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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>
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        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>
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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>
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</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

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>

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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|Dambosel|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-THF|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: C9H7O3</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:
C15H19N2O18P2</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: C3H3O4</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: CH3NO5P</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: CH3NO5P,
extracellular</p></html>
  </notes>
</species>
  <species id="M_C00170_c"
name="5'-Methylthioadenosine|Methylthioadenosine|S-Methyl-5'-thioadenosine|5-Methylthioaden
osine|5'-Deoxy-5'-(methylthio)adenosine|Thiomethyladenosine|MTA|methylthioadenosine"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C11H15N5O3S</p></html>
  </notes>
</species>
  <species id="M_C00175_c" name="Cobalt|Co2+" 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|Dracrylic 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-ketoisoc
aproate" 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 diphosphate|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: C₆H₁₃NO₂, 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: C₃₉H₆₇N₇O₁₇P₃S</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: C₁₉H₁₉N₇O₆</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: C₆H₃O₆</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: C₃H₆O₂</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: C₅H₉NO₃</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-Galactose1-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|Farnesyldiphosphate|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-Ribose1-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-ribose1-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-ribose5-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="mqI7|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: C₉H₁₆NO₅</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: C₉H₁₆NO₅, 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: C₆H₅NO₃</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: C₂₅H₃₇N₇O₁₇P₃S</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: C₆H₈O₈</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: C₆H₈O₈, 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: C₉H₁₃N₃O₄</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-tartrate" 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-tartrate, 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-Dehydroquininate|5-Dehydroquininate|3-Dehydroquinic
acid|5-Dehydroquinic acid|3-dehydroquininate" 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: C₈H₇O₄</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: C₅H₉NO₃</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: C₁₇H₂₅N₃O₁₇P₂</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: C₆H₁₂O₉P</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: C₆H₁₂O₉P</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: C₉H₇O₄</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-(ribosylamino)-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-(ribosylamino)-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
diphospho
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|Mecaptoacetic acid|Mecaptoethanoic 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|Mecaptoacetic acid|Mecaptoethanoic 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-Ribosynicotinamide|1-(beta-D-Ribofuransyl)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-riboseyl)-5-aminoimidazole|5-Amino-1-(5-phospho-D-riboseyl)imidazole|5-amino-1-(5-p
hospho-D-riboseyl)imidazole|5-amino-1--5-phospho-D-riboseylimidazole|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
urionate"
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: C₆H₈O₅</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: C₆H₉NOS</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: C₁₂H₁₄NO₉P</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: C₆H₉NO₄PS</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: C₁₃H₁₈N₄O₆</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: C₆H₇O₆</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: C₁₂H₂₁N₂O₉PS</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: C₈H₁₄N₂O₉P</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: C₉H₁₅N₂O₅</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: C₂₆H₄₁N₇O₁₈P₃S</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

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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-Succiny
l-L-2,6-diaminoheptanedioate|N-Succinyl-L-2,6-diaminopimelate|N-succinyl-LL-2,6-diaminohept
anedioate|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-d
ehydro-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-ribulose 1-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-oxoectanoyl-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>
  </species>

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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-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-Hydroxyglutatesemialdehyde" 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|Benzeneacetic
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)lTHF-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-diketo5-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>
        <html
          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C20H35N2O9PRS</p></html>
        </notes>
      </species>
      <species
        id="M_cpd11501_c"
        name="6-methyl-3-hydroxy-octanoyl-ACP"
        compartment="C_c">
        <notes>
          <html
            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>
            <html
              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>
              <html
                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
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>
              <species
                id="M_cpd11505_c"
                name="8-methyl-3-hydroxy-decanoyl-ACP"
                compartment="C_c">
                <notes>
                  <html
                    xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C22H41N2O9PRS</p></html>

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    </notes>
</species>
  <species id="M_cpd11506_c" name="8-methyl-trans-dec-2-enoyl-ACP"
compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C22H39N2O8PRS</p></html>
  </notes>
</species>
  <species id="M_cpd11507_c" name="8-methyl-decanoyl-ACP" compartment="C_c">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C22H41N2O8PRS</p></html>
  </notes>
</species>
  <species id="M_cpd11508_c" name="10-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_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">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C24H43N2O8PRS</p></html>
  </notes>
</species>
  <species id="M_cpd11511_c" name="10-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_cpd11512_c" name="12-methyl-3-oxo-tetra-decanoyl-ACP"
compartment="C_c">

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      <notes>
        <html
          xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C26H47N2O9PRS</p></html>
        </notes>
      </species>
      <species id="M_cpd11513_c" name="12-methyl-3-hydroxy-tetra-decanoyl-ACP"
compartment="C_c">
        <notes>
          <html
            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">
          <notes>
            <html
              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>
              <html
                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">
    <notes>
      <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>
 </notes>
 </species>
 <species id="M_cpd11526_c" name="7-methyl-3-hydroxy-octanoyl-ACP" compartment="C_c">
 <notes>
 <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:
 C22H39N2O9PRS</p></html>
 </notes>
 </species>
 <species id="M_cpd11530_c" name="9-methyl-3-hydroxy-decanoyl-ACP" compartment="C_c">
 <notes>
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
 C22H41N2O9PRS</p></html>
 </notes>
 </species>
 <species id="M_cpd11531_c" name="9-methyl-trans-dec-2-enoyl-ACP" compartment="C_c">
 <notes>
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
 C22H39N2O8PRS</p></html>
 </notes>
 </species>
 <species id="M_cpd11532_c" name="9-methyl-decanoyl-ACP" compartment="C_c">

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      <notes>
      <html
      xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
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>
  <species id="M_cpd11539_c" name="13-methyl-trans-tetra-dec-2-enoyl-ACP"
compartment="C_c">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
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>
      <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C28H53N2O8PRS</p></html>
    </notes>
</species>
  <species id="M_cpd11545_c" name="2-methylpropionyl-ACP|isobutyryl-ACP"
compartment="C_c">

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      <notes>
        <html
          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>
          <html
            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>
    <html                                xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
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>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
C23H43N2O9PRS</p></html>
  </notes>
</species>
  <species id="M_cpd11560_c" name="10-methyl-trans-undec-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_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>
    <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
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>
                  <html
                    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>
    <html
      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="Diisoheptadecanoylphosphatidylserine"
    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 diisohexadecanoylglycerol"
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="Diisoheptadecanoylphosphatidylglycerol"
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:
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 </notes>
 </species>
 <species id="M_cpd15787_c" name="Isotetradecanoyllysylphosphatidylglycerol"
 compartment="C_c">
 <notes>
 <html xmlns="http://www.w3.org/1999/xhtml"><p>FORMULA:
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 </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>
</listOfSpecies>
<listOfReactions>
  <reaction id="R_bio00006" name="" reversible="false">
    <notes>
      <html xmlns="http://www.w3.org/1999/xhtml">
        <p>GENE_ASSOCIATION: </p>
        <p>GENE_LIST: </p>
        <p>SUBSYSTEM: </p>
      </html>
    </notes>
    <listOfReactants>
      <speciesReference species="M_C00002_c" stoichiometry="105.003"/>
      <speciesReference species="M_C00006_c" stoichiometry="0.001053"/>
      <speciesReference species="M_C00005_c" stoichiometry="0.0002367"/>
      <speciesReference species="M_C00010_c" stoichiometry="0.000127618"/>
      <speciesReference species="M_C00003_c" stoichiometry="0.01822"/>
      <speciesReference species="M_C00013_c" stoichiometry="0.0008548"/>
      <speciesReference species="M_C00020_c" stoichiometry="0.005253"/>
      <speciesReference species="M_C00001_c" stoichiometry="105"/>
      <speciesReference species="M_C00055_c" stoichiometry="0.001153"/>
      <speciesReference species="M_C00112_c" stoichiometry="0.0002924"/>
      <speciesReference species="M_C00305_c" stoichiometry="0.09474"/>
      <speciesReference species="M_C00063_c" stoichiometry="0.0006105"/>
      <speciesReference species="M_C00044_c" stoichiometry="0.0004883"/>
      <speciesReference species="M_C00035_c" stoichiometry="0.0002215"/>
      <speciesReference species="M_C00229_c" stoichiometry="0.000273109"/>
      <speciesReference species="M_C00144_c" stoichiometry="0.0005939"/>
      <speciesReference species="M_C14819_c" stoichiometry="0.003209"/>
      <speciesReference species="M_cpd15800_c" stoichiometry="0.076"/>
      <speciesReference species="M_C00238_c" stoichiometry="0.6576"/>
      <speciesReference species="M_C00017_c" stoichiometry="0.5284"/>
      <speciesReference species="M_C00828_c" stoichiometry="0.00014977"/>
      <speciesReference species="M_C00076_c" stoichiometry="0.002983"/>
      <speciesReference species="M_cpd11462_c" stoichiometry="0.0655"/>
      <speciesReference species="M_C00039_c" stoichiometry="0.026"/>
      <speciesReference species="M_cpd15664_c" stoichiometry="0.2242"/>
      <speciesReference species="M_cpd15670_c" stoichiometry="0.0304"/>
      <speciesReference species="M_C00234_c" stoichiometry="0.000206831"/>
    </listOfReactants>
    <listOfProducts>
      <speciesReference species="M_C00008_c" stoichiometry="104.997"/>
      <speciesReference species="M_C00009_c" stoichiometry="104.987"/>
      <speciesReference species="M_C03688_c" stoichiometry="0.000273109"/>
    </listOfProducts>
  </reaction>
</listOfReactions>

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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="1"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_E00001" name="Exchange">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: </p>
      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00001_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="-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_E00002" name="Exchange">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: </p>
      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>

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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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      <p>SUBSYSTEM: Exchange</p>
    </html>
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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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</reaction>
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    <p>SUBSYSTEM: Exchange</p>
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  </notes>
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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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    <p>SUBSYSTEM: Exchange</p>
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      <p>SUBSYSTEM: Exchange</p>
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  <listOfProducts>
  </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>
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      <p>SUBSYSTEM: Exchange</p>
    </html>
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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"/>

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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: Exchange</p>
    </html>
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  <listOfProducts>
  </listOfProducts>
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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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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
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</math>
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    </math>
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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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  </notes>

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  </math>
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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"/>
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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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    </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>SUBSYSTEM: Exchange</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"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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<reaction id="R_E00040" name="Exchange">
  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
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  <listOfProducts>
  </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"/>

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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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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"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_E00042" name="Exchange">
  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
  <listOfReactants>
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  </listOfReactants>
  <listOfProducts>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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  <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
</listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_E00043" name="Exchange">
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      <p>GENE_LIST: </p>
      <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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      <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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      <p>SUBSYSTEM: Exchange</p>
    </html>
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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_E00046" name="Exchange">
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>

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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 id="R_E00047" name="Exchange">
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
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    <speciesReference species="M_C00120_e"/>
  </listOfReactants>
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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"/>
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  </kineticLaw>
</reaction>
<reaction id="R_E00048" name="Exchange">
  <notes>
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    <p>GENE_LIST: </p>
    <p>SUBSYSTEM: Exchange</p>
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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"/>
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<reaction id="R_E00049" name="Exchange">
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
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  </listOfReactants>
  <listOfProducts>
</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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<reaction id="R_E00050" name="Exchange">
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      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
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    <speciesReference species="M_C00123_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>
</reaction>
<reaction id="R_E00051" name="Exchange">
  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
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    <speciesReference species="M_C00124_e"/>
  </listOfReactants>
  <listOfProducts>
  </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"/>

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</kineticLaw>
</reaction>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00133_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>
</reaction>
<reaction id="R_E00053" name="Exchange">
  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
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    <speciesReference species="M_C00135_e"/>
  </listOfReactants>
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</listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_E00054" name="Exchange">
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      <p>SUBSYSTEM: Exchange</p>
    </html>
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  <listOfProducts>
  </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"/>
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    </listOfParameters>
  </kineticLaw>
</reaction>
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  <notes>
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      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
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  </listOfReactants>
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</listOfProducts>
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  </math>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_E00056" name="Exchange">
  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
  <listOfReactants>
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  <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>
</reaction>
<reaction id="R_E00057" name="Exchange">
  <notes>
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      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>

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  </math>
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      <p>SUBSYSTEM: Exchange</p>
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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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<reaction id="R_E00060" name="Exchange">
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      <p>SUBSYSTEM: Exchange</p>
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    </math>
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</reaction>

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<reaction id="R_E00061" name="Exchange">
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      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
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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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      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
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    <speciesReference species="M_C00159_e"/>
  </listOfReactants>
  <listOfProducts>
  </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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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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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>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
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    <speciesReference species="M_C00163_e"/>
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  </listOfProducts>
  <kineticLaw>
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</listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_E00065" name="Exchange">
  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
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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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</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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</kineticLaw>
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  <notes>
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      <p>SUBSYSTEM: Exchange</p>
    </html>
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    <speciesReference species="M_C00175_e"/>
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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_E00068" name="Exchange">
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
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  </notes>

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  </math>
  <listOfParameters>
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      <p>SUBSYSTEM: Exchange</p>
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  </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"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
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    <p>GENE_LIST: </p>
    <p>SUBSYSTEM: Exchange</p>
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</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"/>
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</kineticLaw>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
  <listOfReactants>
    <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>
</reaction>

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<reaction id="R_E00072" name="Exchange">
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      <p>SUBSYSTEM: Exchange</p>
    </html>
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  </listOfReactants>
  <listOfProducts>
  </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_E00073" name="Exchange">
  <notes>
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      <p>SUBSYSTEM: Exchange</p>
    </html>
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  </listOfReactants>
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  </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"/>

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  </listOfParameters>
</kineticLaw>
</reaction>
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      <p>SUBSYSTEM: Exchange</p>
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    <speciesReference species="M_C00188_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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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
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    <speciesReference species="M_C00189_e"/>
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  <listOfProducts>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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</listOfParameters>
</kineticLaw>
</reaction>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
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  </notes>
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    <speciesReference species="M_C00191_e"/>
  </listOfReactants>
  <listOfProducts>
  </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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<reaction id="R_E00077" name="Exchange">
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      <p>GENE_LIST: </p>
      <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>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
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    <speciesReference species="M_C00204_e"/>
  </listOfReactants>
  <listOfProducts>
  </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"/>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
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  </math>
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<reaction id="R_E00080" name="Exchange">
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      <p>SUBSYSTEM: Exchange</p>
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    <speciesReference species="M_C00212_e"/>
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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"/>
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    </listOfParameters>
  </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: Exchange</p>
  </html>
</notes>
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  <speciesReference species="M_C00214_e"/>
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<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>
</reaction>
<reaction id="R_E00082" name="Exchange">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00216_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>
</reaction>

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<reaction id="R_E00083" name="Exchange">
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      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
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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"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_E00084" name="Exchange">
  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
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    <speciesReference species="M_C00238_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="-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>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00242_e"/>
  </listOfReactants>
  <listOfProducts>
  </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_E00086" name="Exchange">
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
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    <speciesReference species="M_C00243_e"/>
  </listOfReactants>
  <listOfProducts>
  </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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      <p>SUBSYSTEM: Exchange</p>
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  </listOfReactants>
  <listOfProducts>
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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>
<reaction id="R_E00088" name="Exchange">
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
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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"/>
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      <p>SUBSYSTEM: Exchange</p>
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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"/>
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  </kineticLaw>
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      <p>SUBSYSTEM: Exchange</p>
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  </notes>

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  </math>
  <listOfParameters>
    <parameter id="LOWER_BOUND" value="-5" 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>
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  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
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    <speciesReference species="M_C00253_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>
</reaction>
<reaction id="R_E00092" name="Exchange">
  <notes>
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      <p>GENE_ASSOCIATION: </p>

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    <p>GENE_LIST: </p>
    <p>SUBSYSTEM: Exchange</p>
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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_E00093" name="Exchange">
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
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    <speciesReference species="M_C00257_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>
</reaction>

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<reaction id="R_E00094" name="Exchange">
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
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    <speciesReference species="M_C00259_e"/>
  </listOfReactants>
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  <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_E00095" name="Exchange">
  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
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    <speciesReference species="M_C00262_e"/>
  </listOfReactants>
  <listOfProducts>
  </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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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
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    <speciesReference species="M_C00267_e"/>
  </listOfReactants>
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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="-5" 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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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00270_e"/>
  </listOfReactants>
  <listOfProducts>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>

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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_E00098" name="Exchange">
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
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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_E00099" name="Exchange">
  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
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    <speciesReference species="M_C00283_e"/>
  </listOfReactants>
  <listOfProducts>

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</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>
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<reaction id="R_E00100" name="Exchange">
  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
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    <speciesReference species="M_C00291_e"/>
  </listOfReactants>
  <listOfProducts>
  </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_E00101" name="Exchange">
  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>

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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_E00102" name="Exchange">
  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
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    <speciesReference species="M_C00299_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>
</reaction>
<reaction id="R_E00103" name="Exchange">
  <notes>
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      <p>GENE_ASSOCIATION: </p>

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    <p>GENE_LIST: </p>
    <p>SUBSYSTEM: Exchange</p>
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<listOfProducts>
</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_E00104" name="Exchange">
  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00327_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>
</reaction>

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<reaction id="R_E00105" name="Exchange">
  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00329_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 id="R_E00106" name="Exchange">
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00333_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"/>

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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
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      <p>SUBSYSTEM: Exchange</p>
    </html>
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  </listOfReactants>
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    </math>
    <listOfParameters>
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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: Exchange</p>
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</listOfParameters>
</kineticLaw>
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  </notes>
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  </notes>

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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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</reaction>

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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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  <listOfProducts>
  </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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    </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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            <p>GENE_LIST: </p>
            <p>SUBSYSTEM: Exchange</p>
        </html>
    </notes>
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</listOfParameters>
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      <p>GENE_LIST: </p>
      <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>
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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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    <p>SUBSYSTEM: Exchange</p>
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  </math>
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      <p>SUBSYSTEM: Exchange</p>
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    <speciesReference species="M_C00506_e"/>
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  <listOfProducts>
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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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</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_E00128" name="Exchange">
  <notes>
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      <p>GENE_LIST: </p>
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    <speciesReference species="M_C00530_e"/>
  </listOfReactants>
  <listOfProducts>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
      <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
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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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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_E00130" name="Exchange">
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
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    <speciesReference species="M_C00536_e"/>
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    <math xmlns="http://www.w3.org/1998/Math/MathML">
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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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        </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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    </math>
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      <p>SUBSYSTEM: Exchange</p>
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  </notes>

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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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    </math>
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      <p>SUBSYSTEM: Exchange</p>
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  </math>
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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="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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  </listOfParameters>
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</reaction>
<reaction id="R_E00159" name="Exchange">
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C01181_e"/>
  </listOfReactants>
  <listOfProducts>
</listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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  </kineticLaw>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_E00161" name="Exchange">
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  <listOfProducts>
  </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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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
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      <p>SUBSYSTEM: Exchange</p>
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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"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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  </kineticLaw>
</reaction>
<reaction id="R_E00163" name="Exchange">
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      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
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  </listOfProducts>
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</math>
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</listOfParameters>
</kineticLaw>
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      <p>SUBSYSTEM: Exchange</p>
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    </math>
    <listOfParameters>
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</reaction>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
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  </listOfReactants>
  <listOfProducts>

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</listOfProducts>
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  </math>
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      <p>SUBSYSTEM: Exchange</p>
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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_E00167" name="Exchange">
  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>

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<listOfReactants>
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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>
<reaction id="R_E00168" name="Exchange">
  <notes>
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      <p>SUBSYSTEM: Exchange</p>
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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"/>
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    </listOfParameters>
  </kineticLaw>
</reaction>
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  <notes>
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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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</kineticLaw>
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      <p>SUBSYSTEM: Exchange</p>
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  </notes>
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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>

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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"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_E00172" name="Exchange">
  <notes>
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      <p>SUBSYSTEM: Exchange</p>
    </html>
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  <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"/>

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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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  </kineticLaw>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
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  </listOfReactants>
  <listOfProducts>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>

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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_E00175" name="Exchange">
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
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    <speciesReference species="M_C02086_e"/>
  </listOfReactants>
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  </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"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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      <p>SUBSYSTEM: Exchange</p>
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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"/>
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      <p>SUBSYSTEM: Exchange</p>
    </html>
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    <speciesReference species="M_C02350_e"/>
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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"/>
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<reaction id="R_E00178" name="Exchange">
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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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</kineticLaw>
</reaction>
<reaction id="R_E00179" name="Exchange">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
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    <speciesReference species="M_C02354_e"/>
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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_E00180" name="Exchange">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: </p>

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    <p>GENE_LIST: </p>
    <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"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
</reaction>
<reaction id="R_E00181" name="Exchange">
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
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    <speciesReference species="M_C02466_e"/>
  </listOfReactants>
  <listOfProducts>
  </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>

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<reaction id="R_E00182" name="Exchange">
  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
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    <speciesReference species="M_C02532_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>
</reaction>
<reaction id="R_E00183" name="Exchange">
  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
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    <speciesReference species="M_C03031_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"/>

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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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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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    </listOfParameters>
  </kineticLaw>
</reaction>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
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</math>
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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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      <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>
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    </math>
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      <p>SUBSYSTEM: Exchange</p>
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    </math>
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  </kineticLaw>
</reaction>
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      <p>SUBSYSTEM: Exchange</p>
    </html>
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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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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
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  </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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      <p>SUBSYSTEM: Exchange</p>
    </html>
  </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"/>
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    </listOfParameters>
  </kineticLaw>
</reaction>
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  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
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  </notes>

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      <p>SUBSYSTEM: Exchange</p>
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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"/>
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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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      <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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    </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: Exchange</p>
    </html>
  </notes>
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    <speciesReference species="M_C08275_e"/>
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</kineticLaw>
</reaction>
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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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    </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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    </math>
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      <p>SUBSYSTEM: Exchange</p>
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    </math>
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  </kineticLaw>
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      <p>SUBSYSTEM: Exchange</p>
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  </notes>

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    <p>SUBSYSTEM: Exchange</p>
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    </math>
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    </math>
    <listOfParameters>
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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_E00237" name="Exchange">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: </p>
      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_cpd11595_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>
</reaction>
<reaction id="R_E00238" name="Exchange">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: </p>
      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_cpd11596_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"/>

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        <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_E00239" name="Exchange">
    <notes>
        <html xmlns="http://www.w3.org/1999/xhtml">
            <p>GENE_ASSOCIATION: </p>
            <p>GENE_LIST: </p>
            <p>SUBSYSTEM: Exchange</p>
        </html>
    </notes>
    <listOfReactants>
        <speciesReference species="M_cpd11597_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>
</reaction>
<reaction id="R_E00240" name="Exchange">
    <notes>
        <html xmlns="http://www.w3.org/1999/xhtml">
            <p>GENE_ASSOCIATION: </p>
            <p>GENE_LIST: </p>
            <p>SUBSYSTEM: Exchange</p>
        </html>
    </notes>
    <listOfReactants>
        <speciesReference species="M_cpd11598_e"/>
    </listOfReactants>
    <listOfProducts>
    </listOfProducts>
    <kineticLaw>
        <math xmlns="http://www.w3.org/1998/Math/MathML">
            <ci> FLUX_VALUE </ci>

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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_E00241" name="Exchange">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: </p>
      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_cpd11599_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>
</reaction>
<reaction id="R_E00242" name="Exchange">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: </p>
      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_cpd15471_e"/>
  </listOfReactants>
  <listOfProducts>

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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_E00243" name="Exchange">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: </p>
      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_cpd15585_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>
</reaction>
<reaction id="R_E00244" name="Exchange">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: </p>
      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>

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<listOfReactants>
  <speciesReference species="M_C00079_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>
</reaction>
<reaction id="R_E00245" name="Exchange">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: </p>
      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00898_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>
</reaction>
<reaction id="R_E00246" name="Exchange">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: </p>

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    <p>GENE_LIST: </p>
    <p>SUBSYSTEM: Exchange</p>
  </html>
</notes>
<listOfReactants>
  <speciesReference species="M_C00134_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>
</reaction>
<reaction id="R_E00247" name="Exchange">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: </p>
      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C01613_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>
</reaction>

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<reaction id="R_E00248" name="Exchange">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: </p>
      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00246_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>
</reaction>
<reaction id="R_E00249" name="Exchange">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: </p>
      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C06892_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"/>

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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_E00250" name="Exchange">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: </p>
      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_cpd16500_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>
</reaction>
<reaction id="R_E00251" name="Exchange">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: </p>
      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00810_e"/>
  </listOfReactants>
  <listOfProducts>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>

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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_E00252" name="Exchange">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: </p>
      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C01769_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>
</reaction>
<reaction id="R_E00253" name="Exchange">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: </p>
      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C19891_e"/>
  </listOfReactants>
  <listOfProducts>

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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_E00254" name="Exchange">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: </p>
      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Exchange</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C06153_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>
</reaction>
<reaction id="R_R00004" name="Manganese-dependent inorganic pyrophosphatase (EC
3.6.1.1);Inorganic pyrophosphatase PpaX(BSU34970)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU40550 or BSU34970 )</p>
      <p>GENE_LIST: BSU40550 BSU34970</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>

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</notes>
<listOfReactants>
  <speciesReference species="M_C00013_c"/>
  <speciesReference species="M_C00001_c"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00009_c" stoichiometry="2"/>
  <speciesReference species="M_C00080_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"/>
    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</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>
  <listOfReactants>
    <speciesReference species="M_C00080_c" stoichiometry="3"/>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C01010_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00011_c" stoichiometry="2"/>
    <speciesReference species="M_C00014_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="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R00009" name="Catalase (EC 1.11.1.6)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU38630 or BSU39050 or BSU08820 )</p>
      <p>GENE_LIST: BSU38630 BSU39050 BSU08820</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00027_c" stoichiometry="2"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00007_c"/>
    <speciesReference species="M_C00001_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"/>
      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R00014" name="Pyruvate dehydrogenase E1 component alpha subunit (EC
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>
    </html>
  </notes>

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<listOfReactants>
  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C00022_c"/>
  <speciesReference species="M_C00068_c"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00011_c"/>
  <speciesReference species="M_C05125_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_R00021" name="Ferredoxin-dependent glutamate synthase (EC 1.4.7.1)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU06590</p>
      <p>GENE_LIST: BSU06590</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00025_c" stoichiometry="2"/>
    <speciesReference species="M_C00139_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c" stoichiometry="2"/>
    <speciesReference species="M_C00064_c"/>
    <speciesReference species="M_C00026_c"/>
    <speciesReference species="M_C00138_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"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R00022" name="Beta-hexosaminidase (EC 3.2.1.52)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU01660</p>
      <p>GENE_LIST: BSU01660</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C01674_c"/>
  </listOfReactants>
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    <speciesReference species="M_C00140_c" stoichiometry="2"/>
  </listOfProducts>
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  </kineticLaw>
</reaction>
<reaction id="R_R00026" name="Beta-glucosidase (EC 3.2.1.21);6-phospho-beta-glucosidase
(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>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU39260 or BSU03410 or BSU05840 )</p>
      <p>GENE_LIST: BSU39260 BSU03410 BSU05840</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00185_e"/>

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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>
</reaction>
<reaction id="R_R00028" 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>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00208_c"/>
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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_R00036" name="Porphobilinogen synthase (EC 4.2.1.24)"
reversible="false">
  <notes>

