes>
</species>
  <species id="M_cpd15674_c" name="1-isopentadecanoyl-sn-glycerol 3-phosphate"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C18H36O7P</p></html>
  </notes>
</species>
  <species id="M_cpd15675_c" name="1-anteisopentadecanoyl-sn-glycerol 3-phosphate"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C18H36O7P</p></html>
  </notes>
</species>
  <species id="M_cpd15676_c" name="1-isohexadecanoyl-sn-glycerol 3-phosphate"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C19H38O7P</p></html>
  </notes>
</species>
  <species id="M_cpd15677_c" name="1,2-diisoheptadecanoyl-sn-glycerol 3-phosphate"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C37H72O8P</p></html>
  </notes>
</species>
  <species id="M_cpd15678_c" name="1,2-dianteisoheptadecanoyl-sn-glycerol 3-phosphate"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C37H72O8P</p></html>
  </notes>
</species>
  <species id="M_cpd15679_c" name="1,2-diisotetradecanoyl-sn-glycerol 3-phosphate"

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compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C31H60O8P</p></html>
  </notes>
</species>
  <species id="M_cpd15680_c" name="1,2-diisopentadecanoyl-sn-glycerol 3-phosphate"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C33H64O8P</p></html>
  </notes>
</species>
  <species id="M_cpd15681_c" name="1,2-dianteisopentadecanoyl-sn-glycerol 3-phosphate"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C33H64O8P</p></html>
  </notes>
</species>
  <species id="M_cpd15682_c" name="1,2-diisohexadecanoyl-sn-glycerol 3-phosphate"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C35H68O8P</p></html>
  </notes>
</species>
  <species id="M_cpd15683_c" name="CDP-1,2-diisoheptadecanoylglycerol"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C46H83N3O15P2</p></html>
  </notes>
</species>
  <species id="M_cpd15684_c" name="CDP-1,2-dianteisoheptadecanoylglycerol"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C46H83N3O15P2</p></html>
  </notes>
</species>
  <species id="M_cpd15685_c" name="CDP-1,2-diisotetradecanoylglycerol"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C40H71N3O15P2</p></html>
  </notes>
</species>

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    <species      id="M_cpd15686_c"      name="CDP-1,2-diisopentadecanoylglycerol"
compartment="C_c">
    <notes>
    <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C42H75N3O15P2</p></html>
    </notes>
</species>
    <species      id="M_cpd15687_c"      name="CDP-1,2-dianteisopentadecanoylglycerol"
compartment="C_c">
    <notes>
    <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C42H75N3O15P2</p></html>
    </notes>
</species>
    <species      id="M_cpd15688_c"      name="CDP-1,2-diisohexadecanoylglycerol"
compartment="C_c">
    <notes>
    <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C44H79N3O15P2</p></html>
    </notes>
</species>
    <species      id="M_cpd15689_c"      name="Diisoheptadecanoylphosphatidylserine"
compartment="C_c">
    <notes>
    <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C40H76NO10P</p></html>
    </notes>
</species>
    <species      id="M_cpd15690_c"      name="Dianteisoheptadecanoylphosphatidylserine"
compartment="C_c">
    <notes>
    <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C40H76NO10P</p></html>
    </notes>
</species>
    <species      id="M_cpd15691_c"      name="Diisotetradecanoylphosphatidylserine"
compartment="C_c">
    <notes>
    <html      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C34H64NO10P</p></html>
    </notes>
</species>
    <species      id="M_cpd15692_c"      name="Diisopentadecanoylphosphatidylserine"
compartment="C_c">

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    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C36H68NO10P</p></html>
    </notes>
  </species>
  <species id="M_cpd15693_c" name="Dianteisopentadecanoylphosphatidylserine"
    compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C36H68NO10P</p></html>
    </notes>
  </species>
  <species id="M_cpd15694_c" name="Diisohexadecanoylphosphatidylserine"
    compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C38H72NO10P</p></html>
    </notes>
  </species>
  <species id="M_cpd15695_c" name="Diisoheptadecanoylphosphatidylethanolamine"
    compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C39H78NO8P</p></html>
    </notes>
  </species>
  <species id="M_cpd15696_c" name="Dianteisoheptadecanoylphosphatidylethanolamine"
    compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C39H78NO8P</p></html>
    </notes>
  </species>
  <species id="M_cpd15697_c" name="Diisotetradecanoylphosphatidylethanolamine"
    compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C33H66NO8P</p></html>
    </notes>
  </species>
  <species id="M_cpd15698_c" name="Diisopentadecanoylphosphatidylethanolamine"
    compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:

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C35H70NO8P</p></html>  
 </notes>  
</species>  
 <species id="M\_cpd15699\_c" name="Dianteisopentadecanoylphosphatidylethanolamine"  
 compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
 C35H70NO8P</p></html>  
 </notes>  
</species>  
 <species id="M\_cpd15700\_c" name="Diiohexadecanoylphosphatidylethanolamine"  
 compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
 C37H74NO8P</p></html>  
 </notes>  
</species>  
 <species id="M\_cpd15701\_c" name="1,2-Diisoheptadecanoyl-sn-glycerol"  
 compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C37H72O5</p></html>  
 </notes>  
</species>  
 <species id="M\_cpd15702\_c" name="1,2-Dianteisoheptadecanoyl-sn-glycerol"  
 compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C37H72O5</p></html>  
 </notes>  
</species>  
 <species id="M\_cpd15703\_c" name="1,2-Diisotetradecanoyl-sn-glycerol"  
 compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C31H60O5</p></html>  
 </notes>  
</species>  
 <species id="M\_cpd15704\_c" name="1,2-Diisopentadecanoyl-sn-glycerol"  
 compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C33H64O5</p></html>  
 </notes>  
</species>  
 <species id="M\_cpd15705\_c" name="1,2-Dianteisopentadecanoyl-sn-glycerol"  
 compartment="C\_c">  
 <notes>

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      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C33H64O5</p></html>
    </notes>
  </species>
  <species      id="M_cpd15706_c"      name="1,2-Diisohexadecanoyl-sn-glycerol"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C35H68O5</p></html>
    </notes>
  </species>
  <species      id="M_cpd15707_c"      name="Triglucosyl-1,2      dipalmitoylglycerol"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C53H98O20</p></html>
    </notes>
  </species>
  <species      id="M_cpd15708_c"      name="Triglucosyl-1,2      dimyristoylglycerol"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C49H90O20</p></html>
    </notes>
  </species>
  <species      id="M_cpd15709_c"      name="Triglucosyl-1,2      distearoylglycerol"
compartment="C_c">
    <notes>
      <html
                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C57H106O20</p></html>
    </notes>
  </species>
  <species      id="M_cpd15710_c"      name="Triglucosyl-1,2      diisoheptadecanoylglycerol"
compartment="C_c">
    <notes>
      <html
                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C55H102O20</p></html>
    </notes>
  </species>
  <species      id="M_cpd15711_c"      name="Triglucosyl-1,2      dianteisoheptadecanoylglycerol"
compartment="C_c">
    <notes>
      <html
                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C55H102O20</p></html>
    </notes>
  </species>
  <species      id="M_cpd15712_c"      name="Triglucosyl-1,2      diisotetradecanoylglycerol"
compartment="C_c">

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    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C49H90O20</p></html>
    </notes>
  </species>
  <species id="M_cpd15713_c" name="Triglucosyl-1,2 diisopentadecanoylglycerol"
  compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C51H94O20</p></html>
    </notes>
  </species>
  <species id="M_cpd15714_c" name="Triglucosyl-1,2 dianteisopentadecanoylglycerol"
  compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C51H94O20</p></html>
    </notes>
  </species>
  <species id="M_cpd15715_c" name="Triglucosyl-1,2 diisoheptadecanoylglycerol"
  compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C53H98O20</p></html>
    </notes>
  </species>
  <species id="M_cpd15716_c" name="Diisoheptadecanoylphosphatidylglycerophosphate"
  compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C40H78O13P2</p></html>
    </notes>
  </species>
  <species id="M_cpd15717_c" name="Dianteisoheptadecanoylphosphatidylglycerophosphate"
  compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C40H78O13P2</p></html>
    </notes>
  </species>
  <species id="M_cpd15718_c" name="Diisotetradecanoylphosphatidylglycerophosphate"
  compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C34H66O13P2</p></html>
    </notes>
  </species>
  <species id="M_cpd15719_c" name="Diisopentadecanoylphosphatidylglycerophosphate"

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compartment="C_c">
  <notes>
    <html
      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C36H70O13P2</p></html>
    </notes>
</species>
  <species id="M_cpd15720_c" name="Dianteisopentadecanoylphosphatidylglycerophosphate"
compartment="C_c">
  <notes>
    <html
      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C36H70O13P2</p></html>
    </notes>
</species>
  <species id="M_cpd15721_c" name="Diisoheptadecanoylphosphatidylglycerophosphate"
compartment="C_c">
  <notes>
    <html
      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C38H74O13P2</p></html>
    </notes>
</species>
  <species id="M_cpd15722_c" name="Diisoheptadecanoylphosphatidylglycerol"
compartment="C_c">
  <notes>
    <html
      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C40H78O10P</p></html>
    </notes>
</species>
  <species id="M_cpd15723_c" name="Dianteisoheptadecanoylphosphatidylglycerol"
compartment="C_c">
  <notes>
    <html
      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C40H78O10P</p></html>
    </notes>
</species>
  <species id="M_cpd15724_c" name="Diisotetradecanoylphosphatidylglycerol"
compartment="C_c">
  <notes>
    <html
      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C34H66O10P</p></html>
    </notes>
</species>
  <species id="M_cpd15725_c" name="Diisopentadecanoylphosphatidylglycerol"
compartment="C_c">
  <notes>

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    <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C36H70O10P</p></html>
    </notes>
</species>
    <species      id="M_cpd15726_c"      name="Dianteisopentadecanoylphosphatidylglycerol"
compartment="C_c">
    <notes>
    <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C36H70O10P</p></html>
    </notes>
</species>
    <species      id="M_cpd15727_c"      name="Diisohexadecanoylphosphatidylglycerol"
compartment="C_c">
    <notes>
    <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C38H74O10P</p></html>
    </notes>
</species>
    <species      id="M_cpd15728_c"      name="Diglucosyl-1,2      dipalmitoylglycerol"
compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C47H88O15</p></html>
    </notes>
</species>
    <species      id="M_cpd15729_c"      name="Diglucosyl-1,2      dimyristoylglycerol"
compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C43H80O15</p></html>
    </notes>
</species>
    <species      id="M_cpd15730_c"      name="Diglucosyl-1,2      distearoylglycerol"
compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C51H96O15</p></html>
    </notes>
</species>
    <species      id="M_cpd15731_c"      name="Diglucosyl-1,2      diisoheptadecanoylglycerol"
compartment="C_c">
    <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C49H92O15</p></html>
    </notes>
</species>
    <species      id="M_cpd15732_c"      name="Diglucosyl-1,2      dianteisoheptadecanoylglycerol"
compartment="C_c">

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    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C49H92O15</p></html>
    </notes>
  </species>
  <species id="M_cpd15733_c" name="Diglucosyl-1,2 diisotetradecanoylglycerol"
  compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C43H80O15</p></html>
    </notes>
  </species>
  <species id="M_cpd15734_c" name="Diglucosyl-1,2 diisopentadecanoylglycerol"
  compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C45H84O15</p></html>
    </notes>
  </species>
  <species id="M_cpd15735_c" name="Diglucosyl-1,2 dianteisopentadecanoylglycerol"
  compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C45H84O15</p></html>
    </notes>
  </species>
  <species id="M_cpd15736_c" name="Diglucosyl-1,2 diisohexadecanoylglycerol"
  compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C47H88O15</p></html>
    </notes>
  </species>
  <species id="M_cpd15737_c" name="Monoglucosyl-1,2 dipalmitoylglycerol"
  compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C41H78O10</p></html>
    </notes>
  </species>
  <species id="M_cpd15738_c" name="Monoglucosyl-1,2 dimyristoylglycerol"
  compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C37H70O10</p></html>
    </notes>
  </species>
  <species id="M_cpd15739_c" name="Monoglucosyl-1,2 distearoylglycerol"
  compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C45H86O10</p></html>

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    </notes>
</species>
  <species id="M_cpd15740_c" name="Monoglucosyl-1,2 diisoheptadecanoylglycerol"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C43H82O10</p></html>
  </notes>
</species>
  <species id="M_cpd15741_c" name="Monoglucosyl-1,2 dianteisoheptadecanoylglycerol"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C43H82O10</p></html>
  </notes>
</species>
  <species id="M_cpd15742_c" name="Monoglucosyl-1,2 diisotetradecanoylglycerol"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C37H70O10</p></html>
  </notes>
</species>
  <species id="M_cpd15743_c" name="Monoglucosyl-1,2 diisopentadecanoylglycerol"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C39H74O10</p></html>
  </notes>
</species>
  <species id="M_cpd15744_c" name="Monoglucosyl-1,2 dianteisopentadecanoylglycerol"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C39H74O10</p></html>
  </notes>
</species>
  <species id="M_cpd15745_c" name="Monoglucosyl-1,2 diisohexadecanoylglycerol"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C41H78O10</p></html>
  </notes>
</species>
  <species id="M_cpd15746_c" name="Palmitoyllipoteichoic acid (n=24), linked,
unsubstituted" compartment="C_c">
  <notes>
    <html
      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C119H232O135P24</p></html>
  </notes>

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</species>
  <species id="M_cpd15747_c" name="Myristoyllipoteichoic acid (n=24), linked,
unsubstituted" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C115H224O135P24</p></html>
    </notes>
</species>
  <species id="M_cpd15748_c" name="Stearoyllipoteichoic acid (n=24), linked, unsubstituted"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C123H240O135P24</p></html>
    </notes>
</species>
  <species id="M_cpd15749_c" name="Isoheptadecanoyllipoteichoic acid (n=24), linked,
unsubstituted" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C121H236O135P24</p></html>
    </notes>
</species>
  <species id="M_cpd15750_c" name="Anteisoheptadecanoyllipoteichoic acid (n=24), linked,
unsubstituted" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C121H236O135P24</p></html>
    </notes>
</species>
  <species id="M_cpd15751_c" name="Isotetradecanoyllipoteichoic acid (n=24), linked,
unsubstituted" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C115H224O135P24</p></html>
    </notes>
</species>
  <species id="M_cpd15752_c" name="Isopentadecanoyllipoteichoic acid (n=24), linked,
unsubstituted" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C117H228O135P24</p></html>
    </notes>
</species>
  <species id="M_cpd15753_c" name="Anteisopentadecanoyllipoteichoic acid (n=24), linked,

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unsubstituted" compartment="C_c">
  <notes>
    <html
      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C117H228O135P24</p></html>
    </notes>
</species>
  <species id="M_cpd15754_c" name="Isohexadecanoyllipoteichoic acid (n=24), linked,
unsubstituted" compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C119H232O135P24</p></html>
      </notes>
</species>
  <species id="M_cpd15755_c" name="Palmitoyllipoteichoic acid (n=24), linked, glucose
substituted" compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C263H472O255P24</p></html>
      </notes>
</species>
  <species id="M_cpd15756_c" name="Myristoyllipoteichoic acid (n=24), linked, glucose
substituted" compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C259H464O255P24</p></html>
      </notes>
</species>
  <species id="M_cpd15757_c" name="Stearoyllipoteichoic acid (n=24), linked, glucose
substituted" compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C267H480O255P24</p></html>
      </notes>
</species>
  <species id="M_cpd15758_c" name="Isoheptadecanoyllipoteichoic acid (n=24), linked,
glucose substituted" compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C265H476O255P24</p></html>
      </notes>
</species>
  <species id="M_cpd15759_c" name="Anteisoheptadecanoyllipoteichoic acid (n=24), linked,
glucose substituted" compartment="C_c">
    <notes>

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<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
 C265H476O255P24</p></html>

</notes>

</species>

<species id="M\_cpd15760\_c" name="Isotetradecanoyllipoteichoic acid (n=24), linked,  
 glucose substituted" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
 C259H464O255P24</p></html>

</notes>

</species>

<species id="M\_cpd15761\_c" name="Isopentadecanoyllipoteichoic acid (n=24), linked,  
 glucose substituted" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
 C261H468O255P24</p></html>

</notes>

</species>

<species id="M\_cpd15762\_c" name="Anteisopentadecanoyllipoteichoic acid (n=24), linked,  
 glucose substituted" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
 C261H468O255P24</p></html>

</notes>

</species>

<species id="M\_cpd15763\_c" name="Isohexadecanoyllipoteichoic acid (n=24), linked,  
 glucose substituted" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
 C263H472O255P24</p></html>

</notes>

</species>

<species id="M\_cpd15764\_c" name="Palmitoyllipoteichoic acid (n=24), linked,  
 N-acetyl-D-glucosamine" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
 C311H544N24O255P24</p></html>

</notes>

</species>

<species id="M\_cpd15765\_c" name="Myristoyllipoteichoic acid (n=24), linked,  
 N-acetyl-D-glucosamine" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
 C307H536N24O255P24</p></html>

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    </notes>
</species>
  <species id="M_cpd15766_c" name="Stearoyllipoteichoic acid (n=24), linked,
N-acetyl-D-glucosamine" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C315H552N24O255P24</p></html>
    </notes>
</species>
  <species id="M_cpd15767_c" name="Isoheptadecanoyllipoteichoic acid (n=24), linked,
N-acetyl-D-glucosamine" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C313H548N24O255P24</p></html>
    </notes>
</species>
  <species id="M_cpd15768_c" name="Anteisoheptadecanoyllipoteichoic acid (n=24), linked,
N-acetyl-D-glucosamine" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C313H548N24O255P24</p></html>
    </notes>
</species>
  <species id="M_cpd15769_c" name="Isotetradecanoyllipoteichoic acid (n=24), linked,
N-acetyl-D-glucosamine" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C307H536N24O255P24</p></html>
    </notes>
</species>
  <species id="M_cpd15770_c" name="Isopentadecanoyllipoteichoic acid (n=24), linked,
N-acetyl-D-glucosamine" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C309H540N24O255P24</p></html>
    </notes>
</species>
  <species id="M_cpd15771_c" name="Anteisopentadecanoyllipoteichoic acid (n=24), linked,
N-acetyl-D-glucosamine" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C309H540N24O255P24</p></html>
    </notes>
</species>

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<species id="M\_cpd15772\_c" name="Isohexadecanoyllipoteichoic acid (n=24), linked, N-acetyl-D-glucosamine" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C311H544N24O255P24</p></html>

</notes>

</species>

<species id="M\_cpd15773\_c" name="Palmitoyllipoteichoic acid (n=24), linked, D-alanine substituted" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C191H352N24O159P24</p></html>

</notes>

</species>

<species id="M\_cpd15774\_c" name="Myristoyllipoteichoic acid (n=24), linked, D-alanine substituted" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C187H342N24O159P24</p></html>

</notes>

</species>

<species id="M\_cpd15775\_c" name="Stearoyllipoteichoic acid (n=24), linked, D-alanine substituted" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C195H360N24O159P24</p></html>

</notes>

</species>

<species id="M\_cpd15776\_c" name="Isoheptadecanoyllipoteichoic acid (n=24), linked, D-alanine substituted" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C193H356N24O159P24</p></html>

</notes>

</species>

<species id="M\_cpd15777\_c" name="Anteisoheptadecanoyllipoteichoic acid (n=24), linked, D-alanine substituted" compartment="C\_c">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
C193H356N24O159P24</p></html>

</notes>

</species>

<species id="M\_cpd15778\_c" name="Isotetradecanoyllipoteichoic acid (n=24), linked, D-alanine substituted" compartment="C\_c">

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    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C187H344N24O159P24</p></html>
    </notes>
  </species>
  <species id="M_cpd15779_c" name="Isopentadecanoyllipoteichoic acid (n=24), linked,
D-alanine substituted" compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C189H348N24O159P24</p></html>
    </notes>
  </species>
  <species id="M_cpd15780_c" name="Anteisopentadecanoyllipoteichoic acid (n=24), linked,
D-alanine substituted" compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C189H349N24O159P24</p></html>
    </notes>
  </species>
  <species id="M_cpd15781_c" name="Isohexadecanoyllipoteichoic acid (n=24), linked,
D-alanine substituted" compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C191H352N24O159P24</p></html>
    </notes>
  </species>
  <species id="M_cpd15782_c" name="Palmitoyllysylphosphatidylglycerol"
compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C44H88N2O11P</p></html>
    </notes>
  </species>
  <species id="M_cpd15783_c" name="Myristoyllysylphosphatidylglycerol"
compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C40H80N2O11P</p></html>
    </notes>
  </species>
  <species id="M_cpd15784_c" name="Stearoyllysylphosphatidylglycerol"
compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:

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C48H96N2O11P</p></html>  
 </notes>  
 </species>  
 <species id="M\_cpd15785\_c" name="Isoheptadecanoyllysylphosphatidylglycerol"  
 compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
 C46H92N2O11P</p></html>  
 </notes>  
 </species>  
 <species id="M\_cpd15786\_c" name="Anteisoheptadecanoyllysylphosphatidylglycerol"  
 compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
 C46H92N2O11P</p></html>  
 </notes>  
 </species>  
 <species id="M\_cpd15787\_c" name="Isotetradecanoyllysylphosphatidylglycerol"  
 compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
 C40H80N2O11P</p></html>  
 </notes>  
 </species>  
 <species id="M\_cpd15788\_c" name="Isopentadecanoyllysylphosphatidylglycerol"  
 compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
 C42H84N2O11P</p></html>  
 </notes>  
 </species>  
 <species id="M\_cpd15789\_c" name="Anteisopentadecanoyllysylphosphatidylglycerol"  
 compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
 C42H84N2O11P</p></html>  
 </notes>  
 </species>  
 <species id="M\_cpd15790\_c" name="Isohexadecanoyllysylphosphatidylglycerol"  
 compartment="C\_c">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:  
 C44H88N2O11P</p></html>  
 </notes>

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</species>
  <species id="M_cpd15791_c" name="Palmitoylcardiolipin (B. subtilis)"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C73H140O17P2</p></html>
    </notes>
</species>
  <species id="M_cpd15792_c" name="Myristoylcardiolipin (B. subtilis)"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C65H124O17P2</p></html>
    </notes>
</species>
  <species id="M_cpd15793_c" name="Stearoylcardiolipin (B. subtilis)" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C81H156O17P2</p></html>
    </notes>
</species>
  <species id="M_cpd15794_c" name="Isoheptadecanoylcardiolipin (B. subtilis)"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C77H148O17P2</p></html>
    </notes>
</species>
  <species id="M_cpd15795_c" name="Anteisoheptadecanoylcardiolipin (B. subtilis)"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C77H148O17P2</p></html>
    </notes>
</species>
  <species id="M_cpd15796_c" name="Isotetradecanoylcardiolipin (B. subtilis)"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C65H124O17P2</p></html>
    </notes>
</species>
  <species id="M_cpd15797_c" name="Isopentadecanoylcardiolipin (B. subtilis)"
compartment="C_c">

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    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C69H132O17P2</p></html>
    </notes>
  </species>
  <species id="M_cpd15798_c" name="Anteisopentadecanoylcardiolipin (B. subtilis)"
    compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C69H132O17P2</p></html>
    </notes>
  </species>
  <species id="M_cpd15799_c" name="Isohexadecanoylcardiolipin (B. subtilis)"
    compartment="C_c">
    <notes>
      <html
        xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C73H140O17P2</p></html>
    </notes>
  </species>
  <species id="M_cpd15800_c" name="Lipid composition of B. subtilis" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: </p></html>
    </notes>
  </species>
  <species id="M_cpd16488_c" name="Generic lipid content" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C20H28O</p></html>
    </notes>
  </species>
  <species id="M_cpd16500_c" name="meso-2,3-butanediol" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H10O2</p></html>
    </notes>
  </species>
  <species id="M_cpd16500_e" name="meso-2,3-butanediol,extracellular"
    compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H10O2</p></html>
    </notes>
  </species>
  <species id="M_TC0001_c" name="1-keto-D-chiro-inositol" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C6H10O6</p></html>
    </notes>
  </species>

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</species>
  <species id="M_TC0002_c" name="isobutyraldehyde" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H8O</p></html>
    </notes>
  </species>
  <species id="M_TC0003_c" name="isobutanol" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H10O</p></html>
    </notes>
  </species>
  <species id="M_TC0003_e" name="isobutanol,extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C4H10O</p></html>
    </notes>
  </species>
  <species id="M_TC0004_c" name="3-methyl-1-butanol" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H12O</p></html>
    </notes>
  </species>
  <species id="M_TC0004_e" name="3-methyl-1-butanol,extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H12O</p></html>
    </notes>
  </species>
  <species id="M_TC0005_c" name="2-methyl-1-butanol" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H12O</p></html>
    </notes>
  </species>
  <species id="M_TC0005_e" name="2-methyl-1-butanol,extracellular" compartment="C_e">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C5H12O</p></html>
    </notes>
  </species>
  <species id="M_TC0006_c" name="2-phenylethanol" compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA: C8H10O</p></html>
    </notes>
  </species>
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        <p>SUBSYSTEM: </p>
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    </notes>
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    <speciesReference species="M_C03688_c" stoichiometry="0.000273109"/>
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    </math>
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  </math>
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    </math>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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    </math>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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  <listOfProducts>
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  <kineticLaw>
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>

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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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  <kineticLaw>
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    </math>
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  </math>
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    </math>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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      <p>SUBSYSTEM: Exchange</p>
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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  </math>
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    </math>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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    </math>
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  </listOfReactants>
  <listOfProducts>
  </listOfProducts>
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>

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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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    </listOfParameters>
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      <p>SUBSYSTEM: Exchange</p>
    </html>
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  </listOfProducts>
  <kineticLaw>
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  </math>
  <listOfParameters>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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  </listOfParameters>
</kineticLaw>
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  <notes>
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      <p>SUBSYSTEM: Exchange</p>
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  </math>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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  </kineticLaw>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
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  </math>
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    </math>
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  </kineticLaw>
</reaction>
<reaction id="R_E00070" name="Exchange">
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    <p>SUBSYSTEM: Exchange</p>
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  </math>
  <listOfParameters>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
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    <speciesReference species="M_C00184_e"/>
  </listOfReactants>
  <listOfProducts>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>

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</reaction>
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      <p>SUBSYSTEM: Exchange</p>
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    </math>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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  <listOfProducts>
  </listOfProducts>
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>

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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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</kineticLaw>
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    </math>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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<reaction id="R_E00075" name="Exchange">
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    </math>
    <listOfParameters>
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    </math>
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      <p>SUBSYSTEM: Exchange</p>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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      <p>SUBSYSTEM: Exchange</p>
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    </math>
    <listOfParameters>
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  </kineticLaw>
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    <p>SUBSYSTEM: Exchange</p>
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  </math>
  <listOfParameters>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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      <p>SUBSYSTEM: Exchange</p>
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>

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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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    </math>
  </listOfParameters>
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    <p>SUBSYSTEM: Exchange</p>
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  <listOfProducts>
  </listOfProducts>
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>

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      <p>SUBSYSTEM: Exchange</p>
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    <math xmlns="http://www.w3.org/1998/Math/MathML">

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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
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      <p>SUBSYSTEM: Exchange</p>
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    <p>SUBSYSTEM: Exchange</p>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
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    </math>
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      <p>SUBSYSTEM: Exchange</p>
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  </kineticLaw>
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      <p>SUBSYSTEM: Exchange</p>
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    </math>
    <listOfParameters>
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    </math>
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      <p>GENE_LIST: </p>
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    </math>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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    </math>
    <listOfParameters>
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  </kineticLaw>
</reaction>
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      <p>SUBSYSTEM: Exchange</p>
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    </math>
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      <p>SUBSYSTEM: Exchange</p>
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      <p>SUBSYSTEM: Exchange</p>
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    </math>
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  </kineticLaw>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
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    <speciesReference species="M_C06153_e"/>
  </listOfReactants>
  <listOfProducts>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
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3.6.1.1);Inorganic pyrophosphatase PpaX(BSU34970)" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU40550 BSU34970</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>

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    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00080_c" stoichiometry="2"/>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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  </kineticLaw>
</reaction>
<reaction id="R_R00005" name="Allophanate hydrolase subunit 1 (EC 3.5.1.54)|Allophanate
hydrolase subunit 2 (EC 3.5.1.54)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU04080</p>
      <p>GENE_LIST: BSU04080</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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      <p>GENE_LIST: BSU38630 BSU39050 BSU08820</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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    </math>
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1.2.4.1);Pyruvate dehydrogenase E1 component beta subunit (EC
1.2.4.1)(BSU14590);Acetolactate synthase small subunit (EC 2.2.1.6)(BSU28300);Acetolactate
synthase large subunit (EC 2.2.1.6)(BSU28310);Acetolactate synthase, catabolic (EC
2.2.1.6)(BSU36010)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( ( BSU14580 and BSU14590 ) or ( BSU28300 and
BSU28310 ) or BSU36010 )</p>
      <p>GENE_LIST: BSU14580 BSU14590 BSU28300 BSU28310 BSU36010</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </notes>

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  <notes>
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      <p>GENE_LIST: BSU06590</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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      <p>GENE_LIST: BSU01660</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </kineticLaw>
</reaction>
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(EC 3.2.1.86)|Beta-glucosidase (EC 3.2.1.21)(BSU03410);6-phospho-beta-glucosidase (EC
3.2.1.86)|Beta-glucosidase (EC 3.2.1.21)(BSU39260)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU39260 or BSU03410 or BSU05840 )</p>
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    <speciesReference species="M_C00185_e"/>
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      <p>SUBSYSTEM: Carbohydrates</p>
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reversible="false">

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</kineticLaw>
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biosynthesis(BSU23240)" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU23270 BSU23240</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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</kineticLaw>
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reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU28150</p>
      <p>GENE_LIST: BSU28150</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
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    <speciesReference species="M_C00931_c" stoichiometry="4"/>
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  <listOfProducts>
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    <speciesReference species="M_C01024_c"/>
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    </math>
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</reaction>
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      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  </notes>

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      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  </kineticLaw>
</reaction>

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    </listOfParameters>
  </kineticLaw>
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<reaction id="R_R00104" name="NAD kinase (EC 2.7.1.23);Probable inorganic
polyphosphate/ATP-NAD kinase 2 (Poly(P)/ATP NAD kinase 2) (EC 2.7.1.23)(BSU29540)"
reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU11610 or BSU29540 )</p>
      <p>GENE_LIST: BSU11610 BSU29540</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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    <speciesReference species="M_C00003_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00006_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R00114" name="Glutamate synthase [NADPH] small chain (EC
1.4.1.13);Glutamate synthase [NADPH] large chain (EC 1.4.1.13)(BSU18450)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU18440 and BSU18450 )</p>
      <p>GENE_LIST: BSU18440 BSU18450</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </notes>
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    <speciesReference species="M_C00005_c"/>
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    <speciesReference species="M_C00026_c"/>
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    <speciesReference species="M_C00025_c" stoichiometry="2"/>
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    </math>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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      <p>GENE_LIST: BSU01370</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  </notes>
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  </listOfProducts>
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    </math>
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      <p>GENE_LIST: BSU29060</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  </kineticLaw>
</reaction>
<reaction id="R_R00131" name="Urease alpha subunit (EC 3.5.1.5);Urease beta subunit (EC 3.5.1.5)(BSU36650);Urease gamma subunit (EC 3.5.1.5)(BSU36660)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
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      <p>GENE_LIST: BSU36640 BSU36650 BSU36660</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  </notes>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00086_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00011_c"/>

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    <speciesReference species="M_C00014_c" stoichiometry="2"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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    </listOfParameters>
  </kineticLaw>
</reaction>
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  <notes>
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      <p>GENE_ASSOCIATION: ( BSU30690 or BSU34670 )</p>
      <p>GENE_LIST: BSU30690 BSU34670</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </notes>
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  </listOfReactants>
  <listOfProducts>
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  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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reversible="false">
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    <p>GENE_LIST: BSU25640</p>
    <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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</reaction>
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reversible="false">
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      <p>GENE_LIST: BSU22730</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  <listOfProducts>
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    <speciesReference species="M_C00075_c"/>
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    </math>

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  <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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</listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R00158" name="Uridylate kinase (EC 2.7.4.-)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU16510</p>
      <p>GENE_LIST: BSU16510</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
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    <speciesReference species="M_C00105_c"/>
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  <listOfProducts>
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    <speciesReference species="M_C00015_c"/>
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  <kineticLaw>
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    </math>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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  </kineticLaw>
</reaction>
<reaction id="R_R00161" name="FMN adenylyltransferase (EC 2.7.7.2)|Riboflavin kinase
(EC 2.7.1.26)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU16670</p>
      <p>GENE_LIST: BSU16670</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>

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  <speciesReference species="M_C00016_c"/>
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  </math>
  <listOfParameters>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
</reaction>
<reaction id="R_R00177" name="S-adenosylmethionine synthetase (EC 2.5.1.6)"
reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU30550</p>
      <p>GENE_LIST: BSU30550</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00073_c"/>
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    <speciesReference species="M_C00013_c"/>
    <speciesReference species="M_C00019_c"/>
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  <kineticLaw>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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</kineticLaw>
</reaction>
<reaction id="R_R00178" name="S-adenosylmethionine decarboxylase proenzyme (EC
4.1.1.50), prokaryotic class 1B" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU29010</p>
      <p>GENE_LIST: BSU29010</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
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    <speciesReference species="M_C00019_c"/>
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  <listOfProducts>
    <speciesReference species="M_C00011_c"/>
    <speciesReference species="M_C01137_c"/>
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  <kineticLaw>
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  </kineticLaw>
</reaction>
<reaction id="R_R00183" name="5'-nucleotidase yjjG (EC 3.1.3.5);2',3'-cyclic-nucleotide
2'-phosphodiesterase (EC 3.1.4.16)|5'-nucleotidase (EC 3.1.3.5)(BSU07840)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU07840 or BSU07330 )</p>
      <p>GENE_LIST: BSU07840 BSU07330</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00001_c"/>
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  <listOfProducts>
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    <speciesReference species="M_C00080_c"/>
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    </math>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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  </kineticLaw>
</reaction>
<reaction id="R_R00188" name="" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: </p>
      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00054_c"/>
  </listOfReactants>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00020_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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  </kineticLaw>

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    </kineticLaw>
  </reaction>
  <reaction id="R_R00189" name="NAD synthetase (EC 6.3.1.5)" reversible="false">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml">
        <p>GENE_ASSOCIATION: BSU03130</p>
        <p>GENE_LIST: BSU03130</p>
        <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
      </html>
    </notes>
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      <speciesReference species="M_C00002_c"/>
      <speciesReference species="M_C00014_c"/>
      <speciesReference species="M_C00857_c"/>
    </listOfReactants>
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      <speciesReference species="M_C00013_c"/>
      <speciesReference species="M_C00020_c"/>
    </listOfProducts>
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      </math>
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    </kineticLaw>
  </reaction>
  <reaction id="R_R00190" name="Adenine phosphoribosyltransferase (EC 2.4.2.7)"
reversible="false">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml">
        <p>GENE_ASSOCIATION: BSU27610</p>
        <p>GENE_LIST: BSU27610</p>
        <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
      </html>
    </notes>
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      <speciesReference species="M_C00147_c"/>
      <speciesReference species="M_C00119_c"/>
    </listOfReactants>

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<listOfProducts>
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  </math>
  <listOfParameters>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
</reaction>
<reaction id="R_R00192" name="">
  <notes>
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      <p>GENE_ASSOCIATION: </p>
      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00021_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00155_c"/>
    <speciesReference species="M_C00212_c"/>
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  <kineticLaw>
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
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<reaction id="R_R00194" name="5'-methylthioadenosine nucleosidase (EC
3.2.2.16)|S-adenosylhomocysteine nucleosidase (EC 3.2.2.9)">

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<notes>
  <html xmlns="http://www.w3.org/1999/xhtml">
    <p>GENE_ASSOCIATION: BSU27270</p>
    <p>GENE_LIST: BSU27270</p>
    <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
  </html>
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  <speciesReference species="M_C00021_c"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00147_c"/>
  <speciesReference species="M_C03539_c"/>
</listOfProducts>
<kineticLaw>
  <math xmlns="http://www.w3.org/1998/Math/MathML">
    <ci> FLUX_VALUE </ci>
  </math>
  <listOfParameters>
    <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R00199" name="Phosphoenolpyruvate synthase (EC 2.7.9.2)"
reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU18830</p>
      <p>GENE_LIST: BSU18830</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00022_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00020_c"/>
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    <speciesReference species="M_C00074_c"/>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R00200" name="Pyruvate kinase (EC 2.7.1.40)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU29180</p>
      <p>GENE_LIST: BSU29180</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00074_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00002_c"/>
    <speciesReference species="M_C00022_c"/>
  </listOfProducts>
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    </math>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
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<reaction id="R_R00207" name="Pyruvate oxidase [ubiquinone, cytochrome] (EC 1.2.2.2)"
reversible="false">
  <notes>
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    <p>GENE_ASSOCIATION: BSU04340</p>
    <p>GENE_LIST: BSU04340</p>
    <p>SUBSYSTEM: Carbohydrates</p>
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</notes>
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  <speciesReference species="M_C00007_c"/>
  <speciesReference species="M_C00022_c"/>
</listOfReactants>
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  <speciesReference species="M_C00227_c"/>
  <speciesReference species="M_C00011_c"/>
  <speciesReference species="M_C00027_c"/>
</listOfProducts>
<kineticLaw>
  <math xmlns="http://www.w3.org/1998/Math/MathML">
    <ci> FLUX_VALUE </ci>
  </math>
  <listOfParameters>
    <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R00214" name="NAD-dependent malic enzyme (EC 1.1.1.38);Malolactic
enzyme (EC 1.-.-.-)(BSU23550)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU23550 or BSU29880 or BSU37050 )</p>
      <p>GENE_LIST: BSU23550 BSU29880 BSU37050</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00149_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C00011_c"/>
    <speciesReference species="M_C00022_c"/>

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</listOfProducts>
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  </math>
  <listOfParameters>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R00215" name="D-malic enzyme (EC 1.1.1.83)|Tartrate decarboxylase (EC
4.1.1.73)|Tartrate dehydrogenase (EC 1.1.1.93)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU04000</p>
      <p>GENE_LIST: BSU04000</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
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    <speciesReference species="M_C00497_c"/>
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  <listOfProducts>
    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C00011_c"/>
    <speciesReference species="M_C00022_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
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<reaction id="R_R00216" name="NADP-dependent malic enzyme (EC 1.1.1.40)"
reversible="false">
  <notes>

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  <p>GENE_ASSOCIATION: BSU29220</p>
  <p>GENE_LIST: BSU29220</p>
  <p>SUBSYSTEM: Carbohydrates</p>
</html>
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<listOfReactants>
  <speciesReference species="M_C00006_c"/>
  <speciesReference species="M_C00149_c"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00005_c"/>
  <speciesReference species="M_C00011_c"/>
  <speciesReference species="M_C00022_c"/>
</listOfProducts>
<kineticLaw>
  <math xmlns="http://www.w3.org/1998/Math/MathML">
    <ci> FLUX_VALUE </ci>
  </math>
  <listOfParameters>
    <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R00220" name="L-serine dehydratase, beta subunit (EC 4.3.1.17);L-serine
dehydratase, alpha subunit (EC 4.3.1.17)(BSU15860)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU15850 and BSU15860 )</p>
      <p>GENE_LIST: BSU15850 BSU15860</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00065_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00022_c"/>
    <speciesReference species="M_C00014_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">

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    <ci> FLUX_VALUE </ci>
  </math>
  <listOfParameters>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R00221" name="D-serine dehydratase (EC 4.3.1.18)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU23770</p>
      <p>GENE_LIST: BSU23770</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00740_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00022_c"/>
    <speciesReference species="M_C00014_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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  </kineticLaw>
</reaction>
<reaction id="R_R00230" name="Phosphate acetyltransferase (EC 2.3.1.8)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
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      <p>GENE_LIST: BSU37660</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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    <speciesReference species="M_C00009_c"/>
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    <speciesReference species="M_C00024_c"/>
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    <speciesReference species="M_C00227_c"/>
    <speciesReference species="M_C00010_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R00235" name="Acetyl-coenzyme A synthetase (EC 6.2.1.1)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU29560 or BSU29680 )</p>
      <p>GENE_LIST: BSU29560 BSU29680</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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    <speciesReference species="M_C00080_c"/>
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    <speciesReference species="M_C00010_c"/>
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    <speciesReference species="M_C00013_c"/>
    <speciesReference species="M_C00020_c"/>
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    </math>
    <listOfParameters>

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</kineticLaw>
</reaction>
<reaction id="R_R00238" name="3-ketoacyl-CoA thiolase (EC 2.3.1.16)|Acetyl-CoA
acetyltransferase (EC 2.3.1.9);3-ketoacyl-CoA thiolase [isoleucine degradation] (EC
2.3.1.16)(BSU24170)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU10350 or BSU24170 or BSU32830 )</p>
      <p>GENE_LIST: BSU10350 BSU24170 BSU32830</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
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  </kineticLaw>
</reaction>
<reaction id="R_R00239" name="Glutamate 5-kinase (EC 2.7.2.11)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU13120 or BSU18470 )</p>
      <p>GENE_LIST: BSU13120 BSU18470</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </kineticLaw>
</reaction>
<reaction id="R_R00243" name="NAD-specific glutamate dehydrogenase (EC 1.4.1.2)">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU22960 or BSU37790 )</p>
      <p>GENE_LIST: BSU22960 BSU37790</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00025_c"/>
  </listOfReactants>
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  </listOfProducts>
  <kineticLaw>
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    </math>
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1.5.1.12)">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU37780 or BSU03210 )</p>
      <p>GENE_LIST: BSU37780 BSU03210</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C01165_c"/>
  </listOfReactants>
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    <speciesReference species="M_C00025_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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  </kineticLaw>
</reaction>
<reaction id="R_R00253" name="Glutamine synthetase type I (EC 6.3.1.2)"
reversible="false">
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      <p>GENE_LIST: BSU17460</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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    </math>
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</reaction>
<reaction id="R_R00256" name="Glutaminase (EC 3.5.1.2)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU14830 or BSU02430 )</p>
      <p>GENE_LIST: BSU14830 BSU02430</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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    <speciesReference species="M_C00064_c"/>
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    </math>
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            <p>GENE_LIST: </p>
            <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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        <speciesReference species="M_C00041_c"/>
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        <speciesReference species="M_C00022_c"/>
    </listOfProducts>
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</reaction>
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2.3.1.35)|N-acetylglutamate synthase (EC 2.3.1.1)" reversible="false">
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            <p>GENE_ASSOCIATION: BSU11200</p>
            <p>GENE_LIST: BSU11200</p>
            <p>SUBSYSTEM: Amino Acids and Derivatives</p>
        </html>
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  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R00260" name="Glutamate racemase (EC 5.1.1.3);Glutamate racemase 2
(EC 5.1.1.3)(BSU26810)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU28390 or BSU26810 )</p>
      <p>GENE_LIST: BSU28390 BSU26810</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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<reaction id="R_R00264" name="Ketoglutarate semialdehyde dehydrogenase (EC 1.2.1.26)">
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  <p>GENE_LIST: BSU02470</p>
  <p>SUBSYSTEM: Amino Acids and Derivatives</p>
</html>
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  <speciesReference species="M_C00001_c"/>
  <speciesReference species="M_C00433_c"/>
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  <speciesReference species="M_C00005_c"/>
  <speciesReference species="M_C00026_c"/>
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  </math>
  <listOfParameters>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R00268" name="Isocitrate dehydrogenase [NADP] (EC 1.1.1.42)"
reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU29130</p>
      <p>GENE_LIST: BSU29130</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
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    <speciesReference species="M_C05379_c"/>
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    <speciesReference species="M_C00026_c"/>
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  </math>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
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name="2-succinyl-5-enolpyruvyl-6-hydroxy-3-cyclohexene-1-carboxylic-acid synthase (EC
2.2.1.9)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU30820</p>
      <p>GENE_LIST: BSU30820</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
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    <speciesReference species="M_C00026_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00232_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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  </kineticLaw>
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  <notes>
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      <p>GENE_ASSOCIATION: BSU21900</p>

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 <parameter id="OBJECTIVE\_COEFFICIENT" value="0"/>  
 </listOfParameters>  
 </kineticLaw>  
 </reaction>  
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 <p>GENE\_LIST: BSU19330 BSU19400 BSU25020</p>  
 <p>SUBSYSTEM: Cell Wall and Capsule</p>  
 </html>  
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 <speciesReference species="M\_C00027\_c"/>  
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</listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R00286" name="UDP-glucose dehydrogenase (EC 1.1.1.22)">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU35580 or BSU30860 or BSU36230 )</p>
      <p>GENE_LIST: BSU35580 BSU30860 BSU36230</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00003_c" stoichiometry="2"/>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00029_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00004_c" stoichiometry="2"/>
    <speciesReference species="M_C00167_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R00287" name="5'-nucleotidase (EC 3.1.3.5)|UDP-sugar hydrolase (EC 3.6.1.45)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU32370</p>
      <p>GENE_LIST: BSU32370</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  </notes>

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  <speciesReference species="M_C00029_c"/>
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<listOfProducts>
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  <speciesReference species="M_C00103_c"/>
</listOfProducts>
<kineticLaw>
  <math xmlns="http://www.w3.org/1998/Math/MathML">
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  </math>
  <listOfParameters>
    <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R00289" name="UTP--glucose-1-phosphate uridylyltransferase (EC
2.7.7.9)">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU18180 or BSU30850 or Bsu3567 or BSU35670 )</p>
      <p>GENE_LIST: BSU18180 BSU30850 BSU35670</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00075_c"/>
  </listOfReactants>
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    <speciesReference species="M_C00013_c"/>
    <speciesReference species="M_C00029_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>

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        <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
</reaction>
<reaction id="R_R00291" name="UDP-glucose 4-epimerase (EC 5.1.3.2)">
    <notes>
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            <p>GENE_ASSOCIATION: BSU38860</p>
            <p>GENE_LIST: BSU38860</p>
            <p>SUBSYSTEM: Carbohydrates</p>
        </html>
    </notes>
    <listOfReactants>
        <speciesReference species="M_C00029_c"/>
    </listOfReactants>
    <listOfProducts>
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    </listOfProducts>
    <kineticLaw>
        <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </kineticLaw>
    <listOfParameters>
        <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
        <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
        <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R00293" name="UDP-N-acetylglucosamine 4,6-dehydratase (EC 4.2.1.-)"
reversible="false">
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        <html xmlns="http://www.w3.org/1999/xhtml">
            <p>GENE_ASSOCIATION: BSU19810</p>
            <p>GENE_LIST: BSU19810</p>
            <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
        </html>
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        <speciesReference species="M_C00029_c"/>
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    <listOfProducts>
        <speciesReference species="M_C00001_c"/>
        <speciesReference species="M_C04089_c"/>
    </listOfProducts>

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</listOfProducts>
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  </math>
  <listOfParameters>
    <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R00310" name="Ferrochelatase, protoheme ferro-lyase (EC 4.99.1.1)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU10130</p>
      <p>GENE_LIST: BSU10130</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C14818_c"/>
    <speciesReference species="M_C02191_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c" stoichiometry="2"/>
    <speciesReference species="M_C00032_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R00315" name="Acetate kinase (EC 2.7.2.1)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU29470</p>
      <p>GENE_LIST: BSU29470</p>

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    <p>SUBSYSTEM: Carbohydrates</p>
  </html>
</notes>
<listOfReactants>
  <speciesReference species="M_C00002_c"/>
  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C00033_c"/>
</listOfReactants>
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  <speciesReference species="M_C00008_c"/>
  <speciesReference species="M_C00227_c"/>
</listOfProducts>
<kineticLaw>
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  </math>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R00317" name="Acylphosphate phosphohydrolase (EC 3.6.1.7), putative"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU07640</p>
      <p>GENE_LIST: BSU07640</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00227_c"/>
    <speciesReference species="M_C00001_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c" stoichiometry="2"/>
    <speciesReference species="M_C00033_c"/>
  </listOfProducts>
  <kineticLaw>
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      <ci> FLUX_VALUE </ci>
    </math>

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</math>
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</listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R00321" name="Aliphatic amidase amiE (EC 3.5.1.4)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU13570</p>
      <p>GENE_LIST: BSU13570</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C06244_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00033_c"/>
    <speciesReference species="M_C00014_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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  </kineticLaw>
</reaction>
<reaction id="R_R00330" name="Nucleoside diphosphate kinase (EC 2.7.4.6)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU22730</p>
      <p>GENE_LIST: BSU22730</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>

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<listOfReactants>
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  <speciesReference species="M_C00008_c"/>
  <speciesReference species="M_C00044_c"/>
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  </math>
  <listOfParameters>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R00332" name="Guanylate kinase (EC 2.7.4.8)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU15680</p>
      <p>GENE_LIST: BSU15680</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00144_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00008_c"/>
    <speciesReference species="M_C00035_c"/>
  </listOfProducts>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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  </kineticLaw>
</reaction>

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    </kineticLaw>
  </reaction>
  <reaction id="R_R00341" name="Phosphoenolpyruvate carboxykinase [ATP] (EC 4.1.1.49)"
reversible="false">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml">
        <p>GENE_ASSOCIATION: BSU30560</p>
        <p>GENE_LIST: BSU30560</p>
        <p>SUBSYSTEM: Carbohydrates</p>
      </html>
    </notes>
    <listOfReactants>
      <speciesReference species="M_C00002_c"/>
      <speciesReference species="M_C00080_c"/>
      <speciesReference species="M_C00036_c"/>
    </listOfReactants>
    <listOfProducts>
      <speciesReference species="M_C00008_c"/>
      <speciesReference species="M_C00011_c"/>
      <speciesReference species="M_C00074_c"/>
    </listOfProducts>
    <kineticLaw>
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      </math>
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        <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
        <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
      </listOfParameters>
    </kineticLaw>
  </reaction>
  <reaction id="R_R00342" name="Malate dehydrogenase (EC 1.1.1.37);(R)-2-hydroxyacid
dehydrogenase, similar to L-sulfolactate dehydrogenase (EC 1.1.1.272)(BSU12320)">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml">
        <p>GENE_ASSOCIATION: ( BSU12320 or BSU29120 )</p>
        <p>GENE_LIST: BSU12320 BSU29120</p>
        <p>SUBSYSTEM: Carbohydrates</p>
      </html>
    </notes>
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      <speciesReference species="M_C00003_c"/>
      <speciesReference species="M_C00149_c"/>

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</listOfReactants>
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  <speciesReference species="M_C00036_c"/>
</listOfProducts>
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  </math>
  <listOfParameters>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R00344" name="Pyruvate carboxyl transferase (EC 6.4.1.1)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU14860</p>
      <p>GENE_LIST: BSU14860</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00288_c"/>
    <speciesReference species="M_C00022_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00008_c"/>
    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00036_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>

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        <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R00351" name="Citrate synthase (si) (EC 2.3.3.1)" reversible="false">
    <notes>
        <html xmlns="http://www.w3.org/1999/xhtml">
            <p>GENE_ASSOCIATION: ( BSU29140 or BSU09440 )</p>
            <p>GENE_LIST: BSU29140 BSU09440</p>
            <p>SUBSYSTEM: Carbohydrates</p>
        </html>
    </notes>
    <listOfReactants>
        <speciesReference species="M_C00024_c"/>
        <speciesReference species="M_C00001_c"/>
        <speciesReference species="M_C00036_c"/>
    </listOfReactants>
    <listOfProducts>
        <speciesReference species="M_C00080_c"/>
        <speciesReference species="M_C00010_c"/>
        <speciesReference species="M_C00158_c"/>
    </listOfProducts>
    <kineticLaw>
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        </math>
        <listOfParameters>
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            <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
            <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
        </listOfParameters>
    </kineticLaw>
</reaction>
<reaction id="R_R00355" name="Aspartate aminotransferase (EC
2.6.1.1);Aspartate/tyrosine/aromatic aminotransferase(BSU09570)">
    <notes>
        <html xmlns="http://www.w3.org/1999/xhtml">
            <p>GENE_ASSOCIATION: ( BSU22370 or BSU37690 or BSU09570 )</p>
            <p>GENE_LIST: BSU22370 BSU37690 BSU09570</p>
            <p>SUBSYSTEM: Amino Acids and Derivatives</p>
        </html>
    </notes>
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        <speciesReference species="M_C00026_c"/>