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<html xmlns="http://www.w3.org/1999/xhtml">
  <p>GENE_ASSOCIATION: BSU28130</p>
  <p>GENE_LIST: BSU28130</p>
  <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  <speciesReference species="M_C00430_c" stoichiometry="2"/>
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<listOfProducts>
  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C00001_c" stoichiometry="2"/>
  <speciesReference species="M_C00931_c"/>
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<kineticLaw>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R00066" name="Riboflavin synthase alpha chain (EC 2.5.1.9);riboflavin
biosynthesis(BSU23240)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU23270 or BSU23240 )</p>
      <p>GENE_LIST: BSU23270 BSU23240</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>
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  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00255_c"/>
    <speciesReference species="M_C04732_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>

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</math>
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</listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R00084" name="Porphobilinogen deaminase (EC 2.5.1.61)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <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"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00014_c" stoichiometry="4"/>
    <speciesReference species="M_C01024_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_R00086" 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>
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  </notes>

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<listOfReactants>
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  <speciesReference species="M_C00009_c"/>
  <speciesReference species="M_C00080_c"/>
</listOfProducts>
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    <parameter id="LOWER_BOUND" value="5.85" 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_R00089" name="Adenylate cyclase" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU11580</p>
      <p>GENE_LIST: BSU11580</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00002_c"/>
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  <listOfProducts>
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    <speciesReference species="M_C00575_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"/>
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  </kineticLaw>
</reaction>

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    </kineticLaw>
  </reaction>
  <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>
      <html xmlns="http://www.w3.org/1999/xhtml">
        <p>GENE_ASSOCIATION: ( BSU11610 or BSU29540 )</p>
        <p>GENE_LIST: BSU11610 BSU29540</p>
        <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
      </html>
    </notes>
    <listOfReactants>
      <speciesReference species="M_C00002_c"/>
      <speciesReference species="M_C00003_c"/>
    </listOfReactants>
    <listOfProducts>
      <speciesReference species="M_C00008_c"/>
      <speciesReference species="M_C00006_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_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>
      </html>
    </notes>
    <listOfReactants>
      <speciesReference species="M_C00080_c"/>
      <speciesReference species="M_C00005_c"/>

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    <speciesReference species="M_C00064_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_R00127" name="Adenylate kinase (EC 2.7.4.3)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU01370</p>
      <p>GENE_LIST: BSU01370</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
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    <speciesReference species="M_C00020_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>

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<reaction id="R_R00130" name="Dephospho-CoA kinase (EC 2.7.1.24)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU29060</p>
      <p>GENE_LIST: BSU29060</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00882_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00008_c"/>
    <speciesReference species="M_C00010_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_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">
      <p>GENE_ASSOCIATION: ( BSU36640 and BSU36650 and BSU36660 )</p>
      <p>GENE_LIST: BSU36640 BSU36650 BSU36660</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00086_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00011_c"/>
    <speciesReference species="M_C00014_c" stoichiometry="2"/>
  </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_R00132" name="Carbonic anhydrase (EC 4.2.1.1)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU30690 or BSU34670 )</p>
      <p>GENE_LIST: BSU30690 BSU34670</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00080_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00011_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_R00137" name="Nicotinate-nucleotide adenylyltransferase (EC 2.7.7.18)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU25640</p>

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<p>GENE_LIST: BSU25640</p>
 <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
 </html>
 </notes>
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 <speciesReference species="M_C00455_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_R00156" name="Nucleoside diphosphate kinase (EC 2.7.4.6)"
 reversible="false">
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 <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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 <speciesReference species="M_C00008_c"/>
 <speciesReference species="M_C00075_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"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </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_C00002_c"/>
    <speciesReference species="M_C00105_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00008_c"/>
    <speciesReference species="M_C00015_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_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>
  <listOfReactants>

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    <speciesReference species="M_C00002_c"/>
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  <listOfProducts>
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    <speciesReference species="M_C00016_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_R00177" name="S-adenosylmethionine synthetase (EC 2.5.1.6)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU30550</p>
      <p>GENE_LIST: BSU30550</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00002_c"/>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00073_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00013_c"/>
    <speciesReference species="M_C00019_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_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>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00019_c"/>
  </listOfReactants>
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    <speciesReference species="M_C01137_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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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_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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</listOfReactants>
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  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C00212_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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</kineticLaw>
</reaction>
<reaction id="R_R00188" name="" reversible="false">
  <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_C00054_c"/>
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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"/>
    </listOfParameters>
  </kineticLaw>

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</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_C00014_c"/>
    <speciesReference species="M_C00857_c"/>
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    <speciesReference species="M_C00013_c"/>
    <speciesReference species="M_C00020_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_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>
  <listOfReactants>
    <speciesReference species="M_C00147_c"/>
    <speciesReference species="M_C00119_c"/>
  </listOfReactants>
  <listOfProducts>

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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>
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  <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_C00021_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00155_c"/>
    <speciesReference species="M_C00212_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_R00194" 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: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
</html>
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  <speciesReference species="M_C00021_c"/>
</listOfReactants>
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  <speciesReference species="M_C03539_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_R00199" name="Phosphoenolpyruvate synthase (EC 2.7.9.2)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU18830</p>
      <p>GENE_LIST: BSU18830</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00022_c"/>
  </listOfReactants>
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    <speciesReference species="M_C00080_c"/>
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</kineticLaw>
</reaction>
<reaction id="R_R00200" name="Pyruvate kinase (EC 2.7.1.40)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU29180</p>
      <p>GENE_LIST: BSU29180</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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    <speciesReference species="M_C00074_c"/>
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    <speciesReference species="M_C00022_c"/>
  </listOfProducts>
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    </math>
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  </kineticLaw>
</reaction>
<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>

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<p>GENE_LIST: BSU04340</p>
 <p>SUBSYSTEM: Carbohydrates</p>
 </html>
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 <speciesReference species="M_C00007_c"/>
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 <speciesReference species="M_C00011_c"/>
 <speciesReference species="M_C00027_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"/>
 </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>
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 <speciesReference species="M_C00149_c"/>
 </listOfReactants>
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 <speciesReference species="M_C00011_c"/>
 <speciesReference species="M_C00022_c"/>
 </listOfProducts>

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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_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>
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      <p>GENE_ASSOCIATION: BSU04000</p>
      <p>GENE_LIST: BSU04000</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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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>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<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>
</notes>
<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">
      <ci> FLUX_VALUE </ci>

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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_R00221" name="D-serine dehydratase (EC 4.3.1.18)" reversible="false">
  <notes>
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      <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>
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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_R00230" name="Phosphate acetyltransferase (EC 2.3.1.8)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU37660</p>
      <p>GENE_LIST: BSU37660</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00009_c"/>

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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00024_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00227_c"/>
    <speciesReference species="M_C00010_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_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>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00033_c"/>
    <speciesReference species="M_C00010_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00024_c"/>
    <speciesReference species="M_C00013_c"/>
    <speciesReference species="M_C00020_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"/>

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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_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>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00024_c" stoichiometry="2"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00010_c"/>
    <speciesReference species="M_C00332_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_R00239" name="Glutamate 5-kinase (EC 2.7.2.11)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU13120 or BSU18470 )</p>
      <p>GENE_LIST: BSU13120 BSU18470</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00002_c"/>
    <speciesReference species="M_C00080_c"/>

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    <speciesReference species="M_C00025_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00008_c"/>
    <speciesReference species="M_C03287_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_R00243" name="NAD-specific glutamate dehydrogenase (EC 1.4.1.2)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU22960 or BSU37790 )</p>
      <p>GENE_LIST: BSU22960 BSU37790</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00003_c"/>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00025_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C00014_c"/>
    <speciesReference species="M_C00026_c"/>
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  <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"/>

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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R00245" name="Delta-1-pyrroline-5-carboxylate dehydrogenase (EC
1.5.1.12)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <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"/>
    <speciesReference species="M_C01165_c"/>
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    <speciesReference species="M_C00080_c" stoichiometry="2"/>
    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C00025_c"/>
  </listOfProducts>
  <kineticLaw>
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    </listOfParameters>
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</reaction>
<reaction id="R_R00253" name="Glutamine synthetase type I (EC 6.3.1.2)"
reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU17460</p>
      <p>GENE_LIST: BSU17460</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </notes>
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    <speciesReference species="M_C00002_c"/>

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    <speciesReference species="M_C00025_c"/>
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    <speciesReference species="M_C00080_c"/>
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    </math>
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  </kineticLaw>
</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>
    </html>
  </notes>
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    <speciesReference species="M_C00064_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00014_c"/>
  </listOfProducts>
  <kineticLaw>
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    </listOfParameters>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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    <speciesReference species="M_C00041_c"/>
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    <speciesReference species="M_C00022_c"/>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R00259" name="Glutamate N-acetyltransferase (EC
2.3.1.35)|N-acetylglutamate synthase (EC 2.3.1.1)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU11200</p>
      <p>GENE_LIST: BSU11200</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
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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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  </notes>
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  <listOfProducts>
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</reaction>
<reaction id="R_R00264" name="Ketoglutarate semialdehyde dehydrogenase (EC 1.2.1.26)">
  <notes>
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    <p>GENE_ASSOCIATION: BSU02470</p>
    <p>GENE_LIST: BSU02470</p>
    <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  <speciesReference species="M_C00006_c"/>
  <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>
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</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>
  </notes>
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    <speciesReference species="M_C05379_c"/>
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<reaction id="R_R00272"
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>
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    <speciesReference species="M_C00026_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00011_c"/>
    <speciesReference species="M_C00232_c"/>
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  <kineticLaw>
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  </kineticLaw>
</reaction>
<reaction id="R_R00274" name="Glutathione peroxidase family protein" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU21900</p>
      <p>GENE_LIST: BSU21900</p>

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    <p>SUBSYSTEM: Sulfur Metabolism</p>
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  <speciesReference species="M_C00127_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_R00275" name="Superoxide dismutase [Fe] (EC 1.15.1.1);Manganese
superoxide dismutase (EC 1.15.1.1)(BSU25020);Superoxide dismutase [Cu-Zn] (EC
1.15.1.1)(BSU19400)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU19330 or BSU19400 or BSU25020 )</p>
      <p>GENE_LIST: BSU19330 BSU19400 BSU25020</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
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  </notes>
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    <speciesReference species="M_C00027_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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</kineticLaw>
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  <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>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00029_c"/>
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  <listOfProducts>
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    <speciesReference species="M_C00004_c" stoichiometry="2"/>
    <speciesReference species="M_C00167_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_R00287" name="5'-nucleotidase (EC 3.1.3.5)|UDP-sugar hydrolase (EC
3.6.1.45)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU32370</p>
      <p>GENE_LIST: BSU32370</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  <speciesReference species="M_C00103_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_R00289" name="UTP--glucose-1-phosphate uridylyltransferase (EC
2.7.7.9)">
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      <p>SUBSYSTEM: Carbohydrates</p>
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    <speciesReference species="M_C00075_c"/>
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    <speciesReference species="M_C00029_c"/>
  </listOfProducts>
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    </math>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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  </kineticLaw>
</reaction>

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    </listOfParameters>
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<reaction id="R_R00291" name="UDP-glucose 4-epimerase (EC 5.1.3.2)">
  <notes>
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      <p>GENE_LIST: BSU38860</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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  </listOfReactants>
  <listOfProducts>
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  </listOfProducts>
  <kineticLaw>
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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_R00293" name="UDP-N-acetylglucosamine 4,6-dehydratase (EC 4.2.1.-)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU19810</p>
      <p>GENE_LIST: BSU19810</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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    <speciesReference species="M_C04089_c"/>
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</kineticLaw>
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<reaction id="R_R00310" name="Ferrochelatase, protoheme ferro-lyase (EC 4.99.1.1)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU10130</p>
      <p>GENE_LIST: BSU10130</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
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    <speciesReference species="M_C02191_c"/>
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  <listOfProducts>
    <speciesReference species="M_C00080_c" stoichiometry="2"/>
    <speciesReference species="M_C00032_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_R00315" name="Acetate kinase (EC 2.7.2.1)" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU29470</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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    <speciesReference species="M_C00227_c"/>
  </listOfProducts>
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    </math>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R00317" name="Acylphosphate phosphohydrolase (EC 3.6.1.7), putative"
reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU07640</p>
      <p>GENE_LIST: BSU07640</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </listOfReactants>
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    <speciesReference species="M_C00080_c" stoichiometry="2"/>
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  </listOfProducts>
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    </math>

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<reaction id="R_R00321" 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>
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  </notes>
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    <speciesReference species="M_C06244_c"/>
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    </math>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R00330" 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>
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  </notes>
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  </kineticLaw>
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<reaction id="R_R00332" name="Guanylate kinase (EC 2.7.4.8)" reversible="false">
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      <p>GENE_LIST: BSU15680</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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    </listOfParameters>
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</reaction>
<reaction id="R_R00341" name="Phosphoenolpyruvate carboxykinase [ATP] (EC 4.1.1.49)"
reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU30560</p>
      <p>GENE_LIST: BSU30560</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00036_c"/>
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  <listOfProducts>
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  </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>
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reversible="false">
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      <p>GENE_LIST: BSU14860</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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    </listOfParameters>
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</reaction>
<reaction id="R_R00351" name="Citrate synthase (si) (EC 2.3.3.1)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU29140 or BSU09440 )</p>
      <p>GENE_LIST: BSU29140 BSU09440</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </notes>
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    <speciesReference species="M_C00036_c"/>
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  </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>
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  <notes>
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      <p>GENE_LIST: BSU27870</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </notes>
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</reaction>
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      <p>GENE_LIST: BSU11670</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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    <speciesReference species="M_C00037_c"/>
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  <listOfProducts>
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  </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>
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      <p>GENE_ASSOCIATION: BSU32520</p>
      <p>GENE_LIST: BSU32520</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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</reaction>
<reaction id="R_R00371" name="2-amino-3-ketobutyrate coenzyme A ligase (EC 2.3.1.29)">
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      <p>GENE_LIST: BSU17000</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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</reaction>
<reaction id="R_R00396" name="Alanine dehydrogenase (EC 1.4.1.1)">
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    <p>GENE_ASSOCIATION: BSU31930</p>
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</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>
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  <listOfProducts>
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</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>
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    <speciesReference species="M_C00042_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00091_c"/>
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  </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)">
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  </math>
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<reaction id="R_R00409" name="Methylisocitrate lyase (EC 4.1.3.30)">
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      <p>GENE_LIST: BSU24120</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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  <listOfProducts>
    <speciesReference species="M_C00022_c"/>
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  </listOfProducts>
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</kineticLaw>
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<reaction id="R_R00410" 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>
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</reaction>
<reaction id="R_R00414" name="UDP-N-acetylglucosamine 2-epimerase (EC 5.1.3.14)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU35660</p>
      <p>GENE_LIST: BSU35660</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
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  </kineticLaw>
</reaction>
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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_ASSOCIATION: BSU00500</p>
      <p>GENE_LIST: BSU00500</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
    </html>
  </notes>
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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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    </listOfParameters>
  </kineticLaw>

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</reaction>
<reaction id="R_R00418" name="UDP-glucose 4-epimerase (EC 5.1.3.2);UDP-glucuronate
5'-epimerase (EC 5.1.3.12)(BSU30870)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU38860 or BSU30870 )</p>
      <p>GENE_LIST: BSU38860 BSU30870</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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</reaction>
<reaction id="R_R00420" name="UDP-N-acetylglucosamine 2-epimerase (EC 5.1.3.14)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU35660</p>
      <p>GENE_LIST: BSU35660</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
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  </notes>
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</kineticLaw>
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<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>
    </html>
  </notes>
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    <speciesReference species="M_C00044_c"/>
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  </kineticLaw>
</reaction>
<reaction id="R_R00428" name="GTP cyclohydrolase I (EC 3.5.4.16) type 1;GTP
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>
      <p>GENE_LIST: BSU22780 BSU03340</p>

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<p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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 </reaction>
 <reaction id="R_R00429" name="GTP pyrophosphokinase (EC 2.7.6.5);GTP
 pyrophosphokinase (EC 2.7.6.5), (p)ppGpp synthetase I(BSU27600)" reversible="false">
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 <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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<reaction id="R_R00451" name="Diaminopimelate decarboxylase (EC 4.1.1.20)"
reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU23380</p>
      <p>GENE_LIST: BSU23380</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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    <speciesReference species="M_C00047_c"/>
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  </kineticLaw>
</reaction>
<reaction id="R_R00461" name="Lysine 2,3-aminomutase (EC 5.4.3.2)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU19690</p>
      <p>GENE_LIST: BSU19690</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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</kineticLaw>
</reaction>
<reaction id="R_R00462" name="Arginine decarboxylase (EC 4.1.1.19)|Lysine decarboxylase
(EC 4.1.1.18);Lysine decarboxylase family(BSU34640)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU00270 or BSU34640 )</p>
      <p>GENE_LIST: BSU00270 BSU34640</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </kineticLaw>
</reaction>
<reaction id="R_R00465" name="Glyoxylate reductase (EC 1.1.1.26)|Glyoxylate reductase
(EC 1.1.1.79)|Hydroxypyruvate reductase (EC 1.1.1.81)">

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    <p>GENE_LIST: BSU34680</p>
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  </math>
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<reaction id="R_R00469" name="" reversible="false">
  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
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    <speciesReference species="M_C00603_c"/>
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</listOfProducts>
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</kineticLaw>
</reaction>
<reaction id="R_R00470" name="2-dehydro-3-deoxyphosphogluconate aldolase (EC
4.1.2.14)|4-Hydroxy-2-oxoglutarate aldolase (EC 4.1.3.16)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU22100</p>
      <p>GENE_LIST: BSU22100</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
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  </kineticLaw>
</reaction>
<reaction id="R_R00475" name="Glycolate dehydrogenase (EC 1.1.99.14), subunit
GlcD;Similar to glycolate dehydrogenase iron-sulfur subunit GlcF(BSU28690)"
reversible="false">
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    <p>GENE_ASSOCIATION: ( BSU28680 and BSU28690 )</p>
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    <p>SUBSYSTEM: Carbohydrates</p>
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  <speciesReference species="M_C00160_c"/>
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  <speciesReference species="M_C00048_c"/>
</listOfProducts>
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  </math>
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</kineticLaw>
</reaction>
<reaction id="R_R00480" name="Aspartokinase (EC 2.7.2.4)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU16760 or BSU28470 or BSU03790 )</p>
      <p>GENE_LIST: BSU16760 BSU28470 BSU03790</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </notes>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00049_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00008_c"/>
    <speciesReference species="M_C03082_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>

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</math>
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</kineticLaw>
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<reaction id="R_R00481" name="L-aspartate oxidase (EC 1.4.3.16)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU27870</p>
      <p>GENE_LIST: BSU27870</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  </notes>
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    <speciesReference species="M_C00049_c"/>
  </listOfReactants>
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    <speciesReference species="M_C00027_c"/>
    <speciesReference species="M_C05840_c"/>
  </listOfProducts>
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</reaction>
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  <notes>
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      <p>GENE_ASSOCIATION: ( BSU23580 or BSU02690 )</p>
      <p>GENE_LIST: BSU23580 BSU02690</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </notes>

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  <speciesReference species="M_C00049_c"/>
</listOfProducts>
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  </math>
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<reaction id="R_R00489" name="Aspartate 1-decarboxylase (EC 4.1.1.11)"
reversible="false">
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      <p>GENE_LIST: BSU22410</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  </notes>
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    <speciesReference species="M_C00049_c"/>
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    <speciesReference species="M_C00011_c"/>
    <speciesReference species="M_C00099_c"/>
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  </kineticLaw>
</reaction>

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    </listOfParameters>
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<reaction id="R_R00490" name="Aspartate ammonia-lyase (EC 4.3.1.1)" reversible="false">
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      <p>GENE_LIST: BSU23570</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00014_c"/>
  </listOfProducts>
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    </math>
  </listOfParameters>
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</kineticLaw>
</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">
      <p>GENE_ASSOCIATION: ( BSU18410 or BSU23910 or BSU38920 )</p>
      <p>GENE_LIST: BSU18410 BSU23910 BSU38920</p>
      <p>SUBSYSTEM: Sulfur Metabolism</p>
    </html>
  </notes>
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    <speciesReference species="M_C01419_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_R00502" name="Galactose-1-phosphate uridylyltransferase (EC 2.7.7.10)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU38190</p>
      <p>GENE_LIST: BSU38190</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00446_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00013_c"/>
    <speciesReference species="M_C00052_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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<reaction id="R_R00509" name="Adenylylsulfate kinase (EC 2.7.1.25)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU10910 or BSU15600 )</p>

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<p>GENE_LIST: BSU10910 BSU15600</p>
 <p>SUBSYSTEM: Sulfur Metabolism</p>
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 </kineticLaw>
 </reaction>
 <reaction id="R_R00511" 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">
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      <p>GENE_LIST: BSU22890</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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</reaction>
<reaction id="R_R00513" name="Uridine kinase (EC 2.7.1.48) [C1]" reversible="false">
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      <p>GENE_LIST: BSU27330</p>
      <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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</reaction>
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      <p>GENE_LIST: BSU27330</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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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>
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      <p>SUBSYSTEM: Carbohydrates</p>
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</kineticLaw>
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<reaction id="R_R00522" name="Oxalate decarboxylase (EC 4.1.1.2)" reversible="false">
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      <p>GENE_LIST: BSU18670 BSU33240</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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<reaction id="R_R00525" name="Peptide deformylase (EC 3.5.1.88)">
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  <p>SUBSYSTEM: Carbohydrates</p>
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  <speciesReference species="M_C00058_c"/>
  <speciesReference species="M_C00025_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_R00526" name="Peptide deformylase (EC 3.5.1.88)">
  <notes>
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      <p>GENE_LIST: BSU14560 BSU15720</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  <listOfReactants>
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    <speciesReference species="M_C01044_c"/>
  </listOfReactants>
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    <speciesReference species="M_C00049_c"/>
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</math>
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</kineticLaw>
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<reaction id="R_R00529" name="Sulfate adenylyltransferase, dissimilatory-type (EC
2.7.7.4)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU10920 or BSU15590 )</p>
      <p>GENE_LIST: BSU10920 BSU15590</p>
      <p>SUBSYSTEM: Sulfur Metabolism</p>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00059_c"/>
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  <listOfProducts>
    <speciesReference species="M_C00013_c"/>
    <speciesReference species="M_C00224_c"/>
  </listOfProducts>
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    </math>
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    </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>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  </notes>

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</html>
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  <speciesReference species="M_C00061_c"/>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
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      <p>GENE_LIST: BSU40320</p>
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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: Amino Acids and Derivatives</p>
        </html>
    </notes>
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        <speciesReference species="M_C00080_c"/>
        <speciesReference species="M_C05945_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>
<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>
        <html xmlns="http://www.w3.org/1999/xhtml">
            <p>GENE_ASSOCIATION: ( BSU14630 or BSU00270 )</p>
            <p>GENE_LIST: BSU14630 BSU00270</p>
            <p>SUBSYSTEM: Amino Acids and Derivatives</p>
        </html>
    </notes>
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</listOfReactants>
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  <speciesReference species="M_C00179_c"/>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
</reaction>
<reaction id="R_R00570" name="Nucleoside diphosphate kinase (EC 2.7.4.6)"
reversible="false">
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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_C00112_c"/>
  </listOfReactants>
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    <speciesReference species="M_C00008_c"/>
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  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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</reaction>

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      <p>GENE_LIST: BSU37150</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00014_c"/>
    <speciesReference species="M_C00075_c"/>
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  <listOfProducts>
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    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c" stoichiometry="2"/>
    <speciesReference species="M_C00063_c"/>
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  <kineticLaw>
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    </math>
    <listOfParameters>
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    </listOfParameters>
  </kineticLaw>
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  <notes>
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      <p>GENE_LIST: BSU37150</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00064_c"/>
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<listOfProducts>
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  <speciesReference species="M_C00080_c" stoichiometry="2"/>
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  <speciesReference species="M_C00063_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_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>
  <listOfReactants>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00064_c"/>
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    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c"/>
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<kineticLaw>

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  <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
</listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R00578" name="Asparagine synthetase [glutamine-hydrolyzing] (EC
6.3.5.4)" reversible="false">
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    <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_C00002_c"/>
    <speciesReference species="M_C00001_c"/>
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    <speciesReference species="M_C00049_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="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R00582" name="Phosphoserine phosphatase rsbX (EC 3.1.3.3)"
reversible="false">

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<notes>
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    <p>GENE_ASSOCIATION: BSU04740</p>
    <p>GENE_LIST: BSU04740</p>
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  <speciesReference species="M_C01005_c"/>
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  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C00065_c"/>
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<reaction id="R_R00585" name="L-alanine:glyoxylate aminotransferase (EC
2.6.1.44)|Serine--pyruvate aminotransferase (EC 2.6.1.51)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU32520</p>
      <p>GENE_LIST: BSU32520</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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    <speciesReference species="M_C00065_c"/>
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<reaction id="R_R00586" name="Serine acetyltransferase (EC 2.3.1.30)" reversible="false">
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      <p>GENE_LIST: BSU00930</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
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    <speciesReference species="M_C00065_c"/>
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    <speciesReference species="M_C00979_c"/>
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      <p>SUBSYSTEM: Carbohydrates</p>
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    </html>
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    <speciesReference species="M_C00004_c"/>
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</reaction>
<reaction id="R_R00617" name="Thiamine-monophosphate kinase (EC 2.7.4.16)"
reversible="false">
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      <p>GENE_LIST: BSU05900</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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    <speciesReference species="M_C01081_c"/>
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  </listOfProducts>
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</reaction>
<reaction id="R_R00619" name="Thiamin pyrophosphokinase (EC 2.7.6.2)"
reversible="false">
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      <p>GENE_LIST: BSU15800</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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    <speciesReference species="M_C00378_c"/>
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</reaction>
<reaction id="R_R00621" name="2-oxoglutarate dehydrogenase E1 component (EC 1.2.4.2)"
reversible="false">
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      <p>GENE_LIST: BSU19370</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </kineticLaw>
</reaction>
<reaction id="R_R00650" name="Homocysteine S-methyltransferase (EC 2.1.1.10)"
reversible="false">
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      <p>GENE_ASSOCIATION: BSU02410</p>
      <p>GENE_LIST: BSU02410</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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    <speciesReference species="M_C00019_c"/>
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    <speciesReference species="M_C00021_c"/>
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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>

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<reaction id="R_R00653" name="Peptide deformylase (EC 3.5.1.88)">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU15720 or BSU14560 )</p>
      <p>GENE_LIST: BSU15720 BSU14560</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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</reaction>
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  <notes>
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      <p>GENE_LIST: BSU33900</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </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>
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    <speciesReference species="M_C00074_c"/>
  </listOfReactants>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C04631_c"/>
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    </math>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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  </kineticLaw>
</reaction>
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    <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  <speciesReference species="M_C00077_c"/>
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  <speciesReference species="M_C00025_c"/>
  <speciesReference species="M_C01165_c"/>
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  </math>
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  </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>
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    <speciesReference species="M_C00437_c"/>
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    <speciesReference species="M_C00077_c"/>
  </listOfProducts>
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</listOfParameters>
</kineticLaw>
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<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>
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  </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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  </kineticLaw>
</reaction>
<reaction id="R_R00691" name="" reversible="false">
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </notes>