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    <speciesReference species="M_C00049_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00025_c"/>
    <speciesReference species="M_C00036_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R00357" name="L-aspartate oxidase (EC 1.4.3.16)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU27870</p>
      <p>GENE_LIST: BSU27870</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00049_c"/>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00007_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00036_c"/>
    <speciesReference species="M_C00014_c"/>
    <speciesReference species="M_C00027_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>

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    </kineticLaw>
  </reaction>
  <reaction id="R_R00366" name="Glycine oxidase ThiO (EC 1.4.3.19)" reversible="false">
    <notes>
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        <p>GENE_ASSOCIATION: BSU11670</p>
        <p>GENE_LIST: BSU11670</p>
        <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
      </html>
    </notes>
    <listOfReactants>
      <speciesReference species="M_C00007_c"/>
      <speciesReference species="M_C00001_c"/>
      <speciesReference species="M_C00037_c"/>
    </listOfReactants>
    <listOfProducts>
      <speciesReference species="M_C00014_c"/>
      <speciesReference species="M_C00027_c"/>
      <speciesReference species="M_C00048_c"/>
    </listOfProducts>
    <kineticLaw>
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      </math>
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        <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
        <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
      </listOfParameters>
    </kineticLaw>
  </reaction>
  <reaction id="R_R00369" name="L-alanine:glyoxylate aminotransferase (EC
2.6.1.44)|Serine--pyruvate aminotransferase (EC 2.6.1.51)">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml">
        <p>GENE_ASSOCIATION: BSU32520</p>
        <p>GENE_LIST: BSU32520</p>
        <p>SUBSYSTEM: Carbohydrates</p>
      </html>
    </notes>
    <listOfReactants>
      <speciesReference species="M_C00048_c"/>
      <speciesReference species="M_C00041_c"/>
    </listOfReactants>

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<listOfProducts>
  <speciesReference species="M_C00022_c"/>
  <speciesReference species="M_C00037_c"/>
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  </math>
  <listOfParameters>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R00371" name="2-amino-3-ketobutyrate coenzyme A ligase (EC 2.3.1.29)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU17000</p>
      <p>GENE_LIST: BSU17000</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00024_c"/>
    <speciesReference species="M_C00037_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00010_c"/>
    <speciesReference species="M_C03508_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R00396" name="Alanine dehydrogenase (EC 1.4.1.1)">
  <notes>

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<html xmlns="http://www.w3.org/1999/xhtml">
  <p>GENE_ASSOCIATION: BSU31930</p>
  <p>GENE_LIST: BSU31930</p>
  <p>SUBSYSTEM: Carbohydrates</p>
</html>
</notes>
<listOfReactants>
  <speciesReference species="M_C00003_c"/>
  <speciesReference species="M_C00001_c"/>
  <speciesReference species="M_C00041_c"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C00004_c"/>
  <speciesReference species="M_C00022_c"/>
  <speciesReference species="M_C00014_c"/>
</listOfProducts>
<kineticLaw>
  <math xmlns="http://www.w3.org/1998/Math/MathML">
    <ci> FLUX_VALUE </ci>
  </math>
  <listOfParameters>
    <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R00401" name="Alanine racemase (EC 5.1.1.1);Alanine racemase 2 (EC
5.1.1.1)(BSU17640)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( ( BSU04640 and BSU17640 ) or (BSU04640) )</p>
      <p>GENE_LIST: BSU04640 BSU17640</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00041_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00133_c"/>
  </listOfProducts>
  <kineticLaw>

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<math xmlns="http://www.w3.org/1998/Math/MathML">
  <ci> FLUX_VALUE </ci>
</math>
<listOfParameters>
  <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
  <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
  <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
</listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R00405" name="Succinyl-CoA ligase [ADP-forming] beta chain (EC
6.2.1.5);Succinyl-CoA ligase [ADP-forming] alpha chain (EC 6.2.1.5)(BSU16100)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU16090 and BSU16100 )</p>
      <p>GENE_LIST: BSU16090 BSU16100</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00002_c"/>
    <speciesReference species="M_C00010_c"/>
    <speciesReference species="M_C00042_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00008_c"/>
    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00091_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R00408" name="Succinate dehydrogenase iron-sulfur protein (EC
1.3.99.1);Succinate dehydrogenase flavoprotein subunit (EC 1.3.99.1)(BSU28440);Succinate
dehydrogenase cytochrome b558 subunit(BSU28450)">
  <notes>

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<html xmlns="http://www.w3.org/1999/xhtml">
  <p>GENE_ASSOCIATION: ( BSU28430 and BSU28440 and BSU28450 )</p>
  <p>GENE_LIST: BSU28430 BSU28440 BSU28450</p>
  <p>SUBSYSTEM: Carbohydrates</p>
</html>
</notes>
<listOfReactants>
  <speciesReference species="M_C00042_c"/>
  <speciesReference species="M_C00016_c"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00122_c"/>
  <speciesReference species="M_C01352_c"/>
</listOfProducts>
<kineticLaw>
  <math xmlns="http://www.w3.org/1998/Math/MathML">
    <ci> FLUX_VALUE </ci>
  </math>
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2.8.3.9);Butyrate-acetoacetate CoA-transferase subunit A (EC 2.8.3.9)(BSU38990)">
  <notes>
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      <p>GENE_LIST: BSU35660</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
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  </notes>
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2.3.1.157)|N-acetylglucosamine-1-phosphate uridyltransferase (EC 2.7.7.23)">
  <notes>
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      <p>GENE_LIST: BSU00500</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
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        <p>GENE_LIST: BSU38860 BSU30870</p>
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        <p>GENE_LIST: BSU35660</p>
        <p>SUBSYSTEM: Cell Wall and Capsule</p>
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</reaction>
<reaction id="R_R00425" name="3,4-dihydroxy-2-butanone 4-phosphate synthase|GTP
cyclohydrolase II (EC 3.5.4.25)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU23260</p>
      <p>GENE_LIST: BSU23260</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  </notes>
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    <speciesReference species="M_C00044_c"/>
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cyclohydrolase I (EC 3.5.4.16) type 2(BSU03340)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU22780 or BSU03340 )</p>

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      <p>GENE_LIST: BSU23380</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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      <p>GENE_LIST: BSU19690</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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(EC 4.1.1.18);Lysine decarboxylase family(BSU34640)" reversible="false">
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      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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(EC 1.1.1.79)|Hydroxypyruvate reductase (EC 1.1.1.81)">

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<html xmlns="http://www.w3.org/1999/xhtml">

<p>GENE\_ASSOCIATION: BSU34680</p>

<p>GENE\_LIST: BSU34680</p>

<p>SUBSYSTEM: Carbohydrates</p>

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4.1.2.14)|4-Hydroxy-2-oxoglutarate aldolase (EC 4.1.3.16)">
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      <p>GENE_LIST: BSU22100</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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    </math>
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  </kineticLaw>
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      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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      <p>GENE_LIST: BSU27870</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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      <p>GENE_LIST: BSU23580 BSU02690</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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      <p>GENE_LIST: BSU22410</p>
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        <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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    <notes>
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            <p>GENE_ASSOCIATION: BSU23570</p>
            <p>GENE_LIST: BSU23570</p>
            <p>SUBSYSTEM: Amino Acids and Derivatives</p>
        </html>
    </notes>
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</reaction>
<reaction id="R_R00494" name="Gamma-glutamyltranspeptidase (EC 2.3.2.2);Tripeptide
aminopeptidase (EC 3.4.11.4)(BSU38920);Peptidase T (EC 3.4.11.4)(BSU23910)">
    <notes>
        <html xmlns="http://www.w3.org/1999/xhtml">
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            <p>GENE_LIST: BSU18410 BSU23910 BSU38920</p>
            <p>SUBSYSTEM: Sulfur Metabolism</p>
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        <speciesReference species="M_C00051_c"/>
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    <speciesReference species="M_C00025_c"/>
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<reaction id="R_R00502" name="Galactose-1-phosphate uridylyltransferase (EC 2.7.7.10)">
  <notes>
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      <p>GENE_LIST: BSU38190</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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</reaction>
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 2'-phosphodiesterase (EC 3.1.4.16)|5'-nucleotidase (EC 3.1.3.5)(BSU07840)" reversible="false">  
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 <p>SUBSYSTEM: Nucleosides and Nucleotides</p>  
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 <speciesReference species="M\_C00055\_c"/>  
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</reaction>
<reaction id="R_R00512" name="Cytidylate kinase (EC 2.7.4.14)" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU22890</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
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    <speciesReference species="M_C00055_c"/>
  </listOfReactants>
  <listOfProducts>
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  </listOfProducts>
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      <p>GENE_LIST: BSU27330</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  <notes>
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      <p>GENE_LIST: BSU27330</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  <kineticLaw>
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    <listOfParameters>
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</kineticLaw>
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      <p>GENE_LIST: BSU27330</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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    <speciesReference species="M_C00475_c"/>
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    <speciesReference species="M_C00035_c"/>
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</kineticLaw>
</reaction>
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dehydrogenase, alpha subunit(BSU12160);formate dehydrogenase, alpha
subunit(BSU18570);Formate dehydrogenase chain D (EC 1.2.1.2)(BSU36710)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU27220 or BSU12160 or BSU18570 or
BSU36710 )</p>
      <p>GENE_LIST: BSU27220 BSU12160 BSU18570 BSU36710</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
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  <notes>
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      <p>GENE_LIST: BSU18670 BSU33240</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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    <speciesReference species="M_C00209_c"/>
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  </listOfProducts>
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    </math>
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  </kineticLaw>
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    <p>SUBSYSTEM: Carbohydrates</p>
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  <speciesReference species="M_C01045_c"/>
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  <speciesReference species="M_C00058_c"/>
  <speciesReference species="M_C00025_c"/>
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</kineticLaw>
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  <notes>
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      <p>GENE_ASSOCIATION: ( BSU14560 or BSU15720 )</p>
      <p>GENE_LIST: BSU14560 BSU15720</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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    <speciesReference species="M_C01044_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00058_c"/>
    <speciesReference species="M_C00049_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">

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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
</reaction>
<reaction id="R_R00529" name="Sulfate adenylyltransferase, dissimilatory-type (EC
2.7.7.4)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU10920 or BSU15590 )</p>
      <p>GENE_LIST: BSU10920 BSU15590</p>
      <p>SUBSYSTEM: Sulfur Metabolism</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00059_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00013_c"/>
    <speciesReference species="M_C00224_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R00549" name="Riboflavin kinase (EC 2.7.1.26);FMN adenylyltransferase
(EC 2.7.7.2)Riboflavin kinase (EC 2.7.1.26)(BSU16670)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU16670 or BSU29300 )</p>
      <p>GENE_LIST: BSU16670 BSU29300</p>

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    <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  <speciesReference species="M_C00061_c"/>
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      <p>GENE_LIST: BSU40320</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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    <speciesReference species="M_C00086_c"/>
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      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>

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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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<reaction id="R_R00554" name="" reversible="false">
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C05945_c"/>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R00566" name="Arginine decarboxylase (EC 4.1.1.19);Arginine
decarboxylase (EC 4.1.1.19)|Lysine decarboxylase (EC 4.1.1.18)(BSU00270)" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU14630 BSU00270</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </notes>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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  </kineticLaw>
</reaction>
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      <p>GENE_LIST: BSU22730</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
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  </listOfReactants>
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    <speciesReference species="M_C00063_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
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</reaction>
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      <p>GENE_LIST: BSU37150</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  </notes>
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    <speciesReference species="M_C00014_c"/>
    <speciesReference species="M_C00075_c"/>
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  </kineticLaw>
</reaction>
<reaction id="R_R00573" name="CTP synthase (EC 6.3.4.2)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU37150</p>
      <p>GENE_LIST: BSU37150</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
  <listOfReactants>
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</listOfReactants>
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</kineticLaw>
</reaction>
<reaction id="R_R00575" name="Carbamoyl-phosphate synthase small chain (EC
6.3.5.5);Carbamoyl-phosphate synthase large chain (EC
6.3.5.5)(BSU11240);Carbamoyl-phosphate synthase large chain (EC 6.3.5.5)(BSU15520)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( ( BSU11230 and BSU11240 ) or ( BSU15510 and
BSU15520 ) )</p>
      <p>GENE_LIST: BSU11230 BSU11240 BSU15510 BSU15520</p>
      <p>SUBSYSTEM: Macromolecular Synthesis</p>
    </html>
  </notes>
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    <speciesReference species="M_C00080_c"/>
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</kineticLaw>
</reaction>
<reaction id="R_R00578" name="Asparagine synthetase [glutamine-hydrolyzing] (EC
6.3.5.4)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU10790 or BSU30540 or BSU39920 )</p>
      <p>GENE_LIST: BSU10790 BSU30540 BSU39920</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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    <speciesReference species="M_C00064_c"/>
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    <speciesReference species="M_C00020_c"/>
    <speciesReference species="M_C00025_c"/>
    <speciesReference species="M_C00152_c"/>
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      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R00582" name="Phosphoserine phosphatase rsbX (EC 3.1.3.3)"

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reversible="false">
  <notes>
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      <p>GENE_LIST: BSU04740</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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    <speciesReference species="M_C01005_c"/>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00065_c"/>
  </listOfProducts>
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R00585" name="L-alanine:glyoxylate aminotransferase (EC
2.6.1.44)|Serine--pyruvate aminotransferase (EC 2.6.1.51)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU32520</p>
      <p>GENE_LIST: BSU32520</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
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</listOfProducts>
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<reaction id="R_R00586" name="Serine acetyltransferase (EC 2.3.1.30)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU00930</p>
      <p>GENE_LIST: BSU00930</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00065_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00010_c"/>
    <speciesReference species="M_C00979_c"/>
  </listOfProducts>
  <kineticLaw>
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</reaction>
<reaction id="R_R00605" name="">
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      <p>GENE_LIST: </p>
    </html>
  </notes>

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    <p>SUBSYSTEM: Carbohydrates</p>
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  <speciesReference species="M_C00132_c"/>
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  <speciesReference species="M_C00004_c"/>
  <speciesReference species="M_C00067_c"/>
</listOfProducts>
<kineticLaw>
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  </math>
  <listOfParameters>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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</kineticLaw>
</reaction>
<reaction id="R_R00617" name="Thiamine-monophosphate kinase (EC 2.7.4.16)"
reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU05900</p>
      <p>GENE_LIST: BSU05900</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>
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  </listOfProducts>
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    </math>

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  </kineticLaw>
</reaction>
<reaction id="R_R00619" name="Thiamin pyrophosphokinase (EC 2.7.6.2)"
reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU15800</p>
      <p>GENE_LIST: BSU15800</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
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    <speciesReference species="M_C00378_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00020_c"/>
    <speciesReference species="M_C00068_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R00621" name="2-oxoglutarate dehydrogenase E1 component (EC 1.2.4.2)"
reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU19370</p>
      <p>GENE_LIST: BSU19370</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </notes>

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  <speciesReference species="M_C05381_c"/>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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</reaction>
<reaction id="R_R00650" name="Homocysteine S-methyltransferase (EC 2.1.1.10)"
reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU02410</p>
      <p>GENE_LIST: BSU02410</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
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    <speciesReference species="M_C00073_c"/>
    <speciesReference species="M_C00021_c"/>
  </listOfProducts>
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    </math>
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      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>

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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
</reaction>
<reaction id="R_R00653" name="Peptide deformylase (EC 3.5.1.88)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU15720 or BSU14560 )</p>
      <p>GENE_LIST: BSU15720 BSU14560</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C03145_c"/>
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    <speciesReference species="M_C00073_c"/>
  </listOfProducts>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R00658" name="Enolase (EC 4.2.1.11)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU33900</p>
      <p>GENE_LIST: BSU33900</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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    <speciesReference species="M_C00001_c"/>
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    </math>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R00660" name="UDP-N-acetylglucosamine 1-carboxyvinyltransferase (EC
2.5.1.7);UDP-N-acetylglucosamine 1-carboxyvinyltransferase 2 (EC 2.5.1.7) (Enoylpyruvate
transferase 2) (UDP-N-acetylglucosamine enolpyruvyl transferase 2) (EPT 2)(BSU37100)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU36760 or BSU37100 )</p>
      <p>GENE_LIST: BSU36760 BSU37100</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00043_c"/>
    <speciesReference species="M_C00074_c"/>
  </listOfReactants>
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    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C04631_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>

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<reaction id="R_R00667" name="Ornithine aminotransferase (EC 2.6.1.13)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU40340</p>
      <p>GENE_LIST: BSU40340</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00026_c"/>
    <speciesReference species="M_C00077_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00025_c"/>
    <speciesReference species="M_C01165_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>

<reaction id="R_R00669" name="Acetylornithine deacetylase (EC 3.5.1.16);N-acyl-L-amino
acid amidohydrolase (EC 3.5.1.14)(BSU10070)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU19710 or BSU15350 or BSU10070 )</p>
      <p>GENE_LIST: BSU19710 BSU15350 BSU10070</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
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  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00077_c"/>
  </listOfProducts>

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  </math>
  <listOfParameters>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R00674" name="Tryptophan synthase alpha chain (EC 4.2.1.20);Tryptophan
synthase beta chain (EC 4.2.1.20)(BSU22640)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU22630 and BSU22640 )</p>
      <p>GENE_LIST: BSU22630 BSU22640</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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    <speciesReference species="M_C00463_c"/>
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    <speciesReference species="M_C00078_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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  </kineticLaw>
</reaction>
<reaction id="R_R00691" name="" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
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      <p>GENE_LIST: </p>
    </html>
  </notes>

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    <p>SUBSYSTEM: Amino Acids and Derivatives</p>
  </html>
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  <speciesReference species="M_C00079_c"/>
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  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R00694" name="Aspartate/tyrosine/aromatic aminotransferase;Biosynthetic
Aromatic amino acid aminotransferase beta (EC 2.6.1.57)|Histidinol-phosphate aminotransferase
(EC 2.6.1.9)(BSU22620)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU22620 or BSU09570 )</p>
      <p>GENE_LIST: BSU22620 BSU09570</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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      <p>GENE_LIST: BSU03050</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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</reaction>
<reaction id="R_R00705" name="Methylmalonate-semialdehyde dehydrogenase [inositol]
(EC 1.2.1.27)">
  <notes>
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      <p>GENE_LIST: BSU39760</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
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  <speciesReference species="M_C00011_c"/>
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</reaction>
<reaction id="R_R00707" name="Delta-1-pyrroline-5-carboxylate dehydrogenase (EC
1.5.1.12)">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU03210 or BSU37780 )</p>
      <p>GENE_LIST: BSU03210 BSU37780</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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    <speciesReference species="M_C03912_c"/>
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    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C00025_c"/>
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<reaction id="R_R00710" name="Aldehyde dehydrogenase (EC 1.2.1.3)">
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      <p>GENE_ASSOCIATION: ( BSU07350 or BSU37960 or BSU19310 or BSU38830 or
BSU39860 )</p>
      <p>GENE_LIST: BSU07350 BSU37960 BSU19310 BSU38830 BSU39860</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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    <speciesReference species="M_C00001_c"/>
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  <listOfProducts>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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</reaction>
<reaction id="R_R00714" name="Succinate-semialdehyde dehydrogenase [NADP+] (EC
1.2.1.16)">
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    <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  <speciesReference species="M_C00232_c"/>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R00717" name="Glyoxylate reductase (EC 1.1.1.26)|Glyoxylate reductase
(EC 1.1.1.79)|Hydroxypyruvate reductase (EC 1.1.1.81)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU34680</p>
      <p>GENE_LIST: BSU34680</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
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    <speciesReference species="M_C00160_c"/>
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    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C00048_c"/>
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  <kineticLaw>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R00719" name="Nucleoside 5-triphosphatase RdgB (dHAPTP, dITP,
XTP-specific) (EC 3.6.1.15)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU28360</p>
      <p>GENE_LIST: BSU28360</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  </notes>
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    <speciesReference species="M_C00081_c"/>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00104_c"/>
  </listOfProducts>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R00722" name="Nucleoside diphosphate kinase (EC 2.7.4.6)"
reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU22730</p>
      <p>GENE_LIST: BSU22730</p>

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<p>SUBSYSTEM: Nucleosides and Nucleotides</p>  
</html>  
</notes>  
<listOfReactants>  
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<speciesReference species="M\_C00104\_c"/>  
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<listOfProducts>  
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</listOfProducts>  
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<parameter id="OBJECTIVE\_COEFFICIENT" value="0"/>  
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</reaction>  
<reaction id="R\_R00734" name="Aspartate/tyrosine/aromatic aminotransferase;Biosynthetic Aromatic amino acid aminotransferase beta (EC 2.6.1.57)|Histidinol-phosphate aminotransferase (EC 2.6.1.9)(BSU22620)">  
<notes>  
<html xmlns="http://www.w3.org/1999/xhtml">  
<p>GENE\_ASSOCIATION: ( BSU22620 or BSU09570 )</p>  
<p>GENE\_LIST: BSU22620 BSU09570</p>  
<p>SUBSYSTEM: Amino Acids and Derivatives</p>  
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00346_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00014_c"/>
    <speciesReference species="M_C00084_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R00749" name="" reversible="false">
  <notes>
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      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>

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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </notes>
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  <listOfProducts>
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    <speciesReference species="M_C00084_c"/>
  </listOfProducts>
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    </math>
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  </kineticLaw>
</reaction>

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<reaction id="R\_R00754" name="Alcohol dehydrogenase (EC 1.1.1.1);alcohol dehydrogenase(BSU26970)">

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<p>GENE\_LIST: BSU18430 BSU26970 BSU10320 BSU27010</p>

<p>SUBSYSTEM: Carbohydrates</p>

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</notes>

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<speciesReference species="M\_C00004\_c"/>

<speciesReference species="M\_C00084\_c"/>

</listOfProducts>

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</math>

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<parameter id="OBJECTIVE\_COEFFICIENT" value="0"/>

</listOfParameters>

</kineticLaw>

</reaction>

<reaction id="R\_R00765" name="Glucosamine-6-phosphate deaminase (EC 3.5.99.6)" reversible="false">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml">

<p>GENE\_ASSOCIATION: ( BSU02360 or BSU35020 )</p>

<p>GENE\_LIST: BSU02360 BSU35020</p>

<p>SUBSYSTEM: Carbohydrates</p>

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</listOfReactants>

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    <speciesReference species="M_C05345_c"/>
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  </listOfProducts>
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    </math>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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  </kineticLaw>
</reaction>
<reaction id="R_R00768" name="Glucosamine--fructose-6-phosphate aminotransferase
[isomerizing] (EC 2.6.1.16);glucosamine--fructose-6-phosphate aminotransferase
(isomerizing)(BSU01900)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU01780</p>
      <p>GENE_LIST: BSU01780</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00064_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00025_c"/>
    <speciesReference species="M_C00352_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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</reaction>
<reaction id="R_R00782" name="Cystathionine beta-lyase (EC 4.4.1.8)" reversible="false">

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    <p>GENE_LIST: BSU11880</p>
    <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  <speciesReference species="M_C00014_c"/>
  <speciesReference species="M_C00283_c"/>
</listOfProducts>
<kineticLaw>
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  </math>
  <listOfParameters>
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  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R00802" name="Alpha-glucosidase (EC 3.2.1.20)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU31290</p>
      <p>GENE_LIST: BSU31290</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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  </listOfReactants>
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</kineticLaw>
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  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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  </listOfReactants>
  <listOfProducts>
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  </listOfProducts>
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    </math>
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  </kineticLaw>
</reaction>
<reaction id="R_R00818" name="Salicylate hydroxylase (EC 1.14.13.1)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU07230</p>
      <p>GENE_LIST: BSU07230</p>
      <p>SUBSYSTEM: Metabolism of Aromatic Compounds</p>
    </html>
  </notes>
  <listOfReactants>

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<speciesReference species="M_C00003_c"/>
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</listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R00837" name="Trehalose-6-phosphate hydrolase (EC 3.2.1.93)">
<notes>
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  <p>GENE_LIST: BSU07810</p>
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<reaction id="R_R00838" name="Maltose-6'-phosphate glucosidase (EC 3.2.1.122)">
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      <p>GENE_LIST: BSU08180</p>
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<reaction id="R_R00839" name="6-phospho-beta-glucosidase (EC 3.2.1.86)">
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1.1.1.94)">
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<reaction id="R_R00856" name="Glycerol-3-phosphate cytidyltransferase (EC 2.7.7.39)">
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      <p>GENE_LIST: BSU35740</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
    </html>
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(EC 1.8.1.2);Sulfite reductase [NADPH] flavoprotein alpha-component (EC 1.8.1.2)(BSU33440)"
reversible="false">
  <notes>
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      <p>GENE_LIST: BSU33430 BSU33440</p>
      <p>SUBSYSTEM: Sulfur Metabolism</p>
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    <speciesReference species="M_C00001_c" stoichiometry="3"/>
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    <p>GENE_ASSOCIATION: ( BSU05860 or BSU06170 )</p>
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</kineticLaw>
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<reaction id="R_R00875" name="Sorbitol dehydrogenase (EC 1.1.1.14)">
  <notes>
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      <p>GENE_LIST: BSU06150</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
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      <p>GENE_LIST: BSU17600</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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      <p>GENE_LIST: BSU29970 BSU00730</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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</kineticLaw>
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<reaction id="R_R00899" name="Probable cytosol aminopeptidase (EC 3.4.11.1) (Leucine
aminopeptidase) (LAP) (Leucyl aminopeptidase)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU32050</p>
      <p>GENE_LIST: BSU32050</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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</reaction>
<reaction id="R_R00921" name="Phosphate acetyltransferase (EC 2.3.1.8)">
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      <p>GENE_LIST: BSU37660</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
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    <speciesReference species="M_C00080_c"/>
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    <speciesReference species="M_C02876_c"/>
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    </listOfParameters>
  </kineticLaw>
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<reaction id="R_R00927" name="3-ketoacyl-CoA thiolase (EC 2.3.1.16)|Acetyl-CoA
acetyltransferase (EC 2.3.1.9);3-ketoacyl-CoA thiolase [isoleucine degradation] (EC
2.3.1.16)(BSU24170)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU32830 or BSU10350 or BSU24170 )</p>
      <p>GENE_LIST: BSU32830 BSU10350 BSU24170</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </notes>
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<reaction id="R_R00931" name="2-methylcitrate synthase (EC 2.3.3.5)" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU24140</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00036_c"/>
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    <speciesReference species="M_C02225_c"/>
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  </kineticLaw>
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<reaction id="R_R00935" name="Methylmalonate-semialdehyde dehydrogenase [inositol]

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(EC 1.2.1.27)">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml">

<p>GENE\_ASSOCIATION: BSU39760</p>

<p>GENE\_LIST: BSU39760</p>

<p>SUBSYSTEM: Carbohydrates</p>

</html>

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<parameter id="OBJECTIVE\_COEFFICIENT" value="0"/>

</listOfParameters>

</kineticLaw>

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<reaction id="R\_R00939" name="Dihydrofolate reductase (EC 1.5.1.3)">

<notes>

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<p>GENE\_ASSOCIATION: BSU21810</p>

<p>GENE\_LIST: BSU21810</p>

<p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>

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</notes>

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</listOfReactants>

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<speciesReference species="M\_C00005\_c"/>

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  </kineticLaw>
</reaction>
<reaction id="R_R00942" name="Dihydrofolate synthase (EC 6.3.2.12)|Folylpolyglutamate
synthase (EC 6.3.2.17)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU28080</p>
      <p>GENE_LIST: BSU28080</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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    <speciesReference species="M_C00101_c"/>
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    <speciesReference species="M_C00009_c"/>
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<reaction id="R\_R00943" name="Methenyltetrahydrofolate cyclohydrolase (EC 3.5.4.9)|Methylenetetrahydrofolate dehydrogenase (NADP+) (EC 1.5.1.5)" reversible="false">

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<p>GENE\_ASSOCIATION: BSU24310</p>

<p>GENE\_LIST: BSU24310</p>

<p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>

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</notes>

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<speciesReference species="M\_C00101\_c"/>

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</listOfProducts>

<kineticLaw>

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</math>

<listOfParameters>

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<parameter id="UPPER\_BOUND" value="1000" units="mmol\_per\_gDW\_per\_hr"/>

<parameter id="OBJECTIVE\_COEFFICIENT" value="0"/>

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</kineticLaw>

</reaction>

<reaction id="R\_R00944" name="Formyltetrahydrofolate deformylase (EC 3.5.1.10)" reversible="false">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml">

<p>GENE\_ASSOCIATION: BSU13110</p>

<p>GENE\_LIST: BSU13110</p>

<p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>

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    <speciesReference species="M_C00101_c"/>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R00945" name="Serine hydroxymethyltransferase (EC 2.1.2.1)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU36900</p>
      <p>GENE_LIST: BSU36900</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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    <speciesReference species="M_C00143_c"/>
    <speciesReference species="M_C00037_c"/>
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    <speciesReference species="M_C00065_c"/>
    <speciesReference species="M_C00101_c"/>
  </listOfProducts>
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    </math>
    <listOfParameters>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R00946" name="Methionine synthase II (cobalamin-independent)">

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<notes>
  <html xmlns="http://www.w3.org/1999/xhtml">
    <p>GENE_ASSOCIATION: ( BSU13180 or ( BSU38950 and BSU38960 ) )</p>
    <p>GENE_LIST: BSU13180 BSU38950 BSU38960</p>
    <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  <speciesReference species="M_C00440_c"/>
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  <speciesReference species="M_C00101_c"/>
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  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R00948" name="Glucose-1-phosphate adenylyltransferase (EC
2.7.7.27);Glycogen biosynthesis protein GlgD, glucose-1-phosphate adenylyltransferase
family(BSU30960)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU30960 and BSU30970 )</p>
      <p>GENE_LIST: BSU30960 BSU30970</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00002_c"/>
    <speciesReference species="M_C00103_c"/>
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  <listOfProducts>
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</kineticLaw>
</reaction>
<reaction id="R_R00956" name="Glucose-1-phosphate cytidyltransferase (EC 2.7.7.33)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU07270</p>
      <p>GENE_LIST: BSU07270</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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    <speciesReference species="M_C00063_c"/>
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  <listOfProducts>
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    <speciesReference species="M_C00501_c"/>
  </listOfProducts>
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    </math>
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</reaction>
<reaction id="R_R00959" name="Phosphoglucosamine mutase (EC 5.4.2.10)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU01770</p>
      <p>GENE_LIST: BSU01770</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
    </html>
  </notes>

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    </html>
  </notes>
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</reaction>
<reaction id="R_R00962" name="Uridine kinase (EC 2.7.1.48) [C1]">
  <notes>
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      <p>GENE_ASSOCIATION: BSU27330</p>
      <p>GENE_LIST: BSU27330</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
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  <listOfProducts>
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    </math>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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    </listOfParameters>
  </kineticLaw>

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    </kineticLaw>
  </reaction>
  <reaction id="R_R00963" name="5'-nucleotidase yjjG (EC 3.1.3.5);2',3'-cyclic-nucleotide
2'-phosphodiesterase (EC 3.1.4.16)|5'-nucleotidase (EC 3.1.3.5)(BSU07840)" reversible="false">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml">
        <p>GENE_ASSOCIATION: ( BSU07840 or BSU07330 )</p>
        <p>GENE_LIST: BSU07840 BSU07330</p>
        <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
      </html>
    </notes>
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      <speciesReference species="M_C00001_c"/>
    </listOfReactants>
    <listOfProducts>
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      <speciesReference species="M_C00080_c"/>
      <speciesReference species="M_C00299_c"/>
    </listOfProducts>
    <kineticLaw>
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      </math>
      <listOfParameters>
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  </reaction>
  <reaction id="R_R00964" name="Uridine kinase (EC 2.7.1.48) [C1]" reversible="false">
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        <p>GENE_ASSOCIATION: BSU27330</p>
        <p>GENE_LIST: BSU27330</p>
        <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
      </html>
    </notes>
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    <listOfProducts>

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    <speciesReference species="M_C00008_c"/>
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    </math>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R00965" name="Orotidine 5'-phosphate decarboxylase (EC 4.1.1.23)"
reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU15550</p>
      <p>GENE_LIST: BSU15550</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
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    <speciesReference species="M_C01103_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00105_c"/>
    <speciesReference species="M_C00011_c"/>
  </listOfProducts>
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    </math>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R00966" name="Pyrimidine operon regulatory protein PyrR|Uracil
phosphoribosyltransferase (EC 2.4.2.9);phosphoribosyltransferase(BSU36890)"

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reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU15470 or BSU36890 )</p>
      <p>GENE_LIST: BSU15470 BSU36890</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
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    <speciesReference species="M_C00106_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00105_c"/>
    <speciesReference species="M_C00013_c"/>
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    </math>
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  </kineticLaw>
</reaction>
<reaction id="R_R00967" name="Uridine kinase (EC 2.7.1.48) [C1]" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU27330</p>
      <p>GENE_LIST: BSU27330</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  </notes>
  <listOfReactants>
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  <kineticLaw>

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</math>
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</kineticLaw>
</reaction>
<reaction id="R_R00968" name="Uridine kinase (EC 2.7.1.48) [C1]" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU27330</p>
      <p>GENE_LIST: BSU27330</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00044_c"/>
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    <speciesReference species="M_C00105_c"/>
    <speciesReference species="M_C00035_c"/>
  </listOfProducts>
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  </kineticLaw>
</reaction>
<reaction id="R_R00970" name="Uridine kinase (EC 2.7.1.48) [C1]">
  <notes>
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      <p>GENE_LIST: BSU27330</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>

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</notes>
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  <speciesReference species="M_C00081_c"/>
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</listOfProducts>
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  </math>
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  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R00985" name="Anthranilate synthase, aminase component (EC
4.1.3.27);Anthranilate synthase, amidotransferase component (EC 4.1.3.27)|Para-aminobenzoate
synthase, amidotransferase component (EC 2.6.1.85)(BSU00750)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU22680 and BSU00750 )</p>
      <p>GENE_LIST: BSU22680 BSU00750</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
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    <speciesReference species="M_C00251_c"/>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00022_c"/>
    <speciesReference species="M_C00108_c"/>
  </listOfProducts>
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    </math>

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</listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R00986" name="Anthranilate synthase, aminase component (EC
4.1.3.27);Anthranilate synthase, amidotransferase component (EC 4.1.3.27)|Para-aminobenzoate
synthase, amidotransferase component (EC 2.6.1.85)(BSU00750)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU00750 and BSU22680 )</p>
      <p>GENE_LIST: BSU00750 BSU22680</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  </notes>
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    <speciesReference species="M_C00025_c"/>
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    </math>
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    </listOfParameters>
  </kineticLaw>
</reaction>
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reversible="false">
  <notes>
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      <p>GENE_LIST: BSU21770</p>

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    <p>SUBSYSTEM: Amino Acids and Derivatives</p>
  </html>
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  <speciesReference species="M_C00109_c"/>
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  </math>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
</reaction>
<reaction id="R_R00999" name="Cystathionine gamma-synthase (EC 2.5.1.48)"
reversible="false">
  <notes>
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      <p>GENE_LIST: BSU11870</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C01118_c"/>
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    <speciesReference species="M_C00014_c"/>
    <speciesReference species="M_C00042_c"/>
    <speciesReference species="M_C00109_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>

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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
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reversible="false">
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      <p>GENE_LIST: BSU27250</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </notes>
  <listOfReactants>
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    <speciesReference species="M_C02291_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00014_c"/>
    <speciesReference species="M_C00097_c"/>
    <speciesReference species="M_C00109_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R01010" name="Alkaline phosphatase (EC 3.1.3.1)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU05740 or BSU09410 )</p>
      <p>GENE_LIST: BSU05740 BSU09410</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
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  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C00184_c"/>
</listOfProducts>
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  <math xmlns="http://www.w3.org/1998/Math/MathML">
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  </math>
  <listOfParameters>
    <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R01015" name="Triosephosphate isomerase (EC
5.3.1.1);Glyceraldehyde-3-phosphate ketol-isomerase (EC 5.3.1.1)(BSU39690)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU33920 or BSU39690 )</p>
      <p>GENE_LIST: BSU33920 BSU39690</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00118_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00111_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>

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</kineticLaw>
</reaction>
<reaction id="R_R01016" name="Methylglyoxal synthase (EC 4.2.3.3)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU22480</p>
      <p>GENE_LIST: BSU22480</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00111_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00546_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R01021" name="" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: </p>
      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00002_c"/>
    <speciesReference species="M_C00114_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00008_c"/>
    <speciesReference species="M_C00588_c"/>
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</listOfProducts>
<kineticLaw>
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  </math>
  <listOfParameters>
    <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R01030" name="Glycerophosphoryl diester phosphodiesterase, periplasmic
(EC 3.1.4.46);Glycerophosphoryl diester phosphodiesterase (EC
3.1.4.46)(BSU09620);Glycerophosphoryl diester phosphodiesterase family protein(BSU24180)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU09620 or BSU02130 or BSU24180 )</p>
      <p>GENE_LIST: BSU09620 BSU02130 BSU24180</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00670_c"/>
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  <listOfProducts>
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    <speciesReference species="M_C00114_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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  </kineticLaw>
</reaction>
<reaction id="R_R01034" name="">
  <notes>
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    <p>GENE_ASSOCIATION: </p>
    <p>GENE_LIST: </p>
    <p>SUBSYSTEM: Carbohydrates</p>
  </html>
</notes>
<listOfReactants>
  <speciesReference species="M_C00003_c"/>
  <speciesReference species="M_C00116_c"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C00004_c"/>
  <speciesReference species="M_C00184_c"/>
</listOfProducts>
<kineticLaw>
  <math xmlns="http://www.w3.org/1998/Math/MathML">
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R01036" name="Alcohol dehydrogenase (EC 1.1.1.1);alcohol
dehydrogenase(BSU26970)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU18430 or BSU26970 or BSU10320 or
BSU27010 )</p>
      <p>GENE_LIST: BSU18430 BSU26970 BSU10320 BSU27010</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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    <speciesReference species="M_C00003_c"/>
    <speciesReference species="M_C00116_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00577_c"/>
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<kineticLaw>
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  <listOfParameters>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R01049" name="Ribose-phosphate pyrophosphokinase" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU00510</p>
      <p>GENE_LIST: BSU00510</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00117_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00020_c"/>
    <speciesReference species="M_C00119_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R01051" name="Ribokinase (EC 2.7.1.15)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU35920</p>
      <p>GENE_LIST: BSU35920</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>

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    </html>
  </notes>
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    <speciesReference species="M_C00121_c"/>
  </listOfReactants>
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    <speciesReference species="M_C00008_c"/>
    <speciesReference species="M_C00117_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R01054" name="ADP-ribose pyrophosphatase (EC 3.6.1.13)"
reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU23610</p>
      <p>GENE_LIST: BSU23610</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00301_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00020_c"/>
    <speciesReference species="M_C00117_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>

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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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</reaction>
<reaction id="R_R01056" name="Ribose 5-phosphate isomerase B (EC 5.3.1.6)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU36920</p>
      <p>GENE_LIST: BSU36920</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00199_c"/>
  </listOfProducts>
  <kineticLaw>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R01057" name="Phosphopentomutase (EC 5.4.2.7)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU23500</p>
      <p>GENE_LIST: BSU23500</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00620_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00117_c"/>
  </listOfProducts>

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<kineticLaw>
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    <ci> FLUX_VALUE </ci>
  </math>
  <listOfParameters>
    <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R01061" name="NAD-dependent glyceraldehyde-3-phosphate
dehydrogenase (EC 1.2.1.12)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU33940</p>
      <p>GENE_LIST: BSU33940</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00003_c"/>
    <speciesReference species="M_C00118_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C00236_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R01063" name="NADPH-dependent glyceraldehyde-3-phosphate
dehydrogenase (EC 1.2.1.13)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">

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    <p>GENE_ASSOCIATION: BSU29020</p>
    <p>GENE_LIST: BSU29020</p>
    <p>SUBSYSTEM: Carbohydrates</p>
  </html>
</notes>
<listOfReactants>
  <speciesReference species="M_C00005_c"/>
  <speciesReference species="M_C00236_c"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00009_c"/>
  <speciesReference species="M_C00006_c"/>
  <speciesReference species="M_C00118_c"/>
</listOfProducts>
<kineticLaw>
  <math xmlns="http://www.w3.org/1998/Math/MathML">
    <ci> FLUX_VALUE </ci>
  </math>
  <listOfParameters>
    <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R01066" name="Deoxyribose-phosphate aldolase (EC 4.1.2.4)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU39420</p>
      <p>GENE_LIST: BSU39420</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00673_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00118_c"/>
    <speciesReference species="M_C00084_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>

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<listOfParameters>
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  <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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</listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R01069" name="">
  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C03785_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00118_c"/>
    <speciesReference species="M_C00111_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R01070" name="Fructose-bisphosphate aldolase class II (EC 4.1.2.13)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU37120</p>
      <p>GENE_LIST: BSU37120</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C05378_c"/>
  </listOfReactants>

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<listOfProducts>
  <speciesReference species="M_C00118_c"/>
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</listOfProducts>
<kineticLaw>
  <math xmlns="http://www.w3.org/1998/Math/MathML">
    <ci> FLUX_VALUE </ci>
  </math>
  <listOfParameters>
    <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R01071" name="ATP phosphoribosyltransferase catalytic subunit (EC
2.4.2.17);ATP phosphoribosyltransferase regulatory subunit (EC 2.4.2.17)(BSU34930)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU34920 and BSU34930 )</p>
      <p>GENE_LIST: BSU34920 BSU34930</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00002_c"/>
    <speciesReference species="M_C00119_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00013_c"/>
    <speciesReference species="M_C02739_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>

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<reaction id="R\_R01072" name="Amidophosphoribosyltransferase (EC 2.4.2.14)" reversible="false">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml">

<p>GENE\_ASSOCIATION: BSU06490</p>

<p>GENE\_LIST: BSU06490</p>

<p>SUBSYSTEM: Nucleosides and Nucleotides</p>

</html>

</notes>

<listOfReactants>

<speciesReference species="M\_C00001\_c"/>

<speciesReference species="M\_C00064\_c"/>

<speciesReference species="M\_C00119\_c"/>

</listOfReactants>

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<speciesReference species="M\_C00013\_c"/>

<speciesReference species="M\_C00025\_c"/>

<speciesReference species="M\_C03090\_c"/>

</listOfProducts>

<kineticLaw>

<math xmlns="http://www.w3.org/1998/Math/MathML">

<ci> FLUX\_VALUE </ci>

</math>

<listOfParameters>

<parameter id="LOWER\_BOUND" value="0" units="mmol\_per\_gDW\_per\_hr"/>

<parameter id="UPPER\_BOUND" value="1000" units="mmol\_per\_gDW\_per\_hr"/>

<parameter id="OBJECTIVE\_COEFFICIENT" value="0"/>

</listOfParameters>

</kineticLaw>

</reaction>

<reaction id="R\_R01073" name="Anthranilate phosphoribosyltransferase (EC 2.4.2.18)" reversible="false">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml">

<p>GENE\_ASSOCIATION: BSU22670</p>

<p>GENE\_LIST: BSU22670</p>

<p>SUBSYSTEM: Amino Acids and Derivatives</p>

</html>

</notes>

<listOfReactants>

<speciesReference species="M\_C00108\_c"/>

<speciesReference species="M\_C00119\_c"/>

</listOfReactants>

<listOfProducts>

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    <speciesReference species="M_C00013_c"/>
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  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R01082" name="Fumarate hydratase class II (EC 4.2.1.2)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU33040</p>
      <p>GENE_LIST: BSU33040</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00149_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00122_c"/>
    <speciesReference species="M_C00001_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R01083" name="Adenylosuccinate lyase (EC 4.3.2.2)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU06440</p>

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<p>GENE\_LIST: BSU06440</p>  
 <p>SUBSYSTEM: Nucleosides and Nucleotides</p>  
 </html>  
 </notes>  
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 <speciesReference species="M\_C03794\_c"/>  
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 <speciesReference species="M\_C00122\_c"/>  
 <speciesReference species="M\_C00020\_c"/>  
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 </math>  
 <listOfParameters>  
 <parameter id="LOWER\_BOUND" value="-1000" units="mmol\_per\_gDW\_per\_hr"/>  
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 <parameter id="OBJECTIVE\_COEFFICIENT" value="0"/>  
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 </kineticLaw>  
 </reaction>  
 <reaction id="R\_R01086" name="Argininosuccinate lyase (EC 4.3.2.1)">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml">  
 <p>GENE\_ASSOCIATION: BSU29440</p>  
 <p>GENE\_LIST: BSU29440</p>  
 <p>SUBSYSTEM: Amino Acids and Derivatives</p>  
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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  <notes>
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      <p>GENE_LIST: BSU24080</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00123_c"/>
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</reaction>
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2.6.1.42)" reversible="false">
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      <p>GENE_LIST: BSU02390 BSU38550</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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</reaction>
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      <p>GENE_LIST: BSU38200</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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      <p>SUBSYSTEM: Carbohydrates</p>
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  <notes>
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      <p>GENE_LIST: BSU30300</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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<reaction id="R_R01117" name="N-Acetylneuraminate cytidyltransferase (EC 2.7.7.43)"
reversible="false">
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      <p>GENE_LIST: BSU37850</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
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    <speciesReference species="M_C00013_c"/>
    <speciesReference species="M_C00128_c"/>
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</reaction>
<reaction id="R_R01123" name="Isopentenyl-diphosphate delta-isomerase, FMN-dependent
(EC 5.3.3.2)">
  <notes>
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 2'-phosphodiesterase (EC 3.1.4.16)|5'-nucleotidase (EC 3.1.3.5)(BSU07840)" reversible="false">  
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 <p>SUBSYSTEM: Nucleosides and Nucleotides</p>  
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<reaction id="R_R01127" name="IMP cyclohydrolase (EC
3.5.4.10)|Phosphoribosylaminoimidazolecarboxamide formyltransferase (EC 2.1.2.3)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
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      <p>GENE_LIST: BSU06520</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  </notes>
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    <speciesReference species="M_C00130_c"/>
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  <listOfProducts>
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  </kineticLaw>
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<reaction id="R_R01130" name="Inosine-5'-monophosphate dehydrogenase;IMP
dehydrogenase(BSU09230)">
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      <p>GENE_LIST: BSU00090</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  </kineticLaw>
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2.4.2.8)" reversible="false">
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      <p>GENE_LIST: BSU00680</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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    <speciesReference species="M_C00119_c"/>
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    <speciesReference species="M_C00130_c"/>
  </listOfProducts>
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    </math>
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      <p>GENE_ASSOCIATION: BSU32130</p>
      <p>GENE_LIST: BSU32130</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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    <speciesReference species="M_C00005_c"/>
    <speciesReference species="M_C00144_c"/>
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    <speciesReference species="M_C00014_c"/>
    <speciesReference species="M_C00130_c"/>
  </listOfProducts>
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    </math>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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  </kineticLaw>
</reaction>
<reaction id="R_R01135" name="Adenylosuccinate synthetase (EC 6.3.4.4)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
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      <p>GENE_LIST: BSU40420</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  </notes>
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    <speciesReference species="M_C00130_c"/>
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    <speciesReference species="M_C00080_c" stoichiometry="2"/>
    <speciesReference species="M_C00035_c"/>
    <speciesReference species="M_C03794_c"/>
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  </kineticLaw>
</reaction>
<reaction id="R_R01137" name="Nucleoside diphosphate kinase (EC 2.7.4.6)"
reversible="false">
  <notes>
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      <p>GENE_LIST: BSU22730</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
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    <speciesReference species="M_C00206_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00008_c"/>
    <speciesReference species="M_C00131_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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    </listOfParameters>
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</reaction>
<reaction id="R_R01148" name="D-alanine aminotransferase (EC 2.6.1.21) (D-aspartate
aminotransferase) (D-amino acid aminotransferase) (D-amino acid transaminase) (DAAT)"
reversible="false">
  <notes>
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      <p>GENE_LIST: BSU09670</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </notes>
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    <speciesReference species="M_C00026_c"/>
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    </math>
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</reaction>
<reaction id="R_R01150" name="D-alanine--D-alanine ligase (EC 6.3.2.4)"
reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU04560</p>
      <p>GENE_LIST: BSU04560</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
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  </math>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
</reaction>
<reaction id="R_R01157" name="Agmatinase (EC 3.5.3.11)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU37490</p>
      <p>GENE_LIST: BSU37490</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00179_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00134_c"/>
    <speciesReference species="M_C00086_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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</reaction>
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      <p>GENE_LIST: BSU34910</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C01929_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c" stoichiometry="2"/>
    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C00135_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
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<reaction id="R_R01168" name="Histidine ammonia-lyase (EC 4.3.1.3)" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU39350</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </listOfReactants>
  <listOfProducts>
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</listOfProducts>
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  </math>
  <listOfParameters>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
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<reaction id="R_R01171" name="Acyl-CoA dehydrogenase, short-chain specific (EC
1.3.99.2)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU37170 or BSU32820 or BSU04520 )</p>
      <p>GENE_LIST: BSU37170 BSU32820 BSU04520</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </notes>
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    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C00877_c"/>
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    <speciesReference species="M_C00136_c"/>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R01174" name="Phosphate butyryltransferase (EC 2.3.1.19)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">

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    <p>GENE_ASSOCIATION: BSU24090</p>
    <p>GENE_LIST: BSU24090</p>
    <p>SUBSYSTEM: Carbohydrates</p>
  </html>
</notes>
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  <speciesReference species="M_C00009_c"/>
  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C00136_c"/>
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  <speciesReference species="M_C00010_c"/>
  <speciesReference species="M_C02527_c"/>
</listOfProducts>
<kineticLaw>
  <math xmlns="http://www.w3.org/1998/Math/MathML">
    <ci> FLUX_VALUE </ci>
  </math>
  <listOfParameters>
    <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R01177" name="3-ketoacyl-CoA thiolase (EC 2.3.1.16)|Acetyl-CoA
acetyltransferase (EC 2.3.1.9);3-ketoacyl-CoA thiolase [isoleucine degradation] (EC
2.3.1.16)(BSU24170)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU32830 or BSU10350 or BSU24170 )</p>
      <p>GENE_LIST: BSU32830 BSU10350 BSU24170</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00024_c"/>
    <speciesReference species="M_C00136_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00010_c"/>
    <speciesReference species="M_C05269_c"/>
  </listOfProducts>
  <kineticLaw>

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<math xmlns="http://www.w3.org/1998/Math/MathML">
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  <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
  <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
</listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R01179" name="Acetoacetyl-CoA transferase, beta subunit (EC
2.8.3.8);Acetoacetyl-CoA transferase, alpha subunit (EC 2.8.3.8)(BSU19730)">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU19720 and BSU19730 )</p>
      <p>GENE_LIST: BSU19720 BSU19730</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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    <speciesReference species="M_C00136_c"/>
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    <speciesReference species="M_C00246_c"/>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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  </kineticLaw>
</reaction>
<reaction id="R_R01181" name="">
  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>

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</html>
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</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00136_c"/>
</listOfProducts>
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  </math>
  <listOfParameters>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R01183" name="Myo-inositol 2-dehydrogenase (EC 1.1.1.18);myo-inositol
2-dehydrogenase(BSU27770);Myo-inositol 2-dehydrogenase like (EC 1.1.1.18)(BSU10850)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU39700 or BSU10850 or BSU27770 )</p>
      <p>GENE_LIST: BSU39700 BSU10850 BSU27770</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </notes>
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    <speciesReference species="M_C00137_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C00691_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>

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        <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
</reaction>
<reaction id="R_R01185" name="Myo-inositol-1(or 4)-monophosphatase (EC 3.1.3.25)"
reversible="false">
    <notes>
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            <p>GENE_ASSOCIATION: BSU14670</p>
            <p>GENE_LIST: BSU14670</p>
            <p>SUBSYSTEM: Carbohydrates</p>
        </html>
    </notes>
    <listOfReactants>
        <speciesReference species="M_C00001_c"/>
        <speciesReference species="M_C01177_c"/>
    </listOfReactants>
    <listOfProducts>
        <speciesReference species="M_C00009_c"/>
        <speciesReference species="M_C00080_c"/>
        <speciesReference species="M_C00137_c"/>
    </listOfProducts>
    <kineticLaw>
        <math xmlns="http://www.w3.org/1998/Math/MathML">
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        </math>
        <listOfParameters>
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            <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
            <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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    </kineticLaw>
</reaction>
<reaction id="R_R01186" name="Myo-inositol-1(or 4)-monophosphatase (EC 3.1.3.25)"
reversible="false">
    <notes>
        <html xmlns="http://www.w3.org/1999/xhtml">
            <p>GENE_ASSOCIATION: BSU14670</p>
            <p>GENE_LIST: BSU14670</p>
            <p>SUBSYSTEM: Carbohydrates</p>
        </html>
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    <speciesReference species="M_C03546_c"/>
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  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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  </kineticLaw>
</reaction>
<reaction id="R_R01187" name="Myo-inositol-1(or 4)-monophosphatase (EC 3.1.3.25)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU14670</p>
      <p>GENE_LIST: BSU14670</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C04006_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00137_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>

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    </listOfParameters>
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</reaction>
<reaction id="R_R01201" name="" reversible="false">
  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00002_c"/>
    <speciesReference species="M_C00140_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00008_c"/>
    <speciesReference species="M_C00357_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R01207" name="">
  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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    <speciesReference species="M_C00140_c"/>
  </listOfReactants>
  <listOfProducts>
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  </listOfProducts>

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<kineticLaw>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R01213" name="2-isopropylmalate synthase (EC 2.3.3.13)"
reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU28280</p>
      <p>GENE_LIST: BSU28280</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00141_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00010_c"/>
    <speciesReference species="M_C02504_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R01214" name="Branched-chain amino acid aminotransferase (EC
2.6.1.42)">
  <notes>

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<html xmlns="http://www.w3.org/1999/xhtml">
  <p>GENE_ASSOCIATION: ( BSU02390 or BSU38550 )</p>
  <p>GENE_LIST: BSU02390 BSU38550</p>
  <p>SUBSYSTEM: Amino Acids and Derivatives</p>
</html>
</notes>
<listOfReactants>
  <speciesReference species="M_C00026_c"/>
  <speciesReference species="M_C00183_c"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00025_c"/>
  <speciesReference species="M_C00141_c"/>
</listOfProducts>
<kineticLaw>
  <math xmlns="http://www.w3.org/1998/Math/MathML">
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  </math>
  <listOfParameters>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R01220" name="Methenyltetrahydrofolate cyclohydrolase (EC
3.5.4.9)|Methylenetetrahydrofolate dehydrogenase (NADP+) (EC 1.5.1.5)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU24310</p>
      <p>GENE_LIST: BSU24310</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00143_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00005_c"/>
    <speciesReference species="M_C00445_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">

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    <ci> FLUX_VALUE </ci>
  </math>
  <listOfParameters>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R01221" name="Glycine dehydrogenase [decarboxylating] (glycine cleavage
system P2 protein) (EC 1.4.4.2);Glycine dehydrogenase [decarboxylating] (glycine cleavage
system P1 protein) (EC 1.4.4.2)(BSU24560);Aminomethyltransferase (glycine cleavage system T
protein) (EC 2.1.2.10)(BSU24570);Glycine cleavage system H protein(BSU32800)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU24550 and BSU24560 and BSU24570 and
BSU32800 )</p>
      <p>GENE_LIST: BSU24550 BSU24560 BSU24570 BSU32800</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
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    <speciesReference species="M_C00037_c"/>
    <speciesReference species="M_C00101_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C00011_c"/>
    <speciesReference species="M_C00014_c"/>
    <speciesReference species="M_C00143_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>

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<reaction id="R\_R01224" name="5,10-methylenetetrahydrofolate reductase (EC 1.5.1.20)|Homolog of homocysteine-binding domain">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml">

<p>GENE\_ASSOCIATION: BSU11010</p>

<p>GENE\_LIST: BSU11010</p>

<p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>

</html>

</notes>

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<speciesReference species="M\_C00440\_c"/>

</listOfReactants>

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<speciesReference species="M\_C00005\_c"/>

<speciesReference species="M\_C00143\_c"/>

</listOfProducts>

<kineticLaw>

<math xmlns="http://www.w3.org/1998/Math/MathML">

<ci> FLUX\_VALUE </ci>

</math>

<listOfParameters>

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<parameter id="UPPER\_BOUND" value="1000" units="mmol\_per\_gDW\_per\_hr"/>

<parameter id="OBJECTIVE\_COEFFICIENT" value="0"/>

</listOfParameters>

</kineticLaw>

</reaction>

<reaction id="R\_R01226" name="3-methyl-2-oxobutanoate hydroxymethyltransferase (EC 2.1.2.11)">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml">

<p>GENE\_ASSOCIATION: BSU22430</p>

<p>GENE\_LIST: BSU22430</p>

<p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>

</html>

</notes>

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<speciesReference species="M\_C00001\_c"/>

<speciesReference species="M\_C00143\_c"/>

<speciesReference species="M\_C00141\_c"/>

</listOfReactants>

<listOfProducts>

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    <speciesReference species="M_C00101_c"/>
    <speciesReference species="M_C00966_c"/>
  </listOfProducts>
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    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R01227" name="5'-nucleotidase yjjG (EC 3.1.3.5);2',3'-cyclic-nucleotide
2'-phosphodiesterase (EC 3.1.4.16)|5'-nucleotidase (EC 3.1.3.5)(BSU07840)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU07840 or BSU07330 )</p>
      <p>GENE_LIST: BSU07840 BSU07330</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00144_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00387_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R01229" name="Hypoxanthine-guanine phosphoribosyltransferase (EC

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2.4.2.8)" reversible="false">

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<notes>
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    <p>GENE_ASSOCIATION: BSU00680</p>
    <p>GENE_LIST: BSU00680</p>
    <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
  </html>
</notes>
<listOfReactants>
  <speciesReference species="M_C00242_c"/>
  <speciesReference species="M_C00119_c"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00013_c"/>
  <speciesReference species="M_C00144_c"/>
</listOfProducts>
<kineticLaw>
  <math xmlns="http://www.w3.org/1998/Math/MathML">
    <ci> FLUX_VALUE </ci>
  </math>
  <listOfParameters>
    <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R01230" name="" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: </p>
      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00014_c"/>
    <speciesReference species="M_C00655_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00013_c"/>
    <speciesReference species="M_C00020_c"/>
  </listOfProducts>
</reaction>
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reversible="false">
  <notes>
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      <p>GENE_LIST: BSU06360</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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    </kineticLaw>
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deaminase(BSU14520)" reversible="false">
    <notes>
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        <p>GENE_ASSOCIATION: ( BSU14520 or BSU06560 )</p>
        <p>GENE_LIST: BSU14520 BSU06560</p>
        <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
      </html>
    </notes>
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      <speciesReference species="M_C00001_c"/>
      <speciesReference species="M_C00147_c"/>
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    </kineticLaw>
  </reaction>
  <reaction id="R_R01248" name="Pyrroline-5-carboxylate reductase (EC 1.5.1.2),
ProG-like;Pyrroline-5-carboxylate reductase (EC 1.5.1.2)(BSU18480);Pyrroline-5-carboxylate
reductase (EC 1.5.1.2)(BSU23800);Proline dehydrogenase (Proline oxidase) (EC 1.5.99.8)
(BSU03200)">
    <notes>
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        <p>GENE_ASSOCIATION: ( BSU12910 or BSU18480 or BSU23800 or
BSU03200 )</p>
        <p>GENE_LIST: BSU12910 BSU18480 BSU23800 BSU03200</p>
        <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </kineticLaw>
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reductase (EC 1.5.1.2)(BSU23800)">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU12910 or BSU18480 or BSU23800 )</p>
      <p>GENE_LIST: BSU12910 BSU18480 BSU23800</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  <notes>
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      <p>GENE_ASSOCIATION: BSU32850</p>
      <p>GENE_LIST: BSU32850</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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      <p>GENE_LIST: BSU31760 BSU00170</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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6.2.1.3);Acetoacetyl-CoA synthetase [leucine] (EC 6.2.1.16)|Long-chain-fatty-acid--CoA ligase
(EC 6.2.1.3)(BSU18250)" reversible="false">
  <notes>
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BSU18250 or BSU17180 )</p>
      <p>GENE_LIST: BSU10270 BSU28560 BSU04170 BSU10360 BSU18250
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      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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    <speciesReference species="M_C00154_c"/>
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      <p>GENE_LIST: BSU11880</p>
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    </math>
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<reaction id="R_R01290" name="Cystathionine beta-synthase (EC 4.2.1.22)">
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      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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</kineticLaw>
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<reaction id="R_R01291" name="Autoinducer-2 production protein
LuxS|S-ribosylhomocysteine lyase (EC 4.4.1.21)">
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      <p>GENE_LIST: BSU30670</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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</reaction>
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    <speciesReference species="M_C02949_c"/>
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    <speciesReference species="M_C00156_c"/>
  </listOfProducts>
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    </math>
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  </kineticLaw>
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hydratase (EC 4.2.1.3)">
  <notes>
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      <p>GENE_LIST: BSU18000</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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BSU37960 )</p>
      <p>GENE_LIST: BSU38830 BSU39860 BSU19310 BSU07350 BSU37960</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00266_c"/>
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  <listOfProducts>
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    <speciesReference species="M_C00004_c"/>
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  <speciesReference species="M_C00160_c"/>
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  <notes>
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      <p>GENE_LIST: BSU29470</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00163_c"/>
  </listOfReactants>
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</kineticLaw>
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<reaction id="R_R01357" name="Acetoacetyl-CoA synthetase [leucine] (EC
6.2.1.16)|Long-chain-fatty-acid--CoA ligase (EC 6.2.1.3)" reversible="false">
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      <p>GENE_LIST: BSU18250</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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    <speciesReference species="M_C00010_c"/>
    <speciesReference species="M_C00164_c"/>
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  <listOfProducts>
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  <notes>
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      <p>GENE_ASSOCIATION: BSU18230</p>

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  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R01365" name="Butyrate-acetoacetate CoA-transferase subunit B (EC
2.8.3.9);Butyrate-acetoacetate CoA-transferase subunit A (EC 2.8.3.9)(BSU38990)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU38980 and BSU38990 )</p>
      <p>GENE_LIST: BSU38980 BSU38990</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00164_c"/>
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    <speciesReference species="M_C00332_c"/>
    <speciesReference species="M_C00246_c"/>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R01373" name="Prephenate dehydratase (EC 4.2.1.51)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU27900</p>
      <p>GENE_LIST: BSU27900</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00254_c"/>
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    <speciesReference species="M_C00011_c"/>
    <speciesReference species="M_C00166_c"/>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R01387" name="UDP-glucuronate 5'-epimerase (EC 5.1.3.12)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU30870</p>
      <p>GENE_LIST: BSU30870</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
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  <listOfReactants>
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  </listOfReactants>
  <listOfProducts>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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  </kineticLaw>
</reaction>
<reaction id="R_R01388" name="Hydroxypyruvate reductase (EC 1.1.1.81)">

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    <p>GENE_LIST: BSU18560</p>
    <p>SUBSYSTEM: Carbohydrates</p>
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  <speciesReference species="M_C00003_c"/>
  <speciesReference species="M_C00258_c"/>
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  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C00004_c"/>
  <speciesReference species="M_C00168_c"/>
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  </math>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R01397" name="Aspartate carbamoyltransferase (EC 2.1.3.2)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU15490</p>
      <p>GENE_LIST: BSU15490</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
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    <speciesReference species="M_C00169_c"/>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
</reaction>
<reaction id="R_R01398" name="Ornithine carbamoyltransferase (EC 2.1.3.3)"
reversible="false">
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      <p>GENE_ASSOCIATION: BSU11250</p>
      <p>GENE_LIST: BSU11250</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </notes>
  <listOfReactants>
    <speciesReference species="M_C00169_c"/>
    <speciesReference species="M_C00077_c"/>
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  <listOfProducts>
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    <speciesReference species="M_C00080_c" stoichiometry="2"/>
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  </kineticLaw>
</reaction>
<reaction id="R_R01401" name="5'-methylthioadenosine nucleosidase (EC
3.2.2.16)|S-adenosylhomocysteine nucleosidase (EC 3.2.2.9)">
  <notes>

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<html xmlns="http://www.w3.org/1999/xhtml">
  <p>GENE_ASSOCIATION: BSU27270</p>
  <p>GENE_LIST: BSU27270</p>
  <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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<listOfReactants>
  <speciesReference species="M_C00001_c"/>
  <speciesReference species="M_C00170_c"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00147_c"/>
  <speciesReference species="M_C03089_c"/>
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<kineticLaw>
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  </math>
  <listOfParameters>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R01432" name="Xylose isomerase (EC 5.3.1.5)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU17600</p>
      <p>GENE_LIST: BSU17600</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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  </listOfReactants>
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<reaction id="R_R01434" name="Leucine dehydrogenase (EC 1.4.1.9)">
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      <p>GENE_LIST: BSU24080</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </notes>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00183_c"/>
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    <speciesReference species="M_C00004_c"/>
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    <speciesReference species="M_C00141_c"/>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R01446" name="Predicted lactaldehyde dehydrogenase (EC
1.2.1.22)|Predicted rhamnulose-1-phosphate aldolase (EC 4.1.2.19)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU31220</p>
      <p>GENE_LIST: BSU31220</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  <speciesReference species="M_C00424_c"/>
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  <speciesReference species="M_C00004_c"/>
  <speciesReference species="M_C00186_c"/>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R01465" name="L-threonine 3-dehydrogenase (EC 1.1.1.103)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
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      <p>GENE_LIST: BSU16990</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00188_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C03508_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>

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</reaction>
<reaction id="R_R01466" name="Threonine synthase (EC 4.2.3.1)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU32250</p>
      <p>GENE_LIST: BSU32250</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  <listOfReactants>
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    <speciesReference species="M_C01102_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00188_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R01470" name="Glycerophosphoryl diester phosphodiesterase, periplasmic
(EC 3.1.4.46);Glycerophosphoryl diester phosphodiesterase (EC
3.1.4.46)(BSU09620);Glycerophosphoryl diester phosphodiesterase family protein(BSU24180)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU09620 or BSU02130 or BSU24180 )</p>
      <p>GENE_LIST: BSU09620 BSU02130 BSU24180</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>

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<listOfReactants>
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  <speciesReference species="M_C01233_c"/>
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  <speciesReference species="M_C00093_c"/>
  <speciesReference species="M_C00189_c"/>
</listOfProducts>
<kineticLaw>
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  </math>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
</reaction>
<reaction id="R_R01482" name="Uronate isomerase (EC 5.3.1.12)">
  <notes>
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      <p>GENE_LIST: BSU12300</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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  <listOfProducts>
    <speciesReference species="M_C00905_c"/>
  </listOfProducts>
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    </math>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>

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<reaction id="R\_R01504" name="2,3-dihydroxybenzoate-AMP ligase (EC 2.7.7.58)" reversible="false">

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<p>GENE\_ASSOCIATION: BSU31980</p>

<p>GENE\_LIST: BSU31980</p>

<p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>

</html>

</notes>

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<speciesReference species="M\_C00196\_c"/>

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<listOfProducts>

<speciesReference species="M\_C00013\_c"/>

<speciesReference species="M\_C04030\_c"/>

</listOfProducts>

<kineticLaw>

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<ci> FLUX\_VALUE </ci>

</math>

<listOfParameters>

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<parameter id="UPPER\_BOUND" value="1000" units="mmol\_per\_gDW\_per\_hr"/>

<parameter id="OBJECTIVE\_COEFFICIENT" value="0"/>

</listOfParameters>

</kineticLaw>

</reaction>

<reaction id="R\_R01505" name="2,3-dihydro-2,3-dihydroxybenzoate dehydrogenase (EC 1.3.1.28)">

<notes>

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<p>GENE\_ASSOCIATION: BSU32000</p>

<p>GENE\_LIST: BSU32000</p>

<p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>

</html>

</notes>

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</listOfReactants>

<listOfProducts>

<speciesReference species="M\_C00080\_c"/>

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    <speciesReference species="M_C00004_c"/>
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  </listOfProducts>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R01512" name="Phosphoglycerate kinase (EC 2.7.2.3)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU33930</p>
      <p>GENE_LIST: BSU33930</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00197_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00008_c"/>
    <speciesReference species="M_C00236_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R01513" name="D-3-phosphoglycerate dehydrogenase (EC 1.1.1.95)">
  <notes>

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<html xmlns="http://www.w3.org/1999/xhtml">
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  <p>GENE_LIST: BSU23070</p>
  <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  <speciesReference species="M_C00197_c"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C00004_c"/>
  <speciesReference species="M_C03232_c"/>
</listOfProducts>
<kineticLaw>
  <math xmlns="http://www.w3.org/1998/Math/MathML">
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  </math>
  <listOfParameters>
    <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R01514" name="Glycerate kinase (EC 2.7.1.31)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU40040</p>
      <p>GENE_LIST: BSU40040</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00002_c"/>
    <speciesReference species="M_C00258_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00008_c"/>
    <speciesReference species="M_C00197_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">

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    <ci> FLUX_VALUE </ci>
  </math>
  <listOfParameters>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R01515" name="Acylphosphate phosphohydrolase (EC 3.6.1.7), putative"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU07640</p>
      <p>GENE_LIST: BSU07640</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
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  <listOfReactants>
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    <speciesReference species="M_C00236_c"/>
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  <listOfProducts>
    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c" stoichiometry="2"/>
    <speciesReference species="M_C00197_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R01518" name="2,3-bisphosphoglycerate-independent phosphoglycerate
mutase (EC 5.4.2.1);phosphoglycerate mutase(BSU10340)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU33910</p>
      <p>GENE_LIST: BSU33910</p>

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    <p>SUBSYSTEM: Carbohydrates</p>
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</notes>
<listOfReactants>
  <speciesReference species="M_C00631_c"/>
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</kineticLaw>
</reaction>
<reaction id="R_R01519" name="Gluconolactonase (EC 3.1.1.17)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU33200</p>
      <p>GENE_LIST: BSU33200</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
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    <speciesReference species="M_C00198_c"/>
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    <speciesReference species="M_C00257_c"/>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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  </kineticLaw>
</reaction>

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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R01520" name="Glucose 1-dehydrogenase (EC 1.1.1.47)">
  <notes>
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      <p>GENE_LIST: BSU02830 BSU03930</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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    <speciesReference species="M_C00003_c"/>
    <speciesReference species="M_C00221_c"/>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C00198_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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  </kineticLaw>
</reaction>
<reaction id="R_R01526" name="Ribulokinase (EC 2.7.1.16)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU28790</p>
      <p>GENE_LIST: BSU28790</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
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  </kineticLaw>
</reaction>
<reaction id="R_R01528" name="6-phosphogluconate dehydrogenase, decarboxylating (EC
1.1.1.44);6-phosphogluconate dehydrogenase(BSU25730)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU23860 or BSU40080 or BSU25730 )</p>
      <p>GENE_LIST: BSU23860 BSU40080 BSU25730</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
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</reaction>
<reaction id="R_R01529" name="Ribulose-phosphate 3-epimerase (EC 5.1.3.1)">

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<notes>
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    <p>GENE_LIST: BSU15790</p>
    <p>SUBSYSTEM: Carbohydrates</p>
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<listOfProducts>
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</kineticLaw>
</reaction>
<reaction id="R_R01540" name="Altronate hydrolase (EC 4.2.1.7)" reversible="false">
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      <p>GENE_LIST: BSU12390</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </listOfProducts>
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    </math>
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</kineticLaw>
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<reaction id="R_R01541" name="2-dehydro-3-deoxygluconate kinase (EC 2.7.1.45)"
reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU22110</p>
      <p>GENE_LIST: BSU22110</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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    <speciesReference species="M_C00204_c"/>
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  <listOfProducts>
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    <speciesReference species="M_C04442_c"/>
  </listOfProducts>
  <kineticLaw>
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</reaction>
<reaction id="R_R01542" name="2-deoxy-D-gluconate 3-dehydrogenase (EC 1.1.1.125)">
  <notes>
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      <p>GENE_LIST: BSU22140</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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    <speciesReference species="M_C00204_c"/>
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</reaction>
<reaction id="R_R01547" name="Adenylate kinase (EC 2.7.4.3)" reversible="false">
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      <p>GENE_LIST: BSU01370</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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    </listOfParameters>
  </kineticLaw>

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</reaction>
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  <notes>
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      <p>GENE_LIST: BSU27330</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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    <speciesReference species="M_C00206_c"/>
  </listOfProducts>
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    </math>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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  </kineticLaw>
</reaction>
<reaction id="R_R01549" name="Uridine kinase (EC 2.7.1.48) [C1]" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU27330</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
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    <speciesReference species="M_C00131_c"/>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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</reaction>
<reaction id="R_R01555" name="Maltose phosphorylase (EC 2.4.1.8)">
  <notes>
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      <p>GENE_LIST: BSU34570</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </notes>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00208_c"/>
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  <listOfProducts>
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    <speciesReference species="M_C00663_c"/>
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    </math>
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  </kineticLaw>
</reaction>
<reaction id="R_R01556" name="Maltose O-acetyltransferase (EC 2.3.1.79)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU40850</p>

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 </reaction>  
 <reaction id="R\_R01561" name="Purine nucleoside phosphorylase (EC 2.4.2.1)">  
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 <p>SUBSYSTEM: Nucleosides and Nucleotides</p>  
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 </notes>  
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</kineticLaw>
</reaction>
<reaction id="R_R01562" name="5'-nucleotidase yjjG (EC 3.1.3.5);2',3'-cyclic-nucleotide
2'-phosphodiesterase (EC 3.1.4.16)|5'-nucleotidase (EC 3.1.3.5)(BSU07840)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU07840 or BSU07330 )</p>
      <p>GENE_LIST: BSU07840 BSU07330</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  </notes>
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    <speciesReference species="M_C01367_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00212_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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  </kineticLaw>
</reaction>
<reaction id="R_R01567" name="Thymidine kinase (EC 2.7.1.21)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU37060</p>
      <p>GENE_LIST: BSU37060</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  </math>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
</reaction>
<reaction id="R_R01569" name="5'-nucleotidase yjjG (EC 3.1.3.5);2',3'-cyclic-nucleotide
2'-phosphodiesterase (EC 3.1.4.16)|5'-nucleotidase (EC 3.1.3.5)(BSU07840)" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU07840 BSU07330</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00214_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  </notes>
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  </listOfProducts>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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  </listOfReactants>
  <listOfProducts>

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    <speciesReference species="M_C00309_c"/>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
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aminotransferase) (D-amino acid aminotransferase) (D-amino acid transaminase) (DAAT)">
  <notes>
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      <p>GENE_LIST: BSU09670</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </kineticLaw>
</reaction>
<reaction id="R_R01600" name="Glucokinase (EC 2.7.1.2)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">

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    <p>GENE_ASSOCIATION: BSU24850</p>
    <p>GENE_LIST: BSU24850</p>
    <p>SUBSYSTEM: Carbohydrates</p>
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</notes>
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  <speciesReference species="M_C00002_c"/>
  <speciesReference species="M_C00221_c"/>
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  <speciesReference species="M_C01172_c"/>
</listOfProducts>
<kineticLaw>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R01623" name="" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: </p>
      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00001_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C03688_c"/>
  </listOfProducts>
  <kineticLaw>
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      <ci> FLUX_VALUE </ci>
    </math>

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  <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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</listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R01624" name="3-oxoacyl-[acyl-carrier-protein] synthase III (EC
2.3.1.41);3-oxoacyl-[acyl-carrier-protein] synthase, KASIII (EC
2.3.1.41)(BSU11330);3-oxoacyl-[acyl-carrier-protein] synthase, KASII (EC
2.3.1.41)(BSU11340)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( ( BSU11330 and BSU11340 ) or ( BSU10170 and
BSU11340 ) )</p>
      <p>GENE_LIST: BSU11330 BSU11340 BSU10170 BSU11340</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00024_c"/>
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    <speciesReference species="M_C03939_c"/>
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  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>
  </kineticLaw>
</reaction>
<reaction id="R_R01625" name="Holo-[acyl-carrier protein] synthase (EC 2.7.8.7);Acyl
carrier protein(BSU15920)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU04620 and BSU15920 )</p>
      <p>GENE_LIST: BSU04620 BSU15920</p>

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    <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
  </html>
</notes>
<listOfReactants>
  <speciesReference species="M_C00010_c"/>
  <speciesReference species="M_C03688_c"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00229_c"/>
  <speciesReference species="M_C00054_c"/>
</listOfProducts>
<kineticLaw>
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  </math>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R01626" name="Malonyl CoA-acyl carrier protein transacylase (EC
2.3.1.39)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU15900</p>
      <p>GENE_LIST: BSU15900</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00083_c"/>
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  <listOfProducts>
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    <speciesReference species="M_C01209_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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</reaction>
<reaction id="R_R01639" name="Xylulose kinase (EC 2.7.1.17)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU17610</p>
      <p>GENE_LIST: BSU17610</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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    <speciesReference species="M_C00310_c"/>
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    <speciesReference species="M_C00231_c"/>
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    </math>
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</reaction>
<reaction id="R_R01641" name="Transketolase (EC 2.2.1.1)">
  <notes>
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      <p>GENE_LIST: BSU17890</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C05382_c"/>

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</listOfReactants>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
</reaction>
<reaction      id="R_R01648"      name="Gamma-aminobutyrate:alpha-ketoglutarate
aminotransferase (EC 2.6.1.19)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU03900</p>
      <p>GENE_LIST: BSU03900</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00026_c"/>
    <speciesReference species="M_C00334_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00232_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>

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<reaction id="R\_R01652" name="Valine, leucine and isoleucine biosynthesis" reversible="false">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml">

<p>GENE\_ASSOCIATION: </p>

<p>GENE\_LIST: </p>

<p>SUBSYSTEM: Amino Acids and Derivatives</p>

</html>

</notes>

<listOfReactants>

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</listOfReactants>

<listOfProducts>

<speciesReference species="M\_C00011\_c"/>

<speciesReference species="M\_C00233\_c"/>

</listOfProducts>

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</math>

<listOfParameters>

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<parameter id="OBJECTIVE\_COEFFICIENT" value="0"/>

</listOfParameters>

</kineticLaw>

</reaction>

<reaction id="R\_R01654" name="Dihydrofolate synthase (EC 6.3.2.12)|Folylpolyglutamate synthase (EC 6.3.2.17)" reversible="false">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml">

<p>GENE\_ASSOCIATION: BSU28080</p>

<p>GENE\_LIST: BSU28080</p>

<p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>

</html>

</notes>

<listOfReactants>

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<speciesReference species="M\_C00025\_c"/>

<speciesReference species="M\_C00234\_c"/>

</listOfReactants>

<listOfProducts>

<speciesReference species="M\_C00008\_c"/>



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    <speciesReference species="M_C00009_c"/>
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    <speciesReference species="M_C05928_c"/>
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  <kineticLaw>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R01655" name="Methenyltetrahydrofolate cyclohydrolase (EC
3.5.4.9)|Methylenetetrahydrofolate dehydrogenase (NADP+) (EC 1.5.1.5)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU24310</p>
      <p>GENE_LIST: BSU24310</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00445_c"/>
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  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00234_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R01658" name="Geranyltranstransferase (farnesylidiphosphate synthase) (EC

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2.5.1.10)" reversible="false">

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<notes>
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    <p>GENE_LIST: BSU24280</p>
    <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
  </html>
</notes>
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  <speciesReference species="M_C00235_c"/>
</listOfReactants>
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  <speciesReference species="M_C00013_c"/>
  <speciesReference species="M_C00341_c"/>
</listOfProducts>
<kineticLaw>
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  </math>
  <listOfParameters>
    <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R01663" name="Late competence protein ComEB|dCMP deaminase (EC
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3.5.4.12)" reversible="false">

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<notes>
  <html xmlns="http://www.w3.org/1999/xhtml">
    <p>GENE_ASSOCIATION: BSU25580</p>
    <p>GENE_LIST: BSU25580</p>
    <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
  </html>
</notes>
<listOfReactants>
  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C00001_c"/>
  <speciesReference species="M_C00239_c"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00014_c"/>
  <speciesReference species="M_C00365_c"/>
</listOfProducts>
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</listOfProducts>
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  </math>
  <listOfParameters>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R01664" name="5'-nucleotidase yjjG (EC 3.1.3.5);2',3'-cyclic-nucleotide
2'-phosphodiesterase (EC 3.1.4.16)|5'-nucleotidase (EC 3.1.3.5)(BSU07840)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU07840 or BSU07330 )</p>
      <p>GENE_LIST: BSU07840 BSU07330</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00239_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00881_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R01665" name="Cytidylate kinase (EC 2.7.4.14)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">

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    <p>GENE_ASSOCIATION: BSU22890</p>
    <p>GENE_LIST: BSU22890</p>
    <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
  </html>
</notes>
<listOfReactants>
  <speciesReference species="M_C00002_c"/>
  <speciesReference species="M_C00239_c"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00008_c"/>
  <speciesReference species="M_C00705_c"/>
</listOfProducts>
<kineticLaw>
  <math xmlns="http://www.w3.org/1998/Math/MathML">
    <ci> FLUX_VALUE </ci>
  </math>
  <listOfParameters>
    <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R01676" name="Guanine deaminase (EC 3.5.4.3)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU13170</p>
      <p>GENE_LIST: BSU13170</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00242_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00014_c"/>
    <speciesReference species="M_C00385_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>
  </kineticLaw>
</reaction>

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</math>
<listOfParameters>
  <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
  <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
  <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
</listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R01678" name="Beta-galactosidase (EC 3.2.1.23)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU34130 or BSU07080 )</p>
      <p>GENE_LIST: BSU34130 BSU07080</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00243_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00267_c"/>
    <speciesReference species="M_C00124_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R01688" name="Butyrate kinase (EC 2.7.2.7)" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU24070</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>

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<speciesReference species="M_C00246_c"/>
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  <speciesReference species="M_C02527_c"/>
</listOfProducts>
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  </math>
  <listOfParameters>
    <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R01714" name="Chorismate synthase (EC 4.2.3.5)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU22710</p>
      <p>GENE_LIST: BSU22710</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C01269_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00251_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>

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</kineticLaw>
</reaction>
<reaction id="R_R01715" name="Chorismate mutase II (EC 5.4.99.5);Chorismate mutase (EC 5.4.99.5)(BSU27910);2-keto-3-deoxy-D-arabino-heptulosonate-7-phosphate synthase I beta (EC 2.5.1.54)|Chorismate mutase I (EC 5.4.99.5)(BSU29750)" reversible="false">

<notes>
<html xmlns="http://www.w3.org/1999/xhtml">
<p>GENE_ASSOCIATION: ( BSU22690 or BSU27910 or BSU29750 )</p>
<p>GENE_LIST: BSU22690 BSU27910 BSU29750</p>
<p>SUBSYSTEM: Amino Acids and Derivatives</p>
</html>
</notes>
<listOfReactants>
<speciesReference species="M_C00251_c"/>
</listOfReactants>
<listOfProducts>
<speciesReference species="M_C00254_c"/>
</listOfProducts>
<kineticLaw>
<math xmlns="http://www.w3.org/1998/Math/MathML">
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</math>
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</listOfParameters>
</kineticLaw>
</reaction>
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<notes>
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<p>GENE_LIST: BSU00740 BSU00750</p>
<p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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</kineticLaw>
</reaction>
<reaction id="R_R01717" name="Menaquinone-specific isochorismate synthase (EC
5.4.4.2);Isochorismate synthase (EC 5.4.4.2) of siderophore biosynthesis(BSU31990)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU30830 or BSU31990 )</p>
      <p>GENE_LIST: BSU30830 BSU31990</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
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</reaction>
<reaction id="R_R01724" name="Nicotinate phosphoribosyltransferase (EC 2.4.2.11)">
  <notes>
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    <p>GENE_ASSOCIATION: BSU31750</p>
    <p>GENE_LIST: BSU31750</p>
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  <speciesReference species="M_C00253_c"/>
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</reaction>
<reaction id="R_R01728" name="Prephenate dehydrogenase (EC 1.3.1.12)"
reversible="false">
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      <p>GENE_ASSOCIATION: BSU22610</p>
      <p>GENE_LIST: BSU22610</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  <kineticLaw>

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</kineticLaw>
</reaction>
<reaction id="R_R01731" name="Biosynthetic Aromatic amino acid aminotransferase beta
(EC 2.6.1.57)|Histidinol-phosphate aminotransferase (EC 2.6.1.9)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU22620</p>
      <p>GENE_LIST: BSU22620</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00826_c"/>
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  <listOfProducts>
    <speciesReference species="M_C00049_c"/>
    <speciesReference species="M_C00254_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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  </kineticLaw>
</reaction>
<reaction id="R_R01736" name="Metallo-beta-lactamase family protein;Similar to
Hydroxyacylglutathione hydrolase, but in an organism lacking glutathione
biosynthesis(BSU24790)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU24790 or BSU17090 )</p>

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<p>GENE\_LIST: BSU24790 BSU17090</p>  
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 <speciesReference species="M\_C03451\_c"/>  
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 </reaction>  
 <reaction id="R\_R01737" name="Gluconokinase (EC 2.7.1.12)" reversible="false">  
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 <p>GENE\_LIST: BSU40060</p>  
 <p>SUBSYSTEM: Carbohydrates</p>  
 </html>  
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 <speciesReference species="M\_C00002\_c"/>  
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 <speciesReference species="M\_C00345\_c"/>  
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<reaction id="R_R01745" name="2-hydroxy-3-oxopropionate reductase (EC 1.1.1.60)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU13960</p>
      <p>GENE_LIST: BSU13960</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
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    <speciesReference species="M_C00258_c"/>
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  <listOfProducts>
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    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C01146_c"/>
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  </kineticLaw>
</reaction>
<reaction id="R_R01751" name="D-malic enzyme (EC 1.1.1.83)|Tartrate decarboxylase (EC
4.1.1.73)|Tartrate dehydrogenase (EC 1.1.1.93)" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU04000</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  <speciesReference species="M_C00011_c"/>
  <speciesReference species="M_C00258_c"/>
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  </math>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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BSU39860 )</p>
      <p>GENE_LIST: BSU07350 BSU37960 BSU19310 BSU38830 BSU39860</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </notes>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00577_c"/>
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    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C00258_c"/>
  </listOfProducts>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </notes>
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</reaction>
<reaction id="R_R01761" name="L-arabinose isomerase (EC 5.3.1.4)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU28800</p>
      <p>GENE_LIST: BSU28800</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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</kineticLaw>
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<reaction id="R_R01768" name="Xanthine dehydrogenase iron-sulfur subunit (EC
1.17.1.4);Xanthine dehydrogenase, molybdenum binding subunit (EC
1.17.1.4)(BSU32480);Xanthine dehydrogenase, FAD binding subunit (EC
1.17.1.4)(BSU32490);Probable xanthine dehydrogenase subunit A (XDHase subunit A) (EC
1.17.1.4)(BSU32510);xanthine dehydrogenase molybdenum-binding subunit(BSU32500)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU32470 and BSU32480 and BSU32490 and BSU32510
and BSU32500 )</p>
      <p>GENE_LIST: BSU32470 BSU32480 BSU32490 BSU32510 BSU32500</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  </notes>
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    <speciesReference species="M_C00262_c"/>
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    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C00385_c"/>
  </listOfProducts>
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<reaction id="R_R01771" name="Homoserine kinase (EC 2.7.1.39)" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU32240</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </notes>
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    <speciesReference species="M_C00008_c"/>
    <speciesReference species="M_C01102_c"/>
  </listOfProducts>
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    </math>
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</reaction>
<reaction id="R_R01773" name="Homoserine dehydrogenase (EC 1.1.1.3)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU32260</p>
      <p>GENE_LIST: BSU32260</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
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    <speciesReference species="M_C00263_c"/>
  </listOfReactants>
  <listOfProducts>

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    <speciesReference species="M_C00080_c"/>
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    <speciesReference species="M_C00441_c"/>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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  </kineticLaw>
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<reaction id="R_R01775" name="Homoserine dehydrogenase (EC 1.1.1.3)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU32260</p>
      <p>GENE_LIST: BSU32260</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
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  </listOfReactants>
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    <speciesReference species="M_C00005_c"/>
    <speciesReference species="M_C00441_c"/>
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    <listOfParameters>
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    </listOfParameters>
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reversible="false">
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      <p>GENE_LIST: BSU21910</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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    <speciesReference species="M_C01118_c"/>
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    </math>
    <listOfParameters>
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<reaction id="R_R01786" name="Glucokinase (EC 2.7.1.2)" reversible="false">
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      <p>GENE_LIST: BSU24850</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
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  <listOfReactants>
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  </listOfReactants>
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    <speciesReference species="M_C00008_c"/>
    <speciesReference species="M_C00668_c"/>
  </listOfProducts>
  <kineticLaw>

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  <ci> FLUX_VALUE </ci>
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<listOfParameters>
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</listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R01794" name="Dihydropteridine reductase (EC
1.5.1.34)|Oxygen-insensitive NAD(P)H nitroreductase (EC 1.-.-.)">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU05660 or BSU07830 or BSU05480 or
BSU19550 )</p>
      <p>GENE_LIST: BSU05660 BSU07830 BSU05480 BSU19550</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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    <speciesReference species="M_C00005_c"/>
    <speciesReference species="M_C00268_c"/>
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    <speciesReference species="M_C00272_c"/>
  </listOfProducts>
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    </math>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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  </kineticLaw>
</reaction>
<reaction id="R_R01804" name="N-acetylneuraminate synthase (EC 2.5.1.56)"
reversible="false">
  <notes>
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    <p>GENE_ASSOCIATION: BSU37870</p>
    <p>GENE_LIST: BSU37870</p>
    <p>SUBSYSTEM: Cell Wall and Capsule</p>
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      <p>GENE_LIST: </p>
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    </html>
  </notes>
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      <p>GENE_LIST: BSU09310</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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      <p>SUBSYSTEM: Carbohydrates</p>
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synthase I beta (EC 2.5.1.54)|Chorismate mutase I (EC 5.4.99.5)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU29750</p>
      <p>GENE_LIST: BSU29750</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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<reaction id="R_R01827" name="Transaldolase (EC 2.2.1.2)">
  <notes>
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      <p>GENE_LIST: BSU37110</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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    <speciesReference species="M_C05382_c"/>
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</reaction>
<reaction id="R_R01829" name="Fructose-bisphosphate aldolase class II (EC 4.1.2.13)">
  <notes>
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      <p>GENE_LIST: BSU37120</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  <notes>
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</reaction>
<reaction id="R_R01843" name="6-phosphofructokinase (EC 2.7.1.11)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU29190</p>
      <p>GENE_LIST: BSU29190</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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3.1.5.1)">
  <notes>
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      <p>GENE_LIST: BSU37600 BSU05780</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  </notes>
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    <speciesReference species="M_C00286_c"/>
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    <speciesReference species="M_C00330_c"/>
    <speciesReference species="M_C00536_c"/>
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reversible="false">
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      <p>GENE_LIST: BSU22730</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
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    <speciesReference species="M_C00361_c"/>
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    </math>
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  </kineticLaw>
</reaction>
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6.4.1.2)|Acetyl-coenzyme A carboxyl transferase beta chain (EC 6.4.1.2)|Propionyl-CoA
carboxylase beta chain (EC 6.4.1.3)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU23920</p>
      <p>GENE_LIST: BSU23920</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  </notes>
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    <speciesReference species="M_C00100_c"/>
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<reaction id="R_R01863" name="Purine nucleoside phosphorylase (EC 2.4.2.1)">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU23490 or BSU19630 )</p>
      <p>GENE_LIST: BSU23490 BSU19630</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  </notes>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00294_c"/>
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    <speciesReference species="M_C00620_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>

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<reaction id="R_R01867" name="Dihydroorotate dehydrogenase, catalytic subunit (EC
1.3.3.1);Dihydroorotate dehydrogenase electron transfer subunit (EC 1.3.3.1)(BSU15530)"
reversible="false">
    <notes>
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            <p>GENE_LIST: BSU15530 BSU15540</p>
            <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
        </html>
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        <speciesReference species="M_C00337_c"/>
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        <speciesReference species="M_C00295_c"/>
    </listOfProducts>
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        </math>
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</kineticLaw>
</reaction>
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reversible="false">
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            <p>GENE_ASSOCIATION: BSU15560</p>
            <p>GENE_LIST: BSU15560</p>
            <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  </kineticLaw>
</reaction>
<reaction id="R_R01876" name="Pyrimidine-nucleoside phosphorylase (EC 2.4.2.2)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU39400</p>
      <p>GENE_LIST: BSU39400</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
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    <speciesReference species="M_C00299_c"/>
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  </listOfProducts>
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    </math>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>

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</reaction>
<reaction id="R_R01877" name="5'-nucleotidase yjiG (EC 3.1.3.5);2',3'-cyclic-nucleotide
2'-phosphodiesterase (EC 3.1.4.16)|5'-nucleotidase (EC 3.1.3.5)(BSU07840)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU07840 or BSU07330 )</p>
      <p>GENE_LIST: BSU07840 BSU07330</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
  <listOfReactants>
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      <p>GENE_LIST: BSU25300</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  </listOfReactants>
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    <speciesReference species="M_C00014_c"/>
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  </kineticLaw>
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  <notes>
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      <p>GENE_LIST: BSU27330</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00286_c"/>
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    </math>
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  <notes>
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</listOfProducts>
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  <notes>
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      <p>GENE_ASSOCIATION: BSU29130</p>
      <p>GENE_LIST: BSU29130</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00311_c"/>
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    <speciesReference species="M_C05379_c"/>
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    <listOfParameters>
      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>

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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
</reaction>
<reaction id="R_R01900" name="2-methylisocitrate dehydratase (EC 4.2.1.99)|Aconitate
hydratase (EC 4.2.1.3)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU18000</p>
      <p>GENE_LIST: BSU18000</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
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  <listOfReactants>
    <speciesReference species="M_C00311_c"/>
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    <speciesReference species="M_C00417_c"/>
  </listOfProducts>
  <kineticLaw>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R01902" name="Rhamnulokinase (EC 2.7.1.5)" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU31200</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R01920" name="Spermidine synthase (EC 2.5.1.16)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU37500</p>
      <p>GENE_LIST: BSU37500</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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    <speciesReference species="M_C00315_c"/>
    <speciesReference species="M_C00170_c"/>
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<reaction id="R_R01954" name="Argininosuccinate synthase (EC 6.3.4.5)"

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reversible="false">
  <notes>
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      <p>GENE_LIST: BSU29450</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </notes>
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    <speciesReference species="M_C00049_c"/>
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    <speciesReference species="M_C00020_c"/>
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    </listOfParameters>
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</reaction>
<reaction id="R_R01967" name="Deoxyadenosine kinase (EC 2.7.1.76)|Deoxyguanosine
kinase (EC 2.7.1.113)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU00140 or BSU00150 )</p>
      <p>GENE_LIST: BSU00140 BSU00150</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  </notes>
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    <speciesReference species="M_C00362_c"/>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R01968" name="5'-nucleotidase yjjG (EC 3.1.3.5);2',3'-cyclic-nucleotide
2'-phosphodiesterase (EC 3.1.4.16)|5'-nucleotidase (EC 3.1.3.5)(BSU07840)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU07840 or BSU07330 )</p>
      <p>GENE_LIST: BSU07840 BSU07330</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
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    <speciesReference species="M_C00362_c"/>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00330_c"/>
  </listOfProducts>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R01969" name="Purine nucleoside phosphorylase (EC 2.4.2.1)">
  <notes>

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<html xmlns="http://www.w3.org/1999/xhtml">
  <p>GENE_ASSOCIATION: ( BSU23490 or BSU19630 )</p>
  <p>GENE_LIST: BSU23490 BSU19630</p>
  <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C00330_c"/>
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  <speciesReference species="M_C00672_c"/>
  <speciesReference species="M_C00242_c"/>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R01975" name="3-hydroxyacyl-CoA dehydrogenase (EC
1.1.1.35)|Enoyl-CoA hydratase [isoleucine degradation] (EC 4.2.1.17)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU32840</p>
      <p>GENE_LIST: BSU32840</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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    <speciesReference species="M_C00003_c"/>
    <speciesReference species="M_C01144_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C00332_c"/>
  </listOfProducts>

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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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</kineticLaw>
</reaction>
<reaction id="R_R01976" name="3-hydroxyacyl-CoA dehydrogenase (EC
1.1.1.35)|3-hydroxybutyryl-CoA dehydrogenase (EC 1.1.1.157)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU24160</p>
      <p>GENE_LIST: BSU24160</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00006_c"/>
    <speciesReference species="M_C01144_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00005_c"/>
    <speciesReference species="M_C00332_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R01978" name="Hydroxymethylglutaryl-CoA synthase (EC 2.3.3.10)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">

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    <p>GENE_ASSOCIATION: BSU17150</p>
    <p>GENE_LIST: BSU17150</p>
    <p>SUBSYSTEM: Fatty Acids and Lipids</p>
  </html>
</notes>
<listOfReactants>
  <speciesReference species="M_C00332_c"/>
  <speciesReference species="M_C00024_c"/>
  <speciesReference species="M_C00001_c"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C00010_c"/>
  <speciesReference species="M_C00356_c"/>
</listOfProducts>
<kineticLaw>
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  </math>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R01983" name="Uronate isomerase (EC 5.3.1.12)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU12300</p>
      <p>GENE_LIST: BSU12300</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00333_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00558_c"/>
  </listOfProducts>
  <kineticLaw>
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      <ci> FLUX_VALUE </ci>
    </math>

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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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  </kineticLaw>
</reaction>
<reaction id="R_R01993" name="Dihydroorotase (EC 3.5.2.3)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU15500</p>
      <p>GENE_LIST: BSU15500</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00337_c"/>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00438_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R02003" name="Geranyltranstransferase (farnesylidiphosphate synthase) (EC
2.5.1.10)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU24280</p>
      <p>GENE_LIST: BSU24280</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  </notes>
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    <speciesReference species="M_C00129_c"/>
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    <speciesReference species="M_C00013_c"/>
    <speciesReference species="M_C00448_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R02016" name="Thioredoxin reductase (EC 1.8.1.9);thioredoxin reductase
(NADPH)(BSU03270)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( ( BSU34790 and BSU32110 ) or ( BSU03270 and
BSU32110 ) )</p>
      <p>GENE_LIST: BSU34790 BSU32110 BSU03270 BSU32110</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00005_c"/>
    <speciesReference species="M_C00343_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00006_c"/>
    <speciesReference species="M_C00342_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</reaction>
<reaction id="R_R02017" name="Ribonucleotide reductase of class Ib (aerobic), alpha
subunit (EC 1.17.4.1);Ribonucleotide reductase of class Ib (aerobic), beta subunit (EC
1.17.4.1)(BSU17390);SPBc2 prophage-derived ribonucleoside-diphosphate reductase subunit beta
(EC 1.17.4.1) (Ribonucleotide reductase small subunit)(BSU20040);Ribonucleoside-diphosphate
reductase nrdEB subunit alpha (EC 1.17.4.1) (Ribonucleotide reductase large subunit) [Cleaved
into: Bsu nrdEB intein](BSU20060);Ribonucleotide reduction protein NrdI(BSU17370)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( ( BSU17380 and BSU17390 and BSU17370 ) or
( BSU17380 and BSU17390 and BSU20040 and BSU20060 and BSU17370 ) )</p>
      <p>GENE_LIST: BSU17380 BSU17390 BSU17370 BSU17380 BSU17390 BSU20040
BSU20060 BSU17370</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  </notes>
  <listOfReactants>
    <speciesReference species="M_C00008_c"/>
    <speciesReference species="M_C00342_c"/>
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    <speciesReference species="M_C00343_c"/>
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  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R02018" name="Ribonucleotide reductase of class Ib (aerobic), alpha
subunit (EC 1.17.4.1);Ribonucleotide reductase of class Ib (aerobic), beta subunit (EC
1.17.4.1)(BSU17390);SPBc2 prophage-derived ribonucleoside-diphosphate reductase subunit beta
(EC 1.17.4.1) (Ribonucleotide reductase small subunit)(BSU20040);Ribonucleoside-diphosphate

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reductase nrdEB subunit alpha (EC 1.17.4.1) (Ribonucleotide reductase large subunit) [Cleaved into: Bsu nrdEB intein](BSU20060);Ribonucleotide reduction protein NrdI(BSU17370)" reversible="false">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml">

<p>GENE\_ASSOCIATION: ( ( BSU17380 and BSU17390 and BSU17370 ) or ( BSU17380 and BSU17390 and BSU20040 and BSU20060 and BSU17370 ) )</p>

<p>GENE\_LIST: BSU17380 BSU17390 BSU17370 BSU17380 BSU17390 BSU20040 BSU20060 BSU17370</p>

<p>SUBSYSTEM: Nucleosides and Nucleotides</p>

</html>

</notes>

<listOfReactants>

<speciesReference species="M\_C00015\_c"/>

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</listOfProducts>

<kineticLaw>

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</math>

<listOfParameters>

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<parameter id="UPPER\_BOUND" value="1000" units="mmol\_per\_gDW\_per\_hr"/>

<parameter id="OBJECTIVE\_COEFFICIENT" value="0"/>

</listOfParameters>

</kineticLaw>

</reaction>

<reaction id="R\_R02019" name="Ribonucleotide reductase of class Ib (aerobic), alpha subunit (EC 1.17.4.1);Ribonucleotide reductase of class Ib (aerobic), beta subunit (EC 1.17.4.1)(BSU17390);SPBc2 prophage-derived ribonucleoside-diphosphate reductase subunit beta (EC 1.17.4.1) (Ribonucleotide reductase small subunit)(BSU20040);Ribonucleoside-diphosphate reductase nrdEB subunit alpha (EC 1.17.4.1) (Ribonucleotide reductase large subunit) [Cleaved into: Bsu nrdEB intein](BSU20060);Ribonucleotide reduction protein NrdI(BSU17370)" reversible="false">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml">

<p>GENE\_ASSOCIATION: ( ( BSU17380 and BSU17390 and BSU17370 ) or ( BSU17380 and BSU17390 and BSU20040 and BSU20060 and BSU17370 ) )</p>

<p>GENE\_LIST: BSU17380 BSU17390 BSU17370 BSU17380 BSU17390 BSU20040

BSU20060 BSU17370</p>

<p>SUBSYSTEM: Nucleosides and Nucleotides</p>

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<speciesReference species="M\_C00361\_c"/>

</listOfProducts>

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</math>

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<parameter id="UPPER\_BOUND" value="1000" units="mmol\_per\_gDW\_per\_hr"/>

<parameter id="OBJECTIVE\_COEFFICIENT" value="0"/>

</listOfParameters>

</kineticLaw>

</reaction>

<reaction id="R\_R02021" name="Adenylyl-sulfate reductase [thioredoxin] (EC 1.8.4.10)|Phosphoadenylyl-sulfate reductase [thioredoxin] (EC 1.8.4.8)" reversible="false">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml">

<p>GENE\_ASSOCIATION: ( BSU15570 or BSU10930 )</p>

<p>GENE\_LIST: BSU15570 BSU10930</p>

<p>SUBSYSTEM: Amino Acids and Derivatives</p>

</html>

</notes>

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1.17.4.1)(BSU17390);SPBc2 prophage-derived ribonucleoside-diphosphate reductase subunit beta
(EC 1.17.4.1) (Ribonucleotide reductase small subunit)(BSU20040);Ribonucleoside-diphosphate
reductase nrdEB subunit alpha (EC 1.17.4.1) (Ribonucleotide reductase large subunit) [Cleaved
into: Bsu nrdEB intein](BSU20060);Ribonucleotide reduction protein NrdI(BSU17370)"
reversible="false">
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( BSU17380 and BSU17390 and BSU20040 and BSU20060 and BSU17370 ) )</p>
      <p>GENE_LIST: BSU17380 BSU17390 BSU17370 BSU17380 BSU17390 BSU20040
BSU20060 BSU17370</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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      <p>GENE_LIST: BSU13010</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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3.5.1.25)">
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      <p>GENE_LIST: BSU35010</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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<p>SUBSYSTEM: Nucleosides and Nucleotides</p>