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  <speciesReference species="M_C00011_c"/>
  <speciesReference species="M_C00079_c"/>
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  </math>
  <listOfParameters>
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</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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  </listOfReactants>
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  <notes>
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      <p>GENE_LIST: BSU03050</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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    <speciesReference species="M_C00186_c"/>
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    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C00022_c"/>
  </listOfProducts>
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    </math>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R00705" name="Methylmalonate-semialdehyde dehydrogenase [inositol]
(EC 1.2.1.27)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU39760</p>
      <p>GENE_LIST: BSU39760</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  <speciesReference species="M_C00222_c"/>
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  <speciesReference species="M_C00011_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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</kineticLaw>
</reaction>
<reaction id="R_R00707" name="Delta-1-pyrroline-5-carboxylate dehydrogenase (EC
1.5.1.12)">
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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>
  <listOfReactants>
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    <speciesReference species="M_C00001_c" stoichiometry="2"/>
    <speciesReference species="M_C03912_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C00025_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>

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  <notes>
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BSU39860 )</p>
      <p>GENE_LIST: BSU07350 BSU37960 BSU19310 BSU38830 BSU39860</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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    <speciesReference species="M_C00084_c"/>
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    <speciesReference species="M_C00004_c"/>
  </listOfProducts>
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    </math>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R00714" name="Succinate-semialdehyde dehydrogenase [NADP+] (EC
1.2.1.16)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU03910</p>
      <p>GENE_LIST: BSU03910</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_C00232_c"/>
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  <speciesReference species="M_C00042_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_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>
  </notes>
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    <speciesReference species="M_C00160_c"/>
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    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C00048_c"/>
  </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"/>
</listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R00719" name="Nucleoside 5-triphosphatase RdgB (dHATP, 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>
    </html>
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    <speciesReference species="M_C00081_c"/>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00104_c"/>
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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>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU22730</p>
      <p>GENE_LIST: BSU22730</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>

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</html>
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  <speciesReference species="M_C00104_c"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00008_c"/>
  <speciesReference species="M_C00081_c"/>
</listOfProducts>
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  </math>
  <listOfParameters>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</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>
    </html>
  </notes>
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    <speciesReference species="M_C00026_c"/>
    <speciesReference species="M_C00082_c"/>
  </listOfReactants>
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    <speciesReference species="M_C01179_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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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>
    <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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</reaction>
<reaction id="R_R00749" name="" reversible="false">
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  <listOfProducts>
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    <speciesReference species="M_C00084_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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  </kineticLaw>
</reaction>
<reaction id="R_R00754" name="Alcohol dehydrogenase (EC 1.1.1.1);alcohol

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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_C00080_c"/>

<speciesReference species="M_C00004_c"/>

<speciesReference species="M_C00084_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_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>

</html>

</notes>

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</listOfReactants>

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<speciesReference species="M_C05345_c"/>


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    <speciesReference species="M_C00014_c"/>
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  <kineticLaw>
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    </math>
    <listOfParameters>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </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>
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      <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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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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  </kineticLaw>
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<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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</notes>
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  <speciesReference species="M_C00097_c"/>
</listOfReactants>
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  <speciesReference species="M_C00022_c"/>
  <speciesReference species="M_C00014_c"/>
  <speciesReference species="M_C00283_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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<reaction id="R_R00802" name="Alpha-glucosidase (EC 3.2.1.20)">
  <notes>
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      <p>GENE_LIST: BSU31290</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00089_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00095_c"/>
  </listOfProducts>
  <kineticLaw>
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</reaction>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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  </listOfReactants>
  <listOfProducts>
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  </listOfProducts>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
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  <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_C00004_c"/>
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    <speciesReference species="M_C00805_c"/>
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    <speciesReference species="M_C00011_c"/>
    <speciesReference species="M_C00090_c"/>
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    </math>
    <listOfParameters>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R00837" name="Trehalose-6-phosphate hydrolase (EC 3.2.1.93)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU07810</p>
      <p>GENE_LIST: BSU07810</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00689_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00668_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"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R00838" name="Maltose-6'-phosphate glucosidase (EC 3.2.1.122)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU08180</p>
      <p>GENE_LIST: BSU08180</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C02995_c"/>
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  <listOfProducts>
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    <speciesReference species="M_C00668_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_R00839" name="6-phospho-beta-glucosidase (EC 3.2.1.86)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU38560 or BSU40110 )</p>
      <p>GENE_LIST: BSU38560 BSU40110</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C04534_c"/>
  </listOfReactants>
  <listOfProducts>

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    <speciesReference species="M_C00267_c"/>
    <speciesReference species="M_C00668_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_R00842" name="Glycerol-3-phosphate dehydrogenase [NAD(P)+] (EC
1.1.1.94)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU22830</p>
      <p>GENE_LIST: BSU22830</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00003_c"/>
    <speciesReference species="M_C00093_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C00111_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_R00847" name="Glycerol kinase (EC 2.7.1.30)" reversible="false">

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<notes>
  <html xmlns="http://www.w3.org/1999/xhtml">
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    <p>GENE_LIST: BSU09290</p>
    <p>SUBSYSTEM: Carbohydrates</p>
  </html>
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<listOfReactants>
  <speciesReference species="M_C00002_c"/>
  <speciesReference species="M_C00116_c"/>
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  <speciesReference species="M_C00008_c"/>
  <speciesReference species="M_C00093_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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      <p>GENE_LIST: BSU35740</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
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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>SUBSYSTEM: Sulfur Metabolism</p>
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<reaction id="R_R00867" name="Fructokinase (EC 2.7.1.4)" reversible="false">
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 <p>SUBSYSTEM: Carbohydrates</p>
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      <p>SUBSYSTEM: Carbohydrates</p>
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      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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aminopeptidase) (LAP) (Leucyl aminopeptidase)">
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      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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      <p>SUBSYSTEM: Carbohydrates</p>
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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>GENE_LIST: BSU32830 BSU10350 BSU24170</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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      <p>GENE_LIST: BSU24140</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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    <speciesReference species="M_C00001_c"/>
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(EC 1.2.1.27)">

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      <p>GENE_LIST: BSU21810</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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synthase (EC 6.3.2.17)" reversible="false">
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3.5.4.9)Methylenetetrahydrofolate dehydrogenase (NADP+) (EC 1.5.1.5)" reversible="false">

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      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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</kineticLaw>
</reaction>
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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>
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  </listOfReactants>
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</kineticLaw>
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      <p>GENE_LIST: BSU07270</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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      <p>GENE_LIST: BSU01770</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
    </html>
  </notes>

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</notes>
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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_R00962" name="Uridine kinase (EC 2.7.1.48) [C1]">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU27330</p>
      <p>GENE_LIST: BSU27330</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
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    <speciesReference species="M_C00475_c"/>
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    </math>
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    </listOfParameters>
  </kineticLaw>

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</reaction>
<reaction id="R_R00963" 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_C00001_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00080_c"/>
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    </math>
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  </kineticLaw>
</reaction>
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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_C00299_c"/>
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    <speciesReference species="M_C00105_c"/>
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    </math>
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  </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>
  <listOfReactants>
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    <speciesReference species="M_C01103_c"/>
  </listOfReactants>
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    <speciesReference species="M_C00105_c"/>
    <speciesReference species="M_C00011_c"/>
  </listOfProducts>
  <kineticLaw>
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</reaction>
<reaction id="R_R00966" name="Pyrimidine operon regulatory protein PyrR|Uracil
phosphoribosyltransferase (EC 2.4.2.9);phosphoribosyltransferase(BSU36890)"
reversible="false">

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<notes>
  <html xmlns="http://www.w3.org/1999/xhtml">
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    <p>GENE_LIST: BSU15470 BSU36890</p>
    <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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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>
    </html>
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  <listOfReactants>
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    <speciesReference species="M_C00075_c"/>
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    <speciesReference species="M_C00015_c"/>
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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_C00044_c"/>
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  <listOfProducts>
    <speciesReference species="M_C00105_c"/>
    <speciesReference species="M_C00035_c"/>
  </listOfProducts>
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    </math>
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</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>
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  </notes>

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</kineticLaw>
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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"/>
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    </math>
    <listOfParameters>

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</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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    <speciesReference species="M_C00251_c"/>
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    </math>
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  </kineticLaw>
</reaction>
<reaction id="R_R00996" name="Threonine dehydratase biosynthetic (EC 4.3.1.19)"
reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU21770</p>
      <p>GENE_LIST: BSU21770</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>

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    </html>
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    <speciesReference species="M_C00014_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">
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      <p>GENE_LIST: BSU11870</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </notes>
  <listOfReactants>
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    <speciesReference species="M_C01118_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00014_c"/>
    <speciesReference species="M_C00042_c"/>
    <speciesReference species="M_C00109_c"/>
  </listOfProducts>
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    </math>
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</kineticLaw>
</reaction>
<reaction id="R_R01001" name="Cystathionine gamma-lyase (EC 4.4.1.1)"
reversible="false">
  <notes>
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      <p>GENE_LIST: BSU27250</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </notes>
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    <speciesReference species="M_C02291_c"/>
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  <listOfProducts>
    <speciesReference species="M_C00014_c"/>
    <speciesReference species="M_C00097_c"/>
    <speciesReference species="M_C00109_c"/>
  </listOfProducts>
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  </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>
  </notes>
  <listOfReactants>

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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00111_c"/>
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    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00184_c"/>
  </listOfProducts>
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    </math>
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    </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"/>
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  <listOfProducts>
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  </listOfProducts>
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<reaction id="R_R01016" name="Methylglyoxal synthase (EC 4.2.3.3)" reversible="false">
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      <p>GENE_LIST: BSU22480</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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    <speciesReference species="M_C00111_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00546_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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<reaction id="R_R01021" name="" reversible="false">
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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    <speciesReference species="M_C00114_c"/>
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  </listOfProducts>

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<kineticLaw>
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  </math>
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</kineticLaw>
</reaction>
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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>
    <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"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00093_c"/>
    <speciesReference species="M_C00114_c"/>
  </listOfProducts>
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    </math>
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<p>GENE_LIST: </p>
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 </reaction>
 <reaction id="R_R01036" name="Alcohol dehydrogenase (EC 1.1.1.1);alcohol
 dehydrogenase(BSU26970)">
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 <html xmlns="http://www.w3.org/1999/xhtml">
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 BSU27010)</p>
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      <p>SUBSYSTEM: Carbohydrates</p>
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      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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      <p>GENE_LIST: BSU06440</p>

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    <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </kineticLaw>
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<reaction id="R_R01090" name="Branched-chain amino acid aminotransferase (EC
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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      <p>GENE_LIST: BSU38200</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </kineticLaw>
</reaction>
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      <p>GENE_LIST: BSU30300</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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reversible="false">
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(EC 5.3.3.2)">
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      <p>GENE_LIST: BSU22870</p>

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    <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  <notes>
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      <p>GENE_LIST: BSU07840 BSU07330</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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3.5.4.10)Phosphoribosylaminoimidazolecarboxamide formyltransferase (EC 2.1.2.3)">
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      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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dehydrogenase(BSU09230)">
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      <p>GENE_LIST: BSU00090</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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    <speciesReference species="M_C00130_c"/>
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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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        <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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aminotransferase) (D-amino acid aminotransferase) (D-amino acid transaminase) (DAAT)"
reversible="false">
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      <p>GENE_LIST: BSU37490</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  <listOfProducts>
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    </math>
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      <p>GENE_LIST: BSU39350</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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1.3.99.2)" reversible="false">
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      <p>SUBSYSTEM: Carbohydrates</p>
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</kineticLaw>
</reaction>
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2.8.3.8);Acetoacetyl-CoA transferase, alpha subunit (EC 2.8.3.8)(BSU19730)">
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    <html xmlns="http://www.w3.org/1999/xhtml">
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      <p>GENE_LIST: BSU19720 BSU19730</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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</kineticLaw>
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2-dehydrogenase(BSU27770);Myo-inositol 2-dehydrogenase like (EC 1.1.1.18)(BSU10850)">
  <notes>
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      <p>GENE_LIST: BSU39700 BSU10850 BSU27770</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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    <speciesReference species="M_C00137_c"/>
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</reaction>

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    </listOfParameters>
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reversible="false">
  <notes>
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      <p>GENE_LIST: BSU14670</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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      <p>GENE_LIST: BSU14670</p>
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reversible="false">
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      <p>GENE_LIST: BSU14670</p>
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    </kineticLaw>
  </reaction>
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        <p>GENE_LIST: </p>
        <p>SUBSYSTEM: Carbohydrates</p>
      </html>
    </notes>
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        <p>SUBSYSTEM: Carbohydrates</p>
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reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU28280</p>
      <p>GENE_LIST: BSU28280</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_C00141_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_R01214" name="Branched-chain amino acid aminotransferase (EC
2.6.1.42)">
  <notes>
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<p>GENE_ASSOCIATION: (BSU02390 or BSU38550)</p>
 <p>GENE_LIST: BSU02390 BSU38550</p>
 <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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 </kineticLaw>
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 <html xmlns="http://www.w3.org/1999/xhtml">
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 <p>GENE_LIST: BSU24310</p>
 <p>SUBSYSTEM: Carbohydrates</p>
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</math>
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</kineticLaw>
</reaction>
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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>
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  </notes>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R01224" name="5,10-methylenetetrahydrofolate reductase (EC

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1.5.1.20)|Homolog of homocysteine-binding domain">

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2.1.2.11)">

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<notes>
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    <p>GENE_LIST: BSU22430</p>
    <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  <speciesReference species="M_C00141_c"/>
</listOfReactants>
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    <speciesReference species="M_C00966_c"/>
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    </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>
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    <speciesReference species="M_C00144_c"/>
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  </kineticLaw>
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<reaction id="R_R01229" name="Hypoxanthine-guanine phosphoribosyltransferase (EC
2.4.2.8)" reversible="false">

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<notes>
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    <p>GENE_LIST: BSU00680</p>
    <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
  </html>
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  <speciesReference species="M_C00119_c"/>
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  <speciesReference species="M_C00013_c"/>
  <speciesReference species="M_C00144_c"/>
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  </math>
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      <p>GENE_LIST: </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="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
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reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU06360</p>
      <p>GENE_LIST: BSU06360</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  </notes>
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    <speciesReference species="M_C00655_c"/>
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    <speciesReference species="M_C00013_c"/>
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    </math>
    <listOfParameters>
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    </listOfParameters>
  </kineticLaw>

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</reaction>
<reaction id="R_R01244" name="Adenine deaminase (EC 3.5.4.2);adenine
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>
  <listOfReactants>
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    <speciesReference species="M_C00147_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00014_c"/>
    <speciesReference species="M_C00262_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
    <listOfParameters>
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    </listOfParameters>
  </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>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <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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  </notes>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R01251" 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)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
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      <p>GENE_LIST: BSU12910 BSU18480 BSU23800</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00148_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00005_c"/>
    <speciesReference species="M_C03912_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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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R01253" name="Proline dehydrogenase (Proline oxidase) (EC 1.5.99.8) ">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU32850</p>
      <p>GENE_LIST: BSU32850</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00148_c"/>
    <speciesReference species="M_C00016_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C03912_c"/>
    <speciesReference species="M_C01352_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_R01268" name="Nicotinamidase (EC 3.5.1.19)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU31760 or BSU00170 )</p>
      <p>GENE_LIST: BSU31760 BSU00170</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00153_c"/>
  </listOfReactants>
  <listOfProducts>

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    <speciesReference species="M_C00014_c"/>
    <speciesReference species="M_C00253_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_R01280" 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 BSU04170 or BSU10360 or
BSU18250 or BSU17180 )</p>
      <p>GENE_LIST: BSU10270 BSU28560 BSU04170 BSU10360 BSU18250
BSU17180</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_C00249_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00013_c"/>
    <speciesReference species="M_C00020_c"/>
    <speciesReference species="M_C00154_c"/>
  </listOfProducts>
  <kineticLaw>
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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"/>

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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R01286" name="Cystathionine beta-lyase (EC 4.4.1.8)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU11880</p>
      <p>GENE_LIST: BSU11880</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C02291_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00022_c"/>
    <speciesReference species="M_C00014_c"/>
    <speciesReference species="M_C00155_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_R01290" name="Cystathionine beta-synthase (EC 4.2.1.22)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU27260</p>
      <p>GENE_LIST: BSU27260</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00065_c"/>
    <speciesReference species="M_C00155_c"/>
  </listOfReactants>

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<listOfProducts>
  <speciesReference species="M_C00001_c"/>
  <speciesReference species="M_C02291_c"/>
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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_R01291" name="Autoinducer-2 production protein
LuxS|S-ribosylhomocysteine lyase (EC 4.4.1.21)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU30670</p>
      <p>GENE_LIST: BSU30670</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C03539_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00155_c"/>
    <speciesReference species="M_C11838_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_R01301" name="4-hydroxybenzoyl-CoA thioesterase family active site"
reversible="false">

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<notes>
  <html xmlns="http://www.w3.org/1999/xhtml">
    <p>GENE_ASSOCIATION: BSU18040</p>
    <p>GENE_LIST: BSU18040</p>
    <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
  </html>
</notes>
<listOfReactants>
  <speciesReference species="M_C00001_c"/>
  <speciesReference species="M_C02949_c"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C00010_c"/>
  <speciesReference species="M_C00156_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_R01325" 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>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00158_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00417_c"/>
  </listOfProducts>
  <kineticLaw>

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<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_R01333" name="Aldehyde dehydrogenase (EC 1.2.1.3)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU38830 or BSU39860 or BSU19310 or BSU07350 or
BSU37960 )</p>
      <p>GENE_LIST: BSU38830 BSU39860 BSU19310 BSU07350 BSU37960</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00003_c"/>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00266_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c" stoichiometry="2"/>
    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C00160_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_R01334" 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: Carbohydrates</p>
  </html>
</notes>
<listOfReactants>
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  <speciesReference species="M_C00988_c"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00009_c"/>
  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C00160_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_R01353" 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>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00002_c"/>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00163_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00008_c"/>
    <speciesReference species="M_C02876_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>

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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_R01357" name="Acetoacetyl-CoA synthetase [leucine] (EC
6.2.1.16)|Long-chain-fatty-acid--CoA ligase (EC 6.2.1.3)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU18250</p>
      <p>GENE_LIST: BSU18250</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_C00164_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00332_c"/>
    <speciesReference species="M_C00013_c"/>
    <speciesReference species="M_C00020_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
      <ci> FLUX_VALUE </ci>
    </math>
  </kineticLaw>
</reaction>
<reaction id="R_R01360" name="Hydroxymethylglutaryl-CoA lyase (EC 4.1.3.4)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU18230</p>
      <p>GENE_LIST: BSU18230</p>

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    <p>SUBSYSTEM: Amino Acids and Derivatives</p>
  </html>
</notes>
<listOfReactants>
  <speciesReference species="M_C00356_c"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00024_c"/>
  <speciesReference species="M_C00164_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_R01361" name="D-beta-hydroxybutyrate dehydrogenase (EC 1.1.1.30)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU38970</p>
      <p>GENE_LIST: BSU38970</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00003_c"/>
    <speciesReference species="M_C01089_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C00164_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"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </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>
    <speciesReference species="M_C00136_c"/>
    <speciesReference species="M_C00164_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00332_c"/>
    <speciesReference species="M_C00246_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_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>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00254_c"/>

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</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00001_c"/>
  <speciesReference species="M_C00011_c"/>
  <speciesReference species="M_C00166_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_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>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00167_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C02330_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_R01388" name="Hydroxypyruvate reductase (EC 1.1.1.81)">
  <notes>

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<html xmlns="http://www.w3.org/1999/xhtml">
  <p>GENE_ASSOCIATION: BSU18560</p>
  <p>GENE_LIST: BSU18560</p>
  <p>SUBSYSTEM: Carbohydrates</p>
</html>
</notes>
<listOfReactants>
  <speciesReference species="M_C00003_c"/>
  <speciesReference species="M_C00258_c"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C00004_c"/>
  <speciesReference species="M_C00168_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_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>
  <listOfReactants>
    <speciesReference species="M_C00049_c"/>
    <speciesReference species="M_C00169_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c" stoichiometry="2"/>
    <speciesReference species="M_C00438_c"/>
  </listOfProducts>

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<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_R01398" name="Ornithine carbamoyltransferase (EC 2.1.3.3)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU11250</p>
      <p>GENE_LIST: BSU11250</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </notes>
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    <speciesReference species="M_C00080_c" stoichiometry="2"/>
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<reaction id="R_R01401" name="5'-methylthioadenosine nucleosidase (EC
3.2.2.16)|S-adenosylhomocysteine nucleosidase (EC 3.2.2.9)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">

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    <p>GENE_ASSOCIATION: BSU27270</p>
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  <speciesReference species="M_C03089_c"/>
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</reaction>
<reaction id="R_R01432" name="Xylose isomerase (EC 5.3.1.5)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU17600</p>
      <p>GENE_LIST: BSU17600</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </notes>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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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>
    </html>
  </notes>
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    <speciesReference species="M_C00183_c"/>
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    <speciesReference species="M_C00014_c"/>
    <speciesReference species="M_C00141_c"/>
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  </kineticLaw>
</reaction>
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1.2.1.22)|Predicted rhamnulose-1-phosphate aldolase (EC 4.1.2.19)">
  <notes>
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      <p>GENE_LIST: BSU31220</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  <speciesReference species="M_C00186_c"/>
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</kineticLaw>
</reaction>
<reaction id="R_R01465" name="L-threonine 3-dehydrogenase (EC 1.1.1.103)">
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      <p>GENE_LIST: BSU16990</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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    <speciesReference species="M_C00004_c"/>
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</kineticLaw>
</reaction>
<reaction id="R_R01466" name="Threonine synthase (EC 4.2.3.1)" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU32250</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </notes>
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    <speciesReference species="M_C01102_c"/>
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    <speciesReference species="M_C00188_c"/>
  </listOfProducts>
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    </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>
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  </notes>
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    <speciesReference species="M_C00189_c"/>
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  <notes>
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      <p>GENE_LIST: BSU12300</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  <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_R01504" name="2,3-dihydroxybenzoate-AMP ligase (EC 2.7.7.58)"

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reversible="false">
  <notes>
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      <p>GENE_LIST: BSU31980</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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    <speciesReference species="M_C00196_c"/>
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    <speciesReference species="M_C04030_c"/>
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<reaction id="R_R01505" name="2,3-dihydro-2,3-dihydroxybenzoate dehydrogenase (EC
1.3.1.28)">
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      <p>GENE_LIST: BSU32000</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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    <speciesReference species="M_C04171_c"/>
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    <speciesReference species="M_C00196_c"/>
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  </kineticLaw>
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      <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>
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    </math>
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  </kineticLaw>
</reaction>
<reaction id="R_R01513" name="D-3-phosphoglycerate dehydrogenase (EC 1.1.1.95)">
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    <p>GENE_ASSOCIATION: BSU23070</p>
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  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C00004_c"/>
  <speciesReference species="M_C03232_c"/>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
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<reaction id="R_R01514" name="Glycerate kinase (EC 2.7.1.31)" reversible="false">
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      <p>GENE_LIST: BSU40040</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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    <speciesReference species="M_C00197_c"/>
  </listOfProducts>
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    </math>

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reversible="false">
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      <p>GENE_LIST: BSU07640</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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    <speciesReference species="M_C00080_c" stoichiometry="2"/>
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  </listOfProducts>
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    </math>
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      <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>
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      <p>GENE_LIST: BSU33910</p>
      <p>SUBSYSTEM: Carbohydrates</p>

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</html>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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      <p>GENE_LIST: BSU33200</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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    <speciesReference species="M_C00198_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>
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</reaction>

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    </kineticLaw>
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      <p>GENE_LIST: BSU02830 BSU03930</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C00198_c"/>
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</reaction>
<reaction id="R_R01526" name="Ribulokinase (EC 2.7.1.16)" reversible="false">
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      <p>SUBSYSTEM: Carbohydrates</p>
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    <speciesReference species="M_C00199_c"/>
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    </listOfParameters>
  </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>
  </notes>
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    <speciesReference species="M_C00011_c"/>
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    </math>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R01529" name="Ribulose-phosphate 3-epimerase (EC 5.1.3.1)">
  <notes>

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  <p>GENE_LIST: BSU15790</p>
  <p>SUBSYSTEM: Carbohydrates</p>
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</kineticLaw>
</reaction>
<reaction id="R_R01540" name="Altronate hydrolase (EC 4.2.1.7)" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU12390</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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reversible="false">
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      <p>GENE_LIST: BSU22110</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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    <speciesReference species="M_C04442_c"/>
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  </kineticLaw>
</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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      <p>GENE_LIST: BSU01370</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
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    </math>
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</reaction>

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<reaction id="R_R01548" 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>
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  <listOfReactants>
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    <speciesReference species="M_C00131_c"/>
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  <listOfProducts>
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    <speciesReference species="M_C00206_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"/>
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  </kineticLaw>
</reaction>
<reaction id="R_R01549" name="Uridine kinase (EC 2.7.1.48) [C1]" reversible="false">
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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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</math>
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</kineticLaw>
</reaction>
<reaction id="R_R01555" name="Maltose phosphorylase (EC 2.4.1.8)">
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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>
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      <p>GENE_ASSOCIATION: BSU40850</p>
      <p>GENE_LIST: BSU40850</p>

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    <p>SUBSYSTEM: Carbohydrates</p>
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  <speciesReference species="M_C02130_c"/>
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</kineticLaw>
</reaction>
<reaction id="R_R01561" name="Purine nucleoside phosphorylase (EC 2.4.2.1)">
  <notes>
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      <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_C00212_c"/>
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  </listOfProducts>
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    </math>
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<reaction id="R_R01562" 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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    <speciesReference species="M_C01367_c"/>
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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_LIST: BSU37060</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  </notes>
  <listOfReactants>

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    <speciesReference species="M_C00364_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_R01569" 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>
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      <p>GENE_LIST: BSU07840 BSU07330</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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    <speciesReference species="M_C00364_c"/>
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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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    </listOfParameters>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  </notes>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00214_c"/>
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    <speciesReference species="M_C00178_c"/>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Carbohydrates</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>
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aminotransferase) (D-amino acid aminotransferase) (D-amino acid transaminase) (DAAT)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU09670</p>
      <p>GENE_LIST: BSU09670</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_C00217_c"/>
  </listOfProducts>
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    </listOfParameters>
  </kineticLaw>
</reaction>
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  <notes>
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      <p>GENE_ASSOCIATION: BSU24850</p>

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    <p>SUBSYSTEM: Carbohydrates</p>
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  <speciesReference species="M_C00008_c"/>
  <speciesReference species="M_C01172_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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</reaction>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00001_c"/>
  </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"/>
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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>
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  </listOfReactants>
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  </listOfProducts>
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    </math>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R01625" name="Holo-[acyl-carrier protein] synthase (EC 2.7.8.7);Acyl
carrier protein(BSU15920)">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU04620 and BSU15920 )</p>
      <p>GENE_LIST: BSU04620 BSU15920</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>