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</listOfParameters>

</kineticLaw>

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<reaction id="R\_R02089" name="Deoxyadenosine kinase (EC 2.7.1.76)|Deoxyguanosine kinase (EC 2.7.1.113)" reversible="false">

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<p>SUBSYSTEM: Nucleosides and Nucleotides</p>

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    <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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      <p>GENE_LIST: BSU27330</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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    </math>
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      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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      <p>GENE_LIST: BSU17660 BSU20020</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  </notes>
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<reaction id="R_R02101" name="Thymidylate synthase (EC 2.1.1.45)" reversible="false">
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      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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1.17.1.4);Xanthine dehydrogenase, molybdenum binding subunit (EC
1.17.1.4)(BSU32480);Xanthine dehydrogenase, FAD binding subunit (EC
1.17.1.4)(BSU32490);Probable xanthine dehydrogenase subunit A (XDHase subunit A) (EC
1.17.1.4)(BSU32510);xanthine dehydrogenase molybdenum-binding subunit(BSU32500)">
  <notes>
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and BSU32500 )</p>
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      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  </notes>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00385_c"/>
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    <speciesReference species="M_C00366_c"/>
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  <notes>
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      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>

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      <p>GENE_LIST: BSU11650</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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2.4.2.8);Xanthine phosphoribosyltransferase (EC 2.4.2.-)(BSU22070)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU00680 or BSU22070 )</p>
      <p>GENE_LIST: BSU00680 BSU22070</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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2'-phosphodiesterase (EC 3.1.4.16)|5'-nucleotidase (EC 3.1.3.5)(BSU07840)" reversible="false">
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      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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    </math>
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    </listOfParameters>
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      <p>GENE_LIST: BSU39980</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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      <p>GENE_LIST: BSU24080</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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2.6.1.42)" reversible="false">
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      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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</reaction>
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      <p>GENE_LIST: BSU21810</p>
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  </kineticLaw>
</reaction>
<reaction id="R_R02237" name="Dihydrofolate synthase (EC 6.3.2.12)|Folylpolyglutamate
synthase (EC 6.3.2.17)" reversible="false">
  <notes>
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  </kineticLaw>
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1.2.1.22)|Predicted rhamnulose-1-phosphate aldolase (EC 4.1.2.19)">
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      <p>GENE_LIST: BSU31220</p>
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reversible="false">
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      <p>GENE_LIST: BSU02460</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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</kineticLaw>
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2.3.1.35)|N-acetylglutamate synthase (EC 2.3.1.1)">
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      <p>GENE_LIST: BSU11200</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </listOfProducts>
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      <p>GENE_LIST: BSU11220</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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    </math>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>

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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R02288" name="Imidazolonepropionase (EC 3.5.2.7)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU39370</p>
      <p>GENE_LIST: BSU39370</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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    <speciesReference species="M_C03680_c"/>
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    <speciesReference species="M_C00439_c"/>
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</reaction>
<reaction id="R_R02291" name="Aspartate-semialdehyde dehydrogenase (EC 1.2.1.11)"
reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU16750</p>
      <p>GENE_LIST: BSU16750</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </notes>
  <listOfReactants>
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  </listOfReactants>
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    <speciesReference species="M_C00009_c"/>

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    <speciesReference species="M_C00441_c"/>
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    </math>
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</reaction>
<reaction id="R_R02292" name="Dihydrodipicolinate synthase (EC 4.2.1.52)"
reversible="false">
  <notes>
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      <p>GENE_LIST: BSU16770</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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    <speciesReference species="M_C00441_c"/>
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  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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</reaction>
<reaction id="R_R02294" name="Purine nucleoside phosphorylase (EC 2.4.2.1)">

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<notes>
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    <p>GENE_ASSOCIATION: ( BSU23490 or BSU19630 )</p>
    <p>GENE_LIST: BSU23490 BSU19630</p>
    <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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</notes>
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  <speciesReference species="M_C03150_c"/>
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<listOfProducts>
  <speciesReference species="M_C00620_c"/>
  <speciesReference species="M_C00153_c"/>
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<kineticLaw>
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</kineticLaw>
</reaction>
<reaction id="R_R02295" name="Purine nucleoside phosphorylase (EC 2.4.2.1)">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU23490 or BSU19630 )</p>
      <p>GENE_LIST: BSU23490 BSU19630</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  <listOfProducts>
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    <speciesReference species="M_C00620_c"/>
  </listOfProducts>
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  </math>
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</kineticLaw>
</reaction>
<reaction id="R_R02296" name="Pyrimidine-nucleoside phosphorylase (EC 2.4.2.2)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU39400</p>
      <p>GENE_LIST: BSU39400</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00475_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00380_c"/>
  </listOfProducts>
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    </math>
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</reaction>
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      <p>GENE_LIST: BSU23490 BSU19630</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </notes>

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</notes>
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</kineticLaw>
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<reaction id="R_R02301" name="5-formyltetrahydrofolate cyclo-ligase (EC 6.3.3.2)"
reversible="false">
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      <p>GENE_LIST: BSU24890</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
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    <speciesReference species="M_C03479_c"/>
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  <listOfProducts>
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    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00445_c"/>
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    </math>
    <listOfParameters>

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<reaction id="R_R02317" name="" reversible="false">
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
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  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00450_c"/>
  </listOfProducts>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R02323" name="5'-nucleotidase yjjG (EC 3.1.3.5);2',3'-cyclic-nucleotide
2'-phosphodiesterase (EC 3.1.4.16)|5'-nucleotidase (EC 3.1.3.5)(BSU07840)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU07840 or BSU07330 )</p>
      <p>GENE_LIST: BSU07840 BSU07330</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
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    <speciesReference species="M_C00455_c"/>
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    <speciesReference species="M_C03150_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R02326" name="Nucleoside diphosphate kinase (EC 2.7.4.6)"
reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU22730</p>
      <p>GENE_LIST: BSU22730</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
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    <speciesReference species="M_C00705_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00008_c"/>
    <speciesReference species="M_C00458_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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</kineticLaw>
</reaction>
<reaction id="R_R02327" name="Uridine kinase (EC 2.7.1.48) [C1]" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU27330</p>
      <p>GENE_LIST: BSU27330</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00299_c"/>
    <speciesReference species="M_C00458_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00105_c"/>
    <speciesReference species="M_C00705_c"/>
  </listOfProducts>
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    </math>
  </kineticLaw>
  <listOfParameters>
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</reaction>
<reaction id="R_R02328" name="Glucose-1-phosphate thymidyltransferase (EC 2.7.7.24)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU37840</p>
      <p>GENE_LIST: BSU37840</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
    </html>
  </notes>
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    <speciesReference species="M_C00459_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00013_c"/>
    <speciesReference species="M_C00842_c"/>
  </listOfProducts>

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</listOfProducts>
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  </math>
  <listOfParameters>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
</reaction>
<reaction id="R_R02331" name="Nucleoside diphosphate kinase (EC 2.7.4.6)"
reversible="false">
  <notes>
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      <p>GENE_LIST: BSU22730</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C01346_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00008_c"/>
    <speciesReference species="M_C00460_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R02332" name="Uridine kinase (EC 2.7.1.48) [C1]" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU27330</p>

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<p>GENE\_LIST: BSU27330</p>  
 <p>SUBSYSTEM: Nucleosides and Nucleotides</p>  
 </html>  
 </notes>  
 <listOfReactants>  
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 <speciesReference species="M\_C00460\_c"/>  
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 <listOfProducts>  
 <speciesReference species="M\_C00105\_c"/>  
 <speciesReference species="M\_C01346\_c"/>  
 </listOfProducts>  
 <kineticLaw>  
 <math xmlns="http://www.w3.org/1998/Math/MathML">  
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 </math>  
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 <parameter id="OBJECTIVE\_COEFFICIENT" value="0"/>  
 </listOfParameters>  
 </kineticLaw>  
 </reaction>  
 <reaction id="R\_R02340" name="Tryptophan synthase alpha chain (EC 4.2.1.20);Tryptophan synthase beta chain (EC 4.2.1.20)(BSU22640)">  
 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml">  
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 <p>GENE\_LIST: BSU22630 BSU22640</p>  
 <p>SUBSYSTEM: Amino Acids and Derivatives</p>  
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 </notes>  
 <listOfReactants>  
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 </listOfReactants>  
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 <speciesReference species="M\_C00118\_c"/>  
 <speciesReference species="M\_C00463\_c"/>  
 </listOfProducts>  
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 <listOfParameters>

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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R02370" name="5'-nucleotidase yjiG (EC 3.1.3.5);2',3'-cyclic-nucleotide
2'-phosphodiesterase (EC 3.1.4.16)|5'-nucleotidase (EC 3.1.3.5)(BSU07840)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU07840 or BSU07330 )</p>
      <p>GENE_LIST: BSU07840 BSU07330</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C05822_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00475_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R02371" name="Uridine kinase (EC 2.7.1.48) [C1]" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU27330</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
  <listOfReactants>

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  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R02372" name="Uridine kinase (EC 2.7.1.48) [C1]" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU27330</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
  <listOfReactants>
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  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C01346_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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</reaction>
<reaction id="R_R02410" name="Sucrose-6-phosphate hydrolase (EC 3.2.1.26)">
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      <p>GENE_LIST: BSU38040</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </notes>
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    <speciesReference species="M_C00492_c"/>
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    <speciesReference species="M_C05402_c"/>
  </listOfProducts>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R02412" name="Shikimate kinase I (EC 2.7.1.71)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU03150</p>
      <p>GENE_LIST: BSU03150</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00002_c"/>
    <speciesReference species="M_C00493_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00008_c"/>
    <speciesReference species="M_C03175_c"/>
  </listOfProducts>

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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R02413" name="Shikimate 5-dehydrogenase I alpha (EC 1.1.1.25)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU25660</p>
      <p>GENE_LIST: BSU25660</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00006_c"/>
    <speciesReference species="M_C00493_c"/>
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  <listOfProducts>
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    <speciesReference species="M_C00005_c"/>
    <speciesReference species="M_C02637_c"/>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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  </kineticLaw>
</reaction>
<reaction id="R_R02423" name="Allantoate amidohydrolase (EC 3.5.3.9)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU32530</p>

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    <p>GENE_LIST: BSU32530</p>
    <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
  </html>
</notes>
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  <speciesReference species="M_C00080_c" stoichiometry="2"/>
  <speciesReference species="M_C00001_c"/>
  <speciesReference species="M_C00499_c"/>
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  <speciesReference species="M_C00014_c"/>
  <speciesReference species="M_C02091_c"/>
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  </math>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R02425" name="Allantoinase (EC 3.5.2.5)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU32410</p>
      <p>GENE_LIST: BSU32410</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C02350_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00499_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>

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</math>
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</kineticLaw>
</reaction>
<reaction id="R_R02426" name="Similar to CDP-glucose 4,6-dehydratase (EC 4.2.1.45)"
reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU07280</p>
      <p>GENE_LIST: BSU07280</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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  </listOfReactants>
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    <speciesReference species="M_C01219_c"/>
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    </math>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R02437" name="L-rhamnose isomerase (EC 5.3.1.14)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU31180</p>
      <p>GENE_LIST: BSU31180</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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    <speciesReference species="M_C00507_c"/>
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    </math>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R02439" name="Ribulokinase (EC 2.7.1.16)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU28790</p>
      <p>GENE_LIST: BSU28790</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00508_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00008_c"/>
    <speciesReference species="M_C01101_c"/>
  </listOfProducts>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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  </kineticLaw>
</reaction>
<reaction id="R_R02454" name="D-mannonate oxidoreductase (EC 1.1.1.57)">

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    <p>GENE_ASSOCIATION: BSU12350</p>
    <p>GENE_LIST: BSU12350</p>
    <p>SUBSYSTEM: Carbohydrates</p>
  </html>
</notes>
<listOfReactants>
  <speciesReference species="M_C00003_c"/>
  <speciesReference species="M_C00514_c"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C00004_c"/>
  <speciesReference species="M_C00905_c"/>
</listOfProducts>
<kineticLaw>
  <math xmlns="http://www.w3.org/1998/Math/MathML">
    <ci> FLUX_VALUE </ci>
  </math>
  <listOfParameters>
    <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
</reaction>
<reaction id="R_R02472" name="2-dehydropantoate 2-reductase (EC 1.1.1.169)">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU15110 or BSU14440 )</p>
      <p>GENE_LIST: BSU15110 BSU14440</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00006_c"/>
    <speciesReference species="M_C00522_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00005_c"/>
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<kineticLaw>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
</reaction>
<reaction id="R_R02473" name="Pantoate--beta-alanine ligase (EC 6.3.2.1)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU22420</p>
      <p>GENE_LIST: BSU22420</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00099_c"/>
    <speciesReference species="M_C00522_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00013_c"/>
    <speciesReference species="M_C00020_c"/>
    <speciesReference species="M_C00864_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R02484" name="Purine nucleoside phosphorylase (EC 2.4.2.1)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">

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    <p>GENE_ASSOCIATION: ( BSU23490 or BSU19630 )</p>
    <p>GENE_LIST: BSU23490 BSU19630</p>
    <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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</notes>
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  <speciesReference species="M_C00009_c"/>
  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C00526_c"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00672_c"/>
  <speciesReference species="M_C00106_c"/>
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<kineticLaw>
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  <listOfParameters>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R02485" name="Cytidine deaminase (EC 3.5.4.5)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU25300</p>
      <p>GENE_LIST: BSU25300</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00881_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00014_c"/>
    <speciesReference species="M_C00526_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">

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    <ci> FLUX_VALUE </ci>
  </math>
  <listOfParameters>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R02504" name="">
  <notes>
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      <p>GENE_ASSOCIATION: </p>
      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C02466_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00536_c"/>
  </listOfProducts>
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    </math>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R02513" name="NG,NG-dimethylarginine dimethylaminohydrolase 1 (EC
3.5.3.18)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU13020</p>
      <p>GENE_LIST: BSU13020</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>

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</notes>
<listOfReactants>
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  <speciesReference species="M_C03626_c"/>
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  <speciesReference species="M_C00327_c"/>
  <speciesReference species="M_C00543_c"/>
</listOfProducts>
<kineticLaw>
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  </math>
  <listOfParameters>
    <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R02530" name="Possible glyoxylase family protein (Lactoylglutathione
lyase) (EC 4.4.1.5);Glyoxalase family protein(BSU07160);Lactoylglutathione lyase and related
lyases(BSU23930);Lactoylglutathione lyase and related lyases(BSU26940);Lactoylglutathione
lyase and related lyases(BSU32660);Lactoylglutathione lyase and related lyases(BSU38370)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU07160 or BSU38370 or BSU40860 or BSU23930 or
BSU26940 or BSU32660 )</p>
      <p>GENE_LIST:   BSU07160   BSU38370   BSU40860   BSU23930   BSU26940
BSU32660</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C03451_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00051_c"/>
    <speciesReference species="M_C00546_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>

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<listOfParameters>
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</listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R02540" name="Aliphatic amidase amiE (EC 3.5.1.4)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU13570</p>
      <p>GENE_LIST: BSU13570</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C02505_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00014_c"/>
    <speciesReference species="M_C07086_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R02545" name="D-malic enzyme (EC 1.1.1.83)|Tartrate decarboxylase (EC
4.1.1.73)|Tartrate dehydrogenase (EC 1.1.1.93)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU04000</p>
      <p>GENE_LIST: BSU04000</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>

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  <speciesReference species="M_C00552_c"/>
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  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C00004_c"/>
  <speciesReference species="M_C03459_c"/>
</listOfProducts>
<kineticLaw>
  <math xmlns="http://www.w3.org/1998/Math/MathML">
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  </math>
  <listOfParameters>
    <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R02549" name="Aldehyde dehydrogenase (EC 1.2.1.3)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU07350 or BSU37960 or BSU39860 or BSU38830 or
BSU19310 )</p>
      <p>GENE_LIST: BSU07350 BSU37960 BSU39860 BSU38830 BSU19310</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00003_c"/>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00555_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c" stoichiometry="2"/>
    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C00334_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>
    <listOfParameters>

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    <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R02555" name="Altronate oxidoreductase (EC 1.1.1.58)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU12380</p>
      <p>GENE_LIST: BSU12380</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00003_c"/>
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  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C00558_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R02557" name="Purine nucleoside phosphorylase (EC 2.4.2.1)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU23490 or BSU19630 )</p>
      <p>GENE_LIST: BSU23490 BSU19630</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
  <listOfReactants>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R02565" name="Betaine aldehyde dehydrogenase (EC 1.2.1.8)">
  <notes>
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      <p>GENE_LIST: BSU31060</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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    </listOfParameters>
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      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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</reaction>
<reaction id="R_R02568" name="Fructose-bisphosphate aldolase class II (EC 4.1.2.13)">
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      <p>GENE_LIST: BSU37120</p>
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<reaction id="R_R02569" name="Dihydrolipoamide acetyltransferase component of pyruvate
dehydrogenase complex (EC 2.3.1.12)">
  <notes>
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      <p>GENE_LIST: BSU14600</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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2-oxoglutarate dehydrogenase complex (EC 2.3.1.61)">

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<notes>
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    <p>SUBSYSTEM: Carbohydrates</p>
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  <speciesReference species="M_C16254_c"/>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C05332_c"/>
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  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
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      <p>GENE_LIST: BSU12010</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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    <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C00624_c"/>
</listOfReactants>
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  <speciesReference species="M_C00008_c"/>
  <speciesReference species="M_C04133_c"/>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
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<reaction id="R_R02662" name="Dihydrolipoamide acyltransferase component of
branched-chain alpha-keto acid dehydrogenase complex (EC 2.3.1.168)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU24030</p>
      <p>GENE_LIST: BSU24030</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
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  <listOfProducts>
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reversible="false">
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      <p>GENE_ASSOCIATION: BSU18620</p>
      <p>GENE_LIST: BSU18620</p>
      <p>SUBSYSTEM: Metabolism of Aromatic Compounds</p>
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    <speciesReference species="M_C00007_c"/>
    <speciesReference species="M_C00642_c"/>
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    <speciesReference species="M_C01161_c"/>
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  </kineticLaw>
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<reaction id="R_R02703" name="Mannitol-1-phosphate 5-dehydrogenase (EC 1.1.1.17)">
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  <p>SUBSYSTEM: Carbohydrates</p>
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  <speciesReference species="M_C00644_c"/>
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  <speciesReference species="M_C00004_c"/>
  <speciesReference species="M_C05345_c"/>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
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<reaction id="R_R02719" name="5'-nucleotidase yjiG (EC 3.1.3.5);2',3'-cyclic-nucleotide
2'-phosphodiesterase (EC 3.1.4.16)|5'-nucleotidase (EC 3.1.3.5)(BSU07840)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU07840 or BSU07330 )</p>
      <p>GENE_LIST: BSU07840 BSU07330</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  </notes>
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  </listOfParameters>
</kineticLaw>
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<reaction id="R_R02722" name="Tryptophan synthase alpha chain (EC 4.2.1.20);Tryptophan
synthase beta chain (EC 4.2.1.20)(BSU22640)">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU22630 and BSU22640 )</p>
      <p>GENE_LIST: BSU22630 BSU22640</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </notes>
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    <speciesReference species="M_C03506_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00078_c"/>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R02727" name="Maltose phosphorylase (EC 2.4.1.8)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU34570</p>

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 <p>SUBSYSTEM: Carbohydrates</p>  
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 <speciesReference species="M\_C01083\_c"/>  
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 <speciesReference species="M\_C00663\_c"/>  
 </listOfProducts>  
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 </kineticLaw>  
 </reaction>  
 <reaction id="R\_R02728" name="Beta-phosphoglucosucrose (EC 5.4.2.6)">  
 <notes>  
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 <p>GENE\_ASSOCIATION: BSU34550</p>  
 <p>GENE\_LIST: BSU34550</p>  
 <p>SUBSYSTEM: Carbohydrates</p>  
 </html>  
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 <speciesReference species="M\_C00663\_c"/>  
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 <speciesReference species="M\_C01172\_c"/>  
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 <parameter id="LOWER\_BOUND" value="-1000" units="mmol\_per\_gDW\_per\_hr"/>



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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
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<reaction id="R_R02733" name="N-acetyl-L,L-diaminopimelate deacetylase (EC 3.5.1.47)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU14190</p>
      <p>GENE_LIST: BSU14190</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </notes>
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  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00666_c"/>
  </listOfProducts>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction
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      name="succinyl-diaminopimelate
desuccinylase;N-acetyl-L,L-diaminopimelate
deacetylase
homolog
(EC
3.5.1.18)(BSU29290);N-acetyl-L,L-diaminopimelate
deacetylase
homolog
(EC
3.5.1.18)(BSU39470)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU29980 or BSU29290 or BSU39470 )</p>
      <p>GENE_LIST: BSU29980 BSU29290 BSU39470</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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  <kineticLaw>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R02735" name="Diaminopimelate epimerase (EC 5.1.1.7)">
  <notes>
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      <p>GENE_LIST: BSU32170</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
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  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00680_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
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<reaction id="R_R02736" name="Glucose-6-phosphate 1-dehydrogenase (EC 1.1.1.49)">

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<notes>
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    <p>GENE_LIST: BSU23850</p>
    <p>SUBSYSTEM: Carbohydrates</p>
  </html>
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  <speciesReference species="M_C00080_c"/>
</listOfProducts>
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  <math xmlns="http://www.w3.org/1998/Math/MathML">
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      <p>GENE_LIST: BSU31350</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
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  </listOfProducts>
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</math>
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</kineticLaw>
</reaction>
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      <p>GENE_LIST: BSU31350</p>
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    </html>
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</reaction>
<reaction id="R_R02748" name="Purine nucleoside phosphorylase (EC 2.4.2.1)">
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      <p>GENE_ASSOCIATION: ( BSU23490 or BSU19630 )</p>
      <p>GENE_LIST: BSU23490 BSU19630</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
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      <p>GENE_LIST: BSU23500</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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<reaction id="R_R02750" name="Ribokinase (EC 2.7.1.15)" reversible="false">
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  <speciesReference species="M_C00008_c"/>
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</listOfProducts>
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  </math>
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</kineticLaw>
</reaction>
<reaction id="R_R02752" name="Glucarate dehydratase (EC 4.2.1.40)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU02490</p>
      <p>GENE_LIST: BSU02490</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
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    <speciesReference species="M_C00679_c"/>
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</reaction>
<reaction id="R_R02777" name="dTDP-4-dehydrorhamnose reductase">
  <notes>
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      <p>GENE_LIST: BSU37820</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
    </html>
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    <speciesReference species="M_C00006_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00688_c"/>
    <speciesReference species="M_C00005_c"/>
    <speciesReference species="M_C00080_c"/>
  </listOfProducts>
  <kineticLaw>
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</reaction>
<reaction id="R_R02782" name="Inosose dehydratase (EC 4.2.1.44)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU39720</p>
      <p>GENE_LIST: BSU39720</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </notes>
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    <speciesReference species="M_C00691_c"/>
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<reaction id="R_R02783" name="UDP-N-acetylmuramoylalanine--D-glutamate ligase (EC
6.3.2.9)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU15200</p>
      <p>GENE_LIST: BSU15200</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
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    <speciesReference species="M_C00217_c"/>
    <speciesReference species="M_C01212_c"/>
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    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00692_c"/>
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  <kineticLaw>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>

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        <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</reaction>
<reaction id="R_R02788"
name="UDP-N-acetylmuramoylalanyl-D-glutamate--2,6-diaminopimelate ligase (EC 6.3.2.13)"
reversible="false">
    <notes>
        <html xmlns="http://www.w3.org/1999/xhtml">
            <p>GENE_ASSOCIATION: BSU15180</p>
            <p>GENE_LIST: BSU15180</p>
            <p>SUBSYSTEM: Cell Wall and Capsule</p>
        </html>
    </notes>
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        <speciesReference species="M_C00680_c"/>
        <speciesReference species="M_C00692_c"/>
    </listOfReactants>
    <listOfProducts>
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        <speciesReference species="M_C00009_c"/>
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    </kineticLaw>
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        <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
        <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R02853" name="Phosphoserine phosphatase rsbX (EC 3.1.3.3)"
reversible="false">
    <notes>
        <html xmlns="http://www.w3.org/1999/xhtml">
            <p>GENE_ASSOCIATION: BSU04740</p>
            <p>GENE_LIST: BSU04740</p>
            <p>SUBSYSTEM: Amino Acids and Derivatives</p>
        </html>
    </notes>

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  <speciesReference species="M_C00740_c"/>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R02864" name="Sirohydrochlorin ferrochelatase (EC 4.99.1.4)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU15620</p>
      <p>GENE_LIST: BSU15620</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00748_c"/>
  </listOfReactants>
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    <speciesReference species="M_C05778_c"/>
    <speciesReference species="M_C14818_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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    </listOfParameters>
  </kineticLaw>
</reaction>

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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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<reaction id="R_R02869" name="Spermidine synthase (EC 2.5.1.16)">
  <notes>
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      <p>GENE_LIST: BSU37500</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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    <speciesReference species="M_C01137_c"/>
  </listOfReactants>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00170_c"/>
    <speciesReference species="M_C00750_c"/>
  </listOfProducts>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R02914" name="Urocanate hydratase (EC 4.2.1.49)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU39360</p>
      <p>GENE_LIST: BSU39360</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
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    <speciesReference species="M_C00001_c"/>
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    </math>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R02918" name="Tyrosyl-tRNA synthetase (EC 6.1.1.1);tyrosyl-tRNA
synthetase(BSU38460)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU29670 or BSU38460 )</p>
      <p>GENE_LIST: BSU29670 BSU38460</p>
      <p>SUBSYSTEM: Aminoacyl-tRNA biosynthesis</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00082_c"/>
    <speciesReference species="M_C00787_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00020_c"/>
    <speciesReference species="M_C00013_c"/>
    <speciesReference species="M_C02839_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>

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<reaction id="R\_R02946" name="2,3-butanediol dehydrogenase, R-alcohol forming, (R)- and (S)-acetoin-specific (EC 1.1.1.4)">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml">

<p>GENE\_ASSOCIATION: BSU06240</p>

<p>GENE\_LIST: BSU06240</p>

<p>SUBSYSTEM: Carbohydrates</p>

</html>

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<speciesReference species="M\_C00080\_c"/>

<speciesReference species="M\_C00004\_c"/>

<speciesReference species="M\_C00810\_c"/>

</listOfProducts>

<kineticLaw>

<math xmlns="http://www.w3.org/1998/Math/MathML">

<ci> FLUX\_VALUE </ci>

</math>

<listOfParameters>

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<parameter id="UPPER\_BOUND" value="1000" units="mmol\_per\_gDW\_per\_hr"/>

<parameter id="OBJECTIVE\_COEFFICIENT" value="0"/>

</listOfParameters>

</kineticLaw>

</reaction>

<reaction id="R\_R02947" name="Alpha-acetolactate decarboxylase (EC 4.1.1.5)" reversible="false">

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<html xmlns="http://www.w3.org/1999/xhtml">

<p>GENE\_ASSOCIATION: BSU36000</p>

<p>GENE\_LIST: BSU36000</p>

<p>SUBSYSTEM: Carbohydrates</p>

</html>

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<speciesReference species="M\_C00011\_c"/>

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    <speciesReference species="M_C00810_c"/>
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    </math>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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</reaction>
<reaction id="R_R02949" name="">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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  <listOfProducts>
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  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R03005" name="Nicotinate-nucleotide adenylyltransferase (EC 2.7.7.18)"
reversible="false">
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      <p>GENE_LIST: BSU25640</p>

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    <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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<listOfProducts>
  <speciesReference species="M_C00013_c"/>
  <speciesReference species="M_C00857_c"/>
</listOfProducts>
<kineticLaw>
  <math xmlns="http://www.w3.org/1998/Math/MathML">
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  </math>
  <listOfParameters>
    <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R03012" name="Histidinol dehydrogenase (EC 1.1.1.23)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU34910</p>
      <p>GENE_LIST: BSU34910</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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</kineticLaw>
</reaction>
<reaction id="R_R03013" name="Histidinol-phosphatase (EC 3.1.3.15)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU29620</p>
      <p>GENE_LIST: BSU29620</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C01100_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00080_c"/>
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  </kineticLaw>
</reaction>
<reaction id="R_R03014" name="Rhamnulokinase (EC 2.7.1.5)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU31200</p>
      <p>GENE_LIST: BSU31200</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00002_c"/>

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    <speciesReference species="M_C00861_c"/>
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    <speciesReference species="M_C01131_c"/>
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  <kineticLaw>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R03018" name="Pantothenate kinase type III, CoaX-like (EC
2.7.1.33);Pantothenate kinase (EC 2.7.1.33)(BSU23760)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU23760 or BSU00700 )</p>
      <p>GENE_LIST: BSU23760 BSU00700</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  </notes>
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</reaction>
<reaction id="R_R03024" name="Alkaline phosphatase (EC 3.1.3.1)" reversible="false">
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      <p>GENE_LIST: BSU05740</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
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    <speciesReference species="M_C03360_c"/>
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    <speciesReference species="M_C00870_c"/>
  </listOfProducts>
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  </listOfParameters>
</reaction>
<reaction id="R_R03026" name="Enoyl-CoA hydratase (EC 4.2.1.17);enoyl-CoA
hydratase(BSU17160);enoyl-CoA hydratase(BSU09880)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU28540 or BSU17160 or BSU09880 or
BSU17170 )</p>
      <p>GENE_LIST: BSU28540 BSU17160 BSU09880 BSU17170</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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    <speciesReference species="M_C00877_c"/>
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reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU15020</p>
      <p>GENE_LIST: BSU15020</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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    <speciesReference species="M_C01134_c"/>
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    <speciesReference species="M_C00882_c"/>
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</reaction>
<reaction id="R_R03037" name="Isochorismatase (EC 3.3.2.1) of siderophore
biosynthesis;Isochorismatase (EC 3.3.2.1)(BSU05070)" reversible="false">
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<html xmlns="http://www.w3.org/1999/xhtml">
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  <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  <speciesReference species="M_C04171_c"/>
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  </listOfParameters>
</kineticLaw>
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<reaction id="R_R03038" name="Alanyl-tRNA synthetase (EC 6.1.1.7)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU27410</p>
      <p>GENE_LIST: BSU27410</p>
      <p>SUBSYSTEM: Aminoacyl-tRNA biosynthesis</p>
    </html>
  </notes>
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</listOfParameters>
</kineticLaw>
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<reaction id="R_R03050" name="Acetolactate synthase small subunit (EC
2.2.1.6);Acetolactate synthase large subunit (EC 2.2.1.6)(BSU28310);Acetolactate synthase,
catabolic (EC 2.2.1.6)(BSU36010)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( ( BSU28300 and BSU28310 ) or BSU36010 )</p>
      <p>GENE_LIST: BSU28300 BSU28310 BSU36010</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
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    <speciesReference species="M_C00900_c"/>
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  <listOfProducts>
    <speciesReference species="M_C05125_c"/>
    <speciesReference species="M_C00022_c"/>
  </listOfProducts>
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</reaction>
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reversible="false">
  <notes>
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    <p>GENE_LIST: BSU28290</p>
    <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  <speciesReference species="M_C00005_c"/>
  <speciesReference species="M_C00900_c"/>
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  <speciesReference species="M_C00006_c"/>
  <speciesReference species="M_C04039_c"/>
</listOfProducts>
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</kineticLaw>
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  <notes>
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      <p>GENE_LIST: BSU03180</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  </notes>
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    <speciesReference species="M_C00916_c"/>
  </listOfReactants>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00033_c"/>
    <speciesReference species="M_C03112_c"/>
  </listOfProducts>
  <kineticLaw>
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</kineticLaw>
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  <notes>
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      <p>GENE_LIST: BSU00770</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C01300_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00921_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
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reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU00770</p>
      <p>GENE_LIST: BSU00770</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>

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  <speciesReference species="M_C04807_c"/>
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  <speciesReference species="M_C00921_c"/>
</listOfProducts>
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  </math>
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</kineticLaw>
</reaction>
<reaction id="R_R03083" name="3-dehydroquinate synthase (EC 4.2.3.4)"
reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU22700</p>
      <p>GENE_LIST: BSU22700</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </notes>
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  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00944_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>

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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R03084" name="3-dehydroquinate dehydratase I (EC
4.2.1.10);3-dehydroquinate dehydratase II (EC 4.2.1.10)(BSU24470)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU23080 or BSU24470 )</p>
      <p>GENE_LIST: BSU23080 BSU24470</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
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  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C02637_c"/>
  </listOfProducts>
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    </math>
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  </kineticLaw>
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<reaction id="R_R03096" name="Aliphatic amidase amiE (EC 3.5.1.4)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU13570</p>
      <p>GENE_LIST: BSU13570</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
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  </listOfReactants>
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    <speciesReference species="M_C00954_c"/>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R03165" name="Uroporphyrinogen-III synthase (EC
4.2.1.75);Uroporphyrinogen-III methyltransferase (EC 2.1.1.107)|Uroporphyrinogen-III synthase
(EC 4.2.1.75)(BSU03280);uroporphyrinogen-III synthase;prophobilinogenase;uroporphyrinogen
isomerase;uroporphyrinogen III cosynthase;URO-synthase;hydroxymethylbilane hydro-lyase
(cyclizing)(BSU12230)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU28140 or BSU03280 or BSU12230 )</p>
      <p>GENE_LIST: BSU28140 BSU03280 BSU12230</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
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  <listOfProducts>
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    <speciesReference species="M_C01051_c"/>
  </listOfProducts>
  <kineticLaw>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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  </kineticLaw>
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    <p>GENE_LIST: </p>
    <p>SUBSYSTEM: Amino Acids and Derivatives</p>
  </html>
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<listOfReactants>
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  <speciesReference species="M_C15980_c"/>
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<listOfProducts>
  <speciesReference species="M_C01352_c"/>
  <speciesReference species="M_C03345_c"/>
</listOfProducts>
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  <math xmlns="http://www.w3.org/1998/Math/MathML">
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  <listOfParameters>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
</reaction>
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branched-chain alpha-keto acid dehydrogenase complex (EC 2.3.1.168)">
  <notes>
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      <p>GENE_LIST: BSU24030</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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    <speciesReference species="M_C15979_c"/>
  </listOfProducts>
  <kineticLaw>

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      <p>GENE_LIST: BSU13570</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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      <p>GENE_LIST: BSU30210</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  <speciesReference species="M_C01037_c"/>
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1.1.1.158)" reversible="false">
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      <p>GENE_LIST: BSU15230</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
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      <p>GENE_LIST: BSU29790</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
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2.1.1.107);Uroporphyrinogen-III methyltransferase (EC 2.1.1.107)|Uroporphyrinogen-III synthase
(EC 4.2.1.75)(BSU03280)">
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    <p>GENE_ASSOCIATION: ( BSU03280 or BSU15610 )</p>
    <p>GENE_LIST: BSU03280 BSU15610</p>
    <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  <speciesReference species="M_C00019_c" stoichiometry="2"/>
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<reaction id="R_R03197" name="Uroporphyrinogen III decarboxylase (EC 4.1.1.37)">
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      <p>GENE_LIST: BSU10120</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
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<reaction id="R_R03209" name="Pimeloyl-CoA synthase (EC 6.2.1.14)" reversible="false">
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      <p>GENE_LIST: BSU30240</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00010_c"/>
    <speciesReference species="M_C02656_c"/>
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    <speciesReference species="M_C00020_c"/>
    <speciesReference species="M_C01063_c"/>
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<reaction id="R_R03210" name="8-amino-7-oxononanoate synthase (EC 2.3.1.47)"
reversible="false">
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      <p>GENE_ASSOCIATION: BSU30220</p>
      <p>GENE_LIST: BSU30220</p>

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    <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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</kineticLaw>
</reaction>
<reaction id="R_R03222" name="Protoporphyrinogen IX oxidase, aerobic (EC 1.3.3.4)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU10140</p>
      <p>GENE_LIST: BSU10140</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  </notes>
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    <speciesReference species="M_C01079_c" stoichiometry="2"/>
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    <speciesReference species="M_C02191_c" stoichiometry="2"/>
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</kineticLaw>
</reaction>
<reaction id="R_R03223" name="Thiamin-phosphate pyrophosphorylase (EC
2.5.1.3);Thiamin biosynthesis protein ThiC(BSU08790)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU38290 or BSU11660 or BSU08790 )</p>
      <p>GENE_LIST: BSU38290 BSU11660 BSU08790</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
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    <speciesReference species="M_C04327_c"/>
    <speciesReference species="M_C04752_c"/>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R03231" name="Adenosylmethionine-8-amino-7-oxononanoate
aminotransferase (EC 2.6.1.62)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU30230</p>
      <p>GENE_LIST: BSU30230</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>

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</kineticLaw>
</reaction>
<reaction id="R_R03236" name="1-phosphofructokinase (EC 2.7.1.56)|Tagatose-6-phosphate
kinase (EC 2.7.1.144);6-phosphofructokinase (EC 2.7.1.11)(BSU29190)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU29190 or BSU14390 )</p>
      <p>GENE_LIST: BSU29190 BSU14390</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </listOfProducts>
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<reaction id="R_R03243" name="Biosynthetic Aromatic amino acid aminotransferase beta
(EC 2.6.1.57)|Histidinol-phosphate aminotransferase (EC 2.6.1.9)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU22620</p>
      <p>GENE_LIST: BSU22620</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </listOfReactants>
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    <speciesReference species="M_C01267_c"/>
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    </math>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R03260" name="Cystathionine gamma-synthase (EC 2.5.1.48)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU11870</p>
      <p>GENE_LIST: BSU11870</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
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4.1.1.36)|Phosphopantothenoylcysteine synthetase (EC 6.3.2.5)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU15700</p>
      <p>GENE_LIST: BSU15700</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
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    <speciesReference species="M_C04352_c"/>
  </listOfReactants>
  <listOfProducts>
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  </listOfProducts>
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  </kineticLaw>
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<reaction id="R\_R03270" name="Pyruvate dehydrogenase E1 component alpha subunit (EC 1.2.4.1);Pyruvate dehydrogenase E1 component beta subunit (EC 1.2.4.1)(BSU14590)">

<notes>

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<p>GENE\_ASSOCIATION: ( BSU14580 and BSU14590 )</p>

<p>GENE\_LIST: BSU14580 BSU14590</p>

<p>SUBSYSTEM: Carbohydrates</p>

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</notes>

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<speciesReference species="M\_C00068\_c"/>

<speciesReference species="M\_C16255\_c"/>

</listOfProducts>

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</math>

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<parameter id="OBJECTIVE\_COEFFICIENT" value="0"/>

</listOfParameters>

</kineticLaw>

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<reaction id="R\_R03299" name="4-hydroxyphenylacetate 3-monooxygenase (EC 1.14.13.3)"  
reversible="false">

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<p>GENE\_ASSOCIATION: BSU18620</p>

<p>GENE\_LIST: BSU18620</p>

<p>SUBSYSTEM: Metabolism of Aromatic Compounds</p>

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</notes>

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    <speciesReference species="M_C00003_c"/>
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  </kineticLaw>
</reaction>
<reaction id="R_R03313" name="Gamma-glutamyl phosphate reductase (EC 1.2.1.41)"
reversible="false">
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      <p>GENE_ASSOCIATION: BSU13130</p>
      <p>GENE_LIST: BSU13130</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
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    <speciesReference species="M_C03287_c"/>
  </listOfReactants>
  <listOfProducts>
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  </listOfProducts>
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</reaction>

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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C01165_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C03912_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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  </kineticLaw>
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1.2.4.2)">
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      <p>GENE_LIST: BSU19370</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </listOfProducts>

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  <listOfParameters>
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      <p>GENE_LIST: BSU31350</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
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  </kineticLaw>
</reaction>
<reaction id="R_R03346" name="5'-nucleotidase yjjG (EC 3.1.3.5);2',3'-cyclic-nucleotide
2'-phosphodiesterase (EC 3.1.4.16)|5'-nucleotidase (EC 3.1.3.5)(BSU07840)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU07840 or BSU07330 )</p>
      <p>GENE_LIST: BSU07840 BSU07330</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  <speciesReference species="M_C00080_c"/>
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(EC 2.4.2.19)" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU27860</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  </notes>
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    <speciesReference species="M_C03722_c"/>
    <speciesReference species="M_C00119_c"/>
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    <speciesReference species="M_C00011_c"/>
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<reaction id="R_R03371" name="alternate gene name: yzxA" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU19800</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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<reaction id="R_R03443" name="N-acetyl-gamma-glutamyl-phosphate reductase (EC
1.2.1.38)" reversible="false">
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      <p>GENE_LIST: BSU11190</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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reversible="false">
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      <p>GENE_LIST: BSU34900</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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    <speciesReference species="M_C01267_c"/>
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    </listOfParameters>
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</reaction>
<reaction id="R_R03458" name="5-amino-6-(5-phosphoribosylamino)uracil reductase (EC
1.1.1.193)|Diaminohydroxyphosphoribosylaminopyrimidine deaminase (EC 3.5.4.26)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU23280</p>
      <p>GENE_LIST: BSU23280</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
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    <speciesReference species="M_C04454_c"/>
  </listOfReactants>
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    <speciesReference species="M_C00005_c"/>
    <speciesReference species="M_C01268_c"/>
  </listOfProducts>
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    </math>
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</reaction>
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reversible="false">
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      <p>GENE_LIST: BSU23280</p>
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    </listOfParameters>
  </kineticLaw>
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<reaction id="R_R03460" name="5-Enolpyruvylshikimate-3-phosphate synthase (EC
2.5.1.19)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU22600</p>
      <p>GENE_LIST: BSU22600</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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    <speciesReference species="M_C03175_c"/>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C01269_c"/>
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    </math>
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    </listOfParameters>
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<reaction id="R_R03492" name="hydrolyses bond between the N-acetylglucosaminy and the
N-acetylmuramyl residues in the glycan chain">
  <notes>
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      <p>GENE_ASSOCIATION: BSU35780</p>
      <p>GENE_LIST: BSU35780</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
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<reaction id="R_R03503" name="2-amino-4-hydroxy-6-hydroxymethyldihydropteridine
pyrophosphokinase (EC 2.7.6.3)" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU00790</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
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<reaction id="R_R03504" name="Dihydroneopterin aldolase (EC 4.1.2.25)">
  <notes>
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      <p>GENE_LIST: BSU00780</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  <listOfProducts>
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    <speciesReference species="M_C01300_c"/>
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  <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  <speciesReference species="M_C01302_c"/>
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  <speciesReference species="M_C00001_c"/>
  <speciesReference species="M_C00011_c"/>
  <speciesReference species="M_C03506_c"/>
</listOfProducts>
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</kineticLaw>
</reaction>
<reaction id="R_R03509" name="Phosphoribosylanthranilate isomerase (EC 5.3.1.24)">
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      <p>GENE_LIST: BSU22650</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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      <p>GENE_ASSOCIATION: BSU07840</p>
      <p>GENE_LIST: BSU07840</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  <listOfProducts>
    <speciesReference species="M_C01367_c"/>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R03538" name="2',3'-cyclic-nucleotide 2'-phosphodiesterase (EC
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      <p>GENE_LIST: BSU07840</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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    </listOfParameters>
  </kineticLaw>
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1.1.1.-);NADH-dependent butanol dehydrogenase A (EC 1.1.1.-)(BSU31370)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
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      <p>GENE_LIST: BSU31360 BSU31370</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </notes>
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    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C01412_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C06142_c"/>
  </listOfProducts>
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    </listOfParameters>
  </kineticLaw>

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    </kineticLaw>
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        <p>GENE_LIST: BSU30300</p>
        <p>SUBSYSTEM: Carbohydrates</p>
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      <speciesReference species="M_C01613_c"/>
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    <kineticLaw>
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      </math>
      <listOfParameters>
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        <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
        <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
      </listOfParameters>
    </kineticLaw>
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  <reaction id="R_R03646" name="Arginyl-tRNA synthetase (EC 6.1.1.19)"
reversible="false">
    <notes>
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        <p>GENE_ASSOCIATION: BSU37330</p>
        <p>GENE_LIST: BSU37330</p>
        <p>SUBSYSTEM: Aminoacyl-tRNA biosynthesis</p>
      </html>
    </notes>
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    <speciesReference species="M_C02163_c"/>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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    </listOfParameters>
  </kineticLaw>
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reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU22360</p>
      <p>GENE_LIST: BSU22360</p>
      <p>SUBSYSTEM: Aminoacyl-tRNA biosynthesis</p>
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  </notes>
  <listOfReactants>
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      <p>GENE_LIST: BSU00940</p>
      <p>SUBSYSTEM: Aminoacyl-tRNA biosynthesis</p>
    </html>
  </notes>
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    <speciesReference species="M_C01639_c"/>
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</reaction>
<reaction id="R_R03651" name="Glutamyl-tRNA synthetase (EC
6.1.1.17)|Glutamyl-tRNA(Gln) synthetase" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU00920</p>
      <p>SUBSYSTEM: Aminoacyl-tRNA biosynthesis</p>
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      <p>GENE_LIST: BSU25260 BSU25270</p>
      <p>SUBSYSTEM: Aminoacyl-tRNA biosynthesis</p>
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reversible="false">
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      <p>GENE_LIST: BSU27560</p>
      <p>SUBSYSTEM: Aminoacyl-tRNA biosynthesis</p>
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reversible="false">
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      <p>GENE_LIST: BSU15430</p>
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      <p>GENE_LIST: BSU30320</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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            <p>GENE_LIST: BSU00380</p>
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reversible="false">
  <notes>
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      <p>GENE_LIST: BSU28630 BSU28640</p>
      <p>SUBSYSTEM: Aminoacyl-tRNA biosynthesis</p>
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      <p>GENE_LIST: BSU16570</p>
      <p>SUBSYSTEM: Aminoacyl-tRNA biosynthesis</p>
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    <speciesReference species="M_C01649_c"/>
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  </kineticLaw>
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      <p>GENE_LIST: BSU00130</p>
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      <p>GENE_LIST: BSU28950 BSU37560</p>
      <p>SUBSYSTEM: Aminoacyl-tRNA biosynthesis</p>
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    <speciesReference species="M_C00013_c"/>
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reversible="false">
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      <p>GENE_LIST: BSU11420</p>
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  </listOfProducts>
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</reaction>
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  <notes>
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      <p>SUBSYSTEM: Aminoacyl-tRNA biosynthesis</p>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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2.3.1.16)(BSU24170)">
  <notes>
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      <p>GENE_LIST: BSU32830 BSU10350 BSU24170</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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2.3.1.16)(BSU24170)">
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      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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</reaction>
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6.3.5.-)|Glutamyl-tRNA(Gln) amidotransferase subunit C (EC 6.3.5.-);Aspartyl-tRNA(Asn)
amidotransferase subunit A (EC 6.3.5.-)|Glutamyl-tRNA(Gln) amidotransferase subunit A (EC
6.3.5.-)(BSU06680);Aspartyl-tRNA(Asn) amidotransferase subunit B (EC
6.3.5.-)|Glutamyl-tRNA(Gln) amidotransferase subunit B (EC 6.3.5.-)(BSU06690)"
reversible="false">
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      <p>GENE_LIST: BSU38040</p>
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    <speciesReference species="M_C16688_c"/>
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<reaction id="R_R03929" name="2',3'-cyclic-nucleotide 2'-phosphodiesterase (EC
3.1.4.16)|5'-nucleotidase (EC 3.1.3.5)" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU07840</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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      <p>GENE_LIST: BSU15630</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
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</kineticLaw>
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<reaction id="R_R03968" name="3-isopropylmalate dehydratase small subunit (EC
4.2.1.33);3-isopropylmalate dehydratase large subunit (EC 4.2.1.33)(BSU28260)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU28260 or BSU28250 )</p>
      <p>GENE_LIST: BSU28260 BSU28250</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </notes>
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  <speciesReference species="M_C05711_c"/>
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reversible="false">
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      <p>GENE_LIST: BSU39540</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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    <speciesReference species="M_C05466_c"/>
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    <speciesReference species="M_C02528_c"/>
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  </kineticLaw>
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acetyltransferase (EC 2.3.1.9);3-ketoacyl-CoA thiolase [isoleucine degradation] (EC
2.3.1.16)(BSU24170)">
  <notes>
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 <p>SUBSYSTEM: Amino Acids and Derivatives</p>  
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<reaction id="R_R04030" name="O-succinylbenzoic acid--CoA ligase (EC 6.2.1.26)"
reversible="false">
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      <p>GENE_LIST: BSU30790</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00010_c"/>
    <speciesReference species="M_C02730_c"/>
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  <listOfProducts>
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    <speciesReference species="M_C00020_c"/>
    <speciesReference species="M_C03160_c"/>
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</reaction>
<reaction id="R_R04031" name="O-succinylbenzoate-CoA synthase (EC 4.2.1.-)"
reversible="false">
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      <p>GENE_LIST: BSU30780</p>

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  <speciesReference species="M_C02730_c"/>
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  </math>
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</kineticLaw>
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3.5.4.19)|Phosphoribosyl-ATP pyrophosphatase (EC 3.6.1.31)" reversible="false">
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      <p>GENE_LIST: BSU34860</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C02739_c"/>
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  <listOfProducts>
    <speciesReference species="M_C00013_c"/>
    <speciesReference species="M_C02741_c"/>
  </listOfProducts>
  <kineticLaw>
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</kineticLaw>
</reaction>
<reaction id="R_R04037" name="Phosphoribosyl-AMP cyclohydrolase (EC
3.5.4.19)|Phosphoribosyl-ATP pyrophosphatase (EC 3.6.1.31)">
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      <p>GENE_LIST: BSU34860</p>
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BSU19310 )</p>
      <p>GENE_LIST: BSU07350 BSU37960 BSU39860 BSU38830 BSU19310</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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    </math>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
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      <p>GENE_LIST: BSU18260</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00016_c"/>
  </listOfReactants>
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    <speciesReference species="M_C03069_c"/>
  </listOfProducts>
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    </math>
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    </listOfParameters>
  </kineticLaw>

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</reaction>
<reaction id="R_R04097" name="Dihydrolipoamide acyltransferase component of
branched-chain alpha-keto acid dehydrogenase complex (EC 2.3.1.168)">
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      <p>GENE_LIST: BSU24030</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </notes>
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  </listOfProducts>
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  </kineticLaw>
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      <p>GENE_LIST: BSU28170</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
</reaction>
<reaction id="R_R04112" name="Germination-specific N-acetylmuramoyl-L-alanine amidase
(EC 3.5.1.28), cell wall hydrolase CwID;N-acetylmuramoyl-L-alanine amidase cwIH precursor
(EC 3.5.1.28)(BSU25710);N-acetylmuramoyl-L-alanine amidase xlyB (EC 3.5.1.28) (Cell wall
hydrolase) (Autolysin)(BSU12460);N-acetylmuramoyl-L-alanine amidase xlyA (EC 3.5.1.28)
(Cell wall hydrolase) (Autolysin)(BSU12810);Sporulation-specific N-acetylmuramoyl-L-alanine
amidase (EC 3.5.1.28) (Cell wall hydrolase)
(Autolysin)(BSU17410);N-acetylmuramoyl-L-alanine amidase cwIA (EC 3.5.1.28) (Cell wall
hydrolase) (Autolysin)(BSU25900);N-acetylmuramoyl-L-alanine
amidase(BSU02600);N-acetylmuramoyl-L-alanine
amidase(BSU13820);N-acetylmuramoyl-L-alanine
amidase(BSU22930);N-acetylmuramoyl-L-alanine
amidase(BSU21410);N-acetylmuramoyl-L-alanine
amidase(BSU27580);N-acetylmuramoyl-L-alanine amidase (major autolysin)
(CWBP49)(BSU35620);N-acetylmuramoyl-L-alanine
amidase(BSU24190);N-acetylmuramoyl-L-alanine amidase, family 4(BSU31120)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU01530 or BSU25710 or BSU12460 or BSU12810 or
BSU17410 or BSU25900 or BSU02600 or BSU13820 or BSU22930 or BSU21410 or BSU27580
or BSU35620 or BSU24190 or BSU31120 )</p>
      <p>GENE_LIST: BSU01530 BSU25710 BSU12460 BSU12810 BSU17410 BSU25900
BSU02600 BSU13820 BSU22930 BSU21410 BSU27580 BSU35620 BSU24190 BSU31120</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
    </html>
  </notes>
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</reaction>
<reaction id="R_R04138" name="Methylcrotonyl-CoA carboxylase carboxyl transferase
subunit (EC 6.4.1.4);Biotin carboxylase of methylcrotonyl-CoA carboxylase (EC
6.3.4.14)(BSU18240);Biotin carboxyl carrier protein of methylcrotonyl-CoA
carboxylase(Bsu1823a)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU18210 and Bsu1823a and BSU18240 )</p>
      <p>GENE_LIST: BSU18210 BSU18240</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
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    <speciesReference species="M_C00288_c"/>
    <speciesReference species="M_C03069_c"/>
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    </listOfParameters>
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<reaction id="R_R04143" name="5-methylthioribose kinase (EC 2.7.1.100)"
reversible="false">
  <notes>
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      <p>GENE_LIST: BSU13560</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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    <speciesReference species="M_C03089_c"/>
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  </kineticLaw>
</reaction>
<reaction id="R_R04144" name="Phosphoribosylamine--glycine ligase (EC 6.3.4.13)"
reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU06530</p>
      <p>GENE_LIST: BSU06530</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
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</kineticLaw>
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<reaction id="R_R04170" name="Enoyl-CoA hydratase (EC 4.2.1.17);enoyl-CoA
hydratase(BSU17160);enoyl-CoA hydratase(BSU09880)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU28540 or BSU17160 or BSU09880 or
BSU17170 )</p>
      <p>GENE_LIST: BSU28540 BSU17160 BSU09880 BSU17170</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  </notes>
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    <speciesReference species="M_C03221_c"/>
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  </kineticLaw>

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</kineticLaw>
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      <p>GENE_LIST: BSU10020</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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    <speciesReference species="M_C03232_c"/>
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</reaction>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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    <speciesReference species="M_C00001_c"/>
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</listOfProducts>
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      <p>GENE_LIST: BSU22490</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
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    <speciesReference species="M_C03340_c"/>
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    </listOfParameters>
  </kineticLaw>
</reaction>
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1.1.1.35)|Enoyl-CoA hydratase [isoleucine degradation] (EC 4.2.1.17)">
  <notes>
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    <p>GENE_ASSOCIATION: BSU32840</p>
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    <p>SUBSYSTEM: Amino Acids and Derivatives</p>
  </html>
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  <speciesReference species="M_C04405_c"/>
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  <speciesReference species="M_C00004_c"/>
  <speciesReference species="M_C03344_c"/>
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  </math>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R04204" name="Enoyl-CoA hydratase (EC 4.2.1.17);enoyl-CoA
hydratase(BSU17160);enoyl-CoA hydratase(BSU09880)">
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      <p>GENE_ASSOCIATION: ( BSU28540 or BSU17160 or BSU09880 )</p>
      <p>GENE_LIST: BSU28540 BSU17160 BSU09880</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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  <listOfProducts>
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    <speciesReference species="M_C03345_c"/>
  </listOfProducts>
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6.3.3.1)" reversible="false">
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      <p>GENE_ASSOCIATION: BSU06500</p>
      <p>GENE_LIST: BSU06500</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
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    <speciesReference species="M_C04640_c"/>
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  <listOfProducts>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C03373_c"/>
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  </kineticLaw>
</reaction>
<reaction id="R_R04212" name="Aspartyl-tRNA(Asn) amidotransferase subunit C (EC
6.3.5.-)|Glutamyl-tRNA(Gln) amidotransferase subunit C (EC 6.3.5.-);Aspartyl-tRNA(Asn)
amidotransferase subunit A (EC 6.3.5.-)|Glutamyl-tRNA(Gln) amidotransferase subunit A (EC
6.3.5.-)(BSU06680);Aspartyl-tRNA(Asn) amidotransferase subunit B (EC
6.3.5.-)|Glutamyl-tRNA(Gln) amidotransferase subunit B (EC 6.3.5.-)(BSU06690)"
reversible="false">

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<notes>
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    <p>SUBSYSTEM: Aminoacyl-tRNA biosynthesis</p>
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  <speciesReference species="M_C00002_c"/>
  <speciesReference species="M_C00001_c"/>
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  <speciesReference species="M_C00025_c"/>
  <speciesReference species="M_C00009_c"/>
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</reaction>
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      <p>GENE_LIST: BSU10810</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
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  <listOfProducts>
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</reaction>

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</listOfProducts>
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</kineticLaw>
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      <p>GENE_ASSOCIATION: ( BSU28540 or BSU17160 or BSU09880 or
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      <p>GENE_LIST: BSU28540 BSU17160 BSU09880 BSU17170</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </notes>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R04231" name="Phosphopantothenoylcysteine decarboxylase (EC
4.1.1.36)|Phosphopantothenoylcysteine synthetase (EC 6.3.2.5)" reversible="false">
  <notes>
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    <p>GENE_ASSOCIATION: BSU15700</p>
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</kineticLaw>
</reaction>
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  <notes>
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      <p>GENE_LIST: BSU13730</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  </notes>
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  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00536_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
  </kineticLaw>
</reaction>

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</math>
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      <p>GENE_LIST: BSU27850</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00001_c" stoichiometry="2"/>
    <speciesReference species="M_C03722_c"/>
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    </listOfParameters>
  </kineticLaw>
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<reaction id="R_R04325" name="Phosphoribosylglycinamide formyltransferase (EC
2.1.2.2)">
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      <p>GENE_ASSOCIATION: BSU06510</p>
      <p>GENE_LIST: BSU06510</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>

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    </html>
  </notes>
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  <listOfProducts>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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</reaction>
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  <notes>
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      <p>GENE_ASSOCIATION: </p>
      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
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  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C03972_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
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      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>

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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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</kineticLaw>
</reaction>
<reaction id="R_R04355" name="3-oxoacyl-[acyl-carrier-protein] synthase III (EC
2.3.1.41);3-oxoacyl-[acyl-carrier-protein] synthase, KASIII (EC
2.3.1.41)(BSU11330);3-oxoacyl-[acyl-carrier-protein] synthase, KASII (EC
2.3.1.41)(BSU11340)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( ( BSU11330 and BSU11340 ) or ( BSU10170 and
BSU11340 ) )</p>
      <p>GENE_LIST: BSU11330 BSU11340 BSU10170 BSU11340</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
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    <speciesReference species="M_C03939_c"/>
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    <speciesReference species="M_C05744_c"/>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R04364" name="2,3,4,5-tetrahydropyridine-2,6-dicarboxylate
N-acetyltransferase (EC 2.3.1.89)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU14180</p>
      <p>GENE_LIST: BSU14180</p>

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    <p>SUBSYSTEM: Amino Acids and Derivatives</p>
  </html>
</notes>
<listOfReactants>
  <speciesReference species="M_C00024_c"/>
  <speciesReference species="M_C00001_c"/>
  <speciesReference species="M_C03972_c"/>
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  <speciesReference species="M_C05539_c"/>
</listOfProducts>
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</kineticLaw>
</reaction>
<reaction id="R_R04383" name="4-deoxy-L-threo-5-hexosulose-uronate ketol-isomerase (EC
5.3.1.17)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU22130</p>
      <p>GENE_LIST: BSU22130</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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  <listOfProducts>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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</kineticLaw>
</reaction>
<reaction id="R_R04385" name="Biotin operon repressor|Biotin-protein ligase (EC
6.3.4.15);Biotin carboxylase of acetyl-CoA carboxylase (EC 6.3.4.14)(BSU24340);Biotin
carboxyl carrier protein of acetyl-CoA carboxylase(BSU24350)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU24350 and BSU24340 and BSU22440 )</p>
      <p>GENE_LIST: BSU24350 BSU24340 BSU22440</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
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    <speciesReference species="M_C00288_c"/>
    <speciesReference species="M_C06250_c"/>
  </listOfReactants>
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    <speciesReference species="M_C00008_c"/>
    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C04419_c"/>
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  <kineticLaw>
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    </math>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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  </kineticLaw>
</reaction>
<reaction id="R_R04386" name="Acetyl-coenzyme A carboxyl transferase alpha chain (EC
6.4.1.2);Acetyl-coenzyme A carboxyl transferase beta chain (EC 6.4.1.2)(BSU29210)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU29210 and BSU29200 )</p>
      <p>GENE_LIST: BSU29210 BSU29200</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>

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  </notes>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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  </kineticLaw>
</reaction>
<reaction id="R_R04405" name="5-methyltetrahydropteroyltriglutamate--homocysteine
methyltransferase (EC 2.1.1.14)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU13180</p>
      <p>GENE_LIST: BSU13180</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
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    <speciesReference species="M_C00155_c"/>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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</kineticLaw>
</reaction>
<reaction id="R_R04420" name="Methylthioribose-1-phosphate isomerase (EC 5.3.1.23)">
  <notes>
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      <p>GENE_LIST: BSU13550</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  <listOfProducts>
    <speciesReference species="M_C04582_c"/>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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  </kineticLaw>
</reaction>
<reaction id="R_R04424" name="2-methylcitrate dehydratase (EC 4.2.1.79)">
  <notes>
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      <p>GENE_LIST: BSU24130</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </notes>
  <listOfReactants>
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  <listOfProducts>
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    <speciesReference species="M_C04225_c"/>
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</listOfProducts>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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hydratase (EC 4.2.1.3)">
  <notes>
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      <p>GENE_LIST: BSU18000</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
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  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C04225_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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  </kineticLaw>
</reaction>
<reaction id="R_R04426" name="3-isopropylmalate dehydrogenase (EC 1.1.1.85)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU28270</p>
      <p>GENE_LIST: BSU28270</p>

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    <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  <speciesReference species="M_C00003_c"/>
  <speciesReference species="M_C04411_c"/>
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  <speciesReference species="M_C00004_c"/>
  <speciesReference species="M_C04236_c"/>
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</kineticLaw>
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<reaction id="R_R04428" name="(3R)-hydroxymyristoyl-[acyl carrier protein] dehydratase
(EC 4.2.1.-)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU36370</p>
      <p>GENE_LIST: BSU36370</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  </notes>
  <listOfReactants>
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  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C04246_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>

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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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</kineticLaw>
</reaction>
<reaction id="R_R04429" name="Enoyl-[acyl-carrier-protein] reductase [NADH] (EC
1.3.1.9);Enoyl-[acyl-carrier-protein] reductase [FMN] (EC 1.3.1.9) homolog(BSU26800)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU11720 or BSU26800 )</p>
      <p>GENE_LIST: BSU11720 BSU26800</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C04246_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C05745_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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  </kineticLaw>
</reaction>
<reaction id="R_R04430" name="Enoyl-[acyl-carrier-protein] reductase [NADPH] (EC
1.3.1.10)" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU08650</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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</notes>
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  <speciesReference species="M_C00006_c"/>
  <speciesReference species="M_C05745_c"/>
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  </math>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R04440" name="Ketol-acid reductoisomerase (EC 1.1.1.86)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU28290</p>
      <p>GENE_LIST: BSU28290</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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    <speciesReference species="M_C04039_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00005_c"/>
    <speciesReference species="M_C04181_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>

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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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</kineticLaw>
</reaction>
<reaction id="R_R04441" name="Dihydroxy-acid dehydratase (EC 4.2.1.9)"
reversible="false">
  <notes>
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      <p>GENE_LIST: BSU21870</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00141_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R04444" name="Delta-1-pyrroline-5-carboxylate dehydrogenase (EC
1.5.1.12)">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU37780 or BSU03210 )</p>
      <p>GENE_LIST: BSU37780 BSU03210</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00001_c" stoichiometry="2"/>

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    <speciesReference species="M_C04281_c"/>
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    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C05947_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R04448" name="Hydroxyethylthiazole kinase (EC 2.7.1.50)"
reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU38300</p>
      <p>GENE_LIST: BSU38300</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C04294_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00008_c"/>
    <speciesReference species="M_C04327_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>

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    </kineticLaw>
  </reaction>
  <reaction id="R_R04457" name="6,7-dimethyl-8-ribityllumazine synthase (EC 2.5.1.9)">
    <notes>
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        <p>GENE_ASSOCIATION: BSU23250</p>
        <p>GENE_LIST: BSU23250</p>
        <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
      </html>
    </notes>
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      <speciesReference species="M_C15556_c"/>
    </listOfReactants>
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      <speciesReference species="M_C00080_c"/>
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      <speciesReference species="M_C04332_c"/>
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    <kineticLaw>
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      </math>
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    </kineticLaw>
  </reaction>
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amidotransferase subunit (EC 6.3.5.3);Phosphoribosylformylglycinamidine synthase, synthetase
subunit (EC 6.3.5.3)(BSU06480);Phosphoribosylformylglycinamidine synthase, PurS subunit (EC
6.3.5.3)(BSU06460)" reversible="false">
    <notes>
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        <p>GENE_ASSOCIATION: ( BSU06460 and BSU06470 and BSU06480 )</p>
        <p>GENE_LIST: BSU06460 BSU06470 BSU06480</p>
        <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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    </notes>
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    <speciesReference species="M_C04376_c"/>
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    <speciesReference species="M_C00009_c"/>
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    <speciesReference species="M_C00025_c"/>
    <speciesReference species="M_C04640_c"/>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R04467" name="N-acetyl-L,L-diaminopimelate aminotransferase homolog
(EC 2.6.1.-);N-acetyl-L,L-diaminopimelate aminotransferase (EC 2.6.1.-)(BSU14000)"
reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU14000 or BSU31400 )</p>
      <p>GENE_LIST: BSU14000 BSU31400</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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    <speciesReference species="M_C05539_c"/>
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    </math>

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</reaction>
<reaction id="R_R04486" name="Choloylglycine hydrolase (EC 3.5.1.24)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU39540</p>
      <p>GENE_LIST: BSU39540</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
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    <speciesReference species="M_C05464_c"/>
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    <speciesReference species="M_C04483_c"/>
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</reaction>
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reversible="false">
  <notes>
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      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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reductase(BSU29420)">
  <notes>
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      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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    <speciesReference species="M_C05744_c"/>
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reductase(BSU29420)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU15910 or BSU16870 or BSU29420 )</p>
      <p>GENE_LIST: BSU15910 BSU16870 BSU29420</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
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    <speciesReference species="M_C04619_c"/>
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    <speciesReference species="M_C00005_c"/>
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  </kineticLaw>
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(EC 4.2.1.-)">
  <notes>
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      <p>GENE_LIST: BSU36370</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  </kineticLaw>
</reaction>
<reaction id="R_R04536" name="3-oxoacyl-[acyl-carrier protein] reductase (EC
1.1.1.100);3-oxoacyl-[acyl-carrier protein] reductase(BSU16870);3-oxoacyl-[acyl-carrier protein]
reductase(BSU29420)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU15910 or BSU16870 or BSU29420 )</p>
      <p>GENE_LIST: BSU15910 BSU16870 BSU29420</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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    </listOfParameters>
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      <p>GENE_LIST: BSU36370</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
  <listOfReactants>
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  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C05751_c"/>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R04543" name="3-oxoacyl-[acyl-carrier protein] reductase (EC
1.1.1.100);3-oxoacyl-[acyl-carrier protein] reductase(BSU16870);3-oxoacyl-[acyl-carrier protein]
reductase(BSU29420)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
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      <p>GENE_LIST: BSU15910 BSU16870 BSU29420</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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</kineticLaw>
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      <p>GENE_LIST: BSU36370</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  </notes>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
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</reaction>
<reaction id="R_R04558" name="Imidazole glycerol phosphate synthase cyclase subunit (EC

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4.1.3.-);Imidazole glycerol phosphate synthase amidotransferase subunit (EC 2.4.2.-)(BSU34890)"  
reversible="false">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml">

<p>GENE\_ASSOCIATION: ( BSU34870 and BSU34890 )</p>

<p>GENE\_LIST: BSU34870 BSU34890</p>

<p>SUBSYSTEM: Amino Acids and Derivatives</p>

</html>

</notes>

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</listOfReactants>

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</math>

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<parameter id="OBJECTIVE\_COEFFICIENT" value="0"/>

</listOfParameters>

</kineticLaw>

</reaction>

<reaction id="R\_R04559" name="Adenylosuccinate lyase (EC 4.3.2.2)">

<notes>

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<p>GENE\_LIST: BSU06440</p>

<p>SUBSYSTEM: Nucleosides and Nucleotides</p>

</html>

</notes>

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<speciesReference species="M\_C04677\_c"/>

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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
</reaction>
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3.5.4.10)|Phosphoribosylaminoimidazolecarboxamide formyltransferase (EC 2.1.2.3)">
  <notes>
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      <p>GENE_LIST: BSU06520</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
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    <speciesReference species="M_C04677_c"/>
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    <speciesReference species="M_C04734_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R04566" name="3-oxoacyl-[acyl-carrier protein] reductase (EC
1.1.1.100);3-oxoacyl-[acyl-carrier protein] reductase(BSU16870);3-oxoacyl-[acyl-carrier protein]
reductase(BSU29420)">
  <notes>

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<html xmlns="http://www.w3.org/1999/xhtml">
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  <p>GENE_LIST: BSU15910 BSU16870 BSU29420</p>
  <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  <speciesReference species="M_C04688_c"/>
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  <speciesReference species="M_C00005_c"/>
  <speciesReference species="M_C05759_c"/>
</listOfProducts>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
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(EC 4.2.1.-)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU36370</p>
      <p>GENE_LIST: BSU36370</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00001_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">

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    <ci> FLUX_VALUE </ci>
  </math>
</listOfParameters>
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  <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
  <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
</listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R04591" name="Phosphoribosylaminoimidazole-succinocarboxamide
synthase (EC 6.3.2.6)" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU06450</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  </notes>
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    <speciesReference species="M_C04751_c"/>
  </listOfReactants>
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    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c" stoichiometry="2"/>
    <speciesReference species="M_C04823_c"/>
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    </math>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R04617"
name="UDP-N-acetylmuramoylalanyl-D-glutamyl-2,6-diaminopimelate--D-alanyl-D-
ligase (EC 6.3.2.10)" reversible="false">
  <notes>

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  <p>GENE_LIST: BSU04570</p>
  <p>SUBSYSTEM: Cell Wall and Capsule</p>
</html>
</notes>
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  <speciesReference species="M_C00993_c"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00008_c"/>
  <speciesReference species="M_C00009_c"/>
  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C04882_c"/>
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  <math xmlns="http://www.w3.org/1998/Math/MathML">
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  </math>
  <listOfParameters>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R04620" name="Alkaline phosphatase (EC 3.1.3.1)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU05740 or BSU09410 )</p>
      <p>GENE_LIST: BSU05740 BSU09410</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C04895_c"/>
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cyclohydrolase I (EC 3.5.4.16) type 2(BSU03340)" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU22780 BSU03340</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  </notes>
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ribose isomerase (EC 5.3.1.16)">
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      <p>GENE_ASSOCIATION: BSU34880</p>

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 <p>SUBSYSTEM: Amino Acids and Derivatives</p>  
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1.3.1.9);Enoyl-[acyl-carrier-protein] reductase [FMN] (EC 1.3.1.9) homolog(BSU26800)"
reversible="false">
  <notes>
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      <p>GENE_LIST: BSU11720 BSU26800</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
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    </listOfParameters>
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1.3.1.10)" reversible="false">
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2.3.1.41)(BSU11330);3-oxoacyl-[acyl-carrier-protein] synthase, KASII (EC
2.3.1.41)(BSU11340)" reversible="false">
  <notes>
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BSU11340 ) )</p>
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      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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1.1.1.35)|Enoyl-CoA hydratase [isoleucine degradation] (EC 4.2.1.17)">
  <notes>
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      <p>GENE_LIST: BSU32840</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
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  </kineticLaw>
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  <notes>
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 <notes>  
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 <p>GENE\_LIST: BSU32840</p>  
 <p>SUBSYSTEM: Amino Acids and Derivatives</p>  
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      <p>GENE_ASSOCIATION: ( BSU28540 or BSU17160 or BSU09880 or
BSU17170 )</p>
      <p>GENE_LIST: BSU28540 BSU17160 BSU09880 BSU17170</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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      <p>GENE_LIST: BSU32840</p>
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2.3.1.16)(BSU24170)">
  <notes>
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      <p>GENE_LIST: BSU32830 BSU10350 BSU24170</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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      <p>GENE_LIST: BSU32840</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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    <speciesReference species="M_C00004_c"/>
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  </listOfProducts>
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  </kineticLaw>
</reaction>
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      <p>GENE_LIST: BSU28540 BSU17160 BSU09880 BSU17170</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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      <p>GENE_LIST: BSU32840</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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BSU17170 )</p>
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2.3.1.16)(BSU24170)">
  <notes>
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      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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      <p>GENE_LIST: BSU32840</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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    </listOfParameters>
  </kineticLaw>

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</reaction>
<reaction id="R_R04749" name="Enoyl-CoA hydratase (EC 4.2.1.17);enoyl-CoA
hydratase(BSU17160);enoyl-CoA hydratase(BSU09880)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU28540 or BSU17160 or BSU09880 or
BSU17170 )</p>
      <p>GENE_LIST: BSU28540 BSU17160 BSU09880 BSU17170</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C05268_c"/>
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  <listOfProducts>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C05271_c"/>
  </listOfProducts>
  <kineticLaw>
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      <ci> FLUX_VALUE </ci>
    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R04773" name="Methionyl-tRNA synthetase" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU00380</p>
      <p>GENE_LIST: BSU00380</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00002_c"/>
    <speciesReference species="M_C05335_c"/>
    <speciesReference species="M_C01647_c"/>
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    <speciesReference species="M_C00020_c"/>

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    <speciesReference species="M_C00013_c"/>
    <speciesReference species="M_C05336_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R04779" name="6-phosphofructokinase (EC 2.7.1.11)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU29190</p>
      <p>GENE_LIST: BSU29190</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00002_c"/>
    <speciesReference species="M_C05345_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00008_c"/>
    <speciesReference species="M_C05378_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R04780" name="Fructose-1,6-bisphosphatase, Bacillus type (EC
3.1.3.11);Fructose-1,6-bisphosphatase, GlpX type (EC 3.1.3.11)(BSU37090)" reversible="false">
  <notes>

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<html xmlns="http://www.w3.org/1999/xhtml">
  <p>GENE_ASSOCIATION: ( BSU37090 or BSU40190 )</p>
  <p>GENE_LIST: BSU37090 BSU40190</p>
  <p>SUBSYSTEM: Carbohydrates</p>
</html>
</notes>
<listOfReactants>
  <speciesReference species="M_C00001_c"/>
  <speciesReference species="M_C05378_c"/>
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  <speciesReference species="M_C00009_c"/>
  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C05345_c"/>
</listOfProducts>
<kineticLaw>
  <math xmlns="http://www.w3.org/1998/Math/MathML">
    <ci> FLUX_VALUE </ci>
  </math>
  <listOfParameters>
    <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R04859" name="Cysteine synthase (EC 2.5.1.47)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU00730 or BSU29970 )</p>
      <p>GENE_LIST: BSU00730 BSU29970</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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    <speciesReference species="M_C00979_c"/>
    <speciesReference species="M_C00320_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00033_c"/>
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</listOfProducts>
<kineticLaw>
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  </math>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R04951" name="Probable cytosol aminopeptidase (EC 3.4.11.1) (Leucine
aminopeptidase) (LAP) (Leucyl aminopeptidase)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU32050</p>
      <p>GENE_LIST: BSU32050</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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    <speciesReference species="M_C05729_c"/>
    <speciesReference species="M_C00001_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C05726_c"/>
    <speciesReference species="M_C00037_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R04952" name="3-oxoacyl-[acyl-carrier-protein] synthase III (EC
2.3.1.41);3-oxoacyl-[acyl-carrier-protein] synthase, KASIII (EC
2.3.1.41)(BSU11330);3-oxoacyl-[acyl-carrier-protein] synthase, KASII (EC
2.3.1.41)(BSU11340)" reversible="false">

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<notes>
  <html xmlns="http://www.w3.org/1999/xhtml">
    <p>GENE_ASSOCIATION: ( ( BSU11330 and BSU11340 ) or ( BSU10170 and
BSU11340 ) )</p>
    <p>GENE_LIST: BSU11330 BSU11340 BSU10170 BSU11340</p>
    <p>SUBSYSTEM: Fatty Acids and Lipids</p>
  </html>
</notes>
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  <speciesReference species="M_C01209_c"/>
  <speciesReference species="M_C05745_c"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00011_c"/>
  <speciesReference species="M_C00229_c"/>
  <speciesReference species="M_C05746_c"/>
</listOfProducts>
<kineticLaw>
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    <ci> FLUX_VALUE </ci>
  </math>
  <listOfParameters>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R04953" name="3-oxoacyl-[acyl-carrier protein] reductase (EC
1.1.1.100);3-oxoacyl-[acyl-carrier protein] reductase(BSU16870);3-oxoacyl-[acyl-carrier protein]
reductase(BSU29420)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU15910 or BSU16870 or BSU29420 )</p>
      <p>GENE_LIST: BSU15910 BSU16870 BSU29420</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C05747_c"/>
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  <listOfProducts>

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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00005_c"/>
    <speciesReference species="M_C05746_c"/>
  </listOfProducts>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R04954" name="(3R)-hydroxymyristoyl-[acyl carrier protein] dehydratase
(EC 4.2.1.-)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU36370</p>
      <p>GENE_LIST: BSU36370</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
  <listOfReactants>
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  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C05748_c"/>
    <speciesReference species="M_C00001_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R04955" name="Enoyl-[acyl-carrier-protein] reductase [NADH] (EC
1.3.1.9);Enoyl-[acyl-carrier-protein] reductase [FMN] (EC 1.3.1.9) homolog(BSU26800)"

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reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU11720 or BSU26800 )</p>
      <p>GENE_LIST: BSU11720 BSU26800</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C05748_c"/>
    <speciesReference species="M_C00004_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C05749_c"/>
    <speciesReference species="M_C00003_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R04956" name="Enoyl-[acyl-carrier-protein] reductase [NADPH] (EC
1.3.1.10)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU08650</p>
      <p>GENE_LIST: BSU08650</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00005_c"/>
    <speciesReference species="M_C05748_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00006_c"/>

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    <speciesReference species="M_C05749_c"/>
  </listOfProducts>
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    </math>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R04957" name="3-oxoacyl-[acyl-carrier-protein] synthase III (EC
2.3.1.41);3-oxoacyl-[acyl-carrier-protein] synthase, KASIII (EC
2.3.1.41)(BSU11330);3-oxoacyl-[acyl-carrier-protein] synthase, KASII (EC
2.3.1.41)(BSU11340)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( ( BSU11330 and BSU11340 ) or ( BSU10170 and
BSU11340 ) )</p>
      <p>GENE_LIST: BSU11330 BSU11340 BSU10170 BSU11340</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C05749_c"/>
    <speciesReference species="M_C01209_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00011_c"/>
    <speciesReference species="M_C00229_c"/>
    <speciesReference species="M_C05750_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>

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    </kineticLaw>
  </reaction>
  <reaction id="R_R04958" name="Enoyl-[acyl-carrier-protein] reductase [NADH] (EC
1.3.1.9);Enoyl-[acyl-carrier-protein] reductase [FMN] (EC 1.3.1.9) homolog(BSU26800)"
reversible="false">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml">
        <p>GENE_ASSOCIATION: ( BSU11720 or BSU26800 )</p>
        <p>GENE_LIST: BSU11720 BSU26800</p>
        <p>SUBSYSTEM: Fatty Acids and Lipids</p>
      </html>
    </notes>
    <listOfReactants>
      <speciesReference species="M_C00080_c"/>
      <speciesReference species="M_C00004_c"/>
      <speciesReference species="M_C05751_c"/>
    </listOfReactants>
    <listOfProducts>
      <speciesReference species="M_C00003_c"/>
      <speciesReference species="M_C05752_c"/>
    </listOfProducts>
    <kineticLaw>
      <math xmlns="http://www.w3.org/1998/Math/MathML">
        <ci> FLUX_VALUE </ci>
      </math>
      <listOfParameters>
        <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
        <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
        <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
      </listOfParameters>
    </kineticLaw>
  </reaction>
  <reaction id="R_R04959" name="Enoyl-[acyl-carrier-protein] reductase [NADPH] (EC
1.3.1.10)" reversible="false">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml">
        <p>GENE_ASSOCIATION: BSU08650</p>
        <p>GENE_LIST: BSU08650</p>
        <p>SUBSYSTEM: Fatty Acids and Lipids</p>
      </html>
    </notes>
    <listOfReactants>
      <speciesReference species="M_C00080_c"/>
      <speciesReference species="M_C00005_c"/>

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    <speciesReference species="M_C05751_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00006_c"/>
    <speciesReference species="M_C05752_c"/>
  </listOfProducts>
  <kineticLaw>
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      <ci> FLUX_VALUE </ci>
    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R04960" name="3-oxoacyl-[acyl-carrier-protein] synthase III (EC
2.3.1.41);3-oxoacyl-[acyl-carrier-protein] synthase, KASIII (EC
2.3.1.41)(BSU11330);3-oxoacyl-[acyl-carrier-protein] synthase, KASII (EC
2.3.1.41)(BSU11340)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( ( BSU11330 and BSU11340 ) or ( BSU10170 and
BSU11340 ) )</p>
      <p>GENE_LIST: BSU11330 BSU11340 BSU10170 BSU11340</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  </notes>
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    <speciesReference species="M_C01209_c"/>
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  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00229_c"/>
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  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>

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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R04961" name="Enoyl-[acyl-carrier-protein] reductase [NADH] (EC
1.3.1.9);Enoyl-[acyl-carrier-protein] reductase [FMN] (EC 1.3.1.9) homolog(BSU26800)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU11720 or BSU26800 )</p>
      <p>GENE_LIST: BSU11720 BSU26800</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C05754_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00003_c"/>
    <speciesReference species="M_C05755_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R04962" name="Enoyl-[acyl-carrier-protein] reductase [NADPH] (EC
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  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
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      <p>GENE_LIST: BSU08650</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>

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</notes>
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  <speciesReference species="M_C00005_c"/>
  <speciesReference species="M_C05754_c"/>
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  <speciesReference species="M_C00006_c"/>
  <speciesReference species="M_C05755_c"/>
</listOfProducts>
<kineticLaw>
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  </math>
  <listOfParameters>
    <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R04963" name="3-oxoacyl-[acyl-carrier-protein] synthase III (EC
2.3.1.41);3-oxoacyl-[acyl-carrier-protein] synthase, KASIII (EC
2.3.1.41)(BSU11330);3-oxoacyl-[acyl-carrier-protein] synthase, KASII (EC
2.3.1.41)(BSU11340)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
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BSU11340 ) )</p>
      <p>GENE_LIST: BSU11330 BSU11340 BSU10170 BSU11340</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  </notes>
  <listOfReactants>
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    <speciesReference species="M_C01209_c"/>
    <speciesReference species="M_C05755_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00011_c"/>
    <speciesReference species="M_C00229_c"/>
    <speciesReference species="M_C05756_c"/>
  </listOfProducts>
  <kineticLaw>

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      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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2.3.1.41)(BSU11340)" reversible="false">
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<p>GENE\_LIST: BSU11330 BSU11340 BSU10170 BSU11340</p>

<p>SUBSYSTEM: Fatty Acids and Lipids</p>

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</notes>

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</kineticLaw>

</reaction>

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<p>GENE\_LIST: BSU11720 BSU26800</p>

<p>SUBSYSTEM: Fatty Acids and Lipids</p>

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      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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<p>GENE\_LIST: BSU22780 BSU03340</p>  
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</kineticLaw>
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      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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</reaction>
<reaction id="R_R05133" name="6-phospho-beta-glucosidase (EC 3.2.1.86)"
reversible="false">
  <notes>
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      <p>GENE_LIST: BSU38560 BSU40110</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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    <speciesReference species="M_C06187_c"/>
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  <listOfProducts>
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    <speciesReference species="M_C01172_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>

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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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  </listOfParameters>
</kineticLaw>
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reversible="false">
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      <p>GENE_LIST: BSU38560 BSU40110</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </notes>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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  </kineticLaw>
</reaction>
<reaction id="R_R05135" name="2',3'-cyclic-nucleotide 2'-phosphodiesterase (EC
3.1.4.16)|5'-nucleotidase (EC 3.1.3.5)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU07840</p>
      <p>GENE_LIST: BSU07840</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
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    <speciesReference species="M_C06194_c"/>
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  </kineticLaw>
</reaction>
<reaction id="R_R05287" name="2-haloalkanoic acid dehalogenase (EC 3.8.1.2)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU28940</p>
      <p>GENE_LIST: BSU28940</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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    <speciesReference species="M_C06755_c"/>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>

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<reaction id="R\_R05332" name="Glucosamine-1-phosphate N-acetyltransferase (EC 2.3.1.157)|N-acetylglucosamine-1-phosphate uridyltransferase (EC 2.7.7.23)" reversible="false">

<notes>

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<p>GENE\_ASSOCIATION: BSU00500</p>

<p>GENE\_LIST: BSU00500</p>

<p>SUBSYSTEM: Cell Wall and Capsule</p>

</html>

</notes>

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<speciesReference species="M\_C00010\_c"/>

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</math>

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<parameter id="OBJECTIVE\_COEFFICIENT" value="0"/>

</listOfParameters>

</kineticLaw>

</reaction>

<reaction id="R\_R05338" name="D-arabino-3-hexulose 6-phosphate formaldehyde lyase">

<notes>

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<p>GENE\_ASSOCIATION: BSU03460</p>

<p>GENE\_LIST: BSU03460</p>

<p>SUBSYSTEM: Carbohydrates</p>

</html>

</notes>

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<speciesReference species="M\_C00067\_c"/>

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<listOfProducts>

<speciesReference species="M\_C06019\_c"/>

</listOfProducts>

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</reaction>
<reaction id="R_R05339" name="6-phospho-3-hexuloisomerase">
  <notes>
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      <p>GENE_LIST: BSU03450</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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  <listOfProducts>
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<reaction id="R_R05378" name="5-keto-2-deoxy-D-gluconate-6 phosphate aldolase (EC
4.1.2.29)">
  <notes>
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      <p>GENE_LIST: BSU39670</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>

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</kineticLaw>
</reaction>
<reaction id="R_R05389" name="4-oxalocrotonate tautomerase (EC 5.3.2.-)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU37540</p>
      <p>GENE_LIST: BSU37540</p>
      <p>SUBSYSTEM: Metabolism of Aromatic Compounds</p>
    </html>
  </notes>
  <listOfReactants>
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<reaction id="R_R05549" name="Alpha-galactosidase (EC 3.2.1.22)">
  <notes>
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      <p>GENE_LIST: BSU30300</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </notes>
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    <speciesReference species="M_C05404_c"/>
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  <listOfProducts>
    <speciesReference species="M_C05402_c"/>
    <speciesReference species="M_C00124_c"/>
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  </kineticLaw>
</reaction>
<reaction id="R_R05551" name="Aliphatic amidase amiE (EC 3.5.1.4)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU13570</p>
      <p>GENE_LIST: BSU13570</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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    <speciesReference species="M_C00511_c"/>
  </listOfProducts>
  <kineticLaw>

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  <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
</listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R05553" name="Aminodeoxychorismate lyase (EC 4.1.3.38)"
reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU00760</p>
      <p>GENE_LIST: BSU00760</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>
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  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00022_c"/>
    <speciesReference species="M_C00568_c"/>
  </listOfProducts>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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  </kineticLaw>
</reaction>
<reaction id="R_R05554" name="Allantoate amidohydrolase (EC 3.5.3.9)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU32530</p>
      <p>GENE_LIST: BSU32530</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>

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</html>
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  <speciesReference species="M_C00014_c"/>
  <speciesReference species="M_C00603_c"/>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R05566" name="N-acetylmannosaminyltransferase (EC 2.4.1.187)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU35750</p>
      <p>GENE_LIST: BSU35750</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
    </html>
  </notes>
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    <speciesReference species="M_C01289_c"/>
  </listOfReactants>
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    <speciesReference species="M_C00015_c"/>
    <speciesReference species="M_C04881_c"/>
  </listOfProducts>
  <kineticLaw>
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    </listOfParameters>
  </kineticLaw>
</reaction>

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    </listOfParameters>
</kineticLaw>
</reaction>
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    <notes>
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            <p>GENE_LIST: </p>
            <p>SUBSYSTEM: Carbohydrates</p>
        </html>
    </notes>
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        <speciesReference species="M_C06311_c"/>
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    <listOfProducts>
        <speciesReference species="M_C00080_c"/>
        <speciesReference species="M_C00004_c"/>
        <speciesReference species="M_C01097_c"/>
    </listOfProducts>
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    </kineticLaw>
    <listOfParameters>
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        <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
        <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R05577" name="Aspartyl-tRNA synthetase (EC 6.1.1.12)"
reversible="false">
    <notes>
        <html xmlns="http://www.w3.org/1999/xhtml">
            <p>GENE_ASSOCIATION: BSU27550</p>
            <p>GENE_LIST: BSU27550</p>
            <p>SUBSYSTEM: Aminoacyl-tRNA biosynthesis</p>
        </html>
    </notes>
    <listOfReactants>
        <speciesReference species="M_C01638_c"/>
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    <speciesReference species="M_C00002_c"/>
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    <speciesReference species="M_C00020_c"/>
  </listOfProducts>
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    </math>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R05578" name="Glutamyl-tRNA synthetase (EC
6.1.1.17)|Glutamyl-tRNA(Gln) synthetase" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU00920</p>
      <p>GENE_LIST: BSU00920</p>
      <p>SUBSYSTEM: Aminoacyl-tRNA biosynthesis</p>
    </html>
  </notes>
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    <speciesReference species="M_C00002_c"/>
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  <listOfProducts>
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    <speciesReference species="M_C00020_c"/>
  </listOfProducts>
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>

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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R05590" name="Aliphatic amidase amiE (EC 3.5.1.4)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
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      <p>GENE_LIST: BSU13570</p>
      <p>SUBSYSTEM: Metabolism of Aromatic Compounds</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C09815_c"/>
  </listOfReactants>
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    <speciesReference species="M_C00180_c"/>
  </listOfProducts>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R05605" name="2-dehydro-3-deoxyphosphogluconate aldolase (EC
4.1.2.14)|4-Hydroxy-2-oxoglutarate aldolase (EC 4.1.3.16)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU22100</p>
      <p>GENE_LIST: BSU22100</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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    <speciesReference species="M_C00118_c"/>
    <speciesReference species="M_C00022_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R05606" name="Mannonate dehydratase (EC 4.2.1.8)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU12340</p>
      <p>GENE_LIST: BSU12340</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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  </listOfReactants>
  <listOfProducts>
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  </listOfProducts>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R05608" name="D-galactarate dehydratase (EC 4.2.1.42)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">

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<p>GENE\_ASSOCIATION: BSU02510</p>  
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 <p>SUBSYSTEM: Carbohydrates</p>  
 </html>  
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reversible="false">
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      <p>GENE_LIST: BSU22740 BSU22760</p>
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4.6.1.12)" reversible="false">
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      <p>SUBSYSTEM: Carbohydrates</p>
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1.-.-.);Dihydropteridine reductase (EC 1.5.1.34)|Oxygen-insensitive NAD(P)H nitroreductase
(EC 1.-.-.)(BSU05480);Dihydropteridine reductase (EC 1.5.1.34)|Oxygen-insensitive NAD(P)H
nitroreductase (EC 1.-.-.)(BSU05660);Dihydropteridine reductase (EC
1.5.1.34)|Oxygen-insensitive NAD(P)H nitroreductase (EC 1.-.-.)(BSU07830);Dihydropteridine
reductase (EC 1.5.1.34)|Oxygen-insensitive NAD(P)H nitroreductase (EC
1.-.-.)(BSU19550);NADPH-linked nitro/flavin reductase [EC:1.-.-.](BSU38110)"
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</kineticLaw>
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<reaction id="R_R05861" name="Glycine oxidase ThiO (EC 1.4.3.19)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU11670</p>
      <p>GENE_LIST: BSU11670</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00007_c"/>
    <speciesReference species="M_C00133_c"/>
    <speciesReference species="M_C00001_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00022_c"/>
    <speciesReference species="M_C00014_c"/>
    <speciesReference species="M_C00027_c"/>
  </listOfProducts>
  <kineticLaw>
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      <ci> FLUX_VALUE </ci>
    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    </listOfParameters>
  </kineticLaw>
</reaction>

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        <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R05884" name="4-hydroxy-3-methylbut-2-enyl diphosphate reductase (EC
1.17.1.2)" reversible="false">
    <notes>
        <html xmlns="http://www.w3.org/1999/xhtml">
            <p>GENE_ASSOCIATION: BSU25160</p>
            <p>GENE_LIST: BSU25160</p>
            <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
        </html>
    </notes>
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        <speciesReference species="M_C00080_c"/>
        <speciesReference species="M_C00005_c"/>
        <speciesReference species="M_C11811_c"/>
    </listOfReactants>
    <listOfProducts>
        <speciesReference species="M_C00006_c"/>
        <speciesReference species="M_C00001_c"/>
        <speciesReference species="M_C00129_c"/>
    </listOfProducts>
    <kineticLaw>
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        </math>
        <listOfParameters>
            <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
            <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
            <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
        </listOfParameters>
    </kineticLaw>
</reaction>
<reaction id="R_R06063" name="" reversible="false">
    <notes>
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            <p>GENE_LIST: </p>
            <p>SUBSYSTEM: Carbohydrates</p>
        </html>
    </notes>
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        <speciesReference species="M_C00001_c"/>

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    <speciesReference species="M_C11821_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00011_c"/>
    <speciesReference species="M_C02348_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R06064" name="" reversible="false">
  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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    <speciesReference species="M_C11821_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00011_c"/>
    <speciesReference species="M_C02350_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>

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<reaction id="R\_R06180" name="D-malic enzyme (EC 1.1.1.83)|Tartrate decarboxylase (EC 4.1.1.73)|Tartrate dehydrogenase (EC 1.1.1.93)">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml">

<p>GENE\_ASSOCIATION: BSU04000</p>

<p>GENE\_LIST: BSU04000</p>

<p>SUBSYSTEM: Carbohydrates</p>

</html>

</notes>

<listOfReactants>

<speciesReference species="M\_C00003\_c"/>

<speciesReference species="M\_C00898\_c"/>

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<speciesReference species="M\_C00004\_c"/>

<speciesReference species="M\_C03459\_c"/>

</listOfProducts>

<kineticLaw>

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<ci> FLUX\_VALUE </ci>

</math>

<listOfParameters>

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<parameter id="UPPER\_BOUND" value="1000" units="mmol\_per\_gDW\_per\_hr"/>

<parameter id="OBJECTIVE\_COEFFICIENT" value="0"/>

</listOfParameters>

</kineticLaw>

</reaction>

<reaction id="R\_R06363" name="Probable beta-lactamase ybxI precursor (EC 3.5.2.6);Beta-lactamase class A(BSU18800);beta-lactamase(BSU01670)" reversible="false">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml">

<p>GENE\_ASSOCIATION: ( BSU18800 or BSU02090 or BSU01670 )</p>

<p>GENE\_LIST: BSU18800 BSU02090 BSU01670</p>

<p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>

</html>

</notes>

<listOfReactants>

<speciesReference species="M\_C00001\_c"/>

<speciesReference species="M\_C00395\_c"/>

</listOfReactants>

<listOfProducts>

<speciesReference species="M\_C00080\_c"/>

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    <speciesReference species="M_C06567_c"/>
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  <kineticLaw>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R06447" name="Undecaprenyl pyrophosphate synthetase (EC 2.5.1.31)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU16530</p>
      <p>GENE_LIST: BSU16530</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00129_c" stoichiometry="7"/>
    <speciesReference species="M_C11356_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00013_c" stoichiometry="7"/>
    <speciesReference species="M_C04574_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R06513" name="dTDP-glucose 4,6-dehydratase (EC 4.2.1.46)"
reversible="false">
  <notes>

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<html xmlns="http://www.w3.org/1999/xhtml">
  <p>GENE_ASSOCIATION: BSU37830</p>
  <p>GENE_LIST: BSU37830</p>
  <p>SUBSYSTEM: Cell Wall and Capsule</p>
</html>
</notes>
<listOfReactants>
  <speciesReference species="M_C00842_c"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00001_c"/>
  <speciesReference species="M_C11907_c"/>
</listOfProducts>
<kineticLaw>
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  </math>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R06514" name="dTDP-4-dehydrorhamnose 3,5-epimerase">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU37810</p>
      <p>GENE_LIST: BSU37810</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
    </html>
  </notes>
  <listOfReactants>
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  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00688_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>

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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R06601" name="5-hydroxyisourate hydrolase (HIU hydrolase) (HIUHase)
(EC 3.5.2.17) (Transthyretin-related protein) (TRP)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU32460</p>
      <p>GENE_LIST: BSU32460</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C11821_c"/>
    <speciesReference species="M_C00001_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C12248_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R06602" name="Spore photoproduct lyase (EC 4.1.99.-)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU13930</p>
      <p>GENE_LIST: BSU13930</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00885_c"/>
  </listOfReactants>

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<listOfProducts>
  <speciesReference species="M_C00022_c"/>
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</listOfProducts>
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  </math>
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    <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R06604" name="" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: </p>
      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C12248_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00011_c"/>
    <speciesReference species="M_C02350_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R06605" name="" reversible="false">
  <notes>

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<html xmlns="http://www.w3.org/1999/xhtml">
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  <p>GENE_LIST: </p>
  <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
</html>
</notes>
<listOfReactants>
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  <speciesReference species="M_C12248_c"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00011_c"/>
  <speciesReference species="M_C02348_c"/>
</listOfProducts>
<kineticLaw>
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    <ci> FLUX_VALUE </ci>
  </math>
  <listOfParameters>
    <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R06613" name="">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: </p>
      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00365_c"/>
    <speciesReference species="M_C01352_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00364_c"/>
    <speciesReference species="M_C00101_c"/>
    <speciesReference species="M_C00016_c"/>
  </listOfProducts>
  <kineticLaw>

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<math xmlns="http://www.w3.org/1998/Math/MathML">
  <ci> FLUX_VALUE </ci>
</math>
<listOfParameters>
  <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
  <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
  <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
</listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R06895" name="Coproporphyrinogen III oxidase, oxygen-independent (EC
1.3.99.22);Putative coproporphyrinogen III oxidase of BS HemN-type, oxygen-independent (EC
1.3.99.22), in heat shock gene cluster(BSU25500)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU25500 or BSU09840 )</p>
      <p>GENE_LIST: BSU25500 BSU09840</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C03263_c"/>
    <speciesReference species="M_C00019_c" stoichiometry="2"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00011_c" stoichiometry="2"/>
    <speciesReference species="M_C00073_c" stoichiometry="2"/>
    <speciesReference species="M_C01079_c"/>
    <speciesReference species="M_C05198_c" stoichiometry="2"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R06903" name="Spore photoproduct lyase (EC 4.1.99.-)"
reversible="false">
  <notes>

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<html xmlns="http://www.w3.org/1999/xhtml">
  <p>GENE_ASSOCIATION: BSU13930</p>
  <p>GENE_LIST: BSU13930</p>
  <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
</html>
</notes>
<listOfReactants>
  <speciesReference species="M_C00122_c"/>
  <speciesReference species="M_C14098_c"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C14115_c"/>
</listOfProducts>
<kineticLaw>
  <math xmlns="http://www.w3.org/1998/Math/MathML">
    <ci> FLUX_VALUE </ci>
  </math>
  <listOfParameters>
    <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R06915" name="Salicylate hydroxylase (EC 1.14.13.1)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU07230</p>
      <p>GENE_LIST: BSU07230</p>
      <p>SUBSYSTEM: Metabolism of Aromatic Compounds</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00080_c" stoichiometry="2"/>
    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C00007_c"/>
    <speciesReference species="M_C14088_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00003_c"/>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00011_c"/>
    <speciesReference species="M_C02923_c"/>
  </listOfProducts>

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<kineticLaw>
  <math xmlns="http://www.w3.org/1998/Math/MathML">
    <ci> FLUX_VALUE </ci>
  </math>
  <listOfParameters>
    <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R06936" name="Salicylate hydroxylase (EC 1.14.13.1)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU07230</p>
      <p>GENE_LIST: BSU07230</p>
      <p>SUBSYSTEM: Metabolism of Aromatic Compounds</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00080_c" stoichiometry="2"/>
    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C00007_c"/>
    <speciesReference species="M_C14109_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00003_c"/>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00011_c"/>
    <speciesReference species="M_C14110_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R06939" name="Salicylate hydroxylase (EC 1.14.13.1)" reversible="false">
  <notes>

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<html xmlns="http://www.w3.org/1999/xhtml">
  <p>GENE_ASSOCIATION: BSU07230</p>
  <p>GENE_LIST: BSU07230</p>
  <p>SUBSYSTEM: Metabolism of Aromatic Compounds</p>
</html>
</notes>
<listOfReactants>
  <speciesReference species="M_C00080_c" stoichiometry="2"/>
  <speciesReference species="M_C00004_c"/>
  <speciesReference species="M_C00007_c"/>
  <speciesReference species="M_C14103_c"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00003_c"/>
  <speciesReference species="M_C00001_c"/>
  <speciesReference species="M_C00011_c"/>
  <speciesReference species="M_C06730_c"/>
</listOfProducts>
<kineticLaw>
  <math xmlns="http://www.w3.org/1998/Math/MathML">
    <ci> FLUX_VALUE </ci>
  </math>
  <listOfParameters>
    <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R06941" name="3-hydroxyacyl-CoA dehydrogenase (EC
1.1.1.35)|Enoyl-CoA hydratase [isoleucine degradation] (EC 4.2.1.17)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU32840</p>
      <p>GENE_LIST: BSU32840</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00003_c"/>
    <speciesReference species="M_C14145_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>

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    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C02232_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R06974" name="Phosphoribosylglycinamide formyltransferase 2 (EC
2.1.2.-)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU02230</p>
      <p>GENE_LIST: BSU02230</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00002_c"/>
    <speciesReference species="M_C00058_c"/>
    <speciesReference species="M_C03838_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00008_c"/>
    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C04376_c"/>
  </listOfProducts>
  <kineticLaw>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
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</reaction>
<reaction id="R_R07013" name="Epoxide hydrolase (EC 3.3.2.9)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU08590</p>
      <p>GENE_LIST: BSU08590</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C14786_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C06205_c"/>
  </listOfProducts>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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</reaction>
<reaction id="R_R07014" name="Epoxide hydrolase (EC 3.3.2.9)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU08590</p>
      <p>GENE_LIST: BSU08590</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C14787_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C06205_c"/>
  </listOfProducts>
  <kineticLaw>
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  <listOfParameters>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R07027" name="Epoxide hydrolase (EC 3.3.2.9)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU08590</p>
      <p>GENE_LIST: BSU08590</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C14800_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C14801_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R07082" name="Epoxide hydrolase (EC 3.3.2.9)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU08590</p>
      <p>GENE_LIST: BSU08590</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>

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    <speciesReference species="M_C00001_c"/>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R07176" name="Adenylyl-sulfate reductase [thioredoxin] (EC
1.8.4.10)|Phosphoadenylyl-sulfate reductase [thioredoxin] (EC 1.8.4.8)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU15570 or BSU10930 )</p>
      <p>GENE_LIST: BSU15570 BSU10930</p>
      <p>SUBSYSTEM: Sulfur Metabolism</p>
    </html>
  </notes>
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    <speciesReference species="M_C00342_c"/>
    <speciesReference species="M_C00224_c"/>
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    <speciesReference species="M_C11481_c"/>
    <speciesReference species="M_C00343_c"/>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>