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    </html>
  </notes>
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  </listOfProducts>
  <kineticLaw>
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    </math>
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  </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>
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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_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>
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  </notes>
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    <speciesReference species="M_C00310_c"/>
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  <listOfProducts>
    <speciesReference species="M_C00008_c"/>
    <speciesReference species="M_C00231_c"/>
  </listOfProducts>
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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>
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</kineticLaw>
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<reaction id="R_R01648" name="Gamma-aminobutyrate:alpha-ketoglutarate
aminotransferase (EC 2.6.1.19)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU03900</p>
      <p>GENE_LIST: BSU03900</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
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    <speciesReference species="M_C00334_c"/>
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    <speciesReference species="M_C00232_c"/>
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</reaction>
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  </html>
</notes>
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  <speciesReference species="M_C04236_c"/>
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  <speciesReference species="M_C00011_c"/>
  <speciesReference species="M_C00233_c"/>
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  </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>
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    <speciesReference species="M_C00025_c"/>
    <speciesReference species="M_C00234_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c"/>

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    <speciesReference species="M_C05928_c"/>
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      <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>
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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_R01658" name="Geranyltranstransferase (farnesylidiphosphate synthase) (EC
2.5.1.10)" reversible="false">
  <notes>

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<html xmlns="http://www.w3.org/1999/xhtml">
  <p>GENE_ASSOCIATION: BSU24280</p>
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  <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  <speciesReference species="M_C00235_c"/>
</listOfReactants>
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  <speciesReference species="M_C00013_c"/>
  <speciesReference species="M_C00341_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_R01663" name="Late competence protein ComEB|dCMP deaminase (EC
3.5.4.12)" reversible="false">
  <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>
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    <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>
  <kineticLaw>

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</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>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00881_c"/>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R01665" name="Cytidylate kinase (EC 2.7.4.14)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU22890</p>
      <p>GENE_LIST: BSU22890</p>

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    <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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</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>
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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_R01676" name="Guanine deaminase (EC 3.5.4.3)" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU13170</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00242_c"/>
  </listOfReactants>
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    <speciesReference species="M_C00385_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>
</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>
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    <speciesReference species="M_C00243_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00267_c"/>
    <speciesReference species="M_C00124_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_R01688" name="Butyrate kinase (EC 2.7.2.7)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU24070</p>
      <p>GENE_LIST: BSU24070</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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    <speciesReference species="M_C00246_c"/>
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    <speciesReference species="M_C00008_c"/>
    <speciesReference species="M_C02527_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_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>
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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_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>

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</listOfReactants>

<listOfProducts>

<speciesReference species="M_C00254_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"/>

<parameter id="OBJECTIVE_COEFFICIENT" value="0"/>

</listOfParameters>

</kineticLaw>

</reaction>

<reaction id="R_R01716" name="Para-aminobenzoate synthase, aminase component (EC 2.6.1.85);Anthranilate synthase, amidotransferase component (EC 4.1.3.27)|Para-aminobenzoate synthase, amidotransferase component (EC 2.6.1.85)(BSU00750)">

<notes>

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

<p>GENE_ASSOCIATION: (BSU00740 and BSU00750)</p>

<p>GENE_LIST: BSU00740 BSU00750</p>

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

</html>

</notes>

<listOfReactants>

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<speciesReference species="M_C00251_c"/>

</listOfReactants>

<listOfProducts>

<speciesReference species="M_C00025_c"/>

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    <speciesReference species="M_C11355_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_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>
  <listOfReactants>
    <speciesReference species="M_C00251_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00885_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>
<reaction id="R_R01724" name="Nicotinate phosphoribosyltransferase (EC 2.4.2.11)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU31750</p>
      <p>GENE_LIST: BSU31750</p>

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    <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
  </html>
</notes>
<listOfReactants>
  <speciesReference species="M_C00013_c"/>
  <speciesReference species="M_C01185_c"/>
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<listOfProducts>
  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C00253_c"/>
  <speciesReference species="M_C00119_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_R01728" name="Prephenate dehydrogenase (EC 1.3.1.12)"
reversible="false">
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      <p>GENE_LIST: BSU22610</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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    <speciesReference species="M_C00254_c"/>
  </listOfReactants>
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    <speciesReference species="M_C01179_c"/>
  </listOfProducts>
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</math>
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  <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
</listOfParameters>
</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>
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    <speciesReference species="M_C00826_c"/>
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    <speciesReference species="M_C00254_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_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>
      <p>GENE_LIST: BSU24790 BSU17090</p>
      <p>SUBSYSTEM: Carbohydrates</p>

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<reaction id="R_R01737" name="Gluconokinase (EC 2.7.1.12)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU40060</p>
      <p>GENE_LIST: BSU40060</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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    <speciesReference species="M_C00257_c"/>
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    <speciesReference species="M_C00345_c"/>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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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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    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C01146_c"/>
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<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_ASSOCIATION: BSU04000</p>
      <p>GENE_LIST: BSU04000</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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    <speciesReference species="M_C00898_c"/>
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<reaction id="R_R01752" name="Aldehyde dehydrogenase (EC 1.2.1.3)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <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>
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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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    </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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    </listOfParameters>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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    <speciesReference species="M_C00532_c"/>
  </listOfReactants>
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    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C00259_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_R01761" name="L-arabinose isomerase (EC 5.3.1.4)">
  <notes>
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      <p>GENE_LIST: BSU28800</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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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>
    <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>
    </html>
  </notes>
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    <speciesReference species="M_C00262_c"/>
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  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C00385_c"/>
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    </math>
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</kineticLaw>
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      <p>GENE_LIST: BSU32240</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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  <listOfProducts>
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    <speciesReference species="M_C01102_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_R01773" name="Homoserine dehydrogenase (EC 1.1.1.3)">
  <notes>
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      <p>GENE_LIST: BSU32260</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </listOfReactants>
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    <speciesReference species="M_C00441_c"/>
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  <notes>
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      <p>GENE_LIST: BSU32260</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00263_c"/>
  </listOfReactants>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00005_c"/>
    <speciesReference species="M_C00441_c"/>
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<reaction id="R_R01777" name="Homoserine O-succinyltransferase (EC 2.3.1.46)"
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_C00091_c"/>
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<listOfProducts>
  <speciesReference species="M_C00010_c"/>
  <speciesReference species="M_C01118_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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      <p>GENE_LIST: BSU24850</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </notes>
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    <speciesReference species="M_C00267_c"/>
  </listOfReactants>
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    <speciesReference species="M_C00008_c"/>
    <speciesReference species="M_C00668_c"/>
  </listOfProducts>
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    </math>

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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
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      <p>GENE_LIST: BSU05660 BSU07830 BSU05480 BSU19550</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
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    <speciesReference species="M_C00005_c"/>
    <speciesReference species="M_C00268_c"/>
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    <speciesReference species="M_C00272_c"/>
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    </math>
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<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>

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    <p>SUBSYSTEM: Cell Wall and Capsule</p>
  </html>
</notes>
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  <speciesReference species="M_C00645_c"/>
  <speciesReference species="M_C00074_c"/>
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  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C00270_c"/>
</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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  </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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</kineticLaw>
</reaction>
<reaction id="R_R01818" name="Phosphomannomutase (EC 5.4.2.8)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU09310</p>
      <p>GENE_LIST: BSU09310</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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  </listOfReactants>
  <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"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R01819" name="Mannose-6-phosphate isomerase (EC 5.3.1.8)">
  <notes>
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      <p>GENE_LIST: BSU12020 BSU35790 BSU05870</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </notes>
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  </listOfReactants>
  <listOfProducts>
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  </listOfProducts>

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</listOfProducts>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R01826" name="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)" 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>
    </html>
  </notes>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00074_c"/>
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  <listOfProducts>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C04691_c"/>
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  <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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  <speciesReference species="M_C05345_c"/>
  <speciesReference species="M_C00279_c"/>
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  </math>
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</kineticLaw>
</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>
    </html>
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  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00279_c"/>
    <speciesReference species="M_C00111_c"/>
  </listOfProducts>
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    </math>

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  </kineticLaw>
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<reaction id="R_R01830" name="Transketolase (EC 2.2.1.1)">
  <notes>
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      <p>GENE_LIST: BSU17890</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
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  </listOfProducts>
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    </math>
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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_LIST: BSU29190</p>
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    <speciesReference species="M_C05382_c"/>
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  </kineticLaw>
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3.1.5.1)">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU37600 or BSU05780 )</p>
      <p>GENE_LIST: BSU37600 BSU05780</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  </notes>
  <listOfReactants>
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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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  <kineticLaw>
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    </listOfParameters>

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    </kineticLaw>
  </reaction>
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reversible="false">
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        <p>GENE_ASSOCIATION: BSU22730</p>
        <p>GENE_LIST: BSU22730</p>
        <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
      </html>
    </notes>
    <listOfReactants>
      <speciesReference species="M_C00002_c"/>
      <speciesReference species="M_C00361_c"/>
    </listOfReactants>
    <listOfProducts>
      <speciesReference species="M_C00008_c"/>
      <speciesReference species="M_C00286_c"/>
    </listOfProducts>
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      </math>
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        <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
      </listOfParameters>
    </kineticLaw>
  </reaction>
  <reaction id="R_R01859" 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)|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>
      </html>
    </notes>
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      <speciesReference species="M_C00002_c"/>
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</listOfReactants>
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</reaction>
<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>
  <listOfReactants>
    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00294_c"/>
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    <speciesReference species="M_C00620_c"/>
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    </math>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>

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    </kineticLaw>
  </reaction>
  <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"/>
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    <kineticLaw>
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      </math>
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  </reaction>
  <reaction id="R_R01870" name="Orotate phosphoribosyltransferase (EC 2.4.2.10)"
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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    </notes>
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      <p>GENE_LIST: BSU39400</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  </notes>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00299_c"/>
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    <speciesReference species="M_C00106_c"/>
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  <kineticLaw>
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  </kineticLaw>
</reaction>
<reaction id="R_R01877" name="5'-nucleotidase yjjG (EC 3.1.3.5);2',3'-cyclic-nucleotide

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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">

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<p>GENE_LIST: BSU07840 BSU07330</p>

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

</html>

</notes>

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</listOfReactants>

<listOfProducts>

<speciesReference species="M_C00009_c"/>

<speciesReference species="M_C00080_c"/>

<speciesReference species="M_C00299_c"/>

</listOfProducts>

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</math>

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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: BSU25300</p>

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

</html>

</notes>

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</listOfReactants>

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<speciesReference species="M_C00299_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>
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  <notes>
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      <p>GENE_LIST: BSU27330</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  </notes>
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  </listOfReactants>
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    <speciesReference species="M_C00361_c"/>
  </listOfProducts>
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    </math>
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      <p>GENE_LIST: BSU04200</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </notes>

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</html>
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</kineticLaw>
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<reaction id="R_R01899" name="Isocitrate dehydrogenase [NADP] (EC 1.1.1.42)">
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      <p>GENE_LIST: BSU29130</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </listOfReactants>
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    <speciesReference species="M_C00005_c"/>
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  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>

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    </listOfParameters>
  </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>
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  </notes>
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  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00417_c"/>
  </listOfProducts>
  <kineticLaw>
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  </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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    <speciesReference species="M_C00312_c"/>
  </listOfReactants>
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    <speciesReference species="M_C00008_c"/>

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    <speciesReference species="M_C06441_c"/>
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  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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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>
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      <p>GENE_ASSOCIATION: BSU37500</p>
      <p>GENE_LIST: BSU37500</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00134_c"/>
    <speciesReference species="M_C01137_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00315_c"/>
    <speciesReference species="M_C00170_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_R01954" name="Argininosuccinate synthase (EC 6.3.4.5)"
reversible="false">
  <notes>

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<html xmlns="http://www.w3.org/1999/xhtml">
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  <p>GENE_LIST: BSU29450</p>
  <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  <speciesReference species="M_C00327_c"/>
</listOfReactants>
<listOfProducts>
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  <speciesReference species="M_C00013_c"/>
  <speciesReference species="M_C00020_c"/>
</listOfProducts>
<kineticLaw>
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      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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(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)"
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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)"

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(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)"
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(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)"
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1.8.4.11)">

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3.5.1.25)">
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      <p>GENE_LIST: BSU35010</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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</reaction>
<reaction id="R_R02060" name="Phosphoglucosamine mutase (EC 5.4.2.10)">
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      <p>GENE_LIST: BSU01770</p>

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    <p>SUBSYSTEM: Cell Wall and Capsule</p>
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</kineticLaw>
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<reaction id="R_R02061" name="Heptaprenyl diphosphate synthase component II (EC
2.5.1.30);Heptaprenyl diphosphate synthase component I (EC 2.5.1.30)(BSU22760)"
reversible="false">
  <notes>
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      <p>GENE_LIST: BSU22740 BSU22760</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  </notes>
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      <p>GENE_LIST: BSU10810</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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</reaction>
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kinase (EC 2.7.1.144)" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU14390</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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<reaction id="R_R02085" name="Methylglutaconyl-CoA hydratase (EC 4.2.1.18)">
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      <p>GENE_LIST: BSU18220</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</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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</kineticLaw>
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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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</reaction>
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      <p>GENE_LIST: BSU27330</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>GENE_LIST: BSU00280</p>
    <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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      <p>GENE_LIST: BSU37060</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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3.6.1.23)" reversible="false">
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      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  </notes>
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  </kineticLaw>
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      <p>GENE_LIST: BSU17680 BSU21820</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  </notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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    </kineticLaw>
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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)">
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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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    </kineticLaw>
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  <reaction id="R_R02106" name="Uricase (EC 1.7.3.3)">
    <notes>
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        <p>GENE_ASSOCIATION: BSU32450</p>
        <p>GENE_LIST: BSU32450</p>
        <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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    </notes>

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<reaction id="R_R02133" name="Thiaminase II (EC 3.5.99.2)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU11650</p>
      <p>GENE_LIST: BSU11650</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
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    <speciesReference species="M_C00378_c"/>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</reaction>
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2.4.2.8);Xanthine phosphoribosyltransferase (EC 2.4.2.-)(BSU22070)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU00680 or BSU22070 )</p>
      <p>GENE_LIST: BSU00680 BSU22070</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00119_c"/>
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    <speciesReference species="M_C00655_c"/>
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  </kineticLaw>
</reaction>
<reaction id="R_R02147" name="Purine nucleoside phosphorylase (EC 2.4.2.1)">
  <notes>
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      <p>GENE_LIST: BSU23490 BSU19630</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  </notes>
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</reaction>
<reaction id="R_R02148" 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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    <speciesReference species="M_C06193_c"/>
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</reaction>
<reaction id="R_R02156" name="Quercetin 2,3-dioxygenase (EC 1.13.11.24)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU39980</p>
      <p>GENE_LIST: BSU39980</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00007_c"/>
    <speciesReference species="M_C00389_c"/>
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  <listOfProducts>
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    <speciesReference species="M_C04524_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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</reaction>
<reaction id="R_R02196" name="Leucine dehydrogenase (EC 1.4.1.9)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU24080</p>
      <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"/>
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<reaction id="R_R02199" name="Branched-chain amino acid aminotransferase (EC
2.6.1.42)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU02390 or BSU38550 )</p>
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      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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    <speciesReference species="M_C00407_c"/>
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<reaction id="R_R02236" name="Dihydrofolate reductase (EC 1.5.1.3)">

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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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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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      <p>GENE_LIST: BSU28080</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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    <speciesReference species="M_C00921_c"/>
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1.2.1.22)|Predicted rhamnulose-1-phosphate aldolase (EC 4.1.2.19)">
  <notes>
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      <p>GENE_LIST: BSU31220</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </notes>
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    <speciesReference species="M_C00424_c"/>
  </listOfProducts>
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  </kineticLaw>
</reaction>
<reaction id="R_R02272" name="Glutamate-1-semialdehyde aminotransferase (EC 5.4.3.8)">
  <notes>
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    <p>GENE_ASSOCIATION: ( BSU28120 or BSU08710 )</p>
    <p>GENE_LIST: BSU28120 BSU08710</p>
    <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  <speciesReference species="M_C03741_c"/>
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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_R02279" name="5-dehydro-4-deoxyglucarate dehydratase (EC 4.2.1.41)"
reversible="false">
  <notes>
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      <p>GENE_LIST: BSU02460</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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    <speciesReference species="M_C00679_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00011_c"/>
    <speciesReference species="M_C00433_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>

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  <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
</listOfParameters>
</kineticLaw>
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2.3.1.35)|N-acetylglutamate synthase (EC 2.3.1.1)">
  <notes>
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      <p>GENE_LIST: BSU11200</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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    <speciesReference species="M_C00437_c"/>
  </listOfReactants>
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    <speciesReference species="M_C00624_c"/>
  </listOfProducts>
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    </math>
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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: BSU11220</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>

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    <speciesReference species="M_C00026_c"/>
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  </listOfProducts>
  <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_R02285" name="Formiminoglutamase (EC 3.5.3.8)" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU39380</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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    <speciesReference species="M_C00439_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>

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</reaction>
<reaction id="R_R02288" name="Imidazolonepropionase (EC 3.5.2.7)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU39370</p>
      <p>GENE_LIST: BSU39370</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C03680_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00439_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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reversible="false">
  <notes>
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      <p>GENE_LIST: BSU16750</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00005_c"/>
    <speciesReference species="M_C03082_c"/>
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    <speciesReference species="M_C00009_c"/>
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    <speciesReference species="M_C00441_c"/>
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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_R02292" name="Dihydrodipicolinate synthase (EC 4.2.1.52)"
reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU16770</p>
      <p>GENE_LIST: BSU16770</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00022_c"/>
    <speciesReference species="M_C00441_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00001_c" stoichiometry="2"/>
    <speciesReference species="M_C03340_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_R02294" 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: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
  </html>
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  <speciesReference species="M_C00620_c"/>
  <speciesReference species="M_C00153_c"/>
</listOfProducts>
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</kineticLaw>
</reaction>
<reaction id="R_R02295" name="Purine nucleoside phosphorylase (EC 2.4.2.1)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
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      <p>GENE_LIST: BSU23490 BSU19630</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </notes>
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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>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00475_c"/>
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  <listOfProducts>
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    <speciesReference species="M_C00380_c"/>
  </listOfProducts>
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    </math>
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      <p>GENE_LIST: BSU23490 BSU19630</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </notes>
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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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      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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      <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>
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</kineticLaw>
</reaction>
<reaction id="R_R02326" 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>
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  <listOfReactants>
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    <speciesReference species="M_C00705_c"/>
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  <listOfProducts>
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    </math>
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</reaction>

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<reaction id="R_R02327" name="Uridine kinase (EC 2.7.1.48) [C1]" reversible="false">
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      <p>GENE_LIST: BSU27330</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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    <speciesReference species="M_C00458_c"/>
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    <speciesReference species="M_C00705_c"/>
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    </math>
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  </kineticLaw>
</reaction>
<reaction id="R_R02328" name="Glucose-1-phosphate thymidyltransferase (EC 2.7.7.24)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU37840</p>
      <p>GENE_LIST: BSU37840</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
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    <speciesReference species="M_C00459_c"/>
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  <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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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">
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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_R02332" 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>

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    </html>
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  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C01346_c"/>
  </listOfProducts>
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    </math>
  </kineticLaw>
  <listOfParameters>
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  </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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    <speciesReference species="M_C00463_c"/>
  </listOfProducts>
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    </math>
  </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"/>

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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R02370" 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_C05822_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00475_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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    </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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    <speciesReference species="M_C00475_c"/>

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</listOfReactants>
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  <speciesReference species="M_C00055_c"/>
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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_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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    <speciesReference species="M_C00460_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00055_c"/>
    <speciesReference species="M_C01346_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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    <p>GENE_LIST: BSU38040</p>
    <p>SUBSYSTEM: Carbohydrates</p>
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  <speciesReference species="M_C05402_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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</kineticLaw>
</reaction>
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      <p>GENE_ASSOCIATION: BSU03150</p>
      <p>GENE_LIST: BSU03150</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </notes>
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    <speciesReference species="M_C03175_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">

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      <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_LIST: BSU25660</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </notes>
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    <speciesReference species="M_C00493_c"/>
  </listOfReactants>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00005_c"/>
    <speciesReference species="M_C02637_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_R02423" name="Allantoate amidohydrolase (EC 3.5.3.9)"
reversible="false">
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      <p>GENE_LIST: BSU32530</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>

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  <speciesReference species="M_C00499_c"/>
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</kineticLaw>
</reaction>
<reaction id="R_R02425" name="Allantoinase (EC 3.5.2.5)">
  <notes>
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      <p>GENE_LIST: BSU32410</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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reversible="false">
  <notes>
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      <p>SUBSYSTEM: Carbohydrates</p>
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<reaction id="R_R02437" name="L-rhamnose isomerase (EC 5.3.1.14)">
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      <p>GENE_LIST: BSU28790</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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      <p>GENE_LIST: BSU15110 BSU14440</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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reversible="false">
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      <p>GENE_LIST: BSU22420</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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    <speciesReference species="M_C00522_c"/>
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    <speciesReference species="M_C00020_c"/>
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    <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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      <p>GENE_LIST: BSU25300</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  </notes>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00881_c"/>
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      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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      <p>GENE_LIST: BSU13020</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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    </listOfParameters>
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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>
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  </notes>
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  </listOfProducts>
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      <p>GENE_ASSOCIATION: BSU13570</p>
      <p>GENE_LIST: BSU13570</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C02505_c"/>
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  </kineticLaw>
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4.1.1.73)|Tartrate dehydrogenase (EC 1.1.1.93)">
  <notes>
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      <p>GENE_LIST: BSU04000</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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BSU19310 )</p>
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      <p>SUBSYSTEM: Carbohydrates</p>
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  </notes>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00555_c"/>
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    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C00334_c"/>
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      <p>GENE_LIST: BSU12380</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
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    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C00558_c"/>
  </listOfProducts>
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</reaction>
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  <notes>
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      <p>GENE_LIST: BSU23490 BSU19630</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  </notes>
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</reaction>
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  <notes>
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      <p>GENE_ASSOCIATION: BSU31060</p>
      <p>GENE_LIST: BSU31060</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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    <speciesReference species="M_C00001_c"/>
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    </math>
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      <p>GENE_LIST: BSU31060</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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    <speciesReference species="M_C00719_c"/>
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    </math>
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      <p>GENE_LIST: BSU37120</p>
      <p>SUBSYSTEM: Carbohydrates</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>
    </html>
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  <listOfReactants>
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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_R02570" name="Dihydrolipoamide succinyltransferase component (E2) of
2-oxoglutarate dehydrogenase complex (EC 2.3.1.61)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">

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    <p>GENE_ASSOCIATION: BSU19360</p>
    <p>GENE_LIST: BSU19360</p>
    <p>SUBSYSTEM: Carbohydrates</p>
  </html>
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  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R02613" name="" reversible="false">
  <notes>
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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"/>
    <speciesReference species="M_C05332_c"/>
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  <listOfProducts>
    <speciesReference species="M_C00014_c"/>
    <speciesReference species="M_C00027_c"/>
    <speciesReference species="M_C00601_c"/>
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  <kineticLaw>
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</kineticLaw>
</reaction>
<reaction id="R_R02630" name="PTS system, mannitol-specific IIA component (EC
2.7.1.69)|PTS system, mannitol-specific IIB component (EC 2.7.1.69)|PTS system,
mannitol-specific IIC component (EC 2.7.1.69);Phosphoenolpyruvate-protein phosphotransferase
of PTS system (EC 2.7.3.9)(BSU13910);PTS system, mannose-specific IIA component (EC
2.7.1.69)|PTS system, mannose-specific IIB component (EC 2.7.1.69)|PTS system,
mannose-specific IIC component (EC 2.7.1.69)(BSU12010)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
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      <p>GENE_LIST: BSU12010</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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    <speciesReference species="M_C00159_c"/>
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  </kineticLaw>
</reaction>
<reaction id="R_R02649" name="Acetylglutamate kinase (EC 2.7.2.8)" reversible="false">
  <notes>
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    <p>GENE_ASSOCIATION: BSU11210</p>
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  <speciesReference species="M_C00002_c"/>
  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C00624_c"/>
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  <speciesReference species="M_C00008_c"/>
  <speciesReference species="M_C04133_c"/>
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</kineticLaw>
</reaction>
<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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  </listOfReactants>
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    <speciesReference species="M_C15977_c"/>
  </listOfProducts>
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    <ci> FLUX_VALUE </ci>
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</kineticLaw>
</reaction>
<reaction id="R_R02698" name="4-hydroxyphenylacetate 3-monooxygenase (EC 1.14.13.3)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU18620</p>
      <p>GENE_LIST: BSU18620</p>
      <p>SUBSYSTEM: Metabolism of Aromatic Compounds</p>
    </html>
  </notes>
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    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C00007_c"/>
    <speciesReference species="M_C00642_c"/>
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  <listOfProducts>
    <speciesReference species="M_C00003_c"/>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C01161_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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  </kineticLaw>
</reaction>
<reaction id="R_R02703" name="Mannitol-1-phosphate 5-dehydrogenase (EC 1.1.1.17)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU03990</p>

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<p>GENE_LIST: BSU03990</p>
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 <speciesReference species="M_C00080_c"/>
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 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>
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 <speciesReference species="M_C01762_c"/>
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 <math xmlns="http://www.w3.org/1998/Math/MathML">

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  </listOfParameters>
</kineticLaw>
</reaction>
<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>
    <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>
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  </notes>
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    <speciesReference species="M_C03506_c"/>
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    <speciesReference species="M_C00118_c"/>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00078_c"/>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R02727" name="Maltose phosphorylase (EC 2.4.1.8)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU34570</p>
      <p>GENE_LIST: BSU34570</p>
      <p>SUBSYSTEM: Carbohydrates</p>

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</html>
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  <speciesReference species="M_C00080_c"/>
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  <speciesReference species="M_C00267_c"/>
  <speciesReference species="M_C00663_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_R02728" name="Beta-phosphoglucomutase (EC 5.4.2.6)">
  <notes>
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      <p>GENE_LIST: BSU34550</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00663_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C01172_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>

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    </listOfParameters>
  </kineticLaw>
</reaction>
<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>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C04390_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00033_c"/>
    <speciesReference species="M_C00666_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_R02734"
  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>
  <listOfReactants>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C04421_c"/>

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</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00042_c"/>
  <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 id="R_R02735" name="Diaminopimelate epimerase (EC 5.1.1.7)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU32170</p>
      <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>
    <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_R02736" name="Glucose-6-phosphate 1-dehydrogenase (EC 1.1.1.49)">
  <notes>
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    <p>GENE_ASSOCIATION: BSU23850</p>
    <p>GENE_LIST: BSU23850</p>
    <p>SUBSYSTEM: Carbohydrates</p>
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  <speciesReference species="M_C01172_c"/>
  <speciesReference species="M_C00006_c"/>
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  <speciesReference species="M_C00005_c"/>
  <speciesReference species="M_C00080_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_R02739" name="Glucose-6-phosphate isomerase (EC 5.3.1.9)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU31350</p>
      <p>GENE_LIST: BSU31350</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C01172_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_R02740" name="Glucose-6-phosphate isomerase (EC 5.3.1.9)">
  <notes>
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      <p>GENE_LIST: BSU31350</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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  <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_R02748" 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>
    </html>
  </notes>
  <listOfReactants>
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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_R02749" 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>
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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_R02750" name="Ribokinase (EC 2.7.1.15)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU35920</p>