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    </kineticLaw>
  </reaction>
  <reaction id="R_R07219" name="4-hydroxy-3-methylbut-2-enyl diphosphate reductase (EC
1.17.1.2)" reversible="false">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml">
        <p>GENE_ASSOCIATION: BSU25160</p>
        <p>GENE_LIST: BSU25160</p>
        <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
      </html>
    </notes>
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      <speciesReference species="M_C00080_c"/>
      <speciesReference species="M_C00005_c"/>
      <speciesReference species="M_C11811_c"/>
    </listOfReactants>
    <listOfProducts>
      <speciesReference species="M_C00006_c"/>
      <speciesReference species="M_C00001_c"/>
      <speciesReference species="M_C00235_c"/>
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      </math>
      <listOfParameters>
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        <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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      </listOfParameters>
    </kineticLaw>
  </reaction>
  <reaction id="R_R07262" name="2-succinyl-6-hydroxy-2,4-cyclohexadiene-1-carboxylate
synthase (EC 4.2.99.20);Alpha/beta hydrolase fold (EC 3.8.1.5)(BSU31420)" reversible="false">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml">
        <p>GENE_ASSOCIATION: ( BSU31420 or BSU30810 )</p>
        <p>GENE_LIST: BSU31420 BSU30810</p>
        <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
      </html>
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      <speciesReference species="M_C15547_c"/>

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</listOfReactants>
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  <speciesReference species="M_C03657_c"/>
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  </math>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R07263" name="Naphthoate synthase (EC 4.1.3.36)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU30800</p>
      <p>GENE_LIST: BSU30800</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C03160_c"/>
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  <listOfProducts>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C15547_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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</reaction>

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<reaction id="R_R07270" name="Phytoene synthase (EC 2.5.1.32)" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU10810</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>
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  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00013_c"/>
    <speciesReference species="M_C05413_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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  </kineticLaw>
</reaction>
<reaction id="R_R07280" name="" reversible="false">
  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
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    <speciesReference species="M_C04454_c"/>
  </listOfReactants>
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    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C04732_c"/>
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  <kineticLaw>

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<math xmlns="http://www.w3.org/1998/Math/MathML">
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</math>
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  <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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</listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R07281" name="3,4-dihydroxy-2-butanone 4-phosphate synthase|GTP
cyclohydrolase II (EC 3.5.4.25)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU23260</p>
      <p>GENE_LIST: BSU23260</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00199_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00058_c"/>
    <speciesReference species="M_C15556_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R07316" name="">
  <notes>
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      <p>GENE_ASSOCIATION: </p>
      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>

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</html>
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  <speciesReference species="M_C01563_c"/>
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  <speciesReference species="M_C00011_c"/>
  <speciesReference species="M_C00014_c"/>
</listOfProducts>
<kineticLaw>
  <math xmlns="http://www.w3.org/1998/Math/MathML">
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  </math>
  <listOfParameters>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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</reaction>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Carbohydrates</p>
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    <speciesReference species="M_C00794_c"/>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00005_c"/>
    <speciesReference species="M_C00247_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>

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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R07355" name="Dihydropteridine reductase (EC
1.5.1.34)|Oxygen-insensitive NAD(P)H nitroreductase (EC 1.-.-.)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU07830 or BSU05660 or BSU05480 or
BSU19550 )</p>
      <p>GENE_LIST: BSU07830 BSU05660 BSU05480 BSU19550</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
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    <speciesReference species="M_C00006_c"/>
    <speciesReference species="M_C05650_c"/>
  </listOfReactants>
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    <speciesReference species="M_C00005_c"/>
    <speciesReference species="M_C05649_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R07363" name="1,2-dihydroxy-3-keto-5-methylthiopentene dioxygenase
(EC 1.13.11.54)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU13620</p>
      <p>GENE_LIST: BSU13620</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>

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  </math>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
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(EC 1.13.11.54)" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU13620</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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    <speciesReference species="M_C00058_c"/>
    <speciesReference species="M_C01180_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>

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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R07392" name="Methylthioribulose-1-phosphate dehydratase (EC
4.2.1.109)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU13610</p>
      <p>GENE_LIST: BSU13610</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C15650_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R07393" name="2,3-diketo-5-methylthiopentyl-1-phosphate enolase"
reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU13590</p>
      <p>GENE_LIST: BSU13590</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </notes>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
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phosphatase" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU13600</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </notes>
  <listOfReactants>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C15651_c"/>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C15606_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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</reaction>

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<reaction id="R\_R07396" name="Glutamine-dependent 2-keto-4-methylthiobutyrate transaminase">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml">

<p>GENE\_ASSOCIATION: BSU13580</p>

<p>GENE\_LIST: BSU13580</p>

<p>SUBSYSTEM: Amino Acids and Derivatives</p>

</html>

</notes>

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<speciesReference species="M\_C00026\_c"/>

<speciesReference species="M\_C00073\_c"/>

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</math>

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<parameter id="UPPER\_BOUND" value="1000" units="mmol\_per\_gDW\_per\_hr"/>

<parameter id="OBJECTIVE\_COEFFICIENT" value="0"/>

</listOfParameters>

</kineticLaw>

</reaction>

<reaction id="R\_R07406" name="" reversible="false">

<notes>

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<p>GENE\_ASSOCIATION: </p>

<p>GENE\_LIST: </p>

<p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>

</html>

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<speciesReference species="M\_C11638\_c"/>

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</reaction>
<reaction id="R_R07460" name="Putative cysteine desulfurase iscS 1 (EC 2.8.1.7);Putative
cysteine desulfurase nifS (EC 2.8.1.7)(BSU27880);Putative cysteine desulfurase iscS 2 (EC
2.8.1.7)(BSU29590)" reversible="false">
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    <html xmlns="http://www.w3.org/1999/xhtml">
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      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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    <speciesReference species="M_C00097_c"/>
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    <speciesReference species="M_C00041_c"/>
  </listOfProducts>
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  </kineticLaw>
</reaction>
<reaction id="R_R07475" name="Heptaprenyl diphosphate synthase component II (EC
2.5.1.30);Heptaprenyl diphosphate synthase component I (EC 2.5.1.30)(BSU22760)"
reversible="false">
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  <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  <speciesReference species="M_C00353_c"/>
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<reaction id="R_R07476" name="Phosphosulfolactate synthase (EC 4.4.1.19)">
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      <p>GENE_LIST: BSU10950</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  <listOfProducts>
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component, alpha subunit (EC 1.2.4.4)(BSU24050)" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU24040 BSU24050</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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    <speciesReference species="M_C00068_c"/>
    <speciesReference species="M_C00141_c"/>
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  <listOfProducts>
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    <speciesReference species="M_C15976_c"/>
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  </kineticLaw>
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component, alpha subunit (EC 1.2.4.4)(BSU24050)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU24040 and BSU24050 )</p>
      <p>GENE_LIST: BSU24040 BSU24050</p>

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    <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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</kineticLaw>
</reaction>
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component, alpha subunit (EC 1.2.4.4)(BSU24050)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU24040 and BSU24050 )</p>
      <p>GENE_LIST: BSU24040 BSU24050</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00068_c"/>
    <speciesReference species="M_C00233_c"/>
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  <listOfProducts>
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    <speciesReference species="M_C15974_c"/>
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</math>
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</kineticLaw>
</reaction>
<reaction id="R_R07602" name="Branched-chain alpha-keto acid dehydrogenase, E1
component, beta subunit (EC 1.2.4.4);Branched-chain alpha-keto acid dehydrogenase, E1
component, alpha subunit (EC 1.2.4.4)(BSU24050)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
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      <p>GENE_LIST: BSU24040 BSU24050</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
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  </listOfProducts>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R07603" name="Branched-chain alpha-keto acid dehydrogenase, E1
component, beta subunit (EC 1.2.4.4);Branched-chain alpha-keto acid dehydrogenase, E1
component, alpha subunit (EC 1.2.4.4)(BSU24050)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU24040 and BSU24050 )</p>
      <p>GENE_LIST: BSU24040 BSU24050</p>

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    <p>SUBSYSTEM: Amino Acids and Derivatives</p>
  </html>
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  <speciesReference species="M_C00671_c"/>
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  <speciesReference species="M_C00011_c"/>
  <speciesReference species="M_C15978_c"/>
</listOfProducts>
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  </math>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
</reaction>
<reaction id="R_R07604" name="Branched-chain alpha-keto acid dehydrogenase, E1
component, beta subunit (EC 1.2.4.4);Branched-chain alpha-keto acid dehydrogenase, E1
component, alpha subunit (EC 1.2.4.4)(BSU24050)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU24040 and BSU24050 )</p>
      <p>GENE_LIST: BSU24040 BSU24050</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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    <speciesReference species="M_C15978_c"/>
  </listOfReactants>
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    <speciesReference species="M_C15979_c"/>
  </listOfProducts>
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</listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R07618" name="Dihydrolipoamide dehydrogenase of pyruvate
dehydrogenase complex (EC 1.8.1.4);Dihydrolipoamide dehydrogenase of branched-chain
alpha-keto acid dehydrogenase (EC 1.8.1.4)(BSU24060)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU14610 or BSU24060 )</p>
      <p>GENE_LIST: BSU14610 BSU24060</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00003_c"/>
    <speciesReference species="M_C15973_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C15972_c"/>
  </listOfProducts>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R07651" name="D-aminopeptidase">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU12920</p>
      <p>GENE_LIST: BSU12920</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>

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</html>
</notes>
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  <speciesReference species="M_C00993_c"/>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R07770" name="Lipoate-protein ligase A" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU24530</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00725_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C16238_c"/>
  </listOfProducts>
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    </listOfParameters>
  </kineticLaw>
</reaction>

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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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      <p>GENE_ASSOCIATION: BSU24530</p>
      <p>GENE_LIST: BSU24530</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
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    <speciesReference species="M_C16240_c"/>
  </listOfReactants>
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    <speciesReference species="M_C16237_c"/>
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  </kineticLaw>
</reaction>
<reaction id="R_R08056" name="Glucarate dehydratase (EC 4.2.1.40)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU02490</p>
      <p>GENE_LIST: BSU02490</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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  </listOfReactants>
  <listOfProducts>

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    <speciesReference species="M_C00001_c"/>
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  <kineticLaw>
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  </kineticLaw>
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<reaction id="R_R08125" name="Fructoselysine 6-phosphate deglycase (EC 3.5.-.-)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU32610</p>
      <p>GENE_LIST: BSU32610</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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    <speciesReference species="M_C16489_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00668_c"/>
  </listOfProducts>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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    </listOfParameters>
  </kineticLaw>
</reaction>
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synthase (EC 4.2.99.20)" reversible="false">
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  <p>GENE_LIST: BSU30810</p>
  <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
</html>
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  <speciesReference species="M_C00022_c"/>
  <speciesReference species="M_C05817_c"/>
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</kineticLaw>
</reaction>
<reaction id="R_R08218" name="Seryl-tRNA synthetase" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU00130</p>
      <p>SUBSYSTEM: Aminoacyl-tRNA biosynthesis</p>
    </html>
  </notes>
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    <speciesReference species="M_C00065_c"/>
    <speciesReference species="M_C16636_c"/>
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  <listOfProducts>
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    <speciesReference species="M_C00013_c"/>
    <speciesReference species="M_C06481_c"/>
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  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R08368" name="Purine nucleoside phosphorylase (EC 2.4.2.1)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU19630 or BSU23490 )</p>
      <p>GENE_LIST: BSU19630 BSU23490</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C15586_c"/>
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  <listOfProducts>
    <speciesReference species="M_C00620_c"/>
    <speciesReference species="M_C15587_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R08386" name="N-hydroxyarylamine O-acetyltransferase (EC 2.3.1.118)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU34730</p>
      <p>GENE_LIST: BSU34730</p>
      <p>SUBSYSTEM: Carbohydrates</p>

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    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00024_c"/>
    <speciesReference species="M_C02720_c"/>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R08871" name="Putative phosphinothricin acetyltransferase ywnH (PPT
N-acetyltransferase) (EC 2.3.1.183)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU36560</p>
      <p>GENE_LIST: BSU36560</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00024_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C17949_c"/>
    <speciesReference species="M_C00010_c"/>
  </listOfProducts>
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>

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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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</kineticLaw>
</reaction>
<reaction id="R_R08938" name="Putative phosphinothricin acetyltransferase ywnH (PPT
N-acetyltransferase) (EC 2.3.1.183)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU36560</p>
      <p>GENE_LIST: BSU36560</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C05042_c"/>
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  <listOfProducts>
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    <speciesReference species="M_C17952_c"/>
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    </math>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn00399" name="Nitric oxide synthase oxygenase (EC 1.-.-.)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU07630</p>
      <p>GENE_LIST: BSU07630</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00007_c" stoichiometry="3"/>

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    <speciesReference species="M_C00062_c" stoichiometry="2"/>
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  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00006_c"/>
    <speciesReference species="M_C00001_c" stoichiometry="2"/>
    <speciesReference species="M_C00327_c" stoichiometry="2"/>
    <speciesReference species="M_C00533_c" stoichiometry="2"/>
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  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn00418" name="Aminoglycoside 6-adenylyltransferase (EC 2.7.7.-)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU26790</p>
      <p>GENE_LIST: BSU26790</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00002_c"/>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00065_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00013_c"/>
    <speciesReference species="M_C05820_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>

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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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</reaction>
<reaction id="R_rxn00568" name="Nitrite reductase [NAD(P)H] small subunit (EC
1.7.1.4);Nitrite reductase [NAD(P)H] large subunit (EC 1.7.1.4)(BSU03300);Assimilatory nitrate
reductase large subunit (EC:1.7.99.4)(BSU03310);Nitrite reductase [NAD(P)H] large subunit (EC
1.7.1.4)(BSU03320)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
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BSU03320 )</p>
      <p>GENE_LIST: BSU03290 BSU03300 BSU03310 BSU03320</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00080_c" stoichiometry="5"/>
    <speciesReference species="M_C00004_c" stoichiometry="3"/>
    <speciesReference species="M_C00088_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00003_c" stoichiometry="3"/>
    <speciesReference species="M_C00001_c" stoichiometry="2"/>
    <speciesReference species="M_C00014_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn00569" name="Nitrite reductase [NAD(P)H] small subunit (EC
1.7.1.4);Nitrite reductase [NAD(P)H] large subunit (EC 1.7.1.4)(BSU03300);Assimilatory nitrate
reductase large subunit (EC:1.7.99.4)(BSU03310);Nitrite reductase [NAD(P)H] large subunit (EC
1.7.1.4)(BSU03320)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">

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<p>GENE\_ASSOCIATION: ( BSU03290 and BSU03300 and BSU03310 and BSU03320 )</p>

<p>GENE\_LIST: BSU03290 BSU03300 BSU03310 BSU03320</p>

<p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>

</html>

</notes>

<listOfReactants>

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<speciesReference species="M\_C00005\_c" stoichiometry="3"/>

<speciesReference species="M\_C00088\_c"/>

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<speciesReference species="M\_C00001\_c" stoichiometry="2"/>

<speciesReference species="M\_C00014\_c"/>

</listOfProducts>

<kineticLaw>

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</math>

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<parameter id="UPPER\_BOUND" value="1000" units="mmol\_per\_gDW\_per\_hr"/>

<parameter id="OBJECTIVE\_COEFFICIENT" value="0"/>

</listOfParameters>

</kineticLaw>

</reaction>

<reaction id="R\_rxn00734" name="" reversible="false">

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<p>GENE\_LIST: </p>

<p>SUBSYSTEM: Carbohydrates</p>

</html>

</notes>

<listOfReactants>

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<speciesReference species="M\_C00080\_c" stoichiometry="2"/>

<speciesReference species="M\_C00007\_c" stoichiometry="0.5"/>

<speciesReference species="M\_C00109\_c"/>

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<listOfProducts>

<speciesReference species="M\_C00001\_c"/>

<speciesReference species="M\_C00011\_c"/>

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    <speciesReference species="M_C02876_c"/>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn00955" name="">
  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C03539_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00155_c"/>
    <speciesReference species="M_C00121_c"/>
  </listOfProducts>
  <kineticLaw>
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      <ci> FLUX_VALUE </ci>
    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn01259" name="Oligo-1,6-glucosidase (EC 3.2.1.10);Neopullulanase (EC
3.2.1.135)(BSU34560)">
  <notes>
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    <p>GENE_ASSOCIATION: ( BSU02840 or BSU34560 )</p>
    <p>GENE_LIST: BSU02840 BSU34560</p>
    <p>SUBSYSTEM: Carbohydrates</p>
  </html>
</notes>
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  <speciesReference species="M_C00001_c"/>
  <speciesReference species="M_C00252_c"/>
</listOfReactants>
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  <speciesReference species="M_C00267_c" stoichiometry="2"/>
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<kineticLaw>
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  </math>
  <listOfParameters>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn01923" name="Butyryl-CoA dehydrogenase (EC 1.3.99.2)"
reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU24150</p>
      <p>GENE_LIST: BSU24150</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00630_c" stoichiometry="2"/>
  </listOfReactants>
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    <speciesReference species="M_C03460_c" stoichiometry="2"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>

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  <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
  <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
</listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn02005" name="PTS system, trehalose-specific IIB component (EC
2.7.1.69)|PTS system, trehalose-specific IIC component (EC
2.7.1.69);Phosphoenolpyruvate-protein phosphotransferase of PTS system (EC
2.7.3.9)(BSU13910);Phosphocarrier protein of PTS system(BSU13900)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU13900 and BSU13910 and BSU07800 )</p>
      <p>GENE_LIST: BSU13900 BSU13910 BSU07800</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00074_c"/>
    <speciesReference species="M_C01083_e"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00022_c"/>
    <speciesReference species="M_C00689_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn02268" name="Butyryl-CoA dehydrogenase (EC 1.3.99.2)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU24150</p>
      <p>GENE_LIST: BSU24150</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>

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</html>
</notes>
<listOfReactants>
  <speciesReference species="M_C00007_c"/>
  <speciesReference species="M_C15980_c" stoichiometry="2"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00001_c" stoichiometry="2"/>
  <speciesReference species="M_C03345_c" stoichiometry="2"/>
</listOfProducts>
<kineticLaw>
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  </math>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn02727" name="Gamma-glutamyltranspeptidase (EC 2.3.2.2)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU18410</p>
      <p>GENE_LIST: BSU18410</p>
      <p>SUBSYSTEM: Sulfur Metabolism</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C02166_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00025_c"/>
    <speciesReference species="M_C05951_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    </listOfParameters>
  </kineticLaw>
</reaction>

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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn03931" name="Epi-inositol hydrolase" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU39730</p>
      <p>GENE_LIST: BSU39730</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C04287_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C06892_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn04675"
name="2-succinyl-5-enolpyruvyl-6-hydroxy-3-cyclohexene-1-carboxylic-acid synthase (EC
2.2.1.9)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU30820</p>
      <p>GENE_LIST: BSU30820</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00080_c"/>
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    <speciesReference species="M_C00885_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00011_c"/>
    <speciesReference species="M_C00022_c"/>
    <speciesReference species="M_C05817_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn05145" name="Phosphate transport ATP-binding protein PstB (TC
3.A.1.7.1);Putative periplasmic phosphate-binding protein PstS, Mycoplasma
type(BSU24970);Phosphate transport system permease protein pstC (TC
3.A.1.7.1)(BSU24980);Phosphate ABC transporter, periplasmic phosphate-binding protein PstS
(TC 3.A.1.7.1)(BSU24990)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU24950 and BSU24960 and BSU24970 and BSU24980
and BSU24990 )</p>
      <p>GENE_LIST: BSU24950 BSU24960 BSU24970 BSU24980 BSU24990</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00002_c"/>
    <speciesReference species="M_C00009_e"/>
    <speciesReference species="M_C00001_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00008_c"/>
    <speciesReference species="M_C00009_c" stoichiometry="2"/>
    <speciesReference species="M_C00080_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>

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</math>
<listOfParameters>
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  <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
  <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
</listOfParameters>
</kineticLaw>
</reaction>
  <reaction id="R_rxn05147" name="Unspecified monosaccharide ABC transport system,
ATP-binding protein;Multiple sugar ABC transporter, ATP-binding protein(BSU32550);Multiple
sugar ABC transporter, substrate-binding protein(BSU30270);Multiple sugar ABC transporter,
membrane-spanning permease protein MsmF(BSU30280);Multiple sugar ABC transporter,
membrane-spanning permease protein MsmG(BSU30290);Unspecified monosaccharide ABC
transport system, substrate-binding component(BSU31540);Unspecified monosaccharide ABC
transport system, permease component Ia (FIG025991)|Unspecified monosaccharide ABC
transport system, permease component Ib (FIG143636)(BSU31560);Unspecified monosaccharide
ABC transport system, permease component 2(BSU31570);Multiple sugar ABC transporter,
membrane-spanning permease protein MsmG(BSU32580);Multiple sugar ABC transporter,
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type transporter HtsABC, permease protein HtsB(BSU07510);Heme ABC type transporter
HtsABC, heme-binding protein(BSU07520)" reversible="false">
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protein SitD;Manganese ABC transporter, inner membrane permease protein

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SitC(BSU30750);Manganese ABC transporter, ATP-binding protein SitB(BSU30760);Manganese ABC transporter, periplasmic-binding protein SitA(BSU30770)" reversible="false">

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<p>SUBSYSTEM: Membrane Transport</p>

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3.A.1.3.2)(BSU27440);Glutamine transport system permease protein glnP (TC
3.A.1.3.2)(BSU27450);Glutamine transport system permease protein glnP (TC
3.A.1.3.2)(BSU27460)" reversible="false">
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protein(BSU31550);Multiple sugar ABC transporter, ATP-binding protein(BSU32550);Ribose
ABC transport system, high affinity permease RbsD (TC 3.A.1.2.1)(BSU35930);Multiple sugar
ABC transporter, substrate-binding protein(BSU30270);Multiple sugar ABC transporter,
membrane-spanning permease protein MsmF(BSU30280);Multiple sugar ABC transporter,
membrane-spanning permease protein MsmG(BSU30290);Unspecified monosaccharide ABC
transport system, substrate-binding component(BSU31540);Unspecified monosaccharide ABC
transport system, permease component Ia (FIG025991)|Unspecified monosaccharide ABC
transport system, permease component Ib (FIG143636)(BSU31560);Unspecified monosaccharide
ABC transport system, permease component 2(BSU31570);Multiple sugar ABC transporter,
membrane-spanning permease protein MsmG(BSU32580);Multiple sugar ABC transporter,
membrane-spanning permease protein MsmF(BSU32590);Multiple sugar ABC transporter,
substrate-binding protein(BSU32600);Ribose ABC transport system, permease protein RbsC (TC
3.A.1.2.1)(BSU35950);Ribose ABC transport system, periplasmic ribose-binding protein RbsB
(TC 3.A.1.2.1)(BSU35960)" reversible="false">
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BSU30280 and BSU30290 ) or ( BSU32550 and BSU32580 and BSU32590 and
BSU32600 ) )</p>
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BSU32600</p>
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membrane-spanning permease protein MsmF(BSU30280);Multiple sugar ABC transporter,
membrane-spanning permease protein MsmG(BSU30290);Unspecified monosaccharide ABC
transport system, substrate-binding component(BSU31540);Unspecified monosaccharide ABC
transport system, permease component Ia (FIG025991)|Unspecified monosaccharide ABC
transport system, permease component Ib (FIG143636)(BSU31560);Unspecified monosaccharide
ABC transport system, permease component 2(BSU31570);Multiple sugar ABC transporter,
membrane-spanning permease protein MsmG(BSU32580);Multiple sugar ABC transporter,
membrane-spanning permease protein MsmF(BSU32590);Multiple sugar ABC transporter,
substrate-binding protein(BSU32600)" reversible="false">
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transport protein(BSU29380)" reversible="false">
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membrane-spanning permease protein MsmF(BSU30280);Multiple sugar ABC transporter,
membrane-spanning permease protein MsmG(BSU30290);Unspecified monosaccharide ABC
transport system, substrate-binding component(BSU31540);Unspecified monosaccharide ABC
transport system, permease component Ia (FIG025991)|Unspecified monosaccharide ABC
transport system, permease component Ib (FIG143636)(BSU31560);Unspecified monosaccharide
ABC transport system, permease component 2(BSU31570);Multiple sugar ABC transporter,
membrane-spanning permease protein MsmG(BSU32580);Multiple sugar ABC transporter,
membrane-spanning permease protein MsmF(BSU32590);Multiple sugar ABC transporter,
substrate-binding protein(BSU32600)" reversible="false">
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BSU30290 BSU32550 BSU32580 BSU32590 BSU32600</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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system, substrate-binding component;Predicted rhamnose oligosaccharide ABC transport
system, permease component 2(BSU06980);Predicted rhamnose oligosaccharide ABC transport
system, permease component(BSU06990);ABC-type polysaccharide transport system, permease
component(BSU07110)" reversible="false">
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araP(BSU28740);alpha-arabinosides ABC transport system, substrate-binding protein
araN(BSU28750);Multiple sugar ABC transporter, substrate-binding protein(BSU30270);Multiple
sugar ABC transporter, membrane-spanning permease protein MsmF(BSU30280);Multiple sugar
ABC transporter, membrane-spanning permease protein MsmG(BSU30290);Unspecified
monosaccharide ABC transport system, substrate-binding component(BSU31540);Unspecified
monosaccharide ABC transport system, permease component Ia (FIG025991)Unspecified
monosaccharide ABC transport system, permease component Ib
(FIG143636)(BSU31560);Unspecified monosaccharide ABC transport system, permease
component 2(BSU31570);Multiple sugar ABC transporter, membrane-spanning permease protein
MsmG(BSU32580);Multiple sugar ABC transporter, membrane-spanning permease protein
MsmF(BSU32590);Multiple sugar ABC transporter, substrate-binding protein(BSU32600)"

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BSU31570 ) or ( BSU32550 and BSU32580 and BSU32590 and BSU32600 ) )</p>
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reversible="false">
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<reaction id="R_rxn05177" name="Duplicated ATPase component YkoD of energizing
module of thiamin-regulated ECF transporter for HydroxyMethylPyrimidine;Transmembrane
component YkoC of energizing module of thiamin-regulated ECF transporter for
HydroxyMethylPyrimidine(BSU13210);Substrate-specific component YkoE of thiamin-regulated
ECF transporter for HydroxyMethylPyrimidine(BSU13230);Additional substrate-binding
component of thiamin-regulated ECF transporter for HydroxyMethylPyrimidine(BSU13240)"
reversible="false">
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permease protein OpuCD;Osmotically activated L-carnitine/choline ABC transporter,
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transporter, permease protein OpuCB(BSU33820);Osmotically activated L-carnitine/choline ABC
transporter, ATP-binding protein OpuCA(BSU33830)" reversible="false">
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OpuAB(BSU02990);Glycine betaine ABC transport system, glycine betaine-binding protein
OpuAC(BSU03000)" reversible="false">
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protein(BSU09080);Methionine ABC transporter substrate-binding protein(BSU09110);ABC
transporter, permease protein(BSU30410);ABC transporter, ATP-binding
protein(BSU30450);Methionine ABC transporter substrate-binding
protein(BSU32730);Methionine ABC transporter permease protein(BSU32740)"
reversible="false">

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<notes>
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ABC transport system, permease protein OpuBB(BSU33720);Choline ABC transport system,
ATP-binding protein OpuBA(BSU33730);Osmotically activated L-carnitine/choline ABC
transporter, permease protein OpuCD(BSU33800);Osmotically activated L-carnitine/choline ABC
transporter, substrate-binding protein OpuCC(BSU33810);Osmotically activated
L-carnitine/choline ABC transporter, permease protein OpuCB(BSU33820);Osmotically activated
L-carnitine/choline ABC transporter, ATP-binding protein OpuCA(BSU33830)"
reversible="false">
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3.5.1.90)|Vitamin B12 ABC transporter, ATPase component BtuD;Vitamin B12 ABC transporter,
permease component BtuC(BSU33170);Vitamin B12 ABC transporter, B12-binding component
BtuF(BSU33180)" reversible="false">
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transport system permease protein fhuB (TC 3.A.1.14.3)(BSU33310);Ferrichrome-binding
periplasmic protein precursor (TC 3.A.1.14.3)(BSU33320)" reversible="false">
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protein OpuAA (EC 3.6.3.32);Glycine betaine ABC transport system, permease protein
OpuAB(BSU02990);Glycine betaine ABC transport system, glycine betaine-binding protein
OpuAC(BSU03000)" reversible="false">
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ATP-binding protein;Multiple sugar ABC transporter, ATP-binding protein(BSU32550);Multiple
sugar ABC transporter, substrate-binding protein(BSU30270);Multiple sugar ABC transporter,
membrane-spanning permease protein MsmF(BSU30280);Multiple sugar ABC transporter,
membrane-spanning permease protein MsmG(BSU30290);Unspecified monosaccharide ABC
transport system, substrate-binding component(BSU31540);Unspecified monosaccharide ABC
transport system, permease component Ia (FIG025991)|Unspecified monosaccharide ABC
transport system, permease component Ib (FIG143636)(BSU31560);Unspecified monosaccharide
ABC transport system, permease component 2(BSU31570);Multiple sugar ABC transporter,
membrane-spanning permease protein MsmG(BSU32580);Multiple sugar ABC transporter,
membrane-spanning permease protein MsmF(BSU32590);Multiple sugar ABC transporter,
substrate-binding protein(BSU32600)" reversible="false">
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protein;component of iron-uptake system(BSU01610);component of iron-uptake
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transporter permease protein(BSU03800);Iron compound ABC uptake transporter permease
protein(BSU03810);Iron compound ABC uptake transporter substrate-binding
protein(BSU03830)" reversible="false">
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protein(BSU36470)">
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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  </kineticLaw>
</reaction>
<reaction id="R_rxn05198" name="Nucleoside permease NupC;Nucleoside permease
nupC(BSU39020)">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU32180 or BSU39020 or BSU39410 )</p>
      <p>GENE_LIST: BSU32180 BSU39020 BSU39410</p>

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    <p>SUBSYSTEM: Membrane Transport</p>
  </html>
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  </math>
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nupC(BSU39020)">
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      <p>GENE_ASSOCIATION: ( BSU32180 or BSU39020 or BSU39410 )</p>
      <p>GENE_LIST: BSU32180 BSU39020 BSU39410</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00299_c"/>
  </listOfProducts>
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    </math>
    <listOfParameters>

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</kineticLaw>
</reaction>
<reaction id="R_rxn05200" name="Nucleoside permease NupC;Nucleoside permease
nupC(BSU39020)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU32180 or BSU39020 or BSU39410 )</p>
      <p>GENE_LIST: BSU32180 BSU39020 BSU39410</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
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  <listOfProducts>
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    <speciesReference species="M_C00214_c"/>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn05201" name="Xanthine/uracil/thiamine/ascorbate permease family
protein;xanthine permease(BSU22060);Xanthine permease(BSU32430);Xanthine
permease(BSU32440);Xanthine permease(BSU37940)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU29990 or BSU06370 or ( BSU32430 and BSU32440 )
or BSU22060 or BSU37940 )</p>
      <p>GENE_LIST: BSU29990 BSU06370 BSU32430 BSU32440 BSU22060
BSU37940</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>

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</html>
</notes>
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  <speciesReference species="M_C00262_c"/>
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  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn05202" name="Xanthine/uracil/thiamine/ascorbate permease family
protein;xanthine permease(BSU22060);Xanthine permease(BSU32430);Xanthine
permease(BSU32440);Xanthine permease(BSU37940)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU22060 or ( BSU32430 and BSU32440 ) or BSU06370
or BSU29990 or BSU37940 )</p>
      <p>GENE_LIST: BSU22060 BSU32430 BSU32440 BSU06370 BSU29990
BSU37940</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
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    <speciesReference species="M_C00385_e"/>
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  <listOfProducts>
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    <speciesReference species="M_C00385_c"/>
  </listOfProducts>
  <kineticLaw>
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</math>
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</kineticLaw>
</reaction>
<reaction id="R_rxn05203" name="Cytosine/purine/uracil/thiamine/allantoin permease family
protein;Purine-cytosine permease(BSU38710)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU38710 or BSU36470 )</p>
      <p>GENE_LIST: BSU38710 BSU36470</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00080_e"/>
    <speciesReference species="M_C00242_e"/>
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  <listOfProducts>
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    <speciesReference species="M_C00242_c"/>
  </listOfProducts>
  <kineticLaw>
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  </kineticLaw>
</reaction>
<reaction id="R_rxn05204" name="Cytosine/purine/uracil/thiamine/allantoin permease family
protein;Purine-cytosine permease(BSU38710)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU38710 or BSU36470 )</p>
      <p>GENE_LIST: BSU38710 BSU36470</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>

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</kineticLaw>
</reaction>
<reaction id="R_rxn05205" name="Nucleoside permease NupC;Nucleoside permease
nupC(BSU39020)">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU39410 or BSU39020 or BSU32180 )</p>
      <p>GENE_LIST: BSU39410 BSU39020 BSU32180</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
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  </listOfProducts>
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    </math>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</reaction>
<reaction id="R_rxn05206" name="Potassium efflux system KefA protein|Small-conductance
mechanosensitive channel">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU14210 or BSU07940 )</p>
      <p>GENE_LIST: BSU14210 BSU07940</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
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  </listOfReactants>
  <listOfProducts>
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  </listOfProducts>
  <kineticLaw>
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  </kineticLaw>
</reaction>
<reaction id="R_rxn05207" name="Malate Na(+) symporter">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU31580 or BSU23560 )</p>
      <p>GENE_LIST: BSU31580 BSU23560</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C01330_e"/>
    <speciesReference species="M_C00149_e"/>
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    <speciesReference species="M_C00149_c"/>
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  </kineticLaw>
</reaction>
<reaction id="R_rxn05209" name="Na(+) H(+) antiporter subunit E (TC 2.A.63.1.2);Na(+)
H(+) antiporter subunit A (TC 2.A.63.1.2)(BSU31600);Na(+) H(+) antiporter subunit B (TC
2.A.63.1.2)(BSU31610);Na(+) H(+) antiporter subunit C (TC 2.A.63.1.2)(BSU31620);Na(+) H(+)
antiporter subunit D (TC 2.A.63.1.2)(BSU31630);Na(+) H(+) antiporter subunit F (TC
2.A.63.1.2)(BSU31650);Na(+) H(+) antiporter subunit G (TC 2.A.63.1.2)(BSU31660)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU31600 and BSU31610 and BSU31620 and BSU31630
and BSU31640 and BSU31650 and BSU31660 )</p>
      <p>GENE_LIST: BSU31600 BSU31610 BSU31620 BSU31630 BSU31640 BSU31650
BSU31660</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
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    <speciesReference species="M_C01330_e"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C01330_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>

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    </kineticLaw>
  </reaction>
  <reaction id="R_rxn05211" name="Citrate transporter;L-Malate Citrate symporter (TC
2.A.24.2.4)(BSU38770)" reversible="false">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml">
        <p>GENE_ASSOCIATION: ( BSU26860 or BSU38770 )</p>
        <p>GENE_LIST: BSU26860 BSU38770</p>
        <p>SUBSYSTEM: Membrane Transport</p>
      </html>
    </notes>
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      <speciesReference species="M_C00158_c"/>
    </listOfReactants>
    <listOfProducts>
      <speciesReference species="M_C00080_e"/>
      <speciesReference species="M_C00158_e"/>
    </listOfProducts>
    <kineticLaw>
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      </math>
      <listOfParameters>
        <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
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      </listOfParameters>
    </kineticLaw>
  </reaction>
  <reaction id="R_rxn05213" name="Ca(2+) Citrate symporter (TC 2.A.11.1.2)">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml">
        <p>GENE_ASSOCIATION: BSU39060</p>
        <p>GENE_LIST: BSU39060</p>
        <p>SUBSYSTEM: Membrane Transport</p>
      </html>
    </notes>
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      <speciesReference species="M_C00076_e"/>
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    <listOfProducts>

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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00158_c"/>
    <speciesReference species="M_C00076_c"/>
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    </math>
    <listOfParameters>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn05214" name="Mg(2+) Citrate transporter (TC 2.A.11.1.1)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU07610</p>
      <p>GENE_LIST: BSU07610</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00080_e"/>
    <speciesReference species="M_C00158_e"/>
    <speciesReference species="M_C00305_e"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00158_c"/>
    <speciesReference species="M_C00305_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>

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<reaction id="R_rxn05215" name="sodium/alanine symporter family protein">
  <notes>
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      <p>GENE_ASSOCIATION: BSU27810</p>
      <p>GENE_LIST: BSU27810</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
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  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C01330_c"/>
    <speciesReference species="M_C00041_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn05216" name="Sodium/glutamine symporter glnT">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU02420</p>
      <p>GENE_LIST: BSU02420</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00064_e"/>
  </listOfReactants>
  <listOfProducts>
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  </listOfProducts>
  <kineticLaw>

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</math>
<listOfParameters>
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  <parameter id="UPPER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
  <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
</listOfParameters>
</kineticLaw>
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<reaction id="R_rxn05217" name="Proton/aspartate symport protein|Proton/glutamate
symport protein">
  <notes>
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      <p>GENE_ASSOCIATION: BSU02340</p>
      <p>GENE_LIST: BSU02340</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00049_e"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00049_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn05219" name="Methionine ABC transporter ATP-binding protein;ABC
transporter, ATP-binding protein(BSU09070);ABC transporter, ATP-binding
protein(BSU09080);Methionine ABC transporter substrate-binding protein(BSU09110);ABC
transporter, permease protein(BSU30410);ABC transporter, ATP-binding
protein(BSU30450);Methionine ABC transporter substrate-binding
protein(BSU32730);Methionine ABC transporter permease protein(BSU32740)"

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reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( ( BSU32730 and BSU32740 and BSU32750 ) or
( BSU09070 and BSU09080 and BSU09110 ) or ( BSU30410 and BSU30420 and
BSU30450 ) )</p>
      <p>GENE_LIST: BSU32730 BSU32740 BSU32750 BSU09070 BSU09080 BSU09110
BSU30410 BSU30420 BSU30450</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00073_e"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00073_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn05221" name="Proline/sodium symporter PutP (TC
2.A.21.2.1)|Propionate/sodium symporter;Sodium/proline symporter(BSU06660)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU06660 or BSU03220 )</p>
      <p>GENE_LIST: BSU06660 BSU03220</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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  </notes>
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    </math>
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      <parameter id="UPPER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn05223" name="Substrate-specific component BioY of biotin ECF
transporter" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU10370 or BSU32030 )</p>
      <p>GENE_LIST: BSU10370 BSU32030</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00120_e"/>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00120_c"/>
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  <kineticLaw>
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    </math>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
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<reaction id="R_rxn05226" name="PTS system, glucose-specific IIBC component (EC
2.7.1.69);PTS system, maltose and glucose-specific IIB component (EC 2.7.1.69)|PTS system,
maltose and glucose-specific IIC component (EC
2.7.1.69)(BSU08200);Phosphoenolpyruvate-protein phosphotransferase of PTS system (EC
2.7.3.9)(BSU13910);PTS system, glucose-specific IIA component (EC 2.7.1.69)|PTS system,
glucose-specific IIB component (EC 2.7.1.69)|PTS system, glucose-specific IIC component (EC
2.7.1.69)(BSU13890);PTS system, glucose-specific IIA component(BSU22230);Phosphocarrier
protein of PTS system(BSU13900)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( ( BSU13890 and BSU13900 and BSU13910 ) or
( BSU08200 and BSU13900 and BSU13910 ) or ( BSU01680 and BSU13900 and BSU13910 ) or
( BSU40120 and BSU13900 and BSU13910 ) or ( BSU22230 and BSU13900 and
BSU13910 ) )</p>
      <p>GENE_LIST: BSU13890 BSU13900 BSU13910 BSU08200 BSU13900 BSU13910
BSU01680 BSU13900 BSU13910 BSU40120 BSU13900 BSU13910 BSU22230 BSU13900
BSU13910</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn05229" name="Phosphoribosylaminoimidazole carboxylase catalytic

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subunit (EC 4.1.1.21);Phosphoribosylaminoimidazole carboxylase ATPase subunit (EC 4.1.1.21)(BSU06430)" reversible="false">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml">

<p>GENE\_ASSOCIATION: ( BSU06420 and BSU06430 )</p>

<p>GENE\_LIST: BSU06420 BSU06430</p>

<p>SUBSYSTEM: Nucleosides and Nucleotides</p>

</html>

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<speciesReference species="M\_C00080\_c"/>

<speciesReference species="M\_C04751\_c"/>

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<kineticLaw>

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</math>

<listOfParameters>

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<parameter id="UPPER\_BOUND" value="1000" units="mmol\_per\_gDW\_per\_hr"/>

<parameter id="OBJECTIVE\_COEFFICIENT" value="0"/>

</listOfParameters>

</kineticLaw>

</reaction>

<reaction id="R\_rxn05237" name="amino acid ABC transporter, ATP-binding protein;amino acid ABC transporter, permease protein(BSU39490);Cysteine ABC transporter, substrate-binding protein(BSU39500)" reversible="false">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml">

<p>GENE\_ASSOCIATION: ( BSU39480 and BSU39490 and BSU39500 )</p>

<p>GENE\_LIST: BSU39480 BSU39490 BSU39500</p>

<p>SUBSYSTEM: Membrane Transport</p>

</html>

</notes>

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  </kineticLaw>
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  <notes>
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      <p>GENE_ASSOCIATION: ( ( BSU26690 and BSU26700 and BSU26710 ) or BSU29600 )</p>
      <p>GENE_LIST: BSU26690 BSU26700 BSU26710 BSU29600</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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  </notes>
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    <speciesReference species="M_C00123_e"/>
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  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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</kineticLaw>
</reaction>
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protein;branched-chain amino acid transport(BSU26700);branched-chain amino acid
transport(BSU26710)">
  <notes>
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      <p>GENE_ASSOCIATION: ( ( BSU26690 and BSU26700 and BSU26710 ) or
BSU29600 )</p>
      <p>GENE_LIST: BSU26690 BSU26700 BSU26710 BSU29600</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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  </notes>
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  <listOfProducts>
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    <speciesReference species="M_C00407_c"/>
  </listOfProducts>
  <kineticLaw>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
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6.2.1.3);Acetoacetyl-CoA synthetase [leucine] (EC 6.2.1.16)|Long-chain-fatty-acid--CoA ligase
(EC 6.2.1.3)(BSU18250)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU10270 or BSU28560 or BSU18250 or BSU10360 or
BSU17180 or BSU04170 )</p>
      <p>GENE_LIST: BSU10270 BSU28560 BSU18250 BSU10360 BSU17180
BSU04170</p>

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    <p>SUBSYSTEM: Fatty Acids and Lipids</p>
  </html>
</notes>
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  <speciesReference species="M_cpd11430_c"/>
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<listOfProducts>
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  <speciesReference species="M_cpd11435_c"/>
</listOfProducts>
<kineticLaw>
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</kineticLaw>
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(EC 6.2.1.3)(BSU18250)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
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BSU17180 or BSU04170 )</p>
      <p>GENE_LIST: BSU10270 BSU28560 BSU18250 BSU10360 BSU17180
BSU04170</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  </notes>
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    <speciesReference species="M_cpd11438_c"/>
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  <listOfProducts>

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    <speciesReference species="M_C00013_c"/>
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    <speciesReference species="M_cpd11439_c"/>
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  </kineticLaw>
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6.2.1.3);Acetoacetyl-CoA synthetase [leucine] (EC 6.2.1.16)|Long-chain-fatty-acid--CoA ligase
(EC 6.2.1.3)(BSU18250)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
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BSU17180 or BSU04170 )</p>
      <p>GENE_LIST: BSU10270 BSU28560 BSU18250 BSU10360 BSU17180
BSU04170</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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    <speciesReference species="M_cpd11436_c"/>
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    <speciesReference species="M_C00020_c"/>
    <speciesReference species="M_cpd11437_c"/>
  </listOfProducts>
  <kineticLaw>
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      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>

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</kineticLaw>
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6.2.1.3);Acetoacetyl-CoA synthetase [leucine] (EC 6.2.1.16)|Long-chain-fatty-acid--CoA ligase
(EC 6.2.1.3)(BSU18250)" reversible="false">
  <notes>
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BSU17180 or BSU04170 )</p>
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BSU04170</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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6.2.1.3);Acetoacetyl-CoA synthetase [leucine] (EC 6.2.1.16)|Long-chain-fatty-acid--CoA ligase
(EC 6.2.1.3)(BSU18250)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">

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<p>GENE\_ASSOCIATION: ( BSU10270 or BSU28560 or BSU18250 or BSU10360 or BSU17180 or BSU04170 )</p>

<p>GENE\_LIST: BSU10270 BSU28560 BSU18250 BSU10360 BSU17180 BSU04170</p>

<p>SUBSYSTEM: Fatty Acids and Lipids</p>

</html>

</notes>

<listOfReactants>

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<speciesReference species="M\_C00020\_c"/>

</listOfProducts>

<kineticLaw>

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</math>

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<parameter id="UPPER\_BOUND" value="1000" units="mmol\_per\_gDW\_per\_hr"/>

<parameter id="OBJECTIVE\_COEFFICIENT" value="0"/>

</listOfParameters>

</kineticLaw>

</reaction>

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<notes>

<html xmlns="http://www.w3.org/1999/xhtml">

<p>GENE\_ASSOCIATION: ( BSU10270 or BSU28560 or BSU18250 or BSU10360 or BSU17180 or BSU04170 )</p>

<p>GENE\_LIST: BSU10270 BSU28560 BSU18250 BSU10360 BSU17180 BSU04170</p>

<p>SUBSYSTEM: Fatty Acids and Lipids</p>

</html>

</notes>

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    <speciesReference species="M_C00020_c"/>
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  </listOfProducts>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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  </kineticLaw>
</reaction>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
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  </notes>
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  <listOfProducts>
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    <speciesReference species="M_C00504_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>

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    </kineticLaw>
  </reaction>
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  UbiE/COQ5 (EC 2.1.1.-)" reversible="false">
    <notes>
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        <p>GENE_ASSOCIATION: BSU22750</p>
        <p>GENE_LIST: BSU22750</p>
        <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
      </html>
    </notes>
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      <speciesReference species="M_C00019_c"/>
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    </listOfReactants>
    <listOfProducts>
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    </kineticLaw>
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  2.5.1.-)" reversible="false">
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        <p>GENE_LIST: BSU38490</p>
        <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
      </html>
    </notes>
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  </listOfProducts>
  <kineticLaw>
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    </math>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn05292" name="Ferrous iron transport peroxidase EfeB;Ferrous iron
transport periplasmic protein EfeO(BSU38270)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU38260 and BSU38270 )</p>
      <p>GENE_LIST: BSU38260 BSU38270</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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  </notes>
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  </listOfReactants>
  <listOfProducts>
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<notes>

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<p>SUBSYSTEM: Macromolecular Synthesis</p>

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</notes>

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3.1.26.3)(BSU15930);tRNA (Guanine37-N1) -methyltransferase (EC
2.1.1.31)(BSU16030);Ribonuclease P protein component (EC
3.1.26.5)(BSU41050);DNA-directed RNA polymerase subunit omega (RNAP omega subunit) (EC
2.7.7.6) (Transcriptase subunit omega) (RNA polymerase omega subunit)(BSU15690);tRNA
(5-methylaminomethyl-2-thiouridylate)-methyltransferase (EC 2.1.1.61)(BSU27500);tRNA
(cytosine34-2'-O-)-methyltransferase (EC 2.1.1.-)(BSU08930);DNA-directed RNA polymerase
subunit delta(BSU37160);tRNA nucleotidyltransferase (EC
2.7.7.25)(BSU22450);Two-component sensor kinase SA14-24(BSU40400);Sigma-M negative
effector(BSU09510);Transcription termination protein NusA(BSU16600);RNA polymerase sigma
factor RpoD(BSU25200);Two-component response regulator SA14-24(BSU40410)"
reversible="false">
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and BSU40410 and BSU40400 and BSU09510 and BSU16600 and BSU15690 )</p>
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and BSU01180 and BSU01190 and BSU01200 and BSU01210 and BSU01220 and BSU01230
and BSU01240 and BSU01250 and BSU01260 and BSU01270 and BSU01280 and BSU01290
and BSU01300 and BSU01310 and BSU01320 and BSU01330 and BSU01340 and BSU01350
and BSU01400 and BSU01410 and BSU01420 and BSU01440 and BSU01490 and BSU01500
and BSU15080 and BSU15820 and BSU15990 and BSU16040 and BSU16490 and BSU16680
and BSU24900 and BSU25410 and BSU25550 and BSU27940 and BSU27960 and BSU28850
and BSU28860 and BSU29660 and BSU37070 and BSU40500 and BSU40890 and BSU40910
and BSU41060 and BSU15730 )</p>
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BSU01420 BSU01440 BSU01490 BSU01500 BSU15080 BSU15820 BSU15990 BSU16040
BSU16490 BSU16680 BSU24900 BSU25410 BSU25550 BSU27940 BSU27960 BSU28850
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</notes>

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  </kineticLaw>
</reaction>
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  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
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<reaction id="R_rxn05312" name="Probable low-affinity inorganic phosphate transporter"
reversible="false">
  <notes>
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      <p>GENE_LIST: BSU12840</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00080_c"/>
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  </kineticLaw>
</reaction>
<reaction id="R_rxn05313" name="Sodium-dependent phosphate transporter">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
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      <p>GENE_LIST: BSU25420</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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  <speciesReference species="M_C01330_c" stoichiometry="3"/>
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</reaction>
<reaction id="R_rxn05315" name="Cobalt-zinc-cadmium resistance protein CzcD">
  <notes>
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      <p>GENE_LIST: BSU26650</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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  </notes>
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    <speciesReference species="M_C00038_c"/>
    <speciesReference species="M_C00238_e"/>
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    <speciesReference species="M_C00038_e"/>
    <speciesReference species="M_C00238_c"/>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn05316" name="Cytosine/purine/uracil/thiamine/allantoin permease family
protein;Purine-cytosine permease(BSU38710)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU38710 or BSU36470 )</p>
      <p>GENE_LIST: BSU38710 BSU36470</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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  </notes>
  <listOfReactants>
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protein;Purine-cytosine permease(BSU38710)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
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      <p>GENE_LIST: BSU38710 BSU36470</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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  </notes>
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    <speciesReference species="M_C00559_e"/>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn05318" name="Cytosine/purine/uracil/thiamine/allantoin permease family
protein;Purine-cytosine permease(BSU38710)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
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      <p>GENE_LIST: BSU38710 BSU36470</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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</reaction>
<reaction id="R_rxn05319" name="" reversible="false">
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
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  <listOfReactants>
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  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00001_e"/>
  </listOfProducts>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn05358" name="Malonyl CoA-acyl carrier protein transacylase (EC
2.3.1.39)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU15900</p>
      <p>GENE_LIST: BSU15900</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  </notes>
  <listOfReactants>
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    <speciesReference species="M_C15980_c"/>
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    <speciesReference species="M_cpd11495_c"/>
  </listOfProducts>
  <kineticLaw>

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</math>
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</listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn05359" name="3-oxoacyl-[acyl-carrier-protein] synthase III (EC
2.3.1.41);3-oxoacyl-[acyl-carrier-protein] synthase, KASIII (EC
2.3.1.41)(BSU11330);3-oxoacyl-[acyl-carrier-protein] synthase, KASII (EC
2.3.1.41)(BSU11340)" reversible="false">
  <notes>
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BSU11340 ) )</p>
      <p>GENE_LIST: BSU11330 BSU11340 BSU10170 BSU11340</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  </notes>
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  <listOfProducts>
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    <speciesReference species="M_C00229_c"/>
    <speciesReference species="M_cpd11496_c"/>
  </listOfProducts>
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    </math>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn05360" name="3-oxoacyl-[acyl-carrier protein] reductase (EC

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1.1.1.100);3-oxoacyl-[acyl-carrier protein] reductase(BSU16870);3-oxoacyl-[acyl-carrier protein] reductase(BSU29420)">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml">

<p>GENE\_ASSOCIATION: ( BSU15910 or BSU16870 or BSU29420 )</p>

<p>GENE\_LIST: BSU15910 BSU16870 BSU29420</p>

<p>SUBSYSTEM: Fatty Acids and Lipids</p>

</html>

</notes>

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<speciesReference species="M\_cpd11496\_c"/>

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<speciesReference species="M\_cpd11497\_c"/>

</listOfProducts>

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<parameter id="OBJECTIVE\_COEFFICIENT" value="0"/>

</listOfParameters>

</kineticLaw>

</reaction>

<reaction id="R\_rxn05361" name="(3R)-hydroxymyristoyl-[acyl carrier protein] dehydratase (EC 4.2.1.-)">

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<p>GENE\_ASSOCIATION: BSU36370</p>

<p>GENE\_LIST: BSU36370</p>

<p>SUBSYSTEM: Fatty Acids and Lipids</p>

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<speciesReference species="M\_C00001\_c"/>

<speciesReference species="M\_cpd11498\_c"/>

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</listOfProducts>
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</reaction>
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1.3.1.10)" reversible="false">
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      <p>GENE_LIST: BSU08650</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  </notes>
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    <speciesReference species="M_C00005_c"/>
    <speciesReference species="M_cpd11498_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00006_c"/>
    <speciesReference species="M_cpd11499_c"/>
  </listOfProducts>
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    </math>
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    </listOfParameters>
  </kineticLaw>
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2.3.1.41);3-oxoacyl-[acyl-carrier-protein] synthase, KASIII (EC
2.3.1.41)(BSU11330);3-oxoacyl-[acyl-carrier-protein] synthase, KASII (EC

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2.3.1.41)(BSU11340)" reversible="false">

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BSU11340 ) )</p>
    <p>GENE_LIST: BSU11330 BSU11340 BSU10170 BSU11340</p>
    <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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<listOfReactants>
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  <speciesReference species="M_C01209_c"/>
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<listOfProducts>
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</kineticLaw>
</reaction>
<reaction id="R_rxn05364" name="3-oxoacyl-[acyl-carrier protein] reductase (EC
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reductase(BSU29420)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU15910 or BSU16870 or BSU29420 )</p>
      <p>GENE_LIST: BSU15910 BSU16870 BSU29420</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn05365" name="(3R)-hydroxymyristoyl-[acyl carrier protein] dehydratase
(EC 4.2.1.-)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
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      <p>GENE_LIST: BSU36370</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  </listOfReactants>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
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1.3.1.10)" reversible="false">

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    <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  <speciesReference species="M_C00005_c"/>
  <speciesReference species="M_cpd11502_c"/>
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  <speciesReference species="M_cpd11503_c"/>
</listOfProducts>
<kineticLaw>
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  </math>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn05367" name="3-oxoacyl-[acyl-carrier-protein] synthase III (EC
2.3.1.41);3-oxoacyl-[acyl-carrier-protein] synthase, KASIII (EC
2.3.1.41)(BSU11330);3-oxoacyl-[acyl-carrier-protein] synthase, KASII (EC
2.3.1.41)(BSU11340)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: ( ( BSU11330 and BSU11340 ) or ( BSU10170 and
BSU11340 ) )</p>
      <p>GENE_LIST: BSU11330 BSU11340 BSU10170 BSU11340</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C01209_c"/>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
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1.1.1.100);3-oxoacyl-[acyl-carrier protein] reductase(BSU16870);3-oxoacyl-[acyl-carrier protein]
reductase(BSU29420)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU15910 or BSU16870 or BSU29420 )</p>
      <p>GENE_LIST: BSU15910 BSU16870 BSU29420</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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  </kineticLaw>
</reaction>

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    </listOfParameters>
  </kineticLaw>
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<reaction id="R_rxn05369" name="(3R)-hydroxymyristoyl-[acyl carrier protein] dehydratase
(EC 4.2.1.-)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU36370</p>
      <p>GENE_LIST: BSU36370</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
  <listOfReactants>
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  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_cpd11506_c"/>
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  </kineticLaw>
</reaction>
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  <notes>
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      <p>GENE_LIST: BSU08650</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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</kineticLaw>
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2.3.1.41);3-oxoacyl-[acyl-carrier-protein] synthase, KASIII (EC
2.3.1.41)(BSU11330);3-oxoacyl-[acyl-carrier-protein] synthase, KASII (EC
2.3.1.41)(BSU11340)" reversible="false">
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reductase(BSU29420)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU15910 or BSU16870 or BSU29420 )</p>
      <p>GENE_LIST: BSU15910 BSU16870 BSU29420</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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(EC 4.2.1.-)">
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      <p>GENE_LIST: BSU36370</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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    </math>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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    </listOfParameters>
  </kineticLaw>
</reaction>
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1.3.1.10)" reversible="false">
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      <p>GENE_LIST: BSU08650</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
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    <speciesReference species="M_C00005_c"/>
    <speciesReference species="M_cpd11510_c"/>
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    </kineticLaw>
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2.3.1.41)(BSU11330);3-oxoacyl-[acyl-carrier-protein] synthase, KASII (EC
2.3.1.41)(BSU11340)" reversible="false">
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BSU11340 ) )</p>
        <p>GENE_LIST: BSU11330 BSU11340 BSU10170 BSU11340</p>
        <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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    </kineticLaw>
  </reaction>
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reductase(BSU29420)">
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        <p>GENE_LIST: BSU15910 BSU16870 BSU29420</p>
        <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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      <p>GENE_LIST: BSU36370</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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      <p>GENE_LIST: BSU08650</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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    </math>
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  </kineticLaw>
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2.3.1.41)(BSU11330);3-oxoacyl-[acyl-carrier-protein] synthase, KASII (EC
2.3.1.41)(BSU11340)" reversible="false">
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BSU11340 ) )</p>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
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      <p>GENE_LIST: BSU15910 BSU16870 BSU29420</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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    <speciesReference species="M_cpd11516_c"/>
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      <p>GENE_LIST: BSU36370</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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    </listOfParameters>
  </kineticLaw>
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1.3.1.10)" reversible="false">
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      <p>GENE_LIST: BSU08650</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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2.3.1.39)">
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      <p>GENE_LIST: BSU15900</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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    <speciesReference species="M_C01209_c"/>
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  <listOfProducts>
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  </kineticLaw>
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reductase(BSU29420)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU15910 or BSU16870 or BSU29420 )</p>
      <p>GENE_LIST: BSU15910 BSU16870 BSU29420</p>

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    <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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      <p>GENE_LIST: BSU36370</p>
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  </listOfReactants>
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      <p>GENE_LIST: BSU08650</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
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  </listOfProducts>
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    </listOfParameters>
  </kineticLaw>
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2.3.1.41)(BSU11330);3-oxoacyl-[acyl-carrier-protein] synthase, KASII (EC
2.3.1.41)(BSU11340)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( ( BSU11330 and BSU11340 ) or ( BSU10170 and
BSU11340 ) )</p>
      <p>GENE_LIST: BSU11330 BSU11340 BSU10170 BSU11340</p>

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    <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  <speciesReference species="M_cpd11525_c"/>
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</kineticLaw>
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1.1.1.100);3-oxoacyl-[acyl-carrier protein] reductase(BSU16870);3-oxoacyl-[acyl-carrier protein]
reductase(BSU29420)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU15910 or BSU16870 or BSU29420 )</p>
      <p>GENE_LIST: BSU15910 BSU16870 BSU29420</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
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(EC 4.2.1.-)">
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      <p>GENE_ASSOCIATION: BSU36370</p>
      <p>GENE_LIST: BSU36370</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
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      <p>GENE_LIST: BSU08650</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>

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</html>
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</kineticLaw>
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2.3.1.41)(BSU11330);3-oxoacyl-[acyl-carrier-protein] synthase, KASII (EC
2.3.1.41)(BSU11340)" reversible="false">
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BSU11340 ) )</p>
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      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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</kineticLaw>
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  <p>GENE_LIST: BSU36370</p>
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</kineticLaw>
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      <p>GENE_LIST: BSU08650</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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2.3.1.41)(BSU11330);3-oxoacyl-[acyl-carrier-protein] synthase, KASII (EC
2.3.1.41)(BSU11340)" reversible="false">
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BSU11340 ) )</p>
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  <listOfProducts>
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  </kineticLaw>
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reductase(BSU29420)">

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<p>GENE\_LIST: BSU15910 BSU16870 BSU29420</p>

<p>SUBSYSTEM: Fatty Acids and Lipids</p>

</html>

</notes>

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</math>

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</listOfParameters>

</kineticLaw>

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<p>GENE\_LIST: BSU36370</p>

<p>SUBSYSTEM: Fatty Acids and Lipids</p>

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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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      <p>GENE_LIST: BSU08650</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  </kineticLaw>
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2.3.1.41)(BSU11330);3-oxoacyl-[acyl-carrier-protein] synthase, KASII (EC
2.3.1.41)(BSU11340)" reversible="false">

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  <speciesReference species="M_C00229_c"/>
  <speciesReference species="M_cpd11537_c"/>
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  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn05401" name="3-oxoacyl-[acyl-carrier protein] reductase (EC
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reductase(BSU29420)">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU15910 or BSU16870 or BSU29420 )</p>
      <p>GENE_LIST: BSU15910 BSU16870 BSU29420</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  </notes>
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      <p>GENE_LIST: BSU36370</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  </listOfReactants>
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  <kineticLaw>
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    </listOfParameters>
  </kineticLaw>
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<notes>
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    <p>GENE_LIST: BSU08650</p>
    <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  <speciesReference species="M_cpd11539_c"/>
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</listOfProducts>
<kineticLaw>
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  </math>
  <listOfParameters>
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  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn05404" name="3-oxoacyl-[acyl-carrier-protein] synthase III (EC
2.3.1.41);3-oxoacyl-[acyl-carrier-protein] synthase, KASIII (EC
2.3.1.41)(BSU11330);3-oxoacyl-[acyl-carrier-protein] synthase, KASII (EC
2.3.1.41)(BSU11340)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
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BSU11340 ) )</p>
      <p>GENE_LIST: BSU11330 BSU11340 BSU10170 BSU11340</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  </notes>
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  <speciesReference species="M_C00229_c"/>
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</listOfProducts>

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1.1.1.100);3-oxoacyl-[acyl-carrier protein] reductase(BSU16870);3-oxoacyl-[acyl-carrier protein]
reductase(BSU29420)">
  <notes>
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      <p>GENE_LIST: BSU15910 BSU16870 BSU29420</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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    <speciesReference species="M_C00005_c"/>
    <speciesReference species="M_cpd11541_c"/>
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    <speciesReference species="M_cpd11542_c"/>
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    </kineticLaw>
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(EC 4.2.1.-)">
    <notes>
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        <p>GENE_ASSOCIATION: BSU36370</p>
        <p>GENE_LIST: BSU36370</p>
        <p>SUBSYSTEM: Fatty Acids and Lipids</p>
      </html>
    </notes>
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      <speciesReference species="M_cpd11542_c"/>
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        <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
        <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
      </listOfParameters>
    </kineticLaw>
  </reaction>
  <reaction id="R_rxn05407" name="Enoyl-[acyl-carrier-protein] reductase [NADPH] (EC
1.3.1.10)" reversible="false">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml">
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        <p>GENE_LIST: BSU08650</p>
        <p>SUBSYSTEM: Fatty Acids and Lipids</p>
      </html>
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2.3.1.39)">
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      <p>GENE_LIST: BSU15900</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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    <speciesReference species="M_C00229_c"/>
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  </kineticLaw>
</reaction>
<reaction id="R_rxn05409" name="3-oxoacyl-[acyl-carrier-protein] synthase III (EC
2.3.1.41);3-oxoacyl-[acyl-carrier-protein] synthase, KASIII (EC

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2.3.1.41)(BSU11330);3-oxoacyl-[acyl-carrier-protein] synthase, KASII (EC 2.3.1.41)(BSU11340)" reversible="false">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml">

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<p>GENE\_LIST: BSU11330 BSU11340 BSU10170 BSU11340</p>

<p>SUBSYSTEM: Fatty Acids and Lipids</p>

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<speciesReference species="M\_cpd11546\_c"/>

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</kineticLaw>

</reaction>

<reaction id="R\_rxn05410" name="3-oxoacyl-[acyl-carrier protein] reductase (EC 1.1.1.100);3-oxoacyl-[acyl-carrier protein] reductase(BSU16870);3-oxoacyl-[acyl-carrier protein] reductase(BSU29420)">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml">

<p>GENE\_ASSOCIATION: ( BSU15910 or BSU16870 or BSU29420 )</p>

<p>GENE\_LIST: BSU15910 BSU16870 BSU29420</p>

<p>SUBSYSTEM: Fatty Acids and Lipids</p>

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      <p>GENE_LIST: BSU36370</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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<reaction id="R\_rxn05412" name="Enoyl-[acyl-carrier-protein] reductase [NADPH] (EC 1.3.1.10)" reversible="false">

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<p>GENE\_LIST: BSU08650</p>

<p>SUBSYSTEM: Fatty Acids and Lipids</p>

</html>

</notes>

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<listOfProducts>

<speciesReference species="M\_C00006\_c"/>

<speciesReference species="M\_cpd11549\_c"/>

</listOfProducts>

<kineticLaw>

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<listOfParameters>

<parameter id="LOWER\_BOUND" value="0" units="mmol\_per\_gDW\_per\_hr"/>

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</kineticLaw>

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<reaction id="R\_rxn05413" name="3-oxoacyl-[acyl-carrier-protein] synthase III (EC 2.3.1.41);3-oxoacyl-[acyl-carrier-protein] synthase, KASIII (EC 2.3.1.41)(BSU11330);3-oxoacyl-[acyl-carrier-protein] synthase, KASII (EC 2.3.1.41)(BSU11340)" reversible="false">

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<p>GENE\_LIST: BSU11330 BSU11340 BSU10170 BSU11340</p>

<p>SUBSYSTEM: Fatty Acids and Lipids</p>

</html>

</notes>

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  </kineticLaw>
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reductase(BSU29420)">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU15910 or BSU16870 or BSU29420 )</p>
      <p>GENE_LIST: BSU15910 BSU16870 BSU29420</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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  <notes>
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      <p>GENE_LIST: BSU36370</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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1.3.1.10)" reversible="false">
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      <p>GENE_LIST: BSU08650</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
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    <speciesReference species="M_cpd11552_c"/>

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  </listOfParameters>
</kineticLaw>
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<reaction id="R_rxn05417" name="3-oxoacyl-[acyl-carrier-protein] synthase III (EC
2.3.1.41);3-oxoacyl-[acyl-carrier-protein] synthase, KASIII (EC
2.3.1.41)(BSU11330);3-oxoacyl-[acyl-carrier-protein] synthase, KASII (EC
2.3.1.41)(BSU11340)" reversible="false">
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BSU11340 ) )</p>
      <p>GENE_LIST: BSU11330 BSU11340 BSU10170 BSU11340</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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    </math>
    <listOfParameters>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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</kineticLaw>
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<reaction id="R_rxn05418" name="3-oxoacyl-[acyl-carrier protein] reductase (EC
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reductase(BSU29420)">
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      <p>GENE_LIST: BSU15910 BSU16870 BSU29420</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
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    <speciesReference species="M_C00005_c"/>
    <speciesReference species="M_cpd11554_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_cpd11555_c"/>
  </listOfProducts>
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    </math>
    <listOfParameters>
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    </listOfParameters>
  </kineticLaw>
</reaction>
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(EC 4.2.1.-)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU36370</p>
      <p>GENE_LIST: BSU36370</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
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  </math>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
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      <p>GENE_LIST: BSU08650</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  </listOfProducts>
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  </kineticLaw>
</reaction>

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    </listOfParameters>
  </kineticLaw>
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<reaction id="R_rxn05421" name="3-oxoacyl-[acyl-carrier-protein] synthase III (EC
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2.3.1.41)(BSU11330);3-oxoacyl-[acyl-carrier-protein] synthase, KASII (EC
2.3.1.41)(BSU11340)" reversible="false">
  <notes>
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BSU11340 ) )</p>
      <p>GENE_LIST: BSU11330 BSU11340 BSU10170 BSU11340</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  </notes>
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  </listOfReactants>
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  </listOfProducts>
  <kineticLaw>
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    </math>
  </listOfParameters>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn05422" name="3-oxoacyl-[acyl-carrier protein] reductase (EC
1.1.1.100);3-oxoacyl-[acyl-carrier protein] reductase(BSU16870);3-oxoacyl-[acyl-carrier protein]
reductase(BSU29420)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU15910 or BSU16870 or BSU29420 )</p>
      <p>GENE_LIST: BSU15910 BSU16870 BSU29420</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  </notes>

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</html>
</notes>
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(EC 4.2.1.-)">
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      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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      <p>GENE_LIST: BSU08650</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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2.3.1.41);3-oxoacyl-[acyl-carrier-protein] synthase, KASIII (EC
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  <notes>
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      <p>GENE_LIST: BSU36370</p>
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      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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    <speciesReference species="M_cpd11528_c"/>
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reversible="false">
  <notes>
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      <p>GENE_LIST: BSU11720 BSU26800</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
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1.3.1.9);Enoyl-[acyl-carrier-protein] reductase [FMN] (EC 1.3.1.9) homolog(BSU26800)"
reversible="false">
  <notes>
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      <p>GENE_LIST: BSU11720 BSU26800</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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<notes>

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<p>GENE\_LIST: BSU11720 BSU26800</p>

<p>SUBSYSTEM: Fatty Acids and Lipids</p>

</html>

</notes>

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</kineticLaw>

</reaction>

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<p>SUBSYSTEM: Fatty Acids and Lipids</p>

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reversible="false">
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reversible="false">
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        <p>GENE_LIST: BSU11720 BSU26800</p>
        <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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      <p>GENE_LIST: BSU15900</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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      <p>GENE_LIST: BSU15900</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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<p>SUBSYSTEM: Fatty Acids and Lipids</p>

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<p>SUBSYSTEM: Fatty Acids and Lipids</p>

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2.3.1.41);3-oxoacyl-[acyl-carrier-protein] synthase, KASIII (EC
2.3.1.41)(BSU11330);3-oxoacyl-[acyl-carrier-protein] synthase, KASII (EC
2.3.1.41)(BSU11340)" reversible="false">
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BSU11340 ) )</p>
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(EC 4.2.1.-)">
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      <p>GENE_LIST: BSU36370</p>
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      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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    <speciesReference species="M_cpd11572_c"/>
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  </listOfProducts>
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1.3.1.9);Enoyl-[acyl-carrier-protein] reductase [FMN] (EC 1.3.1.9) homolog(BSU26800)"
reversible="false">
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
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  </notes>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C03089_c"/>
  </listOfProducts>

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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
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  </listOfProducts>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn05483" name="">
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>

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    </html>
  </notes>
  <listOfReactants>
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  <listOfProducts>
    <speciesReference species="M_C00532_c"/>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
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    <speciesReference species="M_C00164_c"/>
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    </math>
    <listOfParameters>
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    </kineticLaw>
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2.7.1.69);Phosphoenolpyruvate-protein phosphotransferase of PTS system (EC
2.7.3.9)(BSU13910);Phosphocarrier protein of PTS system(BSU13900)" reversible="false">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml">
        <p>GENE_ASSOCIATION: ( BSU13900 and BSU13910 and BSU07700 )</p>
        <p>GENE_LIST: BSU13900 BSU13910 BSU07700</p>
        <p>SUBSYSTEM: Membrane Transport</p>
      </html>
    </notes>
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      <speciesReference species="M_C00074_c"/>
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        <p>GENE_LIST: </p>
        <p>SUBSYSTEM: Membrane Transport</p>
      </html>
    </notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
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    <speciesReference species="M_C00270_e"/>
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    <speciesReference species="M_C00270_c"/>
  </listOfProducts>
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    </math>
    <listOfParameters>
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  <p>SUBSYSTEM: Membrane Transport</p>
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  <speciesReference species="M_C00033_c"/>
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<kineticLaw>
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  </math>
  <listOfParameters>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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</kineticLaw>
</reaction>
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  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
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    <speciesReference species="M_C00147_e"/>
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    <speciesReference species="M_C00147_c"/>
  </listOfProducts>
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</reaction>

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</math>
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</kineticLaw>
</reaction>
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yoaB(BSU18540);alpha-ketoglutarate permease(BSU27760)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU18540 or BSU07570 or BSU27760 )</p>
      <p>GENE_LIST: BSU18540 BSU07570 BSU27760</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
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    <speciesReference species="M_C00026_e"/>
  </listOfReactants>
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    <speciesReference species="M_C00026_c"/>
  </listOfProducts>
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    </math>
  </kineticLaw>
  <listOfParameters>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn05494" name="D-serine/D-alanine/glycine transporter;Na(+)-linked
D-alanine glycine permease(BSU07750)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU05620 or BSU07750 or BSU27090 )</p>
      <p>GENE_LIST: BSU05620 BSU07750 BSU27090</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>

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  <speciesReference species="M_C00133_c"/>
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  </math>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
</reaction>
<reaction id="R_rxn05495" name="D-serine/D-alanine/glycine transporter">
  <notes>
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      <p>GENE_ASSOCIATION: BSU05620</p>
      <p>GENE_LIST: BSU05620</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
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    <speciesReference species="M_C00099_e"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00099_c"/>
  </listOfProducts>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>

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    </listOfParameters>
  </kineticLaw>
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  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
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    <speciesReference species="M_C00020_e"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00020_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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  </kineticLaw>
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  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
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  </listOfReactants>
  <listOfProducts>
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  </listOfProducts>

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</reaction>
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  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
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  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00216_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn05500" name="Arabinose-proton symporter">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU33960</p>
      <p>GENE_LIST: BSU33960</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>

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  <speciesReference species="M_C00080_e"/>
  <speciesReference species="M_C00259_e"/>
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  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C00259_c"/>
</listOfProducts>
<kineticLaw>
  <math xmlns="http://www.w3.org/1998/Math/MathML">
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  </math>
  <listOfParameters>
    <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn05501" name="Phosphoenolpyruvate-protein phosphotransferase of PTS
system (EC 2.7.3.9);PTS system, beta-glucoside-specific IIA component (EC 2.7.1.69)|PTS
system, beta-glucoside-specific IIB component (EC 2.7.1.69)|PTS system, beta-glucoside-specific
IIC component (EC 2.7.1.69)(BSU39270);Phosphocarrier protein of PTS system(BSU13900)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU13900 and BSU13910 and BSU39270 )</p>
      <p>GENE_LIST: BSU13900 BSU13910 BSU39270</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C06186_e"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00022_c"/>
    <speciesReference species="M_C06187_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>

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    <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn05502" name="">
  <notes>
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      <p>GENE_ASSOCIATION: </p>
      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C05945_e"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C05945_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn05504" name="Glycine betaine ABC transport system, ATP-binding protein OpuAA (EC 3.6.3.32);Glycine betaine ABC transport system, permease protein OpuAB(BSU02990);Glycine betaine ABC transport system, glycine betaine-binding protein OpuAC(BSU03000)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU02980 and BSU02990 and BSU03000 )</p>
      <p>GENE_LIST: BSU02980 BSU02990 BSU03000</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>

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<listOfReactants>
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  <speciesReference species="M_C00001_c"/>
  <speciesReference species="M_cpd11597_e"/>
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  <speciesReference species="M_C00008_c"/>
  <speciesReference species="M_C00009_c"/>
  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_cpd11597_c"/>
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  </math>
  <listOfParameters>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
</reaction>
<reaction id="R_rxn05505" name="Glycine betaine transporter OpuD">
  <notes>
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      <p>GENE_ASSOCIATION: BSU30070</p>
      <p>GENE_LIST: BSU30070</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
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  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_cpd11597_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>

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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn05506" name="Arsenic efflux pump protein;Arsenical-resistance protein
ACR3(BSU25790);Arsenical pump membrane protein(BSU36030)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU25790 or BSU36030 or BSU05340 )</p>
      <p>GENE_LIST: BSU25790 BSU36030 BSU05340</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
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  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_cpd01048_e"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn05507" name="Arsenic efflux pump protein;Arsenical-resistance protein
ACR3(BSU25790);Arsenical pump membrane protein(BSU36030)">
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      <p>GENE_LIST: BSU25790 BSU36030 BSU05340</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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      <p>GENE_LIST: </p>
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<p>GENE\_LIST: </p>

<p>SUBSYSTEM: Membrane Transport</p>

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</reaction>
<reaction id="R\_rxn05512" name="Alkanesulfonates ABC transporter ATP-binding protein;Alkanesulfonates-binding protein(BSU08840);Alkanesulfonates transport system permease protein(BSU08850)" reversible="false">
<notes>
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<p>SUBSYSTEM: Membrane Transport</p>
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</kineticLaw>
</reaction>
<reaction id="R_rxn05513" name="cation-transporting ATPase, E1-E2 family"
reversible="false">
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      <p>GENE_LIST: BSU15650</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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</reaction>
<reaction id="R_rxn05514" name="calcium/proton exchanger">
  <notes>

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  <p>SUBSYSTEM: Membrane Transport</p>
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</kineticLaw>
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<reaction id="R_rxn05515" name="Adenosylcobinamide amidohydrolase (EC
3.5.1.90)|Vitamin B12 ABC transporter, ATPase component BtuD;Vitamin B12 ABC transporter,
permease component BtuC(BSU33170);Vitamin B12 ABC transporter, B12-binding component
BtuF(BSU33180)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU33160 and BSU33170 and BSU33180 )</p>
      <p>GENE_LIST: BSU33160 BSU33170 BSU33180</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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    <speciesReference species="M_C00001_c"/>
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cadmium, zinc and mercury transporting ATPase (EC 3.6.3.3) (EC 3.6.3.5)" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU13850 BSU33490</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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  </notes>
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    <speciesReference species="M_C00001_c"/>
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      <p>GENE_LIST: BSU26650</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00238_e"/>
    <speciesReference species="M_C01413_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00238_c"/>
    <speciesReference species="M_C01413_e"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn05518" name="PTS system, cellobiose-specific IIB component (EC
2.7.1.69);PTS system, cellobiose-specific IIB component (EC 2.7.1.69)|PTS system, lichenan-,
cellobiose-specific IIB component (EC 2.7.1.69)(BSU38590);PTS system, cellobiose-specific IIA
component (EC 2.7.1.69)(BSU05820);PTS system, cellobiose-specific IIA component (EC
2.7.1.69)(BSU38570);PTS system, cellobiose-specific IIC component (EC
2.7.1.69)(BSU05830);PTS system, cellobiose-specific IIC component (EC
2.7.1.69)(BSU38390);PTS system, cellobiose-specific IIC component (EC 2.7.1.69)(BSU38580)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( ( BSU38390 and BSU38570 and BSU38590 ) or
( BSU38570 and BSU38580 and BSU38590 ) or ( BSU05810 and BSU05820 and
BSU05830 ) )</p>
      <p>GENE_LIST: BSU38390 BSU38570 BSU38590 BSU38570 BSU38580 BSU38590

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BSU05810 BSU05820 BSU05830</p>

<p>SUBSYSTEM: Membrane Transport</p>  
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<p>GENE\_LIST: </p>  
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<listOfParameters>

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      <p>SUBSYSTEM: Membrane Transport</p>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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  </kineticLaw>
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  <notes>
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      <p>GENE_LIST: BSU36120 BSU36130</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
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<reaction id="R_rxn05527" name="Cytosine/purine/uracil/thiamine/allantoin permease family
protein;Purine-cytosine permease(BSU38710)">
  <notes>
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      <p>SUBSYSTEM: Membrane Transport</p>
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  </kineticLaw>
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<p>GENE\_LIST: BSU03950 BSU33500</p>

<p>SUBSYSTEM: Membrane Transport</p>

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<kineticLaw>

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</math>

<listOfParameters>

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<parameter id="OBJECTIVE\_COEFFICIENT" value="0"/>

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</kineticLaw>

</reaction>

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<notes>

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<p>GENE\_LIST: </p>

<p>SUBSYSTEM: Membrane Transport</p>

</html>

</notes>

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<listOfProducts>



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  </kineticLaw>
</reaction>
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 <p>SUBSYSTEM: Membrane Transport</p>  
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 </reaction>  
 <reaction id="R\_rxn05533" name="Dipeptide transport system permease protein dppB (TC 3.A.1.5.2);Dipeptide transport system permease protein dppC (TC 3.A.1.5.2)(BSU12940);Dipeptide transport ATP-binding protein dppD (TC 3.A.1.5.2)(BSU12950);Dipeptide-binding ABC transporter, periplasmic substrate-binding component (TC 3.A.1.5.2)(BSU12960)" reversible="false">  
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn05534" name="Dipeptide transport system permease protein dppB (TC
3.A.1.5.2);Dipeptide transport system permease protein dppC (TC
3.A.1.5.2)(BSU12940);Dipeptide transport ATP-binding protein dppD (TC
3.A.1.5.2)(BSU12950);Dipeptide-binding ABC transporter, periplasmic substrate-binding
component (TC 3.A.1.5.2)(BSU12960)" reversible="false">
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      <p>SUBSYSTEM: Membrane Transport</p>
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  </notes>
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3.A.1.5.2)(BSU12940);Dipeptide transport ATP-binding protein dppD (TC
3.A.1.5.2)(BSU12950);Dipeptide-binding ABC transporter, periplasmic substrate-binding
component (TC 3.A.1.5.2)(BSU12960)" reversible="false">
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            <p>SUBSYSTEM: Membrane Transport</p>
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3.A.1.5.2);Dipeptide transport system permease protein dppC (TC
3.A.1.5.2)(BSU12940);Dipeptide transport ATP-binding protein dppD (TC
3.A.1.5.2)(BSU12950);Dipeptide-binding ABC transporter, periplasmic substrate-binding
component (TC 3.A.1.5.2)(BSU12960)" reversible="false">

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<notes>
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</kineticLaw>
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3.A.1.5.2)(BSU12940);Dipeptide transport ATP-binding protein dppD (TC
3.A.1.5.2)(BSU12950);Dipeptide-binding ABC transporter, periplasmic substrate-binding
component (TC 3.A.1.5.2)(BSU12960)" reversible="false">
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  </kineticLaw>
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3.A.1.5.2)(BSU12940);Dipeptide transport ATP-binding protein dppD (TC
3.A.1.5.2)(BSU12950);Dipeptide-binding ABC transporter, periplasmic substrate-binding
component (TC 3.A.1.5.2)(BSU12960)" reversible="false">
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BSU12960 )</p>
      <p>GENE_LIST: BSU12930 BSU12940 BSU12950 BSU12960</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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3.A.1.5.2);Dipeptide transport system permease protein dppC (TC
3.A.1.5.2)(BSU12940);Dipeptide transport ATP-binding protein dppD (TC
3.A.1.5.2)(BSU12950);Dipeptide-binding ABC transporter, periplasmic substrate-binding
component (TC 3.A.1.5.2)(BSU12960)" reversible="false">
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    </listOfParameters>
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3.A.1.5.2)(BSU12940);Dipeptide transport ATP-binding protein dppD (TC
3.A.1.5.2)(BSU12950);Dipeptide-binding ABC transporter, periplasmic substrate-binding
component (TC 3.A.1.5.2)(BSU12960)" reversible="false">
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3.A.1.5.2)(BSU12940);Dipeptide transport ATP-binding protein dppD (TC
3.A.1.5.2)(BSU12950);Dipeptide-binding ABC transporter, periplasmic substrate-binding
component (TC 3.A.1.5.2)(BSU12960)" reversible="false">
  <notes>

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  <p>SUBSYSTEM: Membrane Transport</p>
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3.A.1.5.2)(BSU12940);Dipeptide transport ATP-binding protein dppD (TC
3.A.1.5.2)(BSU12950);Dipeptide-binding ABC transporter, periplasmic substrate-binding
component (TC 3.A.1.5.2)(BSU12960)" reversible="false">
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        <p>GENE_LIST: BSU12930 BSU12940 BSU12950 BSU12960</p>
        <p>SUBSYSTEM: Membrane Transport</p>
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3.A.1.5.2);Dipeptide transport system permease protein dppC (TC
3.A.1.5.2)(BSU12940);Dipeptide transport ATP-binding protein dppD (TC
3.A.1.5.2)(BSU12950);Dipeptide-binding ABC transporter, periplasmic substrate-binding
component (TC 3.A.1.5.2)(BSU12960)" reversible="false">
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3.A.1.5.2)(BSU12940);Dipeptide transport ATP-binding protein dppD (TC
3.A.1.5.2)(BSU12950);Dipeptide-binding ABC transporter, periplasmic substrate-binding
component (TC 3.A.1.5.2)(BSU12960)" reversible="false">
  <notes>
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      <p>SUBSYSTEM: Membrane Transport</p>
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    </kineticLaw>
  </reaction>
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3.A.1.5.2)(BSU12940);Dipeptide transport ATP-binding protein dppD (TC
3.A.1.5.2)(BSU12950);Dipeptide-binding ABC transporter, periplasmic substrate-binding
component (TC 3.A.1.5.2)(BSU12960)" reversible="false">
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        <p>GENE_LIST: BSU12930 BSU12940 BSU12950 BSU12960</p>
        <p>SUBSYSTEM: Membrane Transport</p>
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3.A.1.5.2)(BSU12940);Dipeptide transport ATP-binding protein dppD (TC
3.A.1.5.2)(BSU12950);Dipeptide-binding ABC transporter, periplasmic substrate-binding
component (TC 3.A.1.5.2)(BSU12960)" reversible="false">
    <notes>
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<p>GENE\_LIST: BSU12930 BSU12940 BSU12950 BSU12960</p>

<p>SUBSYSTEM: Membrane Transport</p>

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</listOfProducts>

<kineticLaw>

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<parameter id="OBJECTIVE\_COEFFICIENT" value="0"/>

</listOfParameters>

</kineticLaw>

</reaction>

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<notes>

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<p>GENE\_LIST: BSU12930 BSU12940 BSU12950 BSU12960</p>

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</notes>

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    <speciesReference species="M_C00080_c"/>
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  <kineticLaw>
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      <p>GENE_LIST: </p>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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(TC 3.A.1.2.1);Ribose ABC transport system, high affinity permease RbsD (TC
3.A.1.2.1)(BSU35930);Ribose ABC transport system, permease protein RbsC (TC
3.A.1.2.1)(BSU35950);Ribose ABC transport system, periplasmic ribose-binding protein RbsB
(TC 3.A.1.2.1)(BSU35960)" reversible="false">
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</kineticLaw>
</reaction>
<reaction id="R_rxn05550" name="Osmotically activated L-carnitine/choline ABC transporter,
permease protein OpuCD;Osmotically activated L-carnitine/choline ABC transporter,
substrate-binding protein OpuCC(BSU33810);Osmotically activated L-carnitine/choline ABC
transporter, permease protein OpuCB(BSU33820);Osmotically activated L-carnitine/choline ABC

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transporter, ATP-binding protein OpuCA(BSU33830)" reversible="false">
  <notes>
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  </kineticLaw>
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</reaction>
<reaction id="R_rxn05552" name="Alkanesulfonates ABC transporter ATP-binding
protein;Alkanesulfonates-binding protein(BSU08840);Alkanesulfonates transport system
permease protein(BSU08850)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
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protein;component of iron-uptake system(BSU01610);component of iron-uptake
system(BSU01620);component of iron-uptake system(BSU01630);Iron compound ABC uptake
transporter permease protein(BSU03800);Iron compound ABC uptake transporter permease
protein(BSU03810);Iron compound ABC uptake transporter substrate-binding
protein(BSU03830)" reversible="false">
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3.A.1.14.1)(BSU08440);Iron(III) dicitrate transport system permease protein fecD (TC
3.A.1.14.1)(BSU08450);Iron(III) dicitrate transport system permease protein fecD (TC
3.A.1.14.1)(BSU08460)" reversible="false">
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<reaction id="R_rxn05558" name="Ferrichrome transport ATP-binding protein FhuC (TC
3.A.1.14.3);Ferrichrome transport system permease protein fhuG(BSU33300);Ferrichrome

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transport system permease protein fhuB (TC 3.A.1.14.3)(BSU33310);Ferrichrome-binding periplasmic protein precursor (TC 3.A.1.14.3)(BSU33320)" reversible="false">

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</html>

</notes>

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<parameter id="OBJECTIVE\_COEFFICIENT" value="0"/>

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</kineticLaw>

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<p>SUBSYSTEM: Membrane Transport</p>

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</notes>

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fructose-specific IIB component (EC 2.7.1.69)|PTS system, fructose-specific IIC component (EC
2.7.1.69)(BSU14400);PTS system, fructose-specific IIA component (EC
2.7.1.69)(BSU27070);Phosphocarrier protein of PTS system(BSU13900);PTS system,
fructose-specific IID component (EC 2.7.1.69)(BSU27040);PTS system, fructose-specific IIC
component (EC 2.7.1.69)(BSU27050)" reversible="false">
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</kineticLaw>
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  <notes>
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    </listOfParameters>
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  <notes>
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      <p>GENE_LIST: BSU02480</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
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</reaction>
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  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>

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</html>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
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  <listOfProducts>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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  </kineticLaw>
</reaction>

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</kineticLaw>
</reaction>
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system (EC 2.7.3.9);PTS system, Glucosamine-specific IIA component (EC 2.7.1.69)|PTS system,
Glucosamine-specific IIB component (EC 2.7.1.69)|PTS system, Glucosamine-specific IIC
component (EC 2.7.1.69)(BSU02350);Phosphocarrier protein of PTS system(BSU13900)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU13900 and BSU13910 and BSU02350 )</p>
      <p>GENE_LIST: BSU13900 BSU13910 BSU02350</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
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    <speciesReference species="M_C00329_e"/>
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    <speciesReference species="M_C00352_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn05570" name="Glycine betaine ABC transport system, ATP-binding
protein OpuAA (EC 3.6.3.32);Glycine betaine ABC transport system, permease protein
OpuAB(BSU02990);Glycine betaine ABC transport system, glycine betaine-binding protein
OpuAC(BSU03000)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU02980 and BSU02990 and BSU03000 )</p>
      <p>GENE_LIST: BSU02980 BSU02990 BSU03000</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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  </notes>

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  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C01181_c"/>
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<reaction id="R_rxn05571" name="Gluconate permease, Bsu4004 homolog">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU19520 or BSU40070 )</p>
      <p>GENE_LIST: BSU19520 BSU40070</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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    <speciesReference species="M_C00257_c"/>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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<reaction id="R_rxn05572" name="D-glucarate permease">
  <notes>
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      <p>GENE_LIST: BSU02480</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
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    <speciesReference species="M_C00818_e"/>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn05573" name="glucose uptake protein;Glucose/mannose:H+ symporter
GlcP(BSU10520)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU10520 or BSU03920 )</p>
      <p>GENE_LIST: BSU10520 BSU03920</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
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    <speciesReference species="M_C00267_e"/>

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</reaction>
<reaction id="R_rxn05574" name="Hexuronate transporter">
  <notes>
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      <p>GENE_LIST: BSU12360</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
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</reaction>
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<notes>
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    <p>SUBSYSTEM: Membrane Transport</p>
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</notes>
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  <speciesReference species="M_C00080_c"/>
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  </math>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
</reaction>
<reaction id="R_rxn05578" name="Glycerol-3-phosphate transporter">
  <notes>
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      <p>GENE_LIST: BSU02140</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
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    <speciesReference species="M_C00093_c"/>
  </listOfProducts>
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  </math>
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<reaction id="R_rxn05579" name="Glycine betaine transporter OpuD">
  <notes>
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      <p>GENE_LIST: BSU30070</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
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</reaction>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
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  </notes>

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</kineticLaw>
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  <notes>
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      <p>GENE_LIST: BSU09280</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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  </notes>
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  <listOfProducts>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn05582" name="D-serine/D-alanine/glycine transporter">
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  <p>GENE_LIST: BSU05620 BSU27090</p>
  <p>SUBSYSTEM: Membrane Transport</p>
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  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C00037_c"/>
</listOfProducts>
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  </math>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
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protein;Alkanesulfonates-binding protein(BSU08840);Alkanesulfonates transport
system permease protein(BSU08850)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU08830 and BSU08840 and BSU08850 )</p>
      <p>GENE_LIST: BSU08830 BSU08840 BSU08850</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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  </notes>
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    <speciesReference species="M_cpd11578_e"/>
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  <listOfProducts>
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    <speciesReference species="M_C00009_c"/>
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  </listOfProducts>

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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn05593" name="Major myo-inositol transporter IolT;Minor myo-inositol
transporter IolF(BSU39710);Minor myo-inositol transporter IolF(BSU39810)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU39710 or BSU06230 or BSU39810 )</p>
      <p>GENE_LIST: BSU39710 BSU06230 BSU39810</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
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    <speciesReference species="M_C00137_e"/>
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    <speciesReference species="M_C00137_c"/>
  </listOfProducts>
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    </math>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn05594" name="Alkanesulfonates ABC transporter ATP-binding
protein;Alkanesulfonates-binding protein(BSU08840);Alkanesulfonates transport system
permease protein(BSU08850)" reversible="false">

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<notes>
  <html xmlns="http://www.w3.org/1999/xhtml">
    <p>GENE_ASSOCIATION: ( BSU08830 and BSU08840 and BSU08850 )</p>
    <p>GENE_LIST: BSU08830 BSU08840 BSU08850</p>
    <p>SUBSYSTEM: Membrane Transport</p>
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  <speciesReference species="M_C00001_c"/>
  <speciesReference species="M_C05123_e"/>
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  <speciesReference species="M_C00009_c"/>
  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C05123_c"/>
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  </math>
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  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn05595" name="potassium uptake;Potassium uptake protein, integral
membrane component, KtrD(BSU13500);Trk system potassium uptake protein
trkA(BSU14510);Potassium uptake protein, integral membrane component,
KtrA(BSU31090);Potassium uptake protein, integral membrane component, KtrB(BSU31100)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( ( BSU13500 and BSU14510 ) or ( BSU26640 or
BSU31090 and BSU31100 ) )</p>
      <p>GENE_LIST: BSU13500 BSU14510 BSU26640 BSU31090 BSU31100</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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  </notes>
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    <speciesReference species="M_C00238_e"/>
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    </math>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn05597" name="" reversible="false">
  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_cpd11577_e"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_cpd11577_c"/>
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>

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    </listOfParameters>
  </kineticLaw>
</reaction>

<reaction id="R_rxn05598" name="Predicted rhamnose oligosaccharide ABC transport
system, substrate-binding component;Predicted rhamnose oligosaccharide ABC transport system,
permease component 2(BSU06980);Predicted rhamnose oligosaccharide ABC transport system,
permease component(BSU06990);ABC-type polysaccharide transport system, permease
component(BSU07110)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( ( BSU06970 and BSU06980 and BSU06990 ) or
BSU07110 )</p>
      <p>GENE_LIST: BSU06970 BSU06980 BSU06990 BSU07110</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00243_e"/>
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    <speciesReference species="M_C00243_c"/>
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  </kineticLaw>
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<reaction id="R_rxn05599" name="Alkanesulfonates ABC transporter ATP-binding
protein;Alkanesulfonates-binding protein(BSU08840);Alkanesulfonates transport system
permease protein(BSU08850)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU08830 and BSU08840 and BSU08850 )</p>

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    <p>GENE_LIST: BSU08830 BSU08840 BSU08850</p>
    <p>SUBSYSTEM: Membrane Transport</p>
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  <speciesReference species="M_C00080_c"/>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
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  </notes>
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    <speciesReference species="M_C00725_e"/>
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<reaction id="R_rxn05602" name="L-lactate permease">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
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      <p>GENE_LIST: BSU03060 BSU34190</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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periplasmic component;C4-dicarboxylate transport protein(BSU04470);2-oxoglutarate/malate
translocator(BSU07570);Malate permease(BSU37040)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">

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<p>GENE\_ASSOCIATION: ( BSU07570 or BSU37040 or ( BSU04440 and BSU04470 ) )</p>

<p>GENE\_LIST: BSU07570 BSU37040 BSU04440 BSU04470</p>

<p>SUBSYSTEM: Membrane Transport</p>

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</listOfParameters>

</kineticLaw>

</reaction>

<reaction id="R\_rxn05605" name="TRAP-type C4-dicarboxylate transport system, periplasmic component;C4-dicarboxylate transport protein(BSU04470);2-oxoglutarate/malate translocator(BSU07570);Malate permease(BSU37040);L-Malate Citrate symporter (TC 2.A.24.2.4)(BSU38770)">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml">

<p>GENE\_ASSOCIATION: ( BSU38770 or BSU07570 or BSU37040 or ( BSU04440 and BSU04470 ) )</p>

<p>GENE\_LIST: BSU38770 BSU07570 BSU37040 BSU04440 BSU04470</p>

<p>SUBSYSTEM: Membrane Transport</p>

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</notes>

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</kineticLaw>
</reaction>
<reaction id="R_rxn05607" name="PTS system, maltose and glucose-specific IIB component
(EC 2.7.1.69)|PTS system, maltose and glucose-specific IIC component (EC
2.7.1.69);Phosphoenolpyruvate-protein phosphotransferase of PTS system (EC
2.7.3.9)(BSU13910);Phosphocarrier protein of PTS system(BSU13900)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU13900 and BSU13910 and BSU08200 )</p>
      <p>GENE_LIST: BSU13900 BSU13910 BSU08200</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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    <speciesReference species="M_C02995_c"/>
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  </math>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn05610" name="Phosphocarrier protein of PTS system"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU12010 and BSU13900 and BSU13910 )</p>
      <p>GENE_LIST: BSU12010 BSU13900 BSU13910</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
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    <speciesReference species="M_C00159_e"/>
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  </kineticLaw>
</reaction>
<reaction id="R_rxn05611" name="Glucose/mannose:H+ symporter GlcP">
  <notes>
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      <p>GENE_LIST: BSU10520</p>

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    <p>SUBSYSTEM: Membrane Transport</p>
  </html>
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<listOfReactants>
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  <speciesReference species="M_C00159_e"/>
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</listOfProducts>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
</reaction>
<reaction id="R_rxn05612" name="Melibiose carrier protein, Na+/melibiose symporter">
  <notes>
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      <p>GENE_LIST: BSU12310</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
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  </listOfParameters>
</kineticLaw>
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<reaction id="R_rxn05616" name="Magnesium and cobalt transport protein CorA;Magnesium
transporter(BSU13300);Magnesium and cobalt transport protein corA(BSU24740)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU13300 or BSU24740 or BSU08000 )</p>
      <p>GENE_LIST: BSU13300 BSU24740 BSU08000</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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  </notes>
  <listOfReactants>
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  </listOfProducts>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn05617" name="Phosphoenolpyruvate-protein phosphotransferase of PTS
system (EC 2.7.3.9);Phosphocarrier protein of PTS system(BSU13900)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU13900 and BSU13910 and BSU03981 )</p>
      <p>GENE_LIST: BSU13900 BSU13910 BSU03981</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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  </notes>
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</kineticLaw>
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<reaction id="R_rxn05618" name="Manganese transport protein MntH" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU04360</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn05619" name="Predicted molybdate-responsive regulator YvgK in

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bacilli;Molybdenum ABC transporter, periplasmic molybdenum-binding protein modA (TC 3.A.1.8.1)(BSU33380);Molybdenum transport system permease protein modB (TC 3.A.1.8.1)(BSU33390)" reversible="false">

<notes>

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<p>GENE\_ASSOCIATION: ( BSU33370 and BSU33380 and BSU33390 )</p>

<p>GENE\_LIST: BSU33370 BSU33380 BSU33390</p>

<p>SUBSYSTEM: Membrane Transport</p>

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</notes>

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<speciesReference species="M\_C00080\_c"/>

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</listOfProducts>

<kineticLaw>

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</math>

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<parameter id="OBJECTIVE\_COEFFICIENT" value="0"/>

</listOfParameters>

</kineticLaw>

</reaction>

<reaction id="R\_rxn05620" name="Alkanesulfonates ABC transporter ATP-binding protein;Alkanesulfonates-binding protein(BSU08840);Alkanesulfonates transport system permease protein(BSU08850)" reversible="false">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml">

<p>GENE\_ASSOCIATION: ( BSU08830 and BSU08840 and BSU08850 )</p>

<p>GENE\_LIST: BSU08830 BSU08840 BSU08850</p>

<p>SUBSYSTEM: Membrane Transport</p>

</html>

</notes>

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    <speciesReference species="M_cpd11575_c"/>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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  </kineticLaw>
</reaction>
<reaction id="R_rxn05621" name="Alkanesulfonates ABC transporter ATP-binding
protein;Alkanesulfonates-binding protein(BSU08840);Alkanesulfonates transport system
permease protein(BSU08850)" reversible="false">
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    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU08830 and BSU08840 and BSU08850 )</p>
      <p>GENE_LIST: BSU08830 BSU08840 BSU08850</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
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  <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
</listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn05622" name="catalyses ATP-dependent electrogenic Na+ extrusion
without mechanistically coupled H+ or K+ uptake" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU02750 and BSU02760 )</p>
      <p>GENE_LIST: BSU02750 BSU02760</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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  </notes>
  <listOfReactants>
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    <speciesReference species="M_C01330_c"/>
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  <kineticLaw>
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  </kineticLaw>
</reaction>
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transporters(BSU38060)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU38060 or BSU03330 )</p>

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<p>GENE\_LIST: BSU38060 BSU03330</p>  
 <p>SUBSYSTEM: Membrane Transport</p>  
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      <p>GENE_LIST: BSU03330 BSU37320</p>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
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    <speciesReference species="M_C00001_c"/>
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CCCP" reversible="false">
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      <p>GENE_LIST: BSU03070</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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3.A.1.2.1)(BSU35930);Ribose ABC transport system, permease protein RbsC (TC
3.A.1.2.1)(BSU35950);Ribose ABC transport system, periplasmic ribose-binding protein RbsB
(TC 3.A.1.2.1)(BSU35960)" reversible="false">
  <notes>
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BSU35960 )</p>
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  </notes>
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  </kineticLaw>
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transporter">
  <notes>
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      <p>GENE_LIST: BSU23050</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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</kineticLaw>
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system, substrate-binding component;Predicted rhamnose oligosaccharide ABC transport system,
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permease component(BSU06990);ABC-type polysaccharide transport system, permease
component(BSU07110)">
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system (EC 2.7.3.9);PTS system, beta-glucoside-specific IIA component (EC 2.7.1.69)|PTS
system, beta-glucoside-specific IIB component (EC 2.7.1.69)|PTS system, beta-glucoside-specific
IIC component (EC 2.7.1.69)(BSU39270);Phosphocarrier protein of PTS system(BSU13900)"
reversible="false">
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      <p>SUBSYSTEM: Membrane Transport</p>
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Pit-type(BSU15580)">
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      <p>GENE_LIST: BSU15580 BSU01580 BSU34660</p>
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  </listOfParameters>
</kineticLaw>
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<reaction id="R_rxn05654" name="TRAP-type C4-dicarboxylate transport system,
periplasmic component;C4-dicarboxylate transport protein(BSU04470)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU04440 and BSU04470 )</p>
      <p>GENE_LIST: BSU04440 BSU04470</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn05655" name="Phosphoenolpyruvate-protein phosphotransferase of PTS

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system (EC 2.7.3.9);PTS system, sucrose-specific IIB component (EC 2.7.1.69)|PTS system, sucrose-specific IIC component (EC 2.7.1.69)(BSU38050);PTS system, sucrose-specific IIB component; PTS system, sucrose-specific IIC component(BSU38410);Phosphocarrier protein of PTS system(BSU13900)" reversible="false">

<notes>

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<p>SUBSYSTEM: Membrane Transport</p>

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</math>

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<parameter id="OBJECTIVE\_COEFFICIENT" value="0"/>

</listOfParameters>

</kineticLaw>

</reaction>

<reaction id="R\_rxn05656" name="Alkanesulfonates ABC transporter ATP-binding protein;Alkanesulfonates-binding protein(BSU08840);Alkanesulfonates transport system permease protein(BSU08850)" reversible="false">

<notes>

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<p>SUBSYSTEM: Membrane Transport</p>