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      <p>GENE_LIST: BSU37820</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
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    <speciesReference species="M_C00080_c"/>
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6.3.2.9)" reversible="false">
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      <p>GENE_LIST: BSU15200</p>
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        <p>GENE_LIST: BSU15180</p>
        <p>SUBSYSTEM: Cell Wall and Capsule</p>
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reversible="false">
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      <p>GENE_LIST: BSU15620</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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      <p>SUBSYSTEM: Aminoacyl-tRNA biosynthesis</p>
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  </notes>
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  <speciesReference species="M_C00810_c"/>
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      <p>SUBSYSTEM: Carbohydrates</p>
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    </listOfParameters>
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      <p>GENE_LIST: BSU29620</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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      <p>GENE_LIST: BSU31200</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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</kineticLaw>
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2.7.1.33);Pantothenate kinase (EC 2.7.1.33)(BSU23760)" reversible="false">
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      <p>GENE_LIST: BSU23760 BSU00700</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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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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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
</reaction>
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hydratase(BSU17160);enoyl-CoA hydratase(BSU09880)">
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BSU17170 )</p>
      <p>GENE_LIST: BSU28540 BSU17160 BSU09880 BSU17170</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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reversible="false">
  <notes>
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      <p>GENE_LIST: BSU15020</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
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    <speciesReference species="M_C01134_c"/>
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  <listOfProducts>
    <speciesReference species="M_C00013_c"/>
    <speciesReference species="M_C00882_c"/>
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<reaction id="R_R03037" name="Isochorismatase (EC 3.3.2.1) of siderophore
biosynthesis;Isochorismatase (EC 3.3.2.1)(BSU05070)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU31970 or BSU05070 )</p>

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<p>GENE_LIST: BSU31970 BSU05070</p>
 <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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 <p>SUBSYSTEM: Aminoacyl-tRNA biosynthesis</p>
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</kineticLaw>
</reaction>
<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>
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      <p>GENE_ASSOCIATION: ( ( BSU28300 and BSU28310 ) or BSU36010 )</p>
      <p>GENE_LIST: BSU28300 BSU28310 BSU36010</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00068_c"/>
    <speciesReference species="M_C00900_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00022_c"/>
  </listOfProducts>
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    </math>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R03051" name="Ketol-acid reductoisomerase (EC 1.1.1.86)"
reversible="false">
  <notes>
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      <p>GENE_LIST: BSU28290</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>

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</html>
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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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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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  <notes>
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      <p>GENE_LIST: BSU03180</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
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    <speciesReference species="M_C00916_c"/>
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  <notes>
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      <p>GENE_ASSOCIATION: BSU00770</p>
      <p>GENE_LIST: BSU00770</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  </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>
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  </kineticLaw>
</reaction>
<reaction id="R_R03067" name="Dihydropteroate synthase (EC 2.5.1.15)"
reversible="false">
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      <p>GENE_LIST: BSU00770</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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    <speciesReference species="M_C04807_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>
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</reaction>
<reaction id="R_R03083" name="3-dehydroquinate synthase (EC 4.2.3.4)"
reversible="false">
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      <p>GENE_LIST: BSU22700</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00944_c"/>
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    </listOfParameters>
  </kineticLaw>

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</reaction>
<reaction id="R_R03084" name="3-dehydroquinate dehydratase I (EC
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  <notes>
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      <p>GENE_LIST: BSU23080 BSU24470</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </notes>
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    <speciesReference species="M_C02637_c"/>
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    </math>
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</reaction>
<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>
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  </notes>
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    <speciesReference species="M_C02693_c"/>
  </listOfReactants>
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  </listOfParameters>
</kineticLaw>
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4.2.1.75);Uroporphyrinogen-III methyltransferase (EC 2.1.1.107)|Uroporphyrinogen-III synthase
(EC 4.2.1.75)(BSU03280);uroporphyrinogen-III synthase;porphobilinogenase;uroporphyrinogen
isomerase;uroporphyrinogen III cosynthase;URO-synthase;hydroxymethylbilane hydro-lyase
(cyclizing)(BSU12230)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
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      <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>
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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_C15980_c"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C01352_c"/>
  <speciesReference species="M_C03345_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>
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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>
    </html>
  </notes>
  <listOfReactants>
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  </listOfReactants>
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    <speciesReference species="M_C15979_c"/>
  </listOfProducts>
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</math>
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      <p>GENE_LIST: BSU13570</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  </notes>
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    <speciesReference species="M_C03078_c"/>
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    <speciesReference species="M_C01035_c"/>
  </listOfProducts>
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    </math>
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    </listOfParameters>
  </kineticLaw>
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  <notes>
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      <p>GENE_LIST: BSU30210</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  </notes>
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    <speciesReference species="M_C00002_c"/>
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    <speciesReference species="M_C01037_c"/>
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    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c" stoichiometry="3"/>
    <speciesReference species="M_C01909_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>
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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>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00005_c"/>
    <speciesReference species="M_C04631_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00006_c"/>
    <speciesReference species="M_C01050_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>
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reversible="false">
  <notes>
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      <p>GENE_LIST: BSU29790</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
    </html>
  </notes>
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    <speciesReference species="M_C00041_c"/>
    <speciesReference species="M_C01050_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00008_c"/>
    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C01212_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_R03194" name="Uroporphyrinogen-III methyltransferase (EC
2.1.1.107);Uroporphyrinogen-III methyltransferase (EC 2.1.1.107)|Uroporphyrinogen-III synthase
(EC 4.2.1.75)(BSU03280)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU03280 or BSU15610 )</p>
      <p>GENE_LIST: BSU03280 BSU15610</p>

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    <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
  </html>
</notes>
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</kineticLaw>
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  <notes>
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      <p>GENE_ASSOCIATION: BSU10120</p>
      <p>GENE_LIST: BSU10120</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
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    </math>
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</kineticLaw>
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  <notes>
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      <p>GENE_LIST: BSU30240</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00010_c"/>
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    <speciesReference species="M_C00020_c"/>
    <speciesReference species="M_C01063_c"/>
  </listOfProducts>
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    </math>
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</reaction>
<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>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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<reaction id="R_R03222" name="Protoporphyrinogen IX oxidase, aerobic (EC 1.3.3.4)">
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      <p>GENE_LIST: BSU10140</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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    <speciesReference species="M_C02191_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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<reaction id="R_R03223" name="Thiamin-phosphate pyrophosphorylase (EC
2.5.1.3);Thiamin biosynthesis protein ThiC(BSU08790)">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU38290 or BSU11660 or BSU08790 )</p>
      <p>GENE_LIST: BSU38290 BSU11660 BSU08790</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C04327_c"/>
    <speciesReference species="M_C04752_c"/>
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    <speciesReference species="M_C01081_c"/>
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  </kineticLaw>
</reaction>
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aminotransferase (EC 2.6.1.62)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU30230</p>
      <p>GENE_LIST: BSU30230</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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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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    </kineticLaw>
  </reaction>
  <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>
      </html>
    </notes>
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      <speciesReference species="M_C01100_c"/>
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    <listOfProducts>
      <speciesReference species="M_C00025_c"/>
      <speciesReference species="M_C01267_c"/>
    </listOfProducts>
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    </kineticLaw>
  </reaction>
  <reaction id="R_R03260" name="Cystathionine gamma-synthase (EC 2.5.1.48)">
    <notes>
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        <p>GENE_LIST: BSU11870</p>
        <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </kineticLaw>
</reaction>
<reaction id="R_R03269" name="Phosphopantothencysteine decarboxylase (EC
4.1.1.36)|Phosphopantothencysteine synthetase (EC 6.3.2.5)" reversible="false">
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      <p>GENE_LIST: BSU15700</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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    </math>
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</reaction>
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1.2.4.1);Pyruvate dehydrogenase E1 component beta subunit (EC 1.2.4.1)(BSU14590)">

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<notes>
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    <p>SUBSYSTEM: Carbohydrates</p>
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<reaction id="R_R03299" name="4-hydroxyphenylacetate 3-monooxygenase (EC 1.14.13.3)"
reversible="false">
  <notes>
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      <p>GENE_LIST: BSU18620</p>
      <p>SUBSYSTEM: Metabolism of Aromatic Compounds</p>
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    <speciesReference species="M_C00007_c"/>
    <speciesReference species="M_C05593_c"/>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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  </kineticLaw>
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      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  <speciesReference species="M_C03912_c"/>
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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>
    </html>
  </notes>
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  </listOfProducts>
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  <listOfParameters>
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  <notes>
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      <p>GENE_LIST: BSU31350</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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  </listOfReactants>
  <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"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </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>
    <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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  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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  </kineticLaw>
</reaction>
<reaction id="R_R03348" name="Quinolate phosphoribosyltransferase [decarboxylating]
(EC 2.4.2.19)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU27860</p>
      <p>GENE_LIST: BSU27860</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
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    <speciesReference species="M_C03722_c"/>
    <speciesReference species="M_C00119_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00013_c"/>
    <speciesReference species="M_C00011_c"/>
    <speciesReference species="M_C01185_c"/>
  </listOfProducts>
  <kineticLaw>
    <math xmlns="http://www.w3.org/1998/Math/MathML">
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    </math>
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</reaction>
<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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    <speciesReference species="M_C04563_c"/>
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1.2.1.38)" reversible="false">
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      <p>GENE_LIST: BSU11190</p>
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</reaction>
<reaction id="R_R03457" name="Imidazoleglycerol-phosphate dehydratase (EC 4.2.1.19)"
reversible="false">
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      <p>GENE_LIST: BSU34900</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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</reaction>
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  <notes>
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      <p>GENE_LIST: BSU23280</p>
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reversible="false">
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N-acetylmuramyl residues in the glycan chain">
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</reaction>
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pyrophosphokinase (EC 2.7.6.3)" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU00790</p>
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      <p>GENE_LIST: BSU07840</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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      <p>GENE_LIST: BSU07840</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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</kineticLaw>
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1.1.1.-);NADH-dependent butanol dehydrogenase A (EC 1.1.1.-)(BSU31370)">
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      <p>SUBSYSTEM: Carbohydrates</p>
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      <p>GENE_LIST: BSU30300</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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</reaction>
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reversible="false">
  <notes>
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reversible="false">
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      <p>GENE_LIST: BSU22360</p>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R03650" name="CysteinyI-tRNA synthetase (EC 6.1.1.16)"

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reversible="false">
  <notes>
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      <p>GENE_LIST: BSU00940</p>
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</reaction>
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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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  </kineticLaw>
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<reaction id="R_R03654" name="Glycyl-tRNA synthetase beta chain (EC
6.1.1.14);Glycyl-tRNA synthetase alpha chain (EC 6.1.1.14)(BSU25270)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU25260 and BSU25270 )</p>
      <p>GENE_LIST: BSU25260 BSU25270</p>
      <p>SUBSYSTEM: Aminoacyl-tRNA biosynthesis</p>
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  </notes>
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</reaction>
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      <p>GENE_ASSOCIATION: BSU27560</p>
      <p>GENE_LIST: BSU27560</p>
      <p>SUBSYSTEM: Aminoacyl-tRNA biosynthesis</p>
    </html>
  </notes>
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    <speciesReference species="M_C00135_c"/>
    <speciesReference species="M_C01643_c"/>
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  <listOfProducts>
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    <speciesReference species="M_C00013_c"/>
    <speciesReference species="M_C02988_c"/>
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reversible="false">
  <notes>
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      <p>GENE_LIST: BSU15430</p>
      <p>SUBSYSTEM: Aminoacyl-tRNA biosynthesis</p>
    </html>
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</kineticLaw>
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      <p>GENE_LIST: BSU30320</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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    <speciesReference species="M_C00123_c"/>
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    </kineticLaw>
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reversible="false">
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        <p>GENE_LIST: BSU00820</p>
        <p>SUBSYSTEM: Aminoacyl-tRNA biosynthesis</p>
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    </notes>
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      <speciesReference species="M_C00047_c"/>
      <speciesReference species="M_C01646_c"/>
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    <listOfProducts>
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      <speciesReference species="M_C00013_c"/>
      <speciesReference species="M_C01931_c"/>
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  </reaction>
  <reaction id="R_R03659" name="Methionyl-tRNA synthetase" reversible="false">
    <notes>
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        <p>GENE_ASSOCIATION: BSU00380</p>
        <p>GENE_LIST: BSU00380</p>
        <p>SUBSYSTEM: Aminoacyl-tRNA biosynthesis</p>
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    </notes>
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</kineticLaw>
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6.1.1.20);Phenylalanyl-tRNA synthetase alpha chain (EC 6.1.1.20)(BSU28640)"
reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU28630 and BSU28640 )</p>
      <p>GENE_LIST: BSU28630 BSU28640</p>
      <p>SUBSYSTEM: Aminoacyl-tRNA biosynthesis</p>
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  </notes>
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</kineticLaw>
</reaction>
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      <p>GENE_LIST: BSU16570</p>
      <p>SUBSYSTEM: Aminoacyl-tRNA biosynthesis</p>
    </html>
  </notes>
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    <speciesReference species="M_C00148_c"/>
    <speciesReference species="M_C01649_c"/>
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  <listOfProducts>
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    <speciesReference species="M_C00013_c"/>
    <speciesReference species="M_C02702_c"/>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R03662" name="Seryl-tRNA synthetase" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU00130</p>
      <p>SUBSYSTEM: Aminoacyl-tRNA biosynthesis</p>
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  </notes>
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  </kineticLaw>
</reaction>
<reaction id="R_R03663" name="Threonyl-tRNA synthetase (EC 6.1.1.3)"
reversible="false">
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      <p>GENE_LIST: BSU28950 BSU37560</p>
      <p>SUBSYSTEM: Aminoacyl-tRNA biosynthesis</p>
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  </notes>
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    <speciesReference species="M_C00188_c"/>
    <speciesReference species="M_C01651_c"/>
  </listOfReactants>
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    <speciesReference species="M_C00013_c"/>
    <speciesReference species="M_C02992_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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reversible="false">
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            <p>GENE_LIST: BSU11420</p>
            <p>SUBSYSTEM: Aminoacyl-tRNA biosynthesis</p>
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        <speciesReference species="M_C00078_c"/>
        <speciesReference species="M_C01652_c"/>
    </listOfReactants>
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        <speciesReference species="M_C00013_c"/>
        <speciesReference species="M_C03512_c"/>
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    <kineticLaw>
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    </kineticLaw>
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            <p>GENE_LIST: BSU28090</p>
            <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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    <speciesReference species="M_C01888_c"/>
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    </math>
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</kineticLaw>
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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>
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    <speciesReference species="M_C01944_c"/>
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    <speciesReference species="M_C05265_c"/>
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    </math>
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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>
    <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>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R03905" 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">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
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      <p>GENE_LIST: BSU06670 BSU06680 BSU06690</p>
      <p>SUBSYSTEM: Aminoacyl-tRNA biosynthesis</p>
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    <speciesReference species="M_C00064_c"/>
    <speciesReference species="M_C00002_c"/>
    <speciesReference species="M_C00001_c"/>
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  <listOfProducts>
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    <speciesReference species="M_C00025_c"/>
    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00008_c"/>
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      <ci> FLUX_VALUE </ci>
    </math>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  </notes>
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    <speciesReference species="M_C02315_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C02582_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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    </listOfParameters>
  </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: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  <speciesReference species="M_C02582_c"/>
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<kineticLaw>
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  </math>
  <listOfParameters>
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</kineticLaw>
</reaction>
<reaction id="R_R03921" name="Sucrose-6-phosphate hydrolase (EC 3.2.1.26)">
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      <p>GENE_LIST: BSU38040</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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    <speciesReference species="M_C16688_c"/>
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    </math>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
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</reaction>

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    </listOfParameters>
  </kineticLaw>
</reaction>
<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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  </notes>
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    <speciesReference species="M_C02354_c"/>
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  </listOfProducts>
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      <p>GENE_LIST: BSU15630</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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<reaction id="R_R03968" name="3-isopropylmalate dehydratase small subunit (EC
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  <notes>
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      <p>GENE_ASSOCIATION: ( BSU28260 or BSU28250 )</p>
      <p>GENE_LIST: BSU28260 BSU28250</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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      <p>GENE_LIST: BSU39540</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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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">
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      <p>GENE_LIST: BSU32830 BSU10350 BSU24170</p>
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    <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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</kineticLaw>
</reaction>
<reaction id="R_R04001" name="3-isopropylmalate dehydratase small subunit (EC
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  <notes>
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      <p>GENE_ASSOCIATION: ( BSU28250 and BSU28260 )</p>
      <p>GENE_LIST: BSU28250 BSU28260</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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      <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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      <p>GENE_LIST: BSU30780</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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3.5.4.19)|Phosphoribosyl-ATP pyrophosphatase (EC 3.6.1.31)" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU34860</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R04037" name="Phosphoribosyl-AMP cyclohydrolase (EC
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  <notes>
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      <p>GENE_LIST: BSU34860</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  <notes>
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BSU19310 )</p>
      <p>GENE_LIST: BSU07350 BSU37960 BSU39860 BSU38830 BSU19310</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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<reaction id="R_R04095" name="Isovaleryl-CoA dehydrogenase (EC 1.3.99.10)">
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      <p>GENE_LIST: BSU18260</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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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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</kineticLaw>

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<p>GENE_LIST: BSU28170</p>

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

</html>

</notes>

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(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)">
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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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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>
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      <p>GENE_LIST: BSU18210 BSU18240</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </notes>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</reaction>
<reaction id="R_R04144" name="Phosphoribosylamine--glycine ligase (EC 6.3.4.13)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU06530</p>
      <p>GENE_LIST: BSU06530</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
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    <speciesReference species="M_C00002_c"/>
    <speciesReference species="M_C00037_c"/>
    <speciesReference species="M_C03090_c"/>
  </listOfReactants>
  <listOfProducts>

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    <speciesReference species="M_C00008_c"/>
    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C03838_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_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>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C05262_c"/>
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  <listOfProducts>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C03221_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"/>
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    </listOfParameters>
  </kineticLaw>
</reaction>

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<reaction id="R_R04173" name="Phosphoserine aminotransferase (EC 2.6.1.52)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU10020</p>
      <p>GENE_LIST: BSU10020</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00026_c"/>
    <speciesReference species="M_C01005_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00025_c"/>
    <speciesReference species="M_C03232_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"/>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R04175" name="" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: </p>
      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C03239_c"/>
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  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C04092_c"/>
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  <kineticLaw>

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</listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R04199" name="Dihydrodipicolinate reductase (EC 1.3.1.26)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU22490</p>
      <p>GENE_LIST: BSU22490</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
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    <speciesReference species="M_C03972_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00005_c"/>
    <speciesReference species="M_C03340_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_R04203" 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>

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    <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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</notes>
<listOfReactants>
  <speciesReference species="M_C00003_c"/>
  <speciesReference species="M_C04405_c"/>
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<listOfProducts>
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  <speciesReference species="M_C03344_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_R04204" 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 )</p>
      <p>GENE_LIST: BSU28540 BSU17160 BSU09880</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
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  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C03345_c"/>
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</kineticLaw>
</reaction>
<reaction id="R_R04208" name="Phosphoribosylformylglycinamidine cyclo-ligase (EC
6.3.3.1)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU06500</p>
      <p>GENE_LIST: BSU06500</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
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    <speciesReference species="M_C04640_c"/>
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  <listOfProducts>
    <speciesReference species="M_C00008_c"/>
    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C03373_c"/>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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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">
  <notes>
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    <p>GENE_ASSOCIATION: ( BSU06670 and BSU06680 and BSU06690 )</p>
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    <p>SUBSYSTEM: Aminoacyl-tRNA biosynthesis</p>
  </html>
</notes>
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  <speciesReference species="M_C06113_c"/>
  <speciesReference species="M_C00064_c"/>
  <speciesReference species="M_C00002_c"/>
  <speciesReference species="M_C00001_c"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C03402_c"/>
  <speciesReference species="M_C00025_c"/>
  <speciesReference species="M_C00009_c"/>
  <speciesReference species="M_C00008_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_R04218" name="Phytoene synthase (EC 2.5.1.32)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU10810</p>
      <p>GENE_LIST: BSU10810</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C03427_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00013_c"/>
    <speciesReference species="M_C05421_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_R04224" 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: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C03460_c"/>
  </listOfReactants>
  <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_R04231" name="Phosphopantothencysteine decarboxylase (EC
4.1.1.36)|Phosphopantothencysteine 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>

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    <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  <speciesReference species="M_C00063_c"/>
  <speciesReference species="M_C00097_c"/>
  <speciesReference species="M_C03492_c"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00013_c"/>
  <speciesReference species="M_C00055_c"/>
  <speciesReference species="M_C04352_c"/>
</listOfProducts>
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</kineticLaw>
</reaction>
<reaction id="R_R04286" name="6-pyruvoyl tetrahydrobiopterin synthase">
  <notes>
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      <p>GENE_ASSOCIATION: BSU13730</p>
      <p>GENE_LIST: BSU13730</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C04895_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C03684_c"/>
    <speciesReference species="M_C00536_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_R04292" name="Quinolinate synthetase (EC 4.1.99.-)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU27850</p>
      <p>GENE_LIST: BSU27850</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00111_c"/>
    <speciesReference species="M_C05840_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00001_c" stoichiometry="2"/>
    <speciesReference species="M_C03722_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_R04325" name="Phosphoribosylglycinamide formyltransferase (EC
2.1.2.2)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU06510</p>
      <p>GENE_LIST: BSU06510</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>

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<listOfReactants>
  <speciesReference species="M_C00234_c"/>
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  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C04376_c"/>
  <speciesReference species="M_C00101_c"/>
</listOfProducts>
<kineticLaw>
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  </math>
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  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R04336" 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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  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C03972_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>

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    </listOfParameters>
  </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_C01209_c"/>
    <speciesReference species="M_C03939_c"/>
  </listOfReactants>
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    <speciesReference species="M_C00229_c"/>
    <speciesReference species="M_C05744_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_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>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  <speciesReference species="M_C00010_c"/>
  <speciesReference species="M_C05539_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_R04383" name="4-deoxy-L-threo-5-hexosulose-uronate ketol-isomerase (EC
5.3.1.17)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU22130</p>
      <p>GENE_LIST: BSU22130</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C04349_c"/>
  </listOfProducts>
  <kineticLaw>
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    </listOfParameters>
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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>
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      <p>GENE_ASSOCIATION: ( BSU24350 and BSU24340 and BSU22440 )</p>
      <p>GENE_LIST: BSU24350 BSU24340 BSU22440</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  </notes>
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    <speciesReference species="M_C06250_c"/>
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<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)">
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      <p>GENE_ASSOCIATION: ( BSU29210 and BSU29200 )</p>
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      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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<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>
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    </listOfParameters>
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<reaction id="R_R04420" name="Methylthioribose-1-phosphate isomerase (EC 5.3.1.23)">
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      <p>GENE_LIST: BSU13550</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </notes>
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    <speciesReference species="M_C04582_c"/>
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<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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hydratase (EC 4.2.1.3)">
  <notes>
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      <p>GENE_LIST: BSU18000</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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<reaction id="R_R04426" name="3-isopropylmalate dehydrogenase (EC 1.1.1.85)">
  <notes>
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      <p>GENE_LIST: BSU28270</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  <speciesReference species="M_C04236_c"/>
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<reaction id="R_R04428" name="(3R)-hydroxymyristoyl-[acyl carrier protein] dehydratase
(EC 4.2.1.-)">
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      <p>GENE_LIST: BSU36370</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  <listOfProducts>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C04246_c"/>
  </listOfProducts>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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<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>
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    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C04246_c"/>
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  <listOfProducts>
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  </kineticLaw>
</reaction>
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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_C00080_c"/>
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      <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_LIST: BSU28290</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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    <speciesReference species="M_C04039_c"/>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00005_c"/>
    <speciesReference species="M_C04181_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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    </listOfParameters>
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<reaction id="R_R04441" name="Dihydroxy-acid dehydratase (EC 4.2.1.9)"
reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU21870</p>
      <p>GENE_LIST: BSU21870</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00141_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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      <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>
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</kineticLaw>
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<reaction id="R_R04448" name="Hydroxyethylthiazole kinase (EC 2.7.1.50)"
reversible="false">
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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"/>
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  <listOfProducts>
    <speciesReference species="M_C00008_c"/>
    <speciesReference species="M_C04327_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_R04457" name="6,7-dimethyl-8-ribityllumazine synthase (EC 2.5.1.9)">

<notes>

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<p>GENE_LIST: BSU23250</p>

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

</html>

</notes>

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</listOfReactants>

<listOfProducts>

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<speciesReference species="M_C00001_c" stoichiometry="2"/>

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</math>

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<parameter id="OBJECTIVE_COEFFICIENT" value="0"/>

</listOfParameters>

</kineticLaw>

</reaction>

<reaction id="R_R04463" name="Phosphoribosylformylglycinamide synthase, glutamine amidotransferase subunit (EC 6.3.5.3);Phosphoribosylformylglycinamide synthase, synthetase subunit (EC 6.3.5.3)(BSU06480);Phosphoribosylformylglycinamide synthase, PurS subunit (EC 6.3.5.3)(BSU06460)" reversible="false">

<notes>

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

<p>GENE_ASSOCIATION: (BSU06460 and BSU06470 and BSU06480)</p>

<p>GENE_LIST: BSU06460 BSU06470 BSU06480</p>

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

</html>

</notes>

<listOfReactants>

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<speciesReference species="M_C00064_c"/>

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    </math>
    <listOfParameters>
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  </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">
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      <p>GENE_ASSOCIATION: ( BSU14000 or BSU31400 )</p>
      <p>GENE_LIST: BSU14000 BSU31400</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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      <p>GENE_LIST: BSU39540</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  </notes>
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    <speciesReference species="M_C04483_c"/>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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  </kineticLaw>
</reaction>
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reversible="false">
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      <p>GENE_LIST: BSU11710 BSU38020</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  </notes>
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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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    <speciesReference species="M_C04618_c"/>
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    <speciesReference species="M_C00005_c"/>
    <speciesReference species="M_C05744_c"/>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>

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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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    <speciesReference species="M_C04619_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00005_c"/>
    <speciesReference species="M_C05753_c"/>
  </listOfProducts>
  <kineticLaw>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R04535" name="(3R)-hydroxymyristoyl-[acyl carrier protein] dehydratase
(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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  <speciesReference species="M_C05754_c"/>
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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>
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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>
    </html>
  </notes>
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    <speciesReference species="M_C04620_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00005_c"/>
    <speciesReference species="M_C05750_c"/>
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    </listOfParameters>
  </kineticLaw>

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</reaction>
<reaction id="R_R04537" name="(3R)-hydroxymyristoyl-[acyl carrier protein] dehydratase
(EC 4.2.1.-)">
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      <p>GENE_LIST: BSU36370</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
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  </listOfReactants>
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    <speciesReference species="M_C05751_c"/>
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  </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>
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      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  </kineticLaw>
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<reaction id="R_R04544" name="(3R)-hydroxymyristoyl-[acyl carrier protein] dehydratase
(EC 4.2.1.-)">
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      <p>GENE_LIST: BSU36370</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
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</reaction>
<reaction id="R_R04558" name="Imidazole glycerol phosphate synthase cyclase subunit (EC
4.1.3.-);Imidazole glycerol phosphate synthase amidotransferase subunit (EC 2.4.2.-)(BSU34890)"
reversible="false">