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</listOfReactants>
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      <p>SUBSYSTEM: Membrane Transport</p>
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  </notes>
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transporter">
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            <p>SUBSYSTEM: Membrane Transport</p>
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protein;branched-chain amino acid transport(BSU26700);branched-chain amino acid
transport(BSU26710)">
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BSU29600 )</p>
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      <p>SUBSYSTEM: Membrane Transport</p>
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    <speciesReference species="M_C00183_c"/>
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symporter(BSU33960)">
  <notes>
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      <p>GENE_LIST: BSU17570</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
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  </notes>

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  </kineticLaw>
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      <p>SUBSYSTEM: Membrane Transport</p>
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      <p>SUBSYSTEM: Membrane Transport</p>
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<reaction id="R_rxn05682" name="Cytosine/purine/uracil/thiamine/allantoin permease family
protein">
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      <p>GENE_LIST: BSU36470</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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  </notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
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      <p>SUBSYSTEM: Membrane Transport</p>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
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    <speciesReference species="M_C06369_e"/>
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1.3.99.2)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU37170 or BSU32820 or BSU04520 )</p>
      <p>GENE_LIST: BSU37170 BSU32820 BSU04520</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
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    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C05272_c"/>
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    <speciesReference species="M_C00154_c"/>
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BSU37960 )</p>
        <p>GENE_LIST: BSU19310 BSU38830 BSU39860 BSU07350 BSU37960</p>
        <p>SUBSYSTEM: Carbohydrates</p>
      </html>
    </notes>
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      <speciesReference species="M_C00001_c"/>
      <speciesReference species="M_C00048_c"/>
    </listOfReactants>
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    </listOfProducts>
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      </math>
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        <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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    </kineticLaw>
  </reaction>
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    <notes>
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BSU37960 )</p>
        <p>GENE_LIST: BSU19310 BSU38830 BSU39860 BSU07350 BSU37960</p>
        <p>SUBSYSTEM: Carbohydrates</p>
      </html>
    </notes>
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    <speciesReference species="M_C06735_c"/>
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    <speciesReference species="M_C00037_c"/>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn05736" name="Long-chain-fatty-acid--CoA ligase (EC
6.2.1.3);Acetoacetyl-CoA synthetase [leucine] (EC 6.2.1.16)|Long-chain-fatty-acid--CoA ligase
(EC 6.2.1.3)(BSU18250)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
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BSU17180 or BSU04170 )</p>
      <p>GENE_LIST: BSU10270 BSU10360 BSU28560 BSU18250 BSU17180
BSU04170</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
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    <speciesReference species="M_C06424_c"/>
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</listOfParameters>
</kineticLaw>
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reversible="false">
  <notes>
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      <p>GENE_LIST: BSU08860</p>
      <p>SUBSYSTEM: Sulfur Metabolism</p>
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  </notes>
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    <speciesReference species="M_C00245_c"/>
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1.1.99.5)" reversible="false">
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      <p>GENE_ASSOCIATION: BSU09300</p>

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</listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn05746" name="Oligo-1,6-glucosidase (EC 3.2.1.10);Neopullulanase (EC
3.2.1.135)(BSU34560)">
  <notes>
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      <p>GENE_LIST: BSU34560 BSU02840</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </notes>
  <listOfReactants>
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      <p>GENE_LIST: BSU12290 BSU32100 BSU32200</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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1.7.99.4);Respiratory nitrate reductase beta chain (EC 1.7.99.4)(BSU37270);Respiratory nitrate
reductase alpha chain (EC 1.7.99.4)(BSU37280);Respiratory nitrate reductase delta chain (EC
1.7.99.4)(BSU37260)">
  <notes>
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BSU37280 )</p>
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      <p>SUBSYSTEM: Membrane Transport</p>
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      <p>GENE_LIST: BSU25070</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  </notes>
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      <p>SUBSYSTEM: Carbohydrates</p>

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1-phosphate transferase (EC 2.7.8.-)">
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      <p>GENE_LIST: BSU35530</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
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      <p>GENE_LIST: BSU12980</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </notes>
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  </kineticLaw>
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BSU32810 )</p>
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      <p>GENE_LIST: BSU30200</p>
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    </listOfParameters>
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      <p>GENE_LIST: BSU25310</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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      <p>GENE_LIST: BSU25310</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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      <p>GENE_LIST: BSU25310</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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      <p>GENE_LIST: BSU08860</p>
      <p>SUBSYSTEM: Sulfur Metabolism</p>
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</reaction>
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reversible="false">
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      <p>GENE_LIST: BSU08860</p>
      <p>SUBSYSTEM: Sulfur Metabolism</p>
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  <listOfProducts>
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    <p>SUBSYSTEM: Sulfur Metabolism</p>
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      <p>GENE_LIST: BSU08860</p>
      <p>SUBSYSTEM: Sulfur Metabolism</p>
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  </notes>
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2.4.1.21)">
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(EC 3.1.4.46);Glycerophosphoryl diester phosphodiesterase (EC
3.1.4.46)(BSU09620);Glycerophosphoryl diester phosphodiesterase family protein(BSU24180)">
  <notes>

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  <p>SUBSYSTEM: Carbohydrates</p>
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2.5.1.1.) COX10-CtaB">
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      <p>GENE_LIST: BSU12080 BSU14880</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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<reaction id="R_rxn08775" name="L-alanoyl-D-glutamate peptidase">
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      <p>GENE_LIST: BSU02810</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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XTP-specific) (EC 3.6.1.15)" reversible="false">
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      <p>GENE_LIST: BSU28360</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  </notes>

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    </html>
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      <p>GENE_LIST: BSU28360</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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</kineticLaw>
</reaction>
<reaction id="R_rxn09063" name="Diacylglycerol kinase (EC 2.7.1.107)" reversible="false">
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      <p>GENE_LIST: BSU25310</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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      <p>GENE_LIST: BSU25310</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  </notes>
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      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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    <speciesReference species="M_cpd15526_c"/>
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    <speciesReference species="M_C00080_c"/>
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    </listOfParameters>
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      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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    <speciesReference species="M_cpd15536_c"/>
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      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_cpd15540_c"/>
  </listOfProducts>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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    </listOfParameters>
  </kineticLaw>
</reaction>
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3-phosphatidyltransferase (EC 2.7.8.5)">

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    <p>GENE_LIST: BSU16920</p>
    <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  <speciesReference species="M_C00093_c"/>
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  <speciesReference species="M_C00055_c"/>
  <speciesReference species="M_cpd15543_c"/>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
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3-phosphatidyltransferase (EC 2.7.8.5)">

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    <p>GENE_LIST: BSU16920</p>
    <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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      <p>GENE_LIST: BSU16920</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  </kineticLaw>
</reaction>
<reaction id="R_rxn09198" name="Phosphatidylserine decarboxylase (EC 4.1.1.65)">
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      <p>GENE_ASSOCIATION: BSU02290</p>
      <p>GENE_LIST: BSU02290</p>

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    <p>SUBSYSTEM: Fatty Acids and Lipids</p>
  </html>
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  <speciesReference species="M_cpd15529_c"/>
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  </math>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
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      <p>GENE_LIST: BSU02290</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  </notes>
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  </listOfProducts>
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      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>

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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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  </listOfParameters>
</kineticLaw>
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<reaction id="R_rxn09202" name="Phosphatidylserine decarboxylase (EC 4.1.1.65)">
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      <p>GENE_LIST: BSU02290</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
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      <p>GENE_LIST: BSU02270</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
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</listOfReactants>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
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<reaction id="R_rxn09208" name="CDP-diacylglycerol--serine O-phosphatidyltransferase
(EC 2.7.8.8)" reversible="false">
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      <p>GENE_LIST: BSU02270</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  </notes>
  <listOfReactants>
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    <speciesReference species="M_cpd15419_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00055_c"/>
    <speciesReference species="M_cpd15555_c"/>
  </listOfProducts>
  <kineticLaw>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
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</reaction>

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    </kineticLaw>
  </reaction>
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        <p>GENE_LIST: BSU02270</p>
        <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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      <speciesReference species="M_C00065_c"/>
      <speciesReference species="M_cpd15421_c"/>
    </listOfReactants>
    <listOfProducts>
      <speciesReference species="M_C00080_c"/>
      <speciesReference species="M_C00055_c"/>
      <speciesReference species="M_cpd15557_c"/>
    </listOfProducts>
    <kineticLaw>
      <math xmlns="http://www.w3.org/1998/Math/MathML">
        <ci> FLUX_VALUE </ci>
      </math>
      <listOfParameters>
        <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
        <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
        <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
      </listOfParameters>
    </kineticLaw>
  </reaction>
  <reaction id="R_rxn09212" name="" reversible="false">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml">
        <p>GENE_ASSOCIATION: </p>
        <p>GENE_LIST: </p>
        <p>SUBSYSTEM: Amino Acids and Derivatives</p>
      </html>
    </notes>
    <listOfReactants>
      <speciesReference species="M_C00001_c"/>
      <speciesReference species="M_C12147_c"/>
    </listOfReactants>
    <listOfProducts>

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    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00188_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn09264" name="spermine/spermidine acetyltransferase"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU26600</p>
      <p>GENE_LIST: BSU26600</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00024_c"/>
    <speciesReference species="M_C00315_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00010_c"/>
    <speciesReference species="M_C00612_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>

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<reaction id="R\_rxn09340" name="5'-nucleotidase (EC 3.1.3.5)|UDP-sugar hydrolase (EC 3.6.1.45)" reversible="false">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml">

<p>GENE\_ASSOCIATION: BSU32370</p>

<p>GENE\_LIST: BSU32370</p>

<p>SUBSYSTEM: Nucleosides and Nucleotides</p>

</html>

</notes>

<listOfReactants>

<speciesReference species="M\_C00001\_c"/>

<speciesReference species="M\_C00203\_c"/>

</listOfReactants>

<listOfProducts>

<speciesReference species="M\_C00105\_c"/>

<speciesReference species="M\_cpd15390\_c"/>

</listOfProducts>

<kineticLaw>

<math xmlns="http://www.w3.org/1998/Math/MathML">

<ci> FLUX\_VALUE </ci>

</math>

<listOfParameters>

<parameter id="LOWER\_BOUND" value="0" units="mmol\_per\_gDW\_per\_hr"/>

<parameter id="UPPER\_BOUND" value="1000" units="mmol\_per\_gDW\_per\_hr"/>

<parameter id="OBJECTIVE\_COEFFICIENT" value="0"/>

</listOfParameters>

</kineticLaw>

</reaction>

<reaction id="R\_rxn09341" name="5'-nucleotidase (EC 3.1.3.5)|UDP-sugar hydrolase (EC 3.6.1.45)" reversible="false">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml">

<p>GENE\_ASSOCIATION: BSU32370</p>

<p>GENE\_LIST: BSU32370</p>

<p>SUBSYSTEM: Nucleosides and Nucleotides</p>

</html>

</notes>

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<speciesReference species="M\_C00105\_c"/>

<speciesReference species="M\_C04501\_c"/>

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</listOfProducts>
<kineticLaw>
  <math xmlns="http://www.w3.org/1998/Math/MathML">
    <ci> FLUX_VALUE </ci>
  </math>
  <listOfParameters>
    <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn09348" name="5'-nucleotidase (EC 3.1.3.5)|UDP-sugar hydrolase (EC
3.6.1.45)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU32370</p>
      <p>GENE_LIST: BSU32370</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00052_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00105_c"/>
    <speciesReference species="M_C00446_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn09355" name="5'-nucleotidase (EC 3.1.3.5)|UDP-sugar hydrolase (EC
3.6.1.45)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">

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    <p>GENE_ASSOCIATION: BSU32370</p>
    <p>GENE_LIST: BSU32370</p>
    <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
  </html>
</notes>
<listOfReactants>
  <speciesReference species="M_C00001_c"/>
  <speciesReference species="M_C00167_c"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00105_c"/>
  <speciesReference species="M_C05385_c"/>
</listOfProducts>
<kineticLaw>
  <math xmlns="http://www.w3.org/1998/Math/MathML">
    <ci> FLUX_VALUE </ci>
  </math>
  <listOfParameters>
    <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn09399" name="1,4-alpha-glucan (glycogen) branching enzyme,
GH-13-type (EC 2.4.1.18)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU30980</p>
      <p>GENE_LIST: BSU30980</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00718_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00182_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>
    <listOfParameters>

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    <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn09448" name="Long-chain-fatty-acid--CoA ligase (EC
6.2.1.3);Acetoacetyl-CoA synthetase [leucine] (EC 6.2.1.16)|Long-chain-fatty-acid--CoA ligase
(EC 6.2.1.3)(BSU18250)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU10270 or BSU28560 or BSU18250 or BSU10360 or
BSU17180 or BSU04170 )</p>
      <p>GENE_LIST: BSU10270 BSU28560 BSU18250 BSU10360 BSU17180
BSU04170</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00002_c"/>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00010_c"/>
    <speciesReference species="M_cpd15269_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00013_c"/>
    <speciesReference species="M_C00020_c"/>
    <speciesReference species="M_cpd15274_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn09449" name="Long-chain-fatty-acid--CoA ligase (EC
6.2.1.3);Acetoacetyl-CoA synthetase [leucine] (EC 6.2.1.16)|Long-chain-fatty-acid--CoA ligase
(EC 6.2.1.3)(BSU18250)" reversible="false">
  <notes>

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<html xmlns="http://www.w3.org/1999/xhtml">
  <p>GENE_ASSOCIATION: ( BSU10270 or BSU28560 or BSU18250 or BSU10360 or
BSU17180 or BSU04170 )</p>
  <p>GENE_LIST:   BSU10270   BSU28560   BSU18250   BSU10360   BSU17180
BSU04170</p>
  <p>SUBSYSTEM: Fatty Acids and Lipids</p>
</html>
</notes>
<listOfReactants>
  <speciesReference species="M_C00002_c"/>
  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C00010_c"/>
  <speciesReference species="M_C01530_c"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00013_c"/>
  <speciesReference species="M_C00020_c"/>
  <speciesReference species="M_C00412_c"/>
</listOfProducts>
<kineticLaw>
  <math xmlns="http://www.w3.org/1998/Math/MathML">
    <ci> FLUX_VALUE </ci>
  </math>
  <listOfParameters>
    <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn09450" name="Long-chain-fatty-acid--CoA ligase (EC
6.2.1.3);Acetoacetyl-CoA synthetase [leucine] (EC 6.2.1.16)|Long-chain-fatty-acid--CoA ligase
(EC 6.2.1.3)(BSU18250)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU10270 or BSU28560 or BSU18250 or BSU10360 or
BSU17180 or BSU04170 )</p>
      <p>GENE_LIST:   BSU10270   BSU28560   BSU18250   BSU10360   BSU17180
BSU04170</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00002_c"/>

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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00010_c"/>
    <speciesReference species="M_cpd15237_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00013_c"/>
    <speciesReference species="M_C00020_c"/>
    <speciesReference species="M_cpd15238_c"/>
  </listOfProducts>
  <kineticLaw>
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      <ci> FLUX_VALUE </ci>
    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn09562" name="Guanylate kinase (EC 2.7.4.8)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU15680</p>
      <p>GENE_LIST: BSU15680</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00144_c"/>
    <speciesReference species="M_C00131_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00035_c"/>
    <speciesReference species="M_C00206_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>

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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn09657" name="Xanthine/uracil/thiamine/ascorbate permease family
protein;Cytosine/purine/uracil/thiamine/allantoin permease family protein(BSU36470)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU36470 or BSU06370 or BSU29990 )</p>
      <p>GENE_LIST: BSU36470 BSU06370 BSU29990</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00080_e"/>
    <speciesReference species="M_C00378_e"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00378_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn09661" name="Glucitol/sorbitol-specific transport protein gutA">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU06160</p>
      <p>GENE_LIST: BSU06160</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C01722_e"/>
  </listOfReactants>
  <listOfProducts>

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    <speciesReference species="M_C01722_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn09889" name="Dihydroxy-acid dehydratase (EC 4.2.1.9)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU21870</p>
      <p>GENE_LIST: BSU21870</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C06007_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C06008_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn09907" name="" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: </p>

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    <p>GENE_LIST: </p>
    <p>SUBSYSTEM: Amino Acids and Derivatives</p>
  </html>
</notes>
<listOfReactants>
  <speciesReference species="M_C00002_c"/>
  <speciesReference species="M_C00037_c"/>
  <speciesReference species="M_C00073_c"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00008_c"/>
  <speciesReference species="M_C00009_c"/>
  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_cpd11591_c"/>
</listOfProducts>
<kineticLaw>
  <math xmlns="http://www.w3.org/1998/Math/MathML">
    <ci> FLUX_VALUE </ci>
  </math>
  <listOfParameters>
    <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn09925" name="" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: </p>
      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00002_c"/>
    <speciesReference species="M_C00064_c"/>
    <speciesReference species="M_C00037_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00008_c"/>
    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_cpd11580_c"/>
  </listOfProducts>

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</listOfProducts>
<kineticLaw>
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  </math>
  <listOfParameters>
    <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn09940" name="Peptide methionine sulfoxide reductase msrB (EC
1.8.4.12)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU21680</p>
      <p>GENE_LIST: BSU21680</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00342_c"/>
    <speciesReference species="M_cpd11576_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00343_c"/>
    <speciesReference species="M_C00073_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn09944" name="Methylmalonate-semialdehyde dehydrogenase [inositol]
(EC 1.2.1.27)">
  <notes>

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<html xmlns="http://www.w3.org/1999/xhtml">
  <p>GENE_ASSOCIATION: BSU39760</p>
  <p>GENE_LIST: BSU39760</p>
  <p>SUBSYSTEM: Carbohydrates</p>
</html>
</notes>
<listOfReactants>
  <speciesReference species="M_C00010_c"/>
  <speciesReference species="M_C00003_c"/>
  <speciesReference species="M_C00479_c"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00100_c"/>
  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C00004_c"/>
</listOfProducts>
<kineticLaw>
  <math xmlns="http://www.w3.org/1998/Math/MathML">
    <ci> FLUX_VALUE </ci>
  </math>
  <listOfParameters>
    <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn09949" name="spermine/spermidine acetyltransferase"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU26600</p>
      <p>GENE_LIST: BSU26600</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00024_c" stoichiometry="2"/>
    <speciesReference species="M_C00750_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c" stoichiometry="2"/>
    <speciesReference species="M_C00010_c" stoichiometry="2"/>
    <speciesReference species="M_C03413_c"/>
  </listOfProducts>
</reaction>

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</listOfProducts>
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  </math>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn09953" name="Dihydrolipoamide dehydrogenase of acetoin
dehydrogenase (EC 1.8.1.4);Acetoin dehydrogenase E1 component alpha-subunit (EC
1.2.4.-)(BSU08060);Acetoin dehydrogenase E1 component beta-subunit (EC
1.2.4.-)(BSU08070);Dihydrolipoamide acetyltransferase component (E2) of acetoin
dehydrogenase complex (EC 2.3.1.-)(BSU08080)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU08060 and BSU08070 and BSU08080 and
BSU08090 )</p>
      <p>GENE_LIST: BSU08060 BSU08070 BSU08080 BSU08090</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00010_c"/>
    <speciesReference species="M_C00003_c"/>
    <speciesReference species="M_C00810_c"/>
  </listOfReactants>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C00024_c"/>
    <speciesReference species="M_C00084_c"/>
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  <kineticLaw>
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>

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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction      id="R_rxn09978"      name="6-phospho-beta-glucosidase      (EC
3.2.1.86)|Beta-glucosidase (EC 3.2.1.21)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU39260 or BSU03410 )</p>
      <p>GENE_LIST: BSU39260 BSU03410</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_cpd15584_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00267_c"/>
    <speciesReference species="M_C00132_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction      id="R_rxn09979"      name="6-phospho-beta-glucosidase      (EC
3.2.1.86)|Beta-glucosidase (EC 3.2.1.21)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU39260 or BSU03410 )</p>
      <p>GENE_LIST: BSU39260 BSU03410</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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  </listOfReactants>

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<listOfProducts>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn09988" name="Alpha-N-arabinofuranosidase 2 (EC
3.2.1.55);Alpha-N-arabinofuranosidase (EC 3.2.1.55)(BSU28720)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU28720 or BSU28510 )</p>
      <p>GENE_LIST: BSU28720 BSU28510</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00001_c" stoichiometry="2"/>
    <speciesReference species="M_C02474_c"/>
  </listOfReactants>
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    <speciesReference species="M_C00259_c" stoichiometry="3"/>
  </listOfProducts>
  <kineticLaw>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn09989" name="Neopullulanase (EC 3.2.1.135)" reversible="false">
  <notes>

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<html xmlns="http://www.w3.org/1999/xhtml">
  <p>GENE_ASSOCIATION: BSU34560</p>
  <p>GENE_LIST: BSU34560</p>
  <p>SUBSYSTEM: Carbohydrates</p>
</html>
</notes>
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  <speciesReference species="M_C00721_c"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00267_c" stoichiometry="6"/>
</listOfProducts>
<kineticLaw>
  <math xmlns="http://www.w3.org/1998/Math/MathML">
    <ci> FLUX_VALUE </ci>
  </math>
  <listOfParameters>
    <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
</reaction>
<reaction id="R_rxn09992" name="6-phospho-beta-glucosidase (EC 3.2.1.86)"
reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU40110</p>
      <p>GENE_LIST: BSU40110</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C06188_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00668_c"/>
    <speciesReference species="M_C02323_c"/>
  </listOfProducts>
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    </math>

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</math>
<listOfParameters>
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</listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn09996" name="Putative teichuronic acid biosynthesis glycosyl transferase
TuaH;Putative N-acetylglactosaminyl-diphosphoundecaprenol
glucuronosyltransferase(BSU35550);Putative teichuronic acid biosynthesis glycosyl transferase
TuaC(BSU35590);Putative undecaprenyl-phosphate N-acetylglactosaminyl 1-phosphate
transferase|teichuronic acid biosynthesis glycosyltransferase TuaA(BSU35610);Teichuronic acid
biosynthesis protein TuaF(BSU35560);Teichuronic acid biosynthesis protein TuaE, putative
secreted polysaccharide polymerase(BSU35570);Teichuronic acid biosynthesis protein
TuaB(BSU35600)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU35540 and BSU35550 and BSU35560 and BSU35570
and BSU35590 and BSU35600 and BSU35610 )</p>
      <p>GENE_LIST: BSU35540 BSU35550 BSU35560 BSU35570 BSU35590 BSU35600
BSU35610</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00203_c" stoichiometry="45"/>
    <speciesReference species="M_C00167_c" stoichiometry="45"/>
  </listOfReactants>
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    <speciesReference species="M_C00105_c" stoichiometry="45"/>
    <speciesReference species="M_C00015_c" stoichiometry="45"/>
    <speciesReference species="M_cpd15634_c"/>
  </listOfProducts>
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    </math>
  </listOfParameters>
    <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>

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</kineticLaw>
</reaction>
<reaction id="R_rxn10001" name="">
  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00032_c"/>
    <speciesReference species="M_C00097_c" stoichiometry="2"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C15817_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn10002" name="">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: </p>
      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00032_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_cpd15607_c"/>
  </listOfProducts>

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  <listOfParameters>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn10010" name="Acyl-CoA dehydrogenase, short-chain specific (EC
1.3.99.2)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU37170 or BSU32820 or BSU04520 )</p>
      <p>GENE_LIST: BSU37170 BSU32820 BSU04520</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C05271_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00003_c"/>
    <speciesReference species="M_C05270_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn10011" name="Acyl-CoA dehydrogenase, short-chain specific (EC
1.3.99.2)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">

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    <p>GENE_ASSOCIATION: ( BSU37170 or BSU32820 or BSU04520 )</p>
    <p>GENE_LIST: BSU37170 BSU32820 BSU04520</p>
    <p>SUBSYSTEM: Fatty Acids and Lipids</p>
  </html>
</notes>
<listOfReactants>
  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C00004_c"/>
  <speciesReference species="M_C05276_c"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00003_c"/>
  <speciesReference species="M_C01944_c"/>
</listOfProducts>
<kineticLaw>
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  </math>
  <listOfParameters>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn10012" name="Acyl-CoA dehydrogenase, short-chain specific (EC
1.3.99.2)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU37170 or BSU32820 or BSU04520 )</p>
      <p>GENE_LIST: BSU37170 BSU32820 BSU04520</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C05275_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00003_c"/>
    <speciesReference species="M_C05274_c"/>
  </listOfProducts>
  <kineticLaw>

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<math xmlns="http://www.w3.org/1998/Math/MathML">
  <ci> FLUX_VALUE </ci>
</math>
<listOfParameters>
  <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
  <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
  <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
</listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn10013" name="Acyl-CoA dehydrogenase, short-chain specific (EC
1.3.99.2)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU37170 or BSU32820 or BSU04520 )</p>
      <p>GENE_LIST: BSU37170 BSU32820 BSU04520</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C03221_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00003_c"/>
    <speciesReference species="M_C01832_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn10014" name="Acyl-CoA dehydrogenase, short-chain specific (EC
1.3.99.2)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU37170 or BSU32820 or BSU04520 )</p>

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<p>GENE\_LIST: BSU37170 BSU32820 BSU04520</p>

<p>SUBSYSTEM: Fatty Acids and Lipids</p>

</html>
</notes>
<listOfReactants>
<speciesReference species="M\_C00080\_c"/>
<speciesReference species="M\_C00004\_c"/>
<speciesReference species="M\_C05273\_c"/>
</listOfReactants>
<listOfProducts>
<speciesReference species="M\_C00003\_c"/>
<speciesReference species="M\_C02593\_c"/>
</listOfProducts>
<kineticLaw>
<math xmlns="http://www.w3.org/1998/Math/MathML">
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</math>
<listOfParameters>
<parameter id="LOWER\_BOUND" value="0" units="mmol\_per\_gDW\_per\_hr"/>
<parameter id="UPPER\_BOUND" value="1000" units="mmol\_per\_gDW\_per\_hr"/>
<parameter id="OBJECTIVE\_COEFFICIENT" value="0"/>
</listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R\_rxn10042" name="ATP synthase beta chain (EC 3.6.3.14);ATP synthase alpha chain (EC 3.6.3.14)(BSU36830);ATP synthase epsilon chain (EC 3.6.3.14)(BSU36800);ATP synthase gamma chain (EC 3.6.3.14)(BSU36820);ATP synthase delta chain (EC 3.6.3.14)(BSU36840);ATP synthase B chain (EC 3.6.3.14)(BSU36850);ATP synthase C chain (EC 3.6.3.14)(BSU36860);ATP synthase A chain (EC 3.6.3.14)(BSU36870);ATP synthase protein I(BSU36880)" reversible="false">
<notes>
<html xmlns="http://www.w3.org/1999/xhtml">
<p>GENE\_ASSOCIATION: ( BSU36800 and BSU36810 and BSU36820 and BSU36830 and BSU36840 and BSU36850 and BSU36860 and BSU36870 and BSU36880 )</p>
<p>GENE\_LIST: BSU36800 BSU36810 BSU36820 BSU36830 BSU36840 BSU36850 BSU36860 BSU36870 BSU36880</p>
<p>SUBSYSTEM: Membrane Transport</p>
</html>
</notes>
<listOfReactants>
<speciesReference species="M\_C00008\_c"/>
<speciesReference species="M\_C00009\_c"/>
<speciesReference species="M\_C00080\_e" stoichiometry="4"/>
</listOfReactants>

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<listOfProducts>
  <speciesReference species="M_C00002_c"/>
  <speciesReference species="M_C00080_c" stoichiometry="3"/>
  <speciesReference species="M_C00001_c"/>
</listOfProducts>

<kineticLaw>
  <math xmlns="http://www.w3.org/1998/Math/MathML">
    <ci> FLUX_VALUE </ci>
  </math>
  <listOfParameters>
    <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>

<reaction id="R_rxn10043" name="Cytochrome c oxidase polypeptide II (EC
1.9.3.1);Cytochrome c oxidase polypeptide I (EC 1.9.3.1)(BSU14900);Cytochrome c oxidase
polypeptide III (EC 1.9.3.1)(BSU14910);Cytochrome c oxidase, subunit IV (EC
1.9.3.1)(BSU14920)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU14890 and BSU14900 and BSU14910 and
BSU14920 )</p>
      <p>GENE_LIST: BSU14890 BSU14900 BSU14910 BSU14920</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00080_c" stoichiometry="6"/>
    <speciesReference species="M_C00007_c" stoichiometry="0.5"/>
    <speciesReference species="M_C00126_c" stoichiometry="2"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_e" stoichiometry="4"/>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00125_c" stoichiometry="2"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>

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    <parameter id="UPPER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn10044" name="Menaquinone-cytochrome C oxidoreductase, cytochrome
C      subunit;Menaquinone-cytochrome      c      reductase,      cytochrome      B
subunit(BSU22550);Menaquinone-cytochrome C reductase iron-sulfur subunit(BSU22560)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU22540 and BSU22550 and BSU22560 )</p>
      <p>GENE_LIST: BSU22540 BSU22550 BSU22560</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00125_c" stoichiometry="2"/>
    <speciesReference species="M_C00828_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_e" stoichiometry="3"/>
    <speciesReference species="M_C00126_c" stoichiometry="2"/>
    <speciesReference species="M_cpd11606_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
  </listOfParameters>
    <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
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1.10.3.-);Cytochrome d ubiquinol oxidase subunit II (EC 1.10.3.-)(BSU38750);(BSU30720)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( ( BSU30710 and BSU30720 ) or ( BSU38750 and
BSU38760 ) )</p>
      <p>GENE_LIST: BSU30710 BSU30720 BSU38750 BSU38760</p>
    </html>
  </notes>

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    <p>SUBSYSTEM: Membrane Transport</p>
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  <speciesReference species="M_C00828_c"/>
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</kineticLaw>
</reaction>
<reaction id="R_rxn10046" name="AA3-600 quinol oxidase subunit IV;AA3-600 quinol
oxidase subunit III(BSU38150);AA3-600 quinol oxidase subunit I(BSU38160);AA3-600 quinol
oxidase subunit II(BSU38170)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU38140 and BSU38150 and BSU38160 and
BSU38170 )</p>
      <p>GENE_LIST: BSU38140 BSU38150 BSU38160 BSU38170</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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    <speciesReference species="M_C00007_c" stoichiometry="0.5"/>
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</listOfProducts>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
</reaction>
<reaction id="R_rxn10048" name="Heme A synthase, cytochrome oxidase biogenesis protein
Cox15-CtaA">
  <notes>
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      <p>GENE_ASSOCIATION: BSU14870</p>
      <p>GENE_LIST: BSU14870</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
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</reaction>
<reaction id="R_rxn10056" name="NAD kinase (EC 2.7.1.23)" reversible="false">
  <notes>
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<p>GENE\_LIST: BSU11610</p>  
 <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>  
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 <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>  
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<reaction id="R_rxn10058" name="NAD kinase (EC 2.7.1.23)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU11610</p>
      <p>GENE_LIST: BSU11610</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
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    <speciesReference species="M_C00286_c"/>
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  <listOfProducts>
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    <speciesReference species="M_C00361_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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  </kineticLaw>
</reaction>
<reaction id="R_rxn10059" name="NAD kinase (EC 2.7.1.23)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU11610</p>
      <p>GENE_LIST: BSU11610</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
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</listOfReactants>
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  <notes>
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      <p>GENE_LIST: BSU11610</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  </notes>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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  </kineticLaw>
</reaction>
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#### 4.2.1.52);Dipicolinate synthase subunit B(BSU16740)">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml">

<p>GENE\_ASSOCIATION: ( BSU16730 or BSU16740 )</p>

<p>GENE\_LIST: BSU16730 BSU16740</p>

<p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>

</html>

</notes>

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<speciesReference species="M\_cpd15596\_c"/>

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<parameter id="OBJECTIVE\_COEFFICIENT" value="0"/>

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</kineticLaw>

</reaction>

<reaction id="R\_rxn10062" name="Alcohol dehydrogenase GbsB (type III ), essential for the utilization of choline (EC 1.1.1.1)">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml">

<p>GENE\_ASSOCIATION: BSU31050</p>

<p>GENE\_LIST: BSU31050</p>

<p>SUBSYSTEM: Amino Acids and Derivatives</p>

</html>

</notes>

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<speciesReference species="M\_C00576\_c"/>

<speciesReference species="M\_C01352\_c"/>

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</listOfProducts>
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</kineticLaw>
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<reaction id="R_rxn10067" name="Alkanesulfonate monooxygenase (EC 1.14.14.5)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU08860</p>
      <p>GENE_LIST: BSU08860</p>
      <p>SUBSYSTEM: Sulfur Metabolism</p>
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  </notes>
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    <speciesReference species="M_C01847_c"/>
    <speciesReference species="M_cpd11578_c"/>
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  <listOfProducts>
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    <speciesReference species="M_C00061_c"/>
    <speciesReference species="M_C11481_c"/>
    <speciesReference species="M_cpd15611_c"/>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn10072" name="Glycine betaine ABC transport system, ATP-binding

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protein OpuAA (EC 3.6.3.32);Glycine betaine ABC transport system, permease protein OpuAB(BSU02990);Glycine betaine ABC transport system, glycine betaine-binding protein OpuAC(BSU03000)" reversible="false">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml">

<p>GENE\_ASSOCIATION: ( BSU02980 and BSU02990 and BSU03000 )</p>

<p>GENE\_LIST: BSU02980 BSU02990 BSU03000</p>

<p>SUBSYSTEM: Membrane Transport</p>

</html>

</notes>

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<speciesReference species="M\_cpd15471\_e"/>

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<speciesReference species="M\_C00080\_c"/>

<speciesReference species="M\_cpd15471\_c"/>

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<kineticLaw>

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</listOfParameters>

</kineticLaw>

</reaction>

<reaction id="R\_rxn10073" name="Glycine betaine ABC transport system, ATP-binding protein OpuAA (EC 3.6.3.32);Glycine betaine ABC transport system, permease protein OpuAB(BSU02990);Glycine betaine ABC transport system, glycine betaine-binding protein OpuAC(BSU03000)" reversible="false">

<notes>

<html xmlns="http://www.w3.org/1999/xhtml">

<p>GENE\_ASSOCIATION: ( BSU02980 and BSU02990 and BSU03000 )</p>

<p>GENE\_LIST: BSU02980 BSU02990 BSU03000</p>

<p>SUBSYSTEM: Membrane Transport</p>

</html>

</notes>

<listOfReactants>

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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn10191" name="D-alanine--poly(phosphoribitol) ligase subunit 1 (EC
6.1.1.13);D-alanine--poly(phosphoribitol) ligase subunit 2 (EC 6.1.1.13)(BSU38520);D-alanyl
transfer protein DltB(BSU38510);Poly(glycerophosphate chain) D-alanine transfer protein
DltD(BSU38530)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU38500 and BSU38510 and BSU38520 and
BSU38530 )</p>
      <p>GENE_LIST: BSU38500 BSU38510 BSU38520 BSU38530</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00002_c" stoichiometry="45"/>
    <speciesReference species="M_C00133_c" stoichiometry="45"/>
    <speciesReference species="M_cpd15661_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00013_c" stoichiometry="45"/>
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    <speciesReference species="M_cpd15663_c"/>
  </listOfProducts>
  <kineticLaw>

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  <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
  <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
</listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn10192" name="CDP-glycerol:poly(glycerophosphate)
glycerophosphotransferase (EC 2.7.8.12);CDP-glycerol:
N-acetyl-beta-D-mannosaminy1-1,4-N-acetyl-D-glucosaminyldiphosphoundecaprenyl
glycerophosphotransferase(BSU35760)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU35760 and BSU35720 )</p>
      <p>GENE_LIST: BSU35760 BSU35720</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C04881_c"/>
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  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn10193" name="Poly(glycerol-phosphate) alpha-glucosyltransferase (EC
2.4.1.52)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">

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    <p>GENE_ASSOCIATION: BSU35730</p>
    <p>GENE_LIST: BSU35730</p>
    <p>SUBSYSTEM: Cell Wall and Capsule</p>
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  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn10194" name="Teichoic acid export ATP-binding protein TagH (EC
3.6.3.40);Teichoic acid translocation permease protein TagG(BSU35710)">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU35700 and BSU35710 )</p>
      <p>GENE_LIST: BSU35700 BSU35710</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
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  </notes>
  <listOfReactants>
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    <speciesReference species="M_cpd15661_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_cpd15667_c"/>
  </listOfProducts>
  <kineticLaw>
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      <ci> FLUX_VALUE </ci>

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</math>
<listOfParameters>
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</listOfParameters>
</kineticLaw>
</reaction>
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3.6.3.40);Teichoic acid translocation permease protein TagG(BSU35710)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU35700 and BSU35710 )</p>
      <p>GENE_LIST: BSU35700 BSU35710</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
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  </notes>
  <listOfReactants>
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  </listOfReactants>
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    <speciesReference species="M_cpd15669_c"/>
  </listOfProducts>
  <kineticLaw>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn10196" name="Teichoic acid export ATP-binding protein TagH (EC
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  <notes>
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      <p>GENE_ASSOCIATION: ( BSU35700 and BSU35710 )</p>
      <p>GENE_LIST: BSU35700 BSU35710</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
    </html>
  </notes>

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</notes>
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      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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      <p>GENE_LIST: BSU09540</p>
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      <p>GENE_LIST: BSU25310</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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3-phosphatidyltransferase (EC 2.7.8.5)">
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      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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3-phosphatidyltransferase (EC 2.7.8.5)">
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<p>GENE\_LIST: BSU16920</p>

<p>SUBSYSTEM: Fatty Acids and Lipids</p>

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</kineticLaw>

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  </math>
  <listOfParameters>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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synthesis)">
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      <p>SUBSYSTEM: Cell Wall and Capsule</p>
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    <speciesReference species="M_cpd15728_c"/>
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    </math>
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    </math>
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synthesis)">
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      <p>SUBSYSTEM: Cell Wall and Capsule</p>
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      <p>SUBSYSTEM: Cell Wall and Capsule</p>
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<p>GENE\_LIST: BSU21920</p>

<p>SUBSYSTEM: Cell Wall and Capsule</p>

</html>

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<p>GENE\_LIST: BSU21920</p>

<p>SUBSYSTEM: Cell Wall and Capsule</p>

</html>

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  <speciesReference species="M_cpd15735_c"/>
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synthesis)">
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      <p>GENE_LIST: BSU21920</p>
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      <p>GENE_LIST: BSU13350</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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</reaction>
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      <p>GENE_LIST: BSU13350</p>
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  </notes>
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</reaction>
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      <p>GENE_LIST: BSU13350</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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    <speciesReference species="M_cpd15311_c"/>
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</reaction>
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      <p>GENE_LIST: BSU13350</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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    <speciesReference species="M_cpd15701_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00015_c"/>
    <speciesReference species="M_cpd15740_c"/>
  </listOfProducts>
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      <p>GENE_LIST: BSU13350</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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      <p>GENE_LIST: BSU13350</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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    <speciesReference species="M_cpd15703_c"/>
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  <listOfProducts>
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    <speciesReference species="M_cpd15742_c"/>
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  </kineticLaw>
</reaction>
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      <p>GENE_LIST: BSU13350</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  </notes>

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</html>
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  <speciesReference species="M_cpd15743_c"/>
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</kineticLaw>
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<reaction id="R_rxn10287" name="1,2-diacylglycerol 3-glucosyltransferase (EC 2.4.1.157)">
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      <p>GENE_LIST: BSU13350</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
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  <listOfReactants>
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  </listOfProducts>
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    </math>
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      <p>GENE_LIST: BSU13350</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  </listOfProducts>
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    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
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    </listOfParameters>
  </kineticLaw>
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glycerophosphotransferase (EC 2.7.8.12)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU35720</p>
      <p>GENE_LIST: BSU35720</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
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  </notes>
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</kineticLaw>
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glycerophosphotransferase (EC 2.7.8.12)">
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      <p>GENE_LIST: BSU35720</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
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glycerophosphotransferase (EC 2.7.8.12)">

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glycerophosphotransferase (EC 2.7.8.12)">

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2.4.1.52)">

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2.4.1.52)">

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      <p>SUBSYSTEM: Cell Wall and Capsule</p>
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      <p>GENE_LIST: BSU35530</p>
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1-phosphate transferase (EC 2.7.8.-)">

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    <p>SUBSYSTEM: Cell Wall and Capsule</p>
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1-phosphate transferase (EC 2.7.8.-)">
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      <p>SUBSYSTEM: Cell Wall and Capsule</p>
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  </kineticLaw>
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LytR-CpsA-Psr, subfamily F2 (as in PMID19099556)" reversible="false">
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</kineticLaw>
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LytR-CpsA-Psr, subfamily F2 (as in PMID19099556)" reversible="false">
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</kineticLaw>
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LytR-CpsA-Psr, subfamily F2 (as in PMID19099556)" reversible="false">
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      <p>GENE_LIST: BSU35520</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
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LytR-CpsA-Psr, subfamily F2 (as in PMID19099556)" reversible="false">
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  </kineticLaw>
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LytR-CpsA-Psr, subfamily F2 (as in PMID19099556)" reversible="false">
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      <p>GENE_LIST: BSU35520</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
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</reaction>

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<p>GENE\_LIST: BSU35520</p>

<p>SUBSYSTEM: Cell Wall and Capsule</p>

</html>

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</math>

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</listOfParameters>

</kineticLaw>

</reaction>

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<p>SUBSYSTEM: Cell Wall and Capsule</p>

</html>

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</reaction>

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    <speciesReference species="M_cpd15538_c"/>
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  </listOfProducts>
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  </kineticLaw>
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    <speciesReference species="M_cpd15785_c"/>
  </listOfProducts>
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    </listOfParameters>
  </kineticLaw>
</reaction>
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      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
  <listOfReactants>

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      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
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    <speciesReference species="M_cpd15725_c"/>
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  </kineticLaw>
</reaction>
<reaction id="R_rxn10332" name="" reversible="false">
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</kineticLaw>
</reaction>
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      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  </notes>
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  </listOfProducts>
  <kineticLaw>
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</reaction>
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      <p>GENE_LIST: BSU36590 BSU37240</p>
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  </kineticLaw>
</reaction>
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      <p>GENE_LIST: BSU36590 BSU37240</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  </notes>
  <listOfReactants>
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  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00116_c"/>
    <speciesReference species="M_cpd15793_c"/>
  </listOfProducts>
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</reaction>
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    <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  <speciesReference species="M_C00116_c"/>
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</kineticLaw>
</reaction>
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      <p>GENE_LIST: BSU36590 BSU37240</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  </notes>
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  <listOfProducts>
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  </listOfProducts>
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      <p>GENE_LIST: BSU36590 BSU37240</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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    <speciesReference species="M_cpd15796_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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  </kineticLaw>
</reaction>
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  <notes>
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      <p>GENE_LIST: BSU36590 BSU37240</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
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      <p>GENE_LIST: BSU36590 BSU37240</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  </notes>
  <listOfReactants>
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    </math>
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    </listOfParameters>
  </kineticLaw>
</reaction>
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 <p>GENE\_LIST: BSU36590 BSU37240</p>  
 <p>SUBSYSTEM: Fatty Acids and Lipids</p>  
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 <speciesReference species="M\_cpd15799\_c"/>  
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 <parameter id="OBJECTIVE\_COEFFICIENT" value="0"/>  
 </listOfParameters>  
 </kineticLaw>  
 </reaction>  
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 <notes>  
 <html xmlns="http://www.w3.org/1999/xhtml">  
 <p>GENE\_ASSOCIATION: ( BSU33490 or BSU13850 )</p>  
 <p>GENE\_LIST: BSU33490 BSU13850</p>  
 <p>SUBSYSTEM: Membrane Transport</p>  
 </html>  
 </notes>  
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 <speciesReference species="M\_C00001\_c"/>  
 <speciesReference species="M\_C00703\_c"/>  
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 <kineticLaw>



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</math>
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</kineticLaw>
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cadmium, zinc and mercury transporting ATPase (EC 3.6.3.3) (EC 3.6.3.5)" reversible="false">
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      <p>GENE_LIST: BSU33490 BSU13850</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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  </notes>
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    <speciesReference species="M_C00001_c"/>
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  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C06696_e"/>
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  <kineticLaw>
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    </math>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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  </kineticLaw>
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and cobalt transport protein corA(BSU24740)" reversible="false">
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  <p>GENE_LIST: BSU08000 BSU24740</p>
  <p>SUBSYSTEM: Membrane Transport</p>
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</listOfReactants>
<listOfProducts>
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</listOfProducts>
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  </math>
  <listOfParameters>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn10537" name="Na(+)-linked D-alanine glycine permease">
  <notes>
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      <p>GENE_ASSOCIATION: BSU07750</p>
      <p>GENE_LIST: BSU07750</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00037_e"/>
  </listOfReactants>
  <listOfProducts>
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  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>

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    <parameter id="UPPER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
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</kineticLaw>
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  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
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  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00283_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn10862" name="Glycine betaine ABC transport system, ATP-binding
protein OpuAA (EC 3.6.3.32);Glycine betaine ABC transport system, permease protein
OpuAB(BSU02990);Glycine betaine ABC transport system, glycine betaine-binding protein
OpuAC(BSU03000)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU02980 and BSU02990 and BSU03000 )</p>
      <p>GENE_LIST: BSU02980 BSU02990 BSU03000</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00037_e"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c"/>
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  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
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  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00013_e"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c" stoichiometry="2"/>
    <speciesReference species="M_C00013_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>

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    </listOfParameters>
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</reaction>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
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    <speciesReference species="M_cpd15585_e"/>
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  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_cpd15585_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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  </kineticLaw>
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  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00080_e" stoichiometry="2"/>
    <speciesReference species="M_C00552_e"/>
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    <speciesReference species="M_C00080_c" stoichiometry="2"/>

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    <speciesReference species="M_C00552_c"/>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00080_e"/>
    <speciesReference species="M_C01040_e"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C01040_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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  </kineticLaw>
</reaction>
<reaction id="R_rxn11400" name="">
  <notes>
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      <p>GENE_ASSOCIATION: </p>

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    <p>GENE_LIST: </p>
    <p>SUBSYSTEM: Membrane Transport</p>
  </html>
</notes>
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  <speciesReference species="M_C02353_e"/>
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<listOfProducts>
  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C02353_c"/>
</listOfProducts>
<kineticLaw>
  <math xmlns="http://www.w3.org/1998/Math/MathML">
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  </math>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C02354_e"/>
  </listOfReactants>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C02354_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>

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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
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    <speciesReference species="M_C02355_e"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C02355_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</reaction>
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  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C03031_e"/>

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</listOfReactants>
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  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C03031_c"/>
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  </math>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C03619_e"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C03619_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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  </kineticLaw>
</reaction>
<reaction id="R_rxn11405" name="">

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    <p>SUBSYSTEM: Membrane Transport</p>
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  <speciesReference species="M_C05332_e"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C05332_c"/>
</listOfProducts>
<kineticLaw>
  <math xmlns="http://www.w3.org/1998/Math/MathML">
    <ci> FLUX_VALUE </ci>
  </math>
  <listOfParameters>
    <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn11407" name="">
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C12147_e"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C12147_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>

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  <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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</listOfParameters>
</kineticLaw>
</reaction>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00601_e"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00601_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn11921" name="" reversible="false">
  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
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    <speciesReference species="M_cpd16488_c"/>

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</listOfReactants>
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  <speciesReference species="M_cpd15727_c" stoichiometry="5.33e-05"/>
  <speciesReference species="M_cpd15799_c" stoichiometry="2.85e-05"/>
  <speciesReference species="M_cpd15529_c" stoichiometry="6.06e-05"/>
  <speciesReference species="M_cpd15531_c" stoichiometry="5.57e-05"/>
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  <speciesReference species="M_cpd15540_c" stoichiometry="4.95e-05"/>
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  <speciesReference species="M_cpd15697_c" stoichiometry="6.06e-05"/>
  <speciesReference species="M_cpd15698_c" stoichiometry="5.8e-05"/>
  <speciesReference species="M_cpd15699_c" stoichiometry="5.8e-05"/>
  <speciesReference species="M_cpd15700_c" stoichiometry="5.57e-05"/>
  <speciesReference species="M_cpd15722_c" stoichiometry="5.14e-05"/>
  <speciesReference species="M_cpd15723_c" stoichiometry="5.14e-05"/>
  <speciesReference species="M_cpd15724_c" stoichiometry="5.78e-05"/>
  <speciesReference species="M_cpd15725_c" stoichiometry="5.55e-05"/>
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  <speciesReference species="M_cpd15791_c" stoichiometry="2.85e-05"/>
  <speciesReference species="M_cpd15792_c" stoichiometry="3.11e-05"/>
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  <speciesReference species="M_cpd15794_c" stoichiometry="2.74e-05"/>
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  <speciesReference species="M_cpd15797_c" stoichiometry="2.97e-05"/>
  <speciesReference species="M_cpd15798_c" stoichiometry="2.97e-05"/>
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  </math>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn12519" name="">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: </p>

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    <p>GENE_LIST: </p>
    <p>SUBSYSTEM: Membrane Transport</p>
  </html>
</notes>
<listOfReactants>
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  <speciesReference species="M_C00169_e"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00080_c" stoichiometry="2"/>
  <speciesReference species="M_C00169_c"/>
</listOfProducts>
<kineticLaw>
  <math xmlns="http://www.w3.org/1998/Math/MathML">
    <ci> FLUX_VALUE </ci>
  </math>
  <listOfParameters>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_T00001" name="">
  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00080_e"/>
    <speciesReference species="M_C00079_e"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00079_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>
    <listOfParameters>

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    <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_T00003" name="">
  <notes>
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      <p>GENE_ASSOCIATION: </p>
      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_cpd16500_c"/>
    <speciesReference species="M_C00003_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C01769_c"/>
    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C00080_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_T00004" name="">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU39680</p>
      <p>GENE_LIST: BSU39680</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_TC0001_c"/>

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</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00691_c"/>
</listOfProducts>
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  <math xmlns="http://www.w3.org/1998/Math/MathML">
    <ci> FLUX_VALUE </ci>
  </math>
  <listOfParameters>
    <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_T00005" name="">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU39700</p>
      <p>GENE_LIST: BSU39700</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00003_c"/>
    <speciesReference species="M_C19891_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_TC0001_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_T00006" name="">

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    <p>GENE_LIST: BSU10850 BSU33530</p>
    <p>SUBSYSTEM: Carbohydrates</p>
  </html>
</notes>
<listOfReactants>
  <speciesReference species="M_C00003_c"/>
  <speciesReference species="M_C06153_c"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C00004_c"/>
  <speciesReference species="M_C00691_c"/>
</listOfProducts>
<kineticLaw>
  <math xmlns="http://www.w3.org/1998/Math/MathML">
    <ci> FLUX_VALUE </ci>
  </math>
  <listOfParameters>
    <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_T00245" name="">
  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00898_e"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00898_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>
  </kineticLaw>
</reaction>

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</math>
<listOfParameters>
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  <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
  <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
</listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_T00246" name="">
  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00134_e"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00134_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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</reaction>
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      <p>SUBSYSTEM: Membrane Transport</p>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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      <p>SUBSYSTEM: Membrane Transport</p>
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  </notes>
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  <listOfProducts>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
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    <speciesReference species="M_C00011_c"/>
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      <p>GENE_ASSOCIATION: BA__adh2</p>
      <p>GENE_LIST: </p>

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    <p>SUBSYSTEM: Carbohydrates</p>
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  <speciesReference species="M_C00006_c"/>
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  </math>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
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      <p>SUBSYSTEM: Carbohydrates</p>
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    <speciesReference species="M_C00080_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_TC0004_c"/>
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  </listOfProducts>

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    <speciesReference species="M_C00011_c"/>
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      <p>SUBSYSTEM: Carbohydrates</p>
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    <speciesReference species="M_C00005_c"/>
    <speciesReference species="M_C00080_c"/>
  </listOfReactants>
  <listOfProducts>
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  </listOfProducts>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
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  <listOfProducts>
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  </listOfProducts>
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    </math>
  </kineticLaw>
</reaction>

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    </math>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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      <p>GENE_LIST: </p>
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  </notes>

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      <p>GENE_LIST: </p>
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    </math>
    <listOfParameters>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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    </listOfParameters>
  </kineticLaw>
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