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<notes>
  <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_C04677_c"/>
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</kineticLaw>
</reaction>
<reaction id="R_R04559" name="Adenylosuccinate lyase (EC 4.3.2.2)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU06440</p>
      <p>GENE_LIST: BSU06440</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
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  </listOfReactants>
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  <kineticLaw>

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</kineticLaw>
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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>
  </notes>
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    <speciesReference species="M_C04677_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00101_c"/>
    <speciesReference species="M_C04734_c"/>
  </listOfProducts>
  <kineticLaw>
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  </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>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU15910 or BSU16870 or BSU29420 )</p>

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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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 <reaction id="R_R04568" name="(3R)-hydroxymyristoyl-[acyl carrier protein] dehydratase
 (EC 4.2.1.-)">
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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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</kineticLaw>
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<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"/>
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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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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R04617"
name="UDP-N-acetylmuramoylalanyl-D-glutamyl-2,6-diaminopimelate--D-alanyl-D-
alanyl
ligase (EC 6.3.2.10)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU04570</p>

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    <p>GENE_LIST: BSU04570</p>
    <p>SUBSYSTEM: Cell Wall and Capsule</p>
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</notes>
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  <speciesReference species="M_C00002_c"/>
  <speciesReference species="M_C04877_c"/>
  <speciesReference species="M_C00993_c"/>
</listOfReactants>
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  <speciesReference species="M_C00009_c"/>
  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C04882_c"/>
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</kineticLaw>
</reaction>
<reaction id="R_R04620" 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>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C04895_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00009_c" stoichiometry="3"/>
    <speciesReference species="M_C00080_c" stoichiometry="3"/>
    <speciesReference species="M_C04874_c"/>
  </listOfProducts>
  <kineticLaw>

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</kineticLaw>
</reaction>
<reaction id="R_R04639" name="GTP cyclohydrolase I (EC 3.5.4.16) type 1;GTP
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>
      <p>GENE_LIST: BSU22780 BSU03340</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C06148_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00001_c"/>
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    </math>
    <listOfParameters>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R04640" name="Phosphoribosylformimino-5-aminoimidazole carboxamide
ribose isomerase (EC 5.3.1.16)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU34880</p>
      <p>GENE_LIST: BSU34880</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>

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    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C04896_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C04916_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_R04673" name="Acetolactate synthase small subunit (EC
2.2.1.6);Acetolactate synthase large subunit (EC 2.2.1.6)(BSU28310)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU28300 and BSU28310 )</p>
      <p>GENE_LIST: BSU28300 BSU28310</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C05125_c"/>
    <speciesReference species="M_C00109_c"/>
  </listOfReactants>
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    <speciesReference species="M_C06006_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R04724" 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: Cell Wall and Capsule</p>
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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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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: BSU32840</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  </listOfProducts>
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  </kineticLaw>
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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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      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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hydratase(BSU17160);enoyl-CoA hydratase(BSU09880)">
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 <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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aminopeptidase) (LAP) (Leucyl aminopeptidase)" reversible="false">
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      <p>GENE_LIST: BSU32050</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</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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<p>GENE_LIST: BSU11330 BSU11340 BSU10170 BSU11340</p>

<p>SUBSYSTEM: Fatty Acids and Lipids</p>

</html>

</notes>

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</listOfParameters>

</kineticLaw>

</reaction>

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<notes>

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<p>GENE_LIST: BSU15910 BSU16870 BSU29420</p>

<p>SUBSYSTEM: Fatty Acids and Lipids</p>

</html>

</notes>

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      <p>GENE_LIST: BSU36370</p>
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reversible="false">
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  <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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<p>GENE_LIST: BSU11720 BSU26800</p>

<p>SUBSYSTEM: Fatty Acids and Lipids</p>

</html>

</notes>

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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
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BSU11340 ) )</p>
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      <p>GENE_LIST: BSU08650</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>
      <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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</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>
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  </kineticLaw>
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  <notes>
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      <p>GENE_ASSOCIATION: BSU36370</p>
      <p>GENE_LIST: BSU36370</p>

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    <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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reversible="false">
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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">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
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BSU11340 ) )</p>

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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_C05761_c"/>
  <speciesReference species="M_C01209_c"/>
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  <speciesReference species="M_C00229_c"/>
  <speciesReference species="M_C05762_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_R04969" 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_C05763_c"/>
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  </listOfProducts>

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</kineticLaw>
</reaction>
<reaction id="R_R04970" 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>
  </notes>
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    <speciesReference species="M_C00005_c"/>
    <speciesReference species="M_C05763_c"/>
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  <listOfProducts>
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    <speciesReference species="M_C05764_c"/>
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  <kineticLaw>
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</reaction>
<reaction id="R_R04986" name="Hydroxyaromatic non-oxidative decarboxylase protein B
(EC 4.1.1.-)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">

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<p>GENE_ASSOCIATION: BSU03630</p>
 <p>GENE_LIST: BSU03630</p>
 <p>SUBSYSTEM: Metabolism of Aromatic Compounds</p>
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 name="UDP-N-acetylglucosamine--N-acetylmuramyl-(pentapeptide)
 pyrophosphoryl-undecaprenol N-acetylglucosamine transferase (EC 2.4.1.227)">
 <notes>
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 <p>GENE_LIST: BSU15220</p>
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    <ci> FLUX_VALUE </ci>
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</kineticLaw>
</reaction>
<reaction id="R_R05046" name="GTP cyclohydrolase I (EC 3.5.4.16) type 1;GTP
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>
      <p>GENE_LIST: BSU22780 BSU03340</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C05922_c"/>
    <speciesReference species="M_C00001_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C05923_c"/>
    <speciesReference species="M_C00058_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_R05048" name="GTP cyclohydrolase I (EC 3.5.4.16) type 1;GTP
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>
      <p>GENE_LIST: BSU22780 BSU03340</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>

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    </html>
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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_R05051" name="Delta-1-pyrroline-5-carboxylate dehydrogenase (EC
1.5.1.12)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU37780 or BSU03210 )</p>
      <p>GENE_LIST: BSU37780 BSU03210</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </notes>
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    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C05947_c"/>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C05938_c"/>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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<reaction id="R_R05052" name="Aspartate aminotransferase (EC 2.6.1.1)">
  <notes>
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      <p>GENE_LIST: BSU37690 BSU22370</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </notes>
  <listOfReactants>
    <speciesReference species="M_C00026_c"/>
    <speciesReference species="M_C05947_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00025_c"/>
    <speciesReference species="M_C05946_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R05053" name="D-alanine aminotransferase (EC 2.6.1.21) (D-aspartate
aminotransferase) (D-amino acid aminotransferase) (D-amino acid transaminase) (DAAT)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU09670</p>
      <p>GENE_LIST: BSU09670</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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</listOfReactants>
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  <speciesReference species="M_C05947_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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<reaction id="R_R05066" name="3-hydroxyisobutyrate dehydrogenase">
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      <p>GENE_LIST: BSU07990</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
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    <speciesReference species="M_C06001_c"/>
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    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C06002_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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</reaction>

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<reaction id="R_R05068" 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>
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  </notes>
  <listOfReactants>
    <speciesReference species="M_C00006_c"/>
    <speciesReference species="M_C06007_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00005_c"/>
    <speciesReference species="M_C14463_c"/>
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  <kineticLaw>
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    </math>
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  </kineticLaw>
</reaction>
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  <notes>
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      <p>GENE_LIST: BSU28290</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  <listOfProducts>
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  </listOfProducts>
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  </math>
  <listOfParameters>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_R05070" name="Dihydroxy-acid dehydratase (EC 4.2.1.9)"
reversible="false">
  <notes>
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      <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"/>
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  <listOfProducts>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00671_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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  </kineticLaw>
</reaction>
<reaction id="R_R05085" name="Phosphoserine aminotransferase (EC 2.6.1.52)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU10020</p>
      <p>GENE_LIST: BSU10020</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
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  <speciesReference species="M_C06054_c"/>
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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_R05133" name="6-phospho-beta-glucosidase (EC 3.2.1.86)"
reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU38560 or BSU40110 )</p>
      <p>GENE_LIST: BSU38560 BSU40110</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </notes>
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    <speciesReference species="M_C06187_c"/>
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    <speciesReference species="M_C01172_c"/>
  </listOfProducts>
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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>

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    </listOfParameters>
  </kineticLaw>
</reaction>
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reversible="false">
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      <p>GENE_LIST: BSU38560 BSU40110</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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    <speciesReference species="M_C06188_c"/>
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    </math>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </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_C00001_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_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"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00160_c"/>
    <speciesReference species="M_C00698_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_R05332" name="Glucosamine-1-phosphate N-acetyltransferase (EC
2.3.1.157)|N-acetylglucosamine-1-phosphate uridyltransferase (EC 2.7.7.23)" reversible="false">

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    <p>GENE_ASSOCIATION: BSU00500</p>
    <p>GENE_LIST: BSU00500</p>
    <p>SUBSYSTEM: Cell Wall and Capsule</p>
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  <speciesReference species="M_C06156_c"/>
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      <p>GENE_LIST: BSU03460</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
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  <speciesReference species="M_C00124_c"/>
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reversible="false">
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      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  </notes>

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      <speciesReference species="M_C00004_c"/>
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reversible="false">
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  <notes>
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      <p>GENE_LIST: BSU00920</p>
      <p>SUBSYSTEM: Aminoacyl-tRNA biosynthesis</p>
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    <speciesReference species="M_C00025_c"/>
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    <speciesReference species="M_C00020_c"/>
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        <p>GENE_LIST: BSU13570</p>
        <p>SUBSYSTEM: Metabolism of Aromatic Compounds</p>
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      <speciesReference species="M_C09815_c"/>
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  <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)">
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        <p>GENE_LIST: BSU22100</p>
        <p>SUBSYSTEM: Carbohydrates</p>
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      <p>GENE_LIST: BSU12340</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </notes>
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<reaction id="R_R05608" name="D-galactarate dehydratase (EC 4.2.1.42)"
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      <p>GENE_LIST: BSU02510</p>

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    <p>SUBSYSTEM: Carbohydrates</p>
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</kineticLaw>
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reversible="false">
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    <html xmlns="http://www.w3.org/1999/xhtml">
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      <p>GENE_LIST: BSU22740 BSU22760</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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    </math>
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  </kineticLaw>
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      <p>GENE_LIST: BSU31150</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
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2.7.8.13)">
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      <p>SUBSYSTEM: Cell Wall and Capsule</p>
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</kineticLaw>
</reaction>
<reaction id="R_R05632" 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"/>
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    <speciesReference species="M_C00007_c"/>
    <speciesReference species="M_C03203_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00011_c"/>
    <speciesReference species="M_C03012_c"/>
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  <kineticLaw>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R05633" name="2-C-methyl-D-erythritol 4-phosphate cytidyltransferase
(EC 2.7.7.60)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU00900</p>
      <p>GENE_LIST: BSU00900</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>

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  <speciesReference species="M_C11434_c"/>
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  <speciesReference species="M_C00013_c"/>
  <speciesReference species="M_C11435_c"/>
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</kineticLaw>
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</kineticLaw>
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<reaction id="R_R05634" name="4-diphosphocytidyl-2-C-methyl-D-erythritol kinase"
reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU00460</p>
      <p>GENE_LIST: BSU00460</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
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    <speciesReference species="M_C11436_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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  </kineticLaw>
</reaction>

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    </listOfParameters>
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reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU24270</p>
      <p>GENE_LIST: BSU24270</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
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    <speciesReference species="M_C00022_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_R05637" name="2-C-methyl-D-erythritol 2,4-cyclodiphosphate synthase (EC
4.6.1.12)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU00910</p>
      <p>GENE_LIST: BSU00910</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
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<listOfProducts>
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</kineticLaw>
</reaction>
<reaction id="R_R05661" name="5-keto-2-deoxygluconokinase (EC
2.7.1.92);5-keto-2-deoxygluconokinase B (EC 2.7.1.92)(BSU39750)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU39740 and BSU39750 )</p>
      <p>GENE_LIST: BSU39740 BSU39750</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </notes>
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    <speciesReference species="M_C06892_c"/>
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    </listOfParameters>
  </kineticLaw>
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<reaction id="R_R05688" name="1-deoxy-D-xylulose 5-phosphate reductoisomerase (EC

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1.1.1.267)">

<notes>

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

<p>GENE_ASSOCIATION: BSU16550</p>

<p>GENE_LIST: BSU16550</p>

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

</html>

</notes>

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<speciesReference species="M_C00006_c"/>

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</listOfReactants>

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<speciesReference species="M_C00005_c"/>

<speciesReference species="M_C11437_c"/>

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</math>

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</listOfParameters>

</kineticLaw>

</reaction>

<reaction id="R_R05706" name="Dihydropteridine reductase (EC 1.5.1.34)|Oxygen-insensitive NAD(P)H nitroreductase (EC 1.-.-.);NADPH-linked nitro/flavin reductase [EC:1.-.-.](BSU38110)" reversible="false">

<notes>

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

<p>GENE_ASSOCIATION: (BSU38110 or BSU07830 or BSU05660 or BSU05480 or BSU19550)</p>

<p>GENE_LIST: BSU38110 BSU07830 BSU05660 BSU05480 BSU19550</p>

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

</html>

</notes>

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</reaction>
<reaction id="R_R05707" name="Oxygen-insensitive NADPH nitroreductase (EC
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)"
reversible="false">
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      <p>GENE_ASSOCIATION: ( BSU38110 or BSU07830 or BSU03860 or BSU05660 or
BSU05480 or BSU19550 )</p>
      <p>GENE_LIST: BSU38110 BSU07830 BSU03860 BSU05660 BSU05480
BSU19550</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
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    <speciesReference species="M_C00255_c"/>
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</math>
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</kineticLaw>
</reaction>
<reaction id="R_R05724" name="Flavohemoprotein (Hemoglobin-like protein)
(Flavohemoglobin) (Nitric oxide dioxygenase) (EC 1.14.12.17)">
  <notes>
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      <p>GENE_LIST: BSU13040</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00007_c" stoichiometry="2"/>
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  </listOfReactants>
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    <speciesReference species="M_C00003_c"/>
    <speciesReference species="M_C00244_c" stoichiometry="2"/>
  </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_R05725" name="Flavohemoprotein (Hemoglobin-like protein)
(Flavohemoglobin) (Nitric oxide dioxygenase) (EC 1.14.12.17)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU13040</p>
      <p>GENE_LIST: BSU13040</p>

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    <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  <speciesReference species="M_C00007_c" stoichiometry="2"/>
  <speciesReference species="M_C00533_c" stoichiometry="2"/>
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  <speciesReference species="M_C00006_c"/>
  <speciesReference species="M_C00244_c" stoichiometry="2"/>
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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_R05789" name="Probable 2-phosphosulfolactate phosphatase (EC 3.1.3.71)"
reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU10940</p>
      <p>GENE_LIST: BSU10940</p>
      <p>SUBSYSTEM: Sulfur Metabolism</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C11536_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C11537_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_R05835" name="Choloylglycine hydrolase (EC 3.5.1.24)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU39540</p>
      <p>GENE_LIST: BSU39540</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C01921_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00037_c"/>
    <speciesReference species="M_C00695_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_R05850" name="L-ribulose-5-phosphate 4-epimerase (EC 5.1.3.4)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU28780</p>
      <p>GENE_LIST: BSU28780</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </notes>

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  <speciesReference species="M_C00231_c"/>
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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"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
</reaction>
<reaction id="R_R05861" 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>
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    <speciesReference species="M_C00133_c"/>
    <speciesReference species="M_C00001_c"/>
  </listOfReactants>
  <listOfProducts>
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    <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>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</reaction>

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    </kineticLaw>
  </reaction>
  <reaction id="R_R05884" name="4-hydroxy-3-methylbut-2-enyl diphosphate reductase (EC
1.17.1.2)" reversible="false">
    <notes>
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        <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>
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      <speciesReference species="M_C00001_c"/>
      <speciesReference species="M_C00129_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_R06063" name="" reversible="false">
    <notes>
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        <p>GENE_LIST: </p>
        <p>SUBSYSTEM: Carbohydrates</p>
      </html>
    </notes>
    <listOfReactants>
      <speciesReference species="M_C00001_c"/>
      <speciesReference species="M_C11821_c"/>
    </listOfReactants>

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<listOfProducts>
  <speciesReference species="M_C00011_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_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>
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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_R06180" name="D-malic enzyme (EC 1.1.1.83)|Tartrate decarboxylase (EC
4.1.1.73)|Tartrate dehydrogenase (EC 1.1.1.93)">

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<notes>
  <html xmlns="http://www.w3.org/1999/xhtml">
    <p>GENE_ASSOCIATION: BSU04000</p>
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3.5.2.6);Beta-lactamase class A(BSU18800);beta-lactamase(BSU01670)" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU18800 BSU02090 BSU01670</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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      <p>GENE_LIST: BSU16530</p>
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(EC 3.5.2.17) (Transthyretin-related protein) (TRP)">
  <notes>
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      <p>GENE_LIST: BSU32460</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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      <p>GENE_LIST: BSU13930</p>
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1.3.99.22), in heat shock gene cluster(BSU25500)">
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      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  </notes>
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reversible="false">
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<p>GENE_LIST: BSU13930</p>
 <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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 <p>SUBSYSTEM: Metabolism of Aromatic Compounds</p>
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</kineticLaw>
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      <p>GENE_LIST: BSU07230</p>
      <p>SUBSYSTEM: Metabolism of Aromatic Compounds</p>
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  <notes>
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<p>GENE_LIST: BSU07230</p>
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2.1.2.-)" reversible="false">
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      <p>GENE_LIST: BSU02230</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
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    <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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</kineticLaw>
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      <p>GENE_LIST: BSU08590</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
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</kineticLaw>
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      <p>GENE_LIST: BSU08590</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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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_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_C11481_c"/>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
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</reaction>

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<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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</listOfProducts>

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</math>

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<parameter id="OBJECTIVE_COEFFICIENT" value="0"/>

</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>

</notes>

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</listOfReactants>

<listOfProducts>


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    <speciesReference species="M_C03657_c"/>
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  <kineticLaw>
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<reaction id="R_R07263" name="Naphthoate synthase (EC 4.1.3.36)" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU30800</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C03160_c"/>
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  </listOfProducts>
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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>
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  <speciesReference species="M_C05413_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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</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>
  <listOfReactants>
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    <speciesReference species="M_C04454_c"/>
  </listOfReactants>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C04732_c"/>
  </listOfProducts>
  <kineticLaw>
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</reaction>

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</math>
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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>
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  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00058_c"/>
    <speciesReference species="M_C15556_c"/>
  </listOfProducts>
  <kineticLaw>
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</reaction>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>

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  <speciesReference species="M_C00014_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_R07346" name="">
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </notes>
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    <speciesReference species="M_C00794_c"/>
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    <speciesReference species="M_C00005_c"/>
    <speciesReference species="M_C00247_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"/>
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  </kineticLaw>
</reaction>

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    </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>
  <listOfProducts>
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    <speciesReference species="M_C00005_c"/>
    <speciesReference species="M_C05649_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_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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    <speciesReference species="M_C15606_c"/>
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    <speciesReference species="M_C00237_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_R07364" name="1,2-dihydroxy-3-keto-5-methylthiopentene dioxygenase
(EC 1.13.11.54)" reversible="false">
  <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>
  <listOfReactants>
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    <speciesReference species="M_C15606_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00058_c"/>
    <speciesReference species="M_C01180_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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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_R07392" name="Methylthioribulose-1-phosphate dehydratase (EC
4.2.1.109)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU13610</p>
      <p>GENE_LIST: BSU13610</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C04582_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C15650_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_R07393" name="2,3-diketo-5-methylthiopentyl-1-phosphate enolase"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU13590</p>
      <p>GENE_LIST: BSU13590</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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    <speciesReference species="M_C15651_c"/>
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  <listOfProducts>

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    <speciesReference species="M_C15650_c"/>
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  <kineticLaw>
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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_R07394" name="2-hydroxy-3-keto-5-methylthiopentenyl-1-phosphate
phosphatase" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU13600</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C15651_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C15606_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_R07396" name="Glutamine-dependent 2-keto-4-methylthiobutyrate
transaminase">

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<notes>
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    <p>GENE_LIST: BSU13580</p>
    <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  <speciesReference species="M_C00025_c"/>
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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"/>
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</kineticLaw>
</reaction>
<reaction id="R_R07406" name="" reversible="false">
  <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>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C07335_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00011_c"/>
    <speciesReference species="M_C11638_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>
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<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">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU27510 or BSU27880 or BSU29590 )</p>
      <p>GENE_LIST: BSU27510 BSU27880 BSU29590</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C15811_c"/>
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  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00041_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </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">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU22740 and BSU22760 )</p>

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<p>GENE_LIST: BSU22740 BSU22760</p>
 <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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 </reaction>
 <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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      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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component, alpha subunit (EC 1.2.4.4)(BSU24050)" reversible="false">
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component, alpha subunit (EC 1.2.4.4)(BSU24050)">
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component, alpha subunit (EC 1.2.4.4)(BSU24050)" reversible="false">
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component, alpha subunit (EC 1.2.4.4)(BSU24050)">
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      <p>SUBSYSTEM: Carbohydrates</p>
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      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  </notes>
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    <speciesReference species="M_C15586_c"/>
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      <p>SUBSYSTEM: Carbohydrates</p>
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      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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<reaction id="R_rxn00418" name="Aminoglycoside 6-adenylyltransferase (EC 2.7.7.-)"
reversible="false">
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      <p>GENE_LIST: BSU26790</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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    <speciesReference species="M_C00065_c"/>
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  </kineticLaw>
</reaction>

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    </listOfParameters>
  </kineticLaw>
</reaction>
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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">
      <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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</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">
      <p>GENE_ASSOCIATION: ( BSU03290 and BSU03300 and BSU03310 and
BSU03320 )</p>

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  <speciesReference species="M_C00001_c" stoichiometry="2"/>
  <speciesReference species="M_C00014_c"/>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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    <speciesReference species="M_C00080_c" stoichiometry="2"/>
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    <speciesReference species="M_C00109_c"/>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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    <speciesReference species="M_C03539_c"/>
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    <speciesReference species="M_C00121_c"/>
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<reaction id="R_rxn01259" name="Oligo-1,6-glucosidase (EC 3.2.1.10);Neopullulanase (EC
3.2.1.135)(BSU34560)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU02840 or BSU34560 )</p>
      <p>GENE_LIST: BSU02840 BSU34560</p>
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  </notes>

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    <p>SUBSYSTEM: Carbohydrates</p>
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reversible="false">
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      <p>GENE_LIST: BSU24150</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </notes>
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    <speciesReference species="M_C03460_c" stoichiometry="2"/>
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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_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>
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    <speciesReference species="M_C00689_c"/>
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    </math>
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  </kineticLaw>
</reaction>
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reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU24150</p>
      <p>GENE_LIST: BSU24150</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
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  </notes>

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      <p>GENE_LIST: BSU18410</p>
      <p>SUBSYSTEM: Sulfur Metabolism</p>
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</kineticLaw>
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      <p>GENE_LIST: BSU39730</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  </notes>
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    <speciesReference species="M_C06892_c"/>
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</kineticLaw>
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<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>
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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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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</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>
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    <speciesReference species="M_C00009_e"/>
    <speciesReference species="M_C00001_c"/>
  </listOfReactants>
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    <speciesReference species="M_C00080_c"/>
  </listOfProducts>
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    </math>
    <listOfParameters>

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</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,
membrane-spanning permease protein MsmF(BSU32590);Multiple sugar ABC transporter,
substrate-binding protein(BSU32600)" reversible="false">
  <notes>
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BSU31570 ) or ( BSU30270 and BSU30280 and BSU30290 ) or ( BSU32550 and BSU32580 and
BSU32590 and BSU32600 ) )</p>
      <p>GENE_LIST: BSU31540 BSU31550 BSU31560 BSU31570 BSU30270 BSU30280
BSU30290 BSU32550 BSU32580 BSU32590 BSU32600</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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    <speciesReference species="M_C00267_e"/>
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  <listOfProducts>
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    <speciesReference species="M_C00009_c"/>
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    </math>
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</kineticLaw>
</reaction>
<reaction id="R_rxn05148" name="Ferrichrome transport ATP-binding protein FhuC (TC
3.A.1.14.3);Heme ABC type transporter HtsABC, permease protein HtsC(BSU07500);Heme ABC
type transporter HtsABC, permease protein HtsB(BSU07510);Heme ABC type transporter
HtsABC, heme-binding protein(BSU07520)" reversible="false">
  <notes>
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BSU07520 )</p>
      <p>GENE_LIST: BSU07490 BSU07500 BSU07510 BSU07520</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
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    </math>
  </listOfParameters>
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</kineticLaw>
</reaction>
<reaction id="R_rxn05149" name="Manganese ABC transporter, inner membrane permease
protein SitD;Manganese ABC transporter, inner membrane permease protein
SitC(BSU30750);Manganese ABC transporter, ATP-binding protein SitB(BSU30760);Manganese
ABC transporter, periplasmic-binding protein SitA(BSU30770)" reversible="false">

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<notes>
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  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C00034_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>
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cadmium, zinc and mercury transporting ATPase (EC 3.6.3.3) (EC 3.6.3.5);Zinc ABC transporter,
ATP-binding protein ZnuC(BSU02860);Zinc ABC transporter, periplasmic-binding protein
ZnuA(BSU02850);Zinc ABC transporter, inner membrane permease protein ZnuB(BSU02870)"
reversible="false">
  <notes>
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3.A.1.3.2)(BSU27440);Glutamine transport system permease protein glnP (TC
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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
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(TC 3.A.1.2.1)(BSU35960)" reversible="false">
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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,
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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)" 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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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
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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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      <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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    </listOfParameters>
  </kineticLaw>
</reaction>

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</kineticLaw>
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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_C00001_c"/>
    <speciesReference species="M_C00719_e"/>
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</reaction>
<reaction id="R_rxn05183" 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)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">

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<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>

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<speciesReference species="M_C00855_e"/>

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<listOfProducts>

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<speciesReference species="M_C00080_c"/>

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<kineticLaw>

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</math>

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</listOfParameters>

</kineticLaw>

</reaction>

<reaction id="R_rxn05184" name="Choline ABC transport system, permease protein OpuBD;Choline ABC transport system, choline-binding protein OpuBC(BSU33710);Choline 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">

<notes>

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

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BSU33820 BSU33830

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<p>SUBSYSTEM: Membrane Transport</p>
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<reaction id="R_rxn05185" name="" reversible="false">
  <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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<reaction id="R_rxn05187" 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">
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      <p>SUBSYSTEM: Membrane Transport</p>
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    <speciesReference species="M_C05776_e"/>
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  </kineticLaw>

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3.A.1.14.3);Ferrichrome transport system permease protein fhuG(BSU33300);Ferrichrome
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">
  <notes>
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BSU33320 )</p>
      <p>GENE_LIST: BSU33290 BSU33300 BSU33310 BSU33320</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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  </notes>
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  </kineticLaw>
</reaction>
<reaction id="R_rxn05192" 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>
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      <p>GENE_ASSOCIATION: ( BSU02980 and BSU02990 and BSU03000 )</p>
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      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>

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    </html>
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  </kineticLaw>
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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>
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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">
  <notes>
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BSU31570 ) or ( BSU30270 and BSU30280 and BSU30290 ) or ( BSU32550 and BSU32580 and
BSU32590 and BSU32600 ) )</p>
      <p>GENE_LIST: BSU31540 BSU31550 BSU31560 BSU31570 BSU30270 BSU30280
BSU30290 BSU32550 BSU32580 BSU32590 BSU32600</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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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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      <p>GENE_LIST: BSU03800 BSU03810 BSU03820 BSU03830 BSU01610 BSU01620
BSU01630</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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protein(BSU36470)">
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nupC(BSU39020)">
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nupC(BSU39020)">
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</reaction>
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  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
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      <p>SUBSYSTEM: Membrane Transport</p>
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permease(BSU32440);Xanthine permease(BSU37940)">
  <notes>
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      <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>
  </notes>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00385_c"/>
  </listOfProducts>
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    </math>
    <listOfParameters>

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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>
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  </notes>
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    <speciesReference species="M_C00242_c"/>
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</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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    <speciesReference species="M_C00387_c"/>
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</reaction>
<reaction id="R_rxn05205" name="Nucleoside permease NupC;Nucleoside permease
nupC(BSU39020)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU39410 or BSU39020 or BSU32180 )</p>
      <p>GENE_LIST: BSU39410 BSU39020 BSU32180</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00080_e"/>
    <speciesReference species="M_C00881_e"/>
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    <speciesReference species="M_C00881_c"/>
  </listOfProducts>
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</kineticLaw>
</reaction>
<reaction id="R_rxn05206" name="Potassium efflux system KefA protein|Small-conductance
mechanosensitive channel">
  <notes>
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      <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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    </math>
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  </kineticLaw>
</reaction>
<reaction id="R_rxn05207" name="Malate Na(+) symporter">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <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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</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>
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  </kineticLaw>
</reaction>

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<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>

<listOfReactants>

<speciesReference species="M_C00080_c"/>

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<speciesReference species="M_C00158_e"/>

</listOfProducts>

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</math>

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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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</listOfReactants>

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<speciesReference species="M_C00158_c"/>

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    <speciesReference species="M_C00076_c"/>
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  </kineticLaw>
</reaction>
<reaction id="R_rxn05214" name="Mg(2+) Citrate transporter (TC 2.A.11.1.1)">
  <notes>
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      <p>GENE_LIST: BSU07610</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
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    <speciesReference species="M_C00305_e"/>
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    <speciesReference species="M_C00158_c"/>
    <speciesReference species="M_C00305_c"/>
  </listOfProducts>
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  </kineticLaw>
</reaction>
<reaction id="R_rxn05215" name="sodium/alanine symporter family protein">
  <notes>

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  <p>GENE_LIST: BSU27810</p>
  <p>SUBSYSTEM: Membrane Transport</p>
</html>
</notes>
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  <speciesReference species="M_C01330_e"/>
  <speciesReference species="M_C00041_e"/>
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  <speciesReference species="M_C00041_c"/>
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<kineticLaw>
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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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<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"/>
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    <speciesReference species="M_C00064_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>

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</math>
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</kineticLaw>
</reaction>
<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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  </listOfReactants>
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    <speciesReference species="M_C00049_c"/>
  </listOfProducts>
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    </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)"
reversible="false">
  <notes>

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( 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>
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  <speciesReference species="M_C00002_c"/>
  <speciesReference species="M_C00001_c"/>
  <speciesReference species="M_C00073_e"/>
</listOfReactants>
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  <speciesReference species="M_C00008_c"/>
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  <speciesReference species="M_C00080_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_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>
    </html>
  </notes>
  <listOfReactants>
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  </listOfReactants>

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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_rxn05223" name="Substrate-specific component BioY of biotin ECF
transporter" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <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_C00120_e"/>
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    <speciesReference species="M_C00009_c"/>
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    <speciesReference species="M_C00120_c"/>
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  <kineticLaw>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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  </kineticLaw>
</reaction>

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    </kineticLaw>
  </reaction>
  <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>
    </notes>
    <listOfReactants>
      <speciesReference species="M_C00267_e"/>
      <speciesReference species="M_C00074_c"/>
    </listOfReactants>
    <listOfProducts>
      <speciesReference species="M_C00022_c"/>
      <speciesReference species="M_C00668_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_rxn05229" name="Phosphoribosylaminoimidazole carboxylase catalytic
subunit (EC 4.1.1.21);Phosphoribosylaminoimidazole carboxylase ATPase subunit (EC
4.1.1.21)(BSU06430)" reversible="false">

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<notes>
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    <p>GENE_ASSOCIATION: ( BSU06420 and BSU06430 )</p>
    <p>GENE_LIST: BSU06420 BSU06430</p>
    <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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</notes>
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  <speciesReference species="M_C00002_c"/>
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  <speciesReference species="M_C03373_c"/>
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  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C04751_c"/>
</listOfProducts>
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  <parameter id="LOWER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
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  <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>
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      <p>GENE_LIST: BSU39480 BSU39490 BSU39500</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
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  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( ( BSU26690 and BSU26700 and BSU26710 ) or BSU29600 )</p>
      <p>GENE_LIST: BSU26690 BSU26700 BSU26710 BSU29600</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
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    </listOfParameters>
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<reaction id="R_rxn05244" name="Branched-chain amino acid transport system carrier
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>
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      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
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  </kineticLaw>
</reaction>
<reaction id="R_rxn05247" 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>

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</notes>
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(EC 6.2.1.3)(BSU18250)" reversible="false">
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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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  </kineticLaw>
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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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BSU17180 or BSU04170 )</p>
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      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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(EC 6.2.1.3)(BSU18250)" reversible="false">
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BSU17180 or BSU04170 )</p>

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<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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</math>

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<p>GENE_LIST: BSU10270 BSU28560 BSU18250 BSU10360 BSU17180
BSU04170</p>

<p>SUBSYSTEM: Fatty Acids and Lipids</p>

</html>

</notes>

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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
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  </notes>
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  </kineticLaw>
</reaction>

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<p>GENE_ASSOCIATION: BSU22750</p>

<p>GENE_LIST: BSU22750</p>

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

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</notes>

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<p>GENE_LIST: BSU38490</p>

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

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</kineticLaw>
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transport periplasmic protein EfeO(BSU38270)" reversible="false">
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      <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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  </kineticLaw>
</reaction>
<reaction id="R_rxn05294" name="DNA polymerase III beta subunit;DNA gyrase subunit

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B(BSU00060);DNA gyrase subunit A(BSU00070);DNA polymerase III subunits gamma and Tau(BSU00190);DNA polymerase III delta prime subunit(BSU00310);DNA-cytosine methyltransferase (EC 2.1.1.37)(BSU06060);DNA ligase (EC 6.5.1.2)(BSU06620);ATP-dependent DNA ligase (EC 6.5.1.1) clustered with Ku protein, LigD(BSU13400);DNA topoisomerase I (EC 5.99.1.2)(BSU16120);DNA polymerase III alpha subunit (EC 2.7.7.7)(BSU16580);DNA polymerase III alpha subunit (EC 2.7.7.7)(BSU29230);Probable DNA polymerase yorL (EC 2.7.7.7)(BSU20340);ATP-dependent DNA ligase (EC 6.5.1.1)(BSU20500);DNA polymerase III delta subunit (EC 2.7.7.7)(BSU25560);Topoisomerase IV subunit B (EC 5.99.1.)(BSU18090);Topoisomerase IV subunit A (EC 5.99.1.)(BSU18100);DNA primase (EC 2.7.7.)(BSU25210);Replicative DNA helicase (EC 3.6.1.)(SA14-24)(BSU40440);ATP-dependent DNA helicase UvrD/PcrA(BSU06610);Helicase PriA essential for oriC/DnaA-independent DNA replication(BSU15710);Chromosomal replication initiator protein DnaA(BSU00010);Chromosome partition protein smc(BSU15940);Chromosome replication initiation protein dnaD(BSU22350);DNA-binding protein Hbsu(BSU22790);Segregation and condensation protein B(BSU23210);Segregation and condensation protein A(BSU23220);Helicase loader DnaI(BSU28980);Helicase loader DnaB(BSU28990);Single-stranded DNA-binding protein(BSU40900)">

<notes>

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

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<p>GENE_LIST: BSU20340 BSU00010 BSU28990 BSU40440 BSU22350 BSU29230 BSU25210 BSU28980 BSU00020 BSU00190 BSU25560 BSU00310 BSU06620 BSU06610 BSU16580 BSU15710 BSU40900 BSU00070 BSU00060 BSU22790 BSU18100 BSU18090 BSU15940 BSU16120 BSU23220 BSU23210 BSU06060 BSU20500 BSU00010 BSU28990 BSU40440 BSU22350 BSU29230 BSU25210 BSU28980 BSU00020 BSU00190 BSU25560 BSU00310 BSU06620 BSU06610 BSU16580 BSU15710 BSU40900 BSU00070 BSU00060 BSU22790 BSU18100 BSU18090 BSU15940 BSU16120 BSU23220 BSU23210 BSU06060 BSU13400</p>

<p>SUBSYSTEM: Macromolecular Synthesis</p>

</html>

</notes>

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RNA polymerase alpha subunit (EC 2.7.7.6)(BSU01430);Ribonuclease III (EC
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">
  <notes>
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and BSU22450 and BSU08930 and BSU15930 and BSU41050 and BSU16030 and BSU27500
and BSU40410 and BSU40400 and BSU09510 and BSU16600 and BSU15690 )</p>
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BSU15930 BSU41050 BSU16030 BSU27500 BSU40410 BSU40400 BSU09510 BSU16600
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and BSU01050 and BSU01100 and BSU01110 and BSU01150 and BSU01160 and BSU01170
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>
      <p>GENE_LIST: BSU00670 BSU00990 BSU01030 BSU01040 BSU01050 BSU01100
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BSU01220 BSU01230 BSU01240 BSU01250 BSU01260 BSU01270 BSU01280 BSU01290
BSU01300 BSU01310 BSU01320 BSU01330 BSU01340 BSU01350 BSU01400 BSU01410
BSU01420 BSU01440 BSU01490 BSU01500 BSU15080 BSU15820 BSU15990 BSU16040
BSU16490 BSU16680 BSU24900 BSU25410 BSU25550 BSU27940 BSU27960 BSU28850
BSU28860 BSU29660 BSU37070 BSU40500 BSU40890 BSU40910 BSU41060 BSU15730</p>
      <p>SUBSYSTEM: Macromolecular Synthesis</p>
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protein(BSU10220)">
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      <p>GENE_LIST: BSU39390</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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      <p>GENE_LIST: BSU33330 BSU37760 BSU40330</p>
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</reaction>

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<p>SUBSYSTEM: Membrane Transport</p>

</html>

</notes>

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</kineticLaw>

</reaction>

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<p>GENE_LIST: BSU10870</p>

<p>SUBSYSTEM: Membrane Transport</p>

</html>

</notes>

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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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      <p>GENE_LIST: BSU12840</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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      <p>GENE_LIST: BSU25420</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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  </notes>
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      <p>GENE_LIST: BSU26650</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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protein;Purine-cytosine permease(BSU38710)">
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      <p>GENE_LIST: BSU38710 BSU36470</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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  <notes>
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      <p>GENE_ASSOCIATION: ( BSU38710 or BSU36470 )</p>
      <p>GENE_LIST: BSU38710 BSU36470</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
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      <p>GENE_LIST: BSU38710 BSU36470</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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  </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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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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reductase(BSU29420)">

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  </listOfParameters>
</kineticLaw>
</reaction>
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(EC 4.2.1.-)">
  <notes>
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      <p>GENE_LIST: BSU36370</p>
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  </kineticLaw>
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2.3.1.41)(BSU11330);3-oxoacyl-[acyl-carrier-protein] synthase, KASII (EC
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</kineticLaw>
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reductase(BSU29420)">
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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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  </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
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>
</reaction>
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1.1.1.100);3-oxoacyl-[acyl-carrier protein] reductase(BSU16870);3-oxoacyl-[acyl-carrier protein]
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>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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  </listOfReactants>
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    </listOfParameters>
  </kineticLaw>
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<reaction id="R_rxn05371" 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>SUBSYSTEM: Fatty Acids and Lipids</p>
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  </kineticLaw>

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</kineticLaw>
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reductase(BSU29420)">
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  </kineticLaw>
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<reaction id="R_rxn05373" 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>
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</kineticLaw>
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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>
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  </notes>
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  <listOfProducts>
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    <speciesReference species="M_cpd11511_c"/>
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  <kineticLaw>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</reaction>

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<reaction id="R_rxn05375" 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_cpd11511_c"/>

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<speciesReference species="M_C00229_c"/>

<speciesReference species="M_cpd11512_c"/>

</listOfProducts>

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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"/>

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</listOfParameters>

</kineticLaw>

</reaction>

<reaction id="R_rxn05376" 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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  </kineticLaw>
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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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    <speciesReference species="M_cpd11514_c"/>
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  </kineticLaw>

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    </kineticLaw>
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        <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_cpd11514_c"/>
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      <speciesReference species="M_cpd11515_c"/>
    </listOfProducts>
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    </kineticLaw>
  </reaction>
  <reaction id="R_rxn05379" 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>
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  </kineticLaw>
</reaction>
<reaction id="R_rxn05380" 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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      <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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  </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>
</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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  </kineticLaw>
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2.3.1.39)">
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      <p>GENE_LIST: BSU15900</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
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    <speciesReference species="M_C02939_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_cpd11520_c"/>
  </listOfProducts>
  <kineticLaw>
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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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      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  </notes>
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    <speciesReference species="M_C00229_c"/>
    <speciesReference species="M_cpd11521_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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  </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>
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  </notes>

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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: BSU36370</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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      <p>GENE_ASSOCIATION: BSU08650</p>
      <p>GENE_LIST: BSU08650</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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    <speciesReference species="M_cpd11523_c"/>
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  <listOfProducts>
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  </listOfProducts>
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<reaction id="R_rxn05388" name="3-oxoacyl-[acyl-carrier-protein] synthase III (EC
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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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</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>
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  </notes>
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  </listOfProducts>
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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
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BSU11340 ) )</p>
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2.3.1.41)(BSU11330);3-oxoacyl-[acyl-carrier-protein] synthase, KASII (EC
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  <notes>

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      <p>GENE_LIST: BSU36370</p>
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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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<notes>

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<p>GENE_LIST: BSU15910 BSU16870 BSU29420</p>

<p>SUBSYSTEM: Fatty Acids and Lipids</p>

</html>

</notes>

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 <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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</math>

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</kineticLaw>

</reaction>

<reaction id="R_rxn05407" 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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      <p>GENE_LIST: BSU15900</p>
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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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reductase(BSU29420)">
  <notes>
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      <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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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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reductase(BSU29420)">
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      <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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<reaction id="R_rxn05417" 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">
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BSU11340 ) )</p>
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    <speciesReference species="M_cpd11553_c"/>
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reductase(BSU29420)">
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      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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    </math>
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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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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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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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(EC 4.2.1.-)">
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      <p>GENE_LIST: BSU36370</p>
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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)(BSU11340)" reversible="false">
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      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  </listOfParameters>
</kineticLaw>
</reaction>
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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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</kineticLaw>
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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>
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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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reversible="false">
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      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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<reaction id="R_rxn05445" 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>
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      <p>GENE_ASSOCIATION: ( BSU11720 or BSU26800 )</p>
      <p>GENE_LIST: BSU11720 BSU26800</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
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<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>

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</math>

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<parameter id="OBJECTIVE_COEFFICIENT" value="0"/>

</listOfParameters>

</kineticLaw>

</reaction>

<reaction id="R_rxn05447" 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>

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reversible="false">
  <notes>
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      <p>SUBSYSTEM: Cell Wall and Capsule</p>
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reversible="false">
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        <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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reversible="false">
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      <p>GENE_LIST: BSU15900</p>
      <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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      <p>GENE_LIST: BSU15900</p>
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    <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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      <p>GENE_LIST: BSU15900</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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      <p>GENE_LIST: BSU11330 BSU11340 BSU10170 BSU11340</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>
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      <p>GENE_LIST: BSU08650</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn05464" 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>

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    <p>SUBSYSTEM: Fatty Acids and Lipids</p>
  </html>
</notes>
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  <speciesReference species="M_cpd11572_c"/>
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  <speciesReference species="M_C00003_c"/>
  <speciesReference species="M_cpd11573_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_rxn05466" name="Ammonium transporter">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU36510</p>
      <p>GENE_LIST: BSU36510</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
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  <listOfProducts>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</reaction>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
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  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00011_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_rxn05468" name="">
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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>
  <kineticLaw>

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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>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00022_e"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00022_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>
<reaction id="R_rxn05470" name="L-lactate permease">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU34190 or BSU03060 )</p>
      <p>GENE_LIST: BSU34190 BSU03060</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>

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</notes>
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  <speciesReference species="M_C00160_c"/>
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</reaction>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
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    <speciesReference species="M_C00144_e"/>
  </listOfReactants>
  <listOfProducts>
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  </listOfProducts>
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    </math>
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</reaction>

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</reaction>
<reaction id="R_rxn05472" name="">
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
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  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C02323_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>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
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    <speciesReference species="M_C00080_e"/>
    <speciesReference species="M_C00988_e"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>

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    <speciesReference species="M_C00988_c"/>
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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>
</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_C00631_e"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00631_c"/>
  </listOfProducts>
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    </math>
    <listOfParameters>
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</reaction>
<reaction id="R_rxn05475" name="gamma-aminobutyrate (GABA) permease">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU06310</p>

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    <p>GENE_LIST: BSU06310</p>
    <p>SUBSYSTEM: Membrane Transport</p>
  </html>
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  <speciesReference species="M_cpd11599_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>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C01367_e"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C01367_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"/>
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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_C05822_e"/>
  </listOfReactants>
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    <speciesReference species="M_C05822_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_rxn05478" name="">
  <notes>
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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_C06193_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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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
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    <speciesReference species="M_C00197_e"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <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"/>
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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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  <speciesReference species="M_C01368_c"/>
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</reaction>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
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    <speciesReference species="M_C03089_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"/>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
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    <speciesReference species="M_C00345_e"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00345_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>

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  <speciesReference species="M_C00532_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>
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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_C00164_e"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00164_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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<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>

<listOfReactants>

<speciesReference species="M_C00140_e"/>

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<listOfProducts>

<speciesReference species="M_C00022_c"/>

<speciesReference species="M_C00357_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>

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<notes>

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<p>GENE_ASSOCIATION: </p>

<p>GENE_LIST: </p>

<p>SUBSYSTEM: Membrane Transport</p>

</html>

</notes>

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    <speciesReference species="M_C00645_c"/>
  </listOfProducts>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
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    <speciesReference species="M_C00270_c"/>
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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>
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<listOfProducts>
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<kineticLaw>
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  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
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</kineticLaw>
</reaction>
<reaction id="R_rxn05493" name="2-oxoglutarate/malate translocator;Putative transporter
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>
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  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00026_e"/>
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    <speciesReference species="M_C00026_c"/>
  </listOfProducts>
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    </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>
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  </notes>
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</reaction>
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  <notes>
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      <p>GENE_LIST: BSU05620</p>
      <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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</reaction>
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      <p>SUBSYSTEM: Membrane Transport</p>
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    </math>
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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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  </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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  <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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  </listOfProducts>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</reaction>
<reaction id="R_rxn05500" name="Arabinose-proton symporter">
  <notes>
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      <p>GENE_LIST: BSU33960</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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  </notes>
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    <speciesReference species="M_C00259_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_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"/>
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    <speciesReference species="M_C06187_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>
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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_C05945_e"/>
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    <listOfProducts>
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        <speciesReference species="M_C05945_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_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>
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    </notes>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_cpd11597_e"/>
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    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_cpd11597_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_rxn05505" name="Glycine betaine transporter OpuD">
  <notes>
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      <p>GENE_LIST: BSU30070</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_cpd11597_e"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_cpd11597_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"/>

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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>
      <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_rxn05507" name="Arsenic efflux pump protein;Arsenical-resistance protein
ACR3(BSU25790);Arsenical pump membrane protein(BSU36030)">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU25790 or BSU36030 or BSU05340 )</p>
      <p>GENE_LIST: BSU25790 BSU36030 BSU05340</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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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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</kineticLaw>
</reaction>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
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    <speciesReference species="M_C00152_e"/>
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  <listOfProducts>
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    <speciesReference species="M_C00152_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"/>
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  </kineticLaw>
</reaction>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
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</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>
</kineticLaw>
</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>
    <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>
  <listOfReactants>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_cpd11596_e"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00008_c"/>
    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_cpd11596_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_rxn05513" name="cation-transporting ATPase, E1-E2 family"
reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU15650</p>
      <p>GENE_LIST: BSU15650</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00076_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00076_e"/>
  </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_rxn05514" name="calcium/proton exchanger">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU07920</p>

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<p>GENE_LIST: BSU07920</p>
 <p>SUBSYSTEM: Membrane Transport</p>
 </html>
 </notes>
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      <p>SUBSYSTEM: Membrane Transport</p>
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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">
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( 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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      <p>SUBSYSTEM: Membrane Transport</p>
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  </kineticLaw>
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<reaction id="R_rxn05527" name="Cytosine/purine/uracil/thiamine/allantoin permease family
protein;Purine-cytosine permease(BSU38710)">
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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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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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        <p>SUBSYSTEM: Membrane Transport</p>
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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">
    <notes>
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<p>GENE_ASSOCIATION: (BSU12930 and BSU12940 and BSU12950 and BSU12960)</p>

<p>GENE_LIST: BSU12930 BSU12940 BSU12950 BSU12960</p>

<p>SUBSYSTEM: Membrane Transport</p>

</html>

</notes>

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</kineticLaw>

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<notes>

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<p>SUBSYSTEM: Membrane Transport</p>

</html>

</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)(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)(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">
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BSU12960 )</p>
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3.A.1.5.2)(BSU12940);Dipeptide transport ATP-binding protein dppD (TC
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component (TC 3.A.1.5.2)(BSU12960)" reversible="false">
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3.A.1.5.2)(BSU12950);Dipeptide-binding ABC transporter, periplasmic substrate-binding
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<p>SUBSYSTEM: Membrane Transport</p>

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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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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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  </kineticLaw>
</reaction>

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<reaction id="R_rxn05553" name="">
  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00469_c"/>
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  <listOfProducts>
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    <speciesReference species="M_C00469_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>
</reaction>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
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    <speciesReference species="M_C05345_e"/>
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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_rxn05555" name="Iron compound ABC uptake transporter ATP-binding
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">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( ( BSU01610 and BSU01620 and BSU01630 ) or
( BSU03800 and BSU03810 and BSU03820 and BSU03830 ) )</p>
      <p>GENE_LIST: BSU01610 BSU01620 BSU01630 BSU03800 BSU03810 BSU03820
BSU03830</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C14818_e"/>
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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_rxn05557" name="Iron(III) dicitrate transport ATP-binding protein FecE (TC
3.A.1.14.1);Iron(III) dicitrate transport system, periplasmic iron-binding protein FecB (TC
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">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( ( BSU08440 and BSU08450 and BSU08460 ) or
BSU32940 )</p>
      <p>GENE_LIST: BSU08440 BSU08450 BSU08460 BSU32940</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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  </notes>
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    <speciesReference species="M_C00001_c"/>
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  <listOfProducts>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00158_c" stoichiometry="2"/>
    <speciesReference species="M_C14819_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"/>
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</kineticLaw>
</reaction>

<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
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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<notes>
  <html xmlns="http://www.w3.org/1999/xhtml">
    <p>GENE_ASSOCIATION: ( BSU33290 and BSU33300 and BSU33310 and
BSU33320 )</p>
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    <p>SUBSYSTEM: Membrane Transport</p>
  </html>
</notes>
<listOfReactants>
  <speciesReference species="M_C00002_c"/>
  <speciesReference species="M_C00001_c"/>
  <speciesReference species="M_C07597_e"/>
</listOfReactants>
<listOfProducts>
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  <speciesReference species="M_C00009_c"/>
  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C07597_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_rxn05559" name="Formate efflux transporter (TC 2.A.44
family);Formate/nitrite family of transporters(BSU38060)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU27200 or BSU38060 )</p>
      <p>GENE_LIST: BSU27200 BSU38060</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
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    <speciesReference species="M_C00058_e"/>
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    <speciesReference species="M_C00080_c"/>
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  <kineticLaw>
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  </kineticLaw>
</reaction>

<reaction id="R_rxn05560" name="PTS system, fructose-specific IIB component (EC
2.7.1.69);PTS system, fructose-specific IIA component (EC 2.7.1.69)|PTS system,
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">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( ( BSU13900 and BSU14400 and BSU27040 ) or
( BSU13900 and BSU27040 and BSU27050 and BSU27060 and BSU27070 ) )</p>
      <p>GENE_LIST: BSU13900 BSU14400 BSU27040 BSU13900 BSU27040 BSU27050
BSU27060 BSU27070</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
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    <speciesReference species="M_C00095_e"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00022_c"/>
    <speciesReference species="M_C01094_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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  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn05561" 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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  </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>
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  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00009_c" stoichiometry="2"/>
    <speciesReference species="M_C00103_e"/>

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</listOfReactants>
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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>
  <listOfReactants>
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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_rxn05564" name="gamma-aminobutyrate (GABA) permease">

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    <p>GENE_LIST: BSU06310</p>
    <p>SUBSYSTEM: Membrane Transport</p>
  </html>
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  <speciesReference species="M_C00334_e"/>
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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_rxn05565" name="D-glucarate permease">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU02480</p>
      <p>GENE_LIST: BSU02480</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00879_e"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00879_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_rxn05566" name="Arabinose-proton symporter">
  <notes>
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      <p>GENE_ASSOCIATION: BSU33960</p>
      <p>GENE_LIST: BSU33960</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00124_e"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00124_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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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn05567" 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_C01697_e"/>
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  <speciesReference species="M_C00022_c"/>
  <speciesReference species="M_C06311_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_rxn05568" name="">
  <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>
    <speciesReference species="M_C00352_e"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00352_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>

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<reaction id="R_rxn05569" name="Phosphoenolpyruvate-protein phosphotransferase of PTS 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>

<listOfReactants>

<speciesReference species="M_C00074_c"/>

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<listOfProducts>

<speciesReference species="M_C00022_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_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>

</html>

</notes>

<listOfReactants>

<speciesReference species="M_C00002_c"/>

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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C01181_e"/>
  </listOfReactants>
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    <speciesReference species="M_C00008_c"/>
    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C01181_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_rxn05571" name="Gluconate permease, Bsu4004 homolog">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU19520 or BSU40070 )</p>
      <p>GENE_LIST: BSU19520 BSU40070</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00080_e"/>
    <speciesReference species="M_C00257_e"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00257_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_rxn05572" name="D-glucarate permease">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU02480</p>
      <p>GENE_LIST: BSU02480</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
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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>
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      <p>GENE_LIST: BSU12360</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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  <notes>
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      <p>GENE_LIST: BSU02140</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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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>
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      <p>GENE_LIST: BSU09280</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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</reaction>
<reaction id="R_rxn05582" name="D-serine/D-alanine/glycine transporter">
  <notes>
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</kineticLaw>
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protein;Alkanesulfonates-binding protein(BSU08840);Alkanesulfonates transport
system permease protein(BSU08850)" reversible="false">
  <notes>
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      <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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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>
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    <speciesReference species="M_C00137_e"/>
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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">

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 <p>GENE_LIST: BSU08830 BSU08840 BSU08850</p>
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 <p>GENE_LIST: BSU13500 BSU14510 BSU26640 BSU31090 BSU31100</p>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
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    <speciesReference species="M_C00009_c"/>
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</reaction>
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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">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
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BSU07110 )</p>
      <p>GENE_LIST: BSU06970 BSU06980 BSU06990 BSU07110</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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  </notes>
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  </kineticLaw>
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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>
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      <p>SUBSYSTEM: Membrane Transport</p>
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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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    </listOfParameters>
  </kineticLaw>
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translocator(BSU07570);Malate permease(BSU37040)">
  <notes>
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      <p>GENE_ASSOCIATION: ( BSU07570 or BSU37040 or ( BSU04440 and
BSU04470 ) )</p>

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<p>GENE_LIST: BSU07570 BSU37040 BSU04440 BSU04470</p>

<p>SUBSYSTEM: Membrane Transport</p>

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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">
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3.A.1.8.1)(BSU33390)" reversible="false">

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      <p>SUBSYSTEM: Membrane Transport</p>
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  </notes>

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</reaction>

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<reaction id="R_rxn05644" name="Ribose ABC transport system, ATP-binding protein RbsA (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">

<notes>

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<p>SUBSYSTEM: Carbohydrates</p>

</html>

</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)">
  <notes>
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BSU07110 )</p>
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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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      <p>GENE_LIST: BSU06160</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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</html>
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Pit-type(BSU15580)">
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  </kineticLaw>
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periplasmic component;C4-dicarboxylate transport protein(BSU04470)">
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      <p>SUBSYSTEM: Membrane Transport</p>
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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

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component; PTS system, sucrose-specific IIC component(BSU38410);Phosphocarrier protein of PTS system(BSU13900)" reversible="false">

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<p>SUBSYSTEM: Membrane Transport</p>

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</notes>

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</listOfParameters>

</kineticLaw>

</reaction>

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<p>SUBSYSTEM: Membrane Transport</p>

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</notes>

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      <p>GENE_LIST: </p>
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  <reaction id="R_rxn05663" name="Substrate-specific component TrpP of tryptophan ECF
transporter">
    <notes>
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        <p>GENE_ASSOCIATION: BSU10010</p>
        <p>GENE_LIST: BSU10010</p>
        <p>SUBSYSTEM: Membrane Transport</p>
      </html>
    </notes>
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    <speciesReference species="M_C00078_c"/>
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    </listOfParameters>
  </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_C00080_c"/>
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  </listOfProducts>
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    <p>GENE_LIST: </p>
    <p>SUBSYSTEM: Membrane Transport</p>
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</kineticLaw>
</reaction>
<reaction id="R_rxn05669" name="Branched-chain amino acid transport system carrier
protein;branched-chain amino acid transport(BSU26700);branched-chain amino acid
transport(BSU26710)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( ( BSU26690 and BSU26700 and BSU26710 ) or
BSU29600 )</p>
      <p>GENE_LIST: BSU26690 BSU26700 BSU26710 BSU29600</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
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<reaction id="R_rxn05671" name="Xyloside transporter XynT;Arabinose-proton
symporter(BSU33960)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU17570</p>
      <p>GENE_LIST: BSU17570</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
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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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  <notes>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
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    <speciesReference species="M_C00080_e"/>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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<reaction id="R_rxn05673" name="Hexuronate transporter">
  <notes>
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      <p>GENE_LIST: BSU12360</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
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    <speciesReference species="M_C00080_e"/>
    <speciesReference species="M_C00333_e"/>
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  <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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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
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    <speciesReference species="M_C00080_e"/>
    <speciesReference species="M_C00275_e"/>
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  <listOfProducts>
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    <speciesReference species="M_C00275_c"/>
  </listOfProducts>

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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
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    <speciesReference species="M_C00530_c"/>
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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>

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    </html>
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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_rxn05680" 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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    <speciesReference species="M_C01762_e"/>
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    <speciesReference species="M_C01762_c"/>
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<reaction id="R_rxn05681" name="2-keto-3-deoxygluconate permease (KDG permease)">
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      <p>GENE_LIST: BSU22090</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
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    <speciesReference species="M_C00204_e"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00204_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>
<reaction id="R_rxn05682" name="Cytosine/purine/uracil/thiamine/allantoin permease family
protein">
  <notes>
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      <p>GENE_LIST: BSU36470</p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
  <listOfReactants>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
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    <speciesReference species="M_C01019_e"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C01019_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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  <speciesReference species="M_C01879_e"/>
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  <speciesReference species="M_C01879_c"/>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
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  <listOfProducts>
    <speciesReference species="M_C00080_c"/>
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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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  </kineticLaw>
</reaction>
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      <p>SUBSYSTEM: Membrane Transport</p>
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</kineticLaw>
</reaction>
<reaction id="R_rxn05714" 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_C03570_e"/>
  </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"/>
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</reaction>

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</kineticLaw>
</reaction>
<reaction id="R_rxn05716" name="">
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    <speciesReference species="M_C00346_e"/>
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  <listOfProducts>
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    <speciesReference species="M_C00346_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>
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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_C00536_c"/>
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    <speciesReference species="M_C00536_e"/>
  </listOfProducts>

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    <p>SUBSYSTEM: Membrane Transport</p>
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      <p>GENE_LIST: </p>
      <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>GENE_LIST: </p>
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    </html>
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</kineticLaw>
</reaction>
<reaction id="R_rxn05732" name="Acyl-CoA dehydrogenase, short-chain specific (EC
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>
  <listOfReactants>
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    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C05272_c"/>
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    <speciesReference species="M_C00154_c"/>
  </listOfProducts>
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BSU37960 )</p>
      <p>GENE_LIST: BSU19310 BSU38830 BSU39860 BSU07350 BSU37960</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00048_c"/>
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  <listOfProducts>
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    <speciesReference species="M_C00209_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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  <notes>
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      <p>GENE_ASSOCIATION: ( BSU19310 or BSU38830 or BSU39860 or BSU07350 or
BSU37960 )</p>
      <p>GENE_LIST: BSU19310 BSU38830 BSU39860 BSU07350 BSU37960</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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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"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </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">
      <p>GENE_ASSOCIATION: ( BSU10270 or BSU10360 or BSU28560 or BSU18250 or
BSU17180 or BSU04170 )</p>
      <p>GENE_LIST: BSU10270 BSU10360 BSU28560 BSU18250 BSU17180
BSU04170</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  </notes>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00010_c"/>
    <speciesReference species="M_C06424_c"/>
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    <speciesReference species="M_C00020_c"/>
    <speciesReference species="M_C02593_c"/>
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    <listOfParameters>

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</kineticLaw>
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reversible="false">
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      <p>GENE_LIST: BSU08860</p>
      <p>SUBSYSTEM: Sulfur Metabolism</p>
    </html>
  </notes>
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    <speciesReference species="M_C01847_c"/>
    <speciesReference species="M_C00245_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00061_c"/>
    <speciesReference species="M_C11481_c"/>
    <speciesReference species="M_C06735_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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1.1.99.5)" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU09300</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>

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  <speciesReference species="M_C00111_c"/>
  <speciesReference species="M_C00828_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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<reaction id="R_rxn05740" name="Glycogen phosphorylase (EC 2.4.1.1)">
  <notes>
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      <p>GENE_LIST: BSU30940</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C00182_c"/>
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  </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_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_ASSOCIATION: ( BSU34560 or BSU02840 )</p>
      <p>GENE_LIST: BSU34560 BSU02840</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C01835_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00208_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_rxn05747" name="NADH dehydrogenase (EC 1.6.99.3)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU12290 or BSU32100 or BSU32200 )</p>
      <p>GENE_LIST: BSU12290 BSU32100 BSU32200</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_cpd11606_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_rxn05748" name="Respiratory nitrate reductase gamma chain (EC
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>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU37250 and BSU37260 and BSU37270 and
BSU37280 )</p>
      <p>GENE_LIST: BSU37250 BSU37260 BSU37270 BSU37280</p>
      <p>SUBSYSTEM: Membrane Transport</p>
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    <speciesReference species="M_C00088_c"/>
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    </math>

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</listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn06991" name="1-hydroxy-2-methyl-2-(E)-butenyl 4-diphosphate
synthase (EC 1.17.4.3)" reversible="false">
  <notes>
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      <p>GENE_ASSOCIATION: BSU25070</p>
      <p>GENE_LIST: BSU25070</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
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    <speciesReference species="M_C02315_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C02582_c"/>
    <speciesReference species="M_C11811_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_rxn08025" name="6-phospho-beta-glucosidase (EC 3.2.1.86)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU40110</p>
      <p>GENE_LIST: BSU40110</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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  <speciesReference species="M_C00530_c"/>
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  </math>
  <listOfParameters>
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</kineticLaw>
</reaction>
<reaction id="R_rxn08040" name="Undecaprenyl-phosphate N-acetylglucosaminyl
1-phosphate transferase (EC 2.7.8.-)">
  <notes>
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      <p>GENE_ASSOCIATION: BSU35530</p>
      <p>GENE_LIST: BSU35530</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
    </html>
  </notes>
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    <speciesReference species="M_C00043_c"/>
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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>

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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn08100" name="L-alanine-DL-glutamate epimerase">
  <notes>
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      <p>GENE_LIST: BSU12980</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_cpd15385_c"/>
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  <listOfProducts>
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  </listOfProducts>
  <kineticLaw>
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    </listOfParameters>
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<reaction id="R_rxn08171" name="Arsenate reductase (EC 1.20.4.1);Arsenate reductase
family protein(BSU24770);Arsenate reductase family protein(BSU11500)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU11500 or BSU24770 or BSU25780 or
BSU32810 )</p>
      <p>GENE_LIST: BSU11500 BSU24770 BSU25780 BSU32810</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  </notes>
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    <speciesReference species="M_C00051_c" stoichiometry="2"/>
    <speciesReference species="M_cpd01048_c"/>
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    <speciesReference species="M_C06697_c"/>
    <speciesReference species="M_C00127_c"/>
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</reaction>
<reaction id="R_rxn08180" name="Biotin synthase (EC 2.8.1.6)" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU30200</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
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    <speciesReference species="M_C01909_c"/>
    <speciesReference species="M_C00087_c"/>
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    <speciesReference species="M_C00073_c"/>
    <speciesReference species="M_C00120_c"/>
    <speciesReference species="M_C05198_c"/>
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</reaction>
<reaction id="R_rxn08295" 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>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_cpd15307_c"/>
  </listOfReactants>
  <listOfProducts>
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</reaction>
<reaction id="R_rxn08297" 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>
    </html>
  </notes>
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    <speciesReference species="M_cpd15309_c"/>
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      <p>GENE_LIST: BSU25310</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
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    <speciesReference species="M_cpd15311_c"/>
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  </kineticLaw>
</reaction>
<reaction id="R_rxn08307" name="Phosphatidate cytidyltransferase (EC 2.7.7.41)">
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      <p>GENE_LIST: BSU16540</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  </notes>

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</html>
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</kineticLaw>
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      <p>GENE_LIST: BSU16540</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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            <p>GENE_LIST: BSU16540</p>
            <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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            <p>GENE_LIST: BSU08860</p>
            <p>SUBSYSTEM: Sulfur Metabolism</p>
        </html>
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</kineticLaw>
</reaction>
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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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    <speciesReference species="M_C11481_c"/>
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</kineticLaw>
</reaction>
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reversible="false">
  <notes>
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      <p>SUBSYSTEM: Sulfur Metabolism</p>
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    <speciesReference species="M_cpd11579_c"/>
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reversible="false">
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      <p>GENE_LIST: BSU08860</p>
      <p>SUBSYSTEM: Sulfur Metabolism</p>
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  </notes>

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</notes>
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  <speciesReference species="M_C00061_c"/>
  <speciesReference species="M_C11481_c"/>
  <speciesReference species="M_C01412_c"/>
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</kineticLaw>
</reaction>
<reaction id="R_rxn08471" name="Alkanesulfonate monooxygenase (EC 1.14.14.5)"
reversible="false">
  <notes>
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      <p>GENE_LIST: BSU08860</p>
      <p>SUBSYSTEM: Sulfur Metabolism</p>
    </html>
  </notes>
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    <speciesReference species="M_C01847_c"/>
    <speciesReference species="M_C14179_c"/>
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  <listOfProducts>
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    <speciesReference species="M_C00048_c"/>
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    <speciesReference species="M_C11481_c"/>
  </listOfProducts>
  <kineticLaw>

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</listOfParameters>
</kineticLaw>
</reaction>
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2.4.1.21)">
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      <p>GENE_LIST: BSU30950</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
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  </kineticLaw>
</reaction>
<reaction id="R_rxn08669" 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: ( BSU02130 or BSU09620 or BSU24180 )</p>

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 <p>SUBSYSTEM: Carbohydrates</p>
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 </listOfParameters>
 </kineticLaw>
 </reaction>
 <reaction id="R_rxn08707" name="Heme O synthase, protoheme IX farnesyltransferase (EC 2.5.1.-) COX10-CtaB">
 <notes>
 <html xmlns="http://www.w3.org/1999/xhtml">
 <p>GENE_ASSOCIATION: (BSU12080 or BSU14880)</p>
 <p>GENE_LIST: BSU12080 BSU14880</p>
 <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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</math>
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</listOfParameters>
</kineticLaw>
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  <notes>
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      <p>GENE_LIST: BSU02810</p>
      <p>SUBSYSTEM: Amino Acids and Derivatives</p>
    </html>
  </notes>
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    <speciesReference species="M_cpd15388_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>
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XTP-specific) (EC 3.6.1.15)" reversible="false">
  <notes>
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      <p>GENE_LIST: BSU28360</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
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  <speciesReference species="M_C01344_c"/>
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  </math>
  <listOfParameters>
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</kineticLaw>
</reaction>
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  <notes>
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      <p>GENE_LIST: BSU28360</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</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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  <speciesReference species="M_cpd15543_c"/>
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      <p>GENE_LIST: BSU16920</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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      <p>GENE_LIST: BSU02290</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  </notes>

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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: BSU02290</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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</reaction>

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    </listOfParameters>
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      <p>GENE_LIST: BSU02290</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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  <listOfReactants>
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  </listOfReactants>
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    <speciesReference species="M_cpd15533_c"/>
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  </kineticLaw>
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(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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  </listOfProducts>
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<p>GENE_LIST: BSU02270</p>

<p>SUBSYSTEM: Fatty Acids and Lipids</p>

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</listOfReactants>

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<speciesReference species="M_C00080_c"/>

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<speciesReference species="M_cpd15557_c"/>

</listOfProducts>

<kineticLaw>

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</math>

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</listOfParameters>

</kineticLaw>

</reaction>

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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"/>

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reversible="false">
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  </listOfProducts>
  <kineticLaw>
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3.6.1.45)" reversible="false">

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    <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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3.6.1.45)" reversible="false">
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      <p>GENE_LIST: BSU32370</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
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  </listOfReactants>
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  </listOfProducts>
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      <p>GENE_LIST: BSU32370</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"/>
    </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">
      <p>GENE_ASSOCIATION: BSU32370</p>
      <p>GENE_LIST: BSU32370</p>

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    <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
  </html>
</notes>
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  <speciesReference species="M_C00001_c"/>
  <speciesReference species="M_C00167_c"/>
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  <speciesReference species="M_C05385_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_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>
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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"/>
  </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>
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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_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>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU10270 or BSU28560 or BSU18250 or BSU10360 or

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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>
 </html>
 </notes>
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 <speciesReference species="M_C00010_c"/>
 <speciesReference species="M_C01530_c"/>
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 <speciesReference species="M_C00013_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>
<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>
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    <speciesReference species="M_C00020_c"/>
    <speciesReference species="M_cpd15238_c"/>
  </listOfProducts>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn09562" name="Guanylate kinase (EC 2.7.4.8)">
  <notes>
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      <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"/>
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    <speciesReference species="M_C00035_c"/>
    <speciesReference species="M_C00206_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>

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</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>
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    <speciesReference species="M_C00378_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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      <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"/>
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</kineticLaw>
</reaction>
<reaction id="R_rxn09889" name="Dihydroxy-acid dehydratase (EC 4.2.1.9)"
reversible="false">
  <notes>
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      <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>
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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"/>
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  </kineticLaw>
</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>

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</html>
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  <speciesReference species="M_C00002_c"/>
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  <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>
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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_rxn09925" name="" reversible="false">
  <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_C00064_c"/>
    <speciesReference species="M_C00037_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00008_c"/>
    <speciesReference species="M_C00009_c"/>
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    <speciesReference species="M_cpd11580_c"/>
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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"/>
  <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>
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      <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>
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    <speciesReference species="M_C00343_c"/>
    <speciesReference species="M_C00073_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_rxn09944" name="Methylmalonate-semialdehyde dehydrogenase [inositol]
(EC 1.2.1.27)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU39760</p>

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    <p>GENE_LIST: BSU39760</p>
    <p>SUBSYSTEM: Carbohydrates</p>
  </html>
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  <speciesReference species="M_C00010_c"/>
  <speciesReference species="M_C00003_c"/>
  <speciesReference species="M_C00479_c"/>
</listOfReactants>
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  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C00004_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_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>
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    <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>
  <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_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>
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    <speciesReference species="M_C00003_c"/>
    <speciesReference species="M_C00810_c"/>
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  <listOfProducts>
    <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>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>

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</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>
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    <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">
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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>
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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>
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    <speciesReference species="M_cpd15585_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00267_c"/>

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    <speciesReference species="M_C00132_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_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>
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    <speciesReference species="M_C02474_c"/>
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  </listOfProducts>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn09989" name="Neopullulanase (EC 3.2.1.135)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU34560</p>

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    <p>GENE_LIST: BSU34560</p>
    <p>SUBSYSTEM: Carbohydrates</p>
  </html>
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  <speciesReference species="M_C00001_c" stoichiometry="5"/>
  <speciesReference species="M_C00721_c"/>
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<listOfProducts>
  <speciesReference species="M_C00267_c" stoichiometry="6"/>
</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_rxn09992" name="6-phospho-beta-glucosidase (EC 3.2.1.86)"
reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU40110</p>
      <p>GENE_LIST: BSU40110</p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C06188_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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</kineticLaw>
</reaction>
<reaction id="R_rxn09996" name="Putative teichuronic acid biosynthesis glycosyl transferase
TuaH;Putative N-acetylgalactosaminyl-diphosphoundecaprenol
glucuronosyltransferase(BSU35550);Putative teichuronic acid biosynthesis glycosyl transferase
TuaC(BSU35590);Putative undecaprenyl-phosphate N-acetylgalactosaminyl 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"/>
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  <listOfProducts>
    <speciesReference species="M_C00080_c" stoichiometry="45"/>
    <speciesReference species="M_C00105_c" stoichiometry="45"/>
    <speciesReference species="M_C00015_c" stoichiometry="45"/>
    <speciesReference species="M_cpd15634_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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  <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>
    <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">
      <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_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>
    <speciesReference species="M_C00007_c" stoichiometry="3"/>
    <speciesReference species="M_C00032_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_c" stoichiometry="2"/>
    <speciesReference species="M_cpd15607_c"/>
  </listOfProducts>
  <kineticLaw>
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    <ci> FLUX_VALUE </ci>
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</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>
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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">
      <p>GENE_ASSOCIATION: ( BSU37170 or BSU32820 or BSU04520 )</p>
      <p>GENE_LIST: BSU37170 BSU32820 BSU04520</p>

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    <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"/>
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  <speciesReference species="M_C00003_c"/>
  <speciesReference species="M_C01944_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_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>
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    <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>
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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_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>
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    <speciesReference species="M_C01832_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_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>
      <p>GENE_LIST: BSU37170 BSU32820 BSU04520</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>

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</html>
</notes>
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  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C00004_c"/>
  <speciesReference species="M_C05273_c"/>
</listOfReactants>
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  <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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  <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>
  <listOfProducts>
    <speciesReference species="M_C00002_c"/>

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    <speciesReference species="M_C00080_c" stoichiometry="3"/>
    <speciesReference species="M_C00001_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_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"/>
      <parameter id="UPPER_BOUND" value="0" units="mmol_per_gDW_per_hr"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>

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    </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>
<reaction id="R_rxn10045" name="Cytochrome d ubiquinol oxidase subunit I (EC
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>
      <p>SUBSYSTEM: Membrane Transport</p>
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</notes>
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  <speciesReference species="M_C00001_c"/>
  <speciesReference species="M_cpd11606_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="0" units="mmol_per_gDW_per_hr"/>
    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</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>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00007_c" stoichiometry="0.5"/>
    <speciesReference species="M_C00828_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00080_e" stoichiometry="4"/>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_cpd11606_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_rxn10048" name="Heme A synthase, cytochrome oxidase biogenesis protein
Cox15-CtaA">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU14870</p>
      <p>GENE_LIST: BSU14870</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00007_c"/>
    <speciesReference species="M_C15672_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C15670_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_rxn10056" name="NAD kinase (EC 2.7.1.23)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU11610</p>
      <p>GENE_LIST: BSU11610</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>

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</html>
</notes>
<listOfReactants>
  <speciesReference species="M_C00003_c"/>
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  <speciesReference species="M_C00006_c"/>
  <speciesReference species="M_C00035_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="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn10057" 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>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00131_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00206_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"/>
    </listOfParameters>
  </kineticLaw>
</reaction>

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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
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</kineticLaw>
</reaction>
<reaction id="R_rxn10058" name="NAD kinase (EC 2.7.1.23)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU11610</p>
      <p>GENE_LIST: BSU11610</p>
      <p>SUBSYSTEM: Nucleosides and Nucleotides</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00003_c"/>
    <speciesReference species="M_C00286_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_C00361_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_rxn10059" name="NAD kinase (EC 2.7.1.23)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU11610</p>
      <p>GENE_LIST: BSU11610</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>
    <speciesReference species="M_C00458_c"/>
    <speciesReference species="M_C00003_c"/>
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  <listOfProducts>

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    <speciesReference species="M_C00006_c"/>
    <speciesReference species="M_C00705_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_rxn10060" name="NAD kinase (EC 2.7.1.23)" reversible="false">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU11610</p>
      <p>GENE_LIST: BSU11610</p>
      <p>SUBSYSTEM: Cofactors, Vitamins, Prosthetic Groups, Pigments</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00459_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00006_c"/>
    <speciesReference species="M_C00363_c"/>
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      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn10061" name="Dipicolinate synthase subunit A (EC
4.2.1.52);Dipicolinate synthase subunit B(BSU16740)">
  <notes>

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<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>
<listOfReactants>
  <speciesReference species="M_C00003_c"/>
  <speciesReference species="M_C03340_c"/>
</listOfReactants>
<listOfProducts>
  <speciesReference species="M_C00080_c"/>
  <speciesReference species="M_C00004_c"/>
  <speciesReference species="M_cpd15596_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_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>
  <listOfReactants>
    <speciesReference species="M_C00016_c"/>
    <speciesReference species="M_C00114_c"/>
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  <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
</listOfParameters>
</kineticLaw>
</reaction>
<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>
    </html>
  </notes>
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    <speciesReference species="M_C01847_c"/>
    <speciesReference species="M_cpd11578_c"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00001_c"/>
    <speciesReference species="M_C00061_c"/>
    <speciesReference species="M_C11481_c"/>
    <speciesReference species="M_cpd15611_c"/>
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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"/>
      <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn10072" 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

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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>

<speciesReference species="M_C00002_c"/>

<speciesReference species="M_C00001_c"/>

<speciesReference species="M_cpd15471_e"/>

</listOfReactants>

<listOfProducts>

<speciesReference species="M_C00008_c"/>

<speciesReference species="M_C00009_c"/>

<speciesReference species="M_C00080_c"/>

<speciesReference species="M_cpd15471_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_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>

<speciesReference species="M_C00002_c"/>

<speciesReference species="M_C00001_c"/>

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    <speciesReference species="M_C10172_e"/>
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    <speciesReference species="M_C00009_c"/>
    <speciesReference species="M_C00080_c"/>
    <speciesReference species="M_C10172_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_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>
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    <speciesReference species="M_C00133_c" stoichiometry="45"/>
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  <listOfProducts>
    <speciesReference species="M_C00013_c" stoichiometry="45"/>
    <speciesReference species="M_C00020_c" stoichiometry="45"/>
    <speciesReference species="M_cpd15663_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_rxn10192" name="CDP-glycerol:poly(glycerophosphate)
glycerophosphotransferase (EC 2.7.8.12);CDP-glycerol:
N-acetyl-beta-D-mannosaminyl-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>
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    <speciesReference species="M_C04881_c"/>
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  <listOfProducts>
    <speciesReference species="M_C00055_c" stoichiometry="45"/>
    <speciesReference species="M_cpd15661_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_rxn10193" name="Poly(glycerol-phosphate) alpha-glucosyltransferase (EC
2.4.1.52)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: BSU35730</p>
      <p>GENE_LIST: BSU35730</p>

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    <p>SUBSYSTEM: Cell Wall and Capsule</p>
  </html>
</notes>
<listOfReactants>
  <speciesReference species="M_C00029_c" stoichiometry="45"/>
  <speciesReference species="M_cpd15661_c"/>
</listOfReactants>
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  <speciesReference species="M_C00015_c" stoichiometry="45"/>
</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>
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<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>
    <speciesReference species="M_C00348_c"/>
    <speciesReference species="M_cpd15667_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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  </listOfParameters>
</kineticLaw>
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<reaction id="R_rxn10195" name="Teichoic acid export ATP-binding protein TagH (EC
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>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_cpd15666_c"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_cpd15669_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_rxn10196" name="Teichoic acid export ATP-binding protein TagH (EC
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>
    </html>
  </notes>
  <listOfReactants>

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    <speciesReference species="M_cpd15666_c"/>
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    <speciesReference species="M_cpd15668_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_rxn10197" name="Minor teichoic acid biosynthesis protein GgaB;Minor
teichoic acid biosynthesis protein GgaA(BSU35690)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU35680 or BSU35690 )</p>
      <p>GENE_LIST: BSU35680 BSU35690</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
    </html>
  </notes>
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    <speciesReference species="M_C00029_c" stoichiometry="30"/>
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    <speciesReference species="M_C00015_c" stoichiometry="30"/>
    <speciesReference species="M_cpd11459_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
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<reaction id="R_rxn10198" name="ATPase YjeE, predicted to have essential role in cell wall
biosynthesis">
  <notes>
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      <p>GENE_ASSOCIATION: BSU05910</p>
      <p>GENE_LIST: BSU05910</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_cpd15665_c" stoichiometry="0.453"/>
    <speciesReference species="M_cpd11459_c" stoichiometry="0.0145"/>
    <speciesReference species="M_cpd15667_c" stoichiometry="0.016"/>
    <speciesReference species="M_cpd15668_c" stoichiometry="0.0112"/>
  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_cpd15664_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>
<reaction id="R_rxn10199" name="peptidoglycan biosynthesis;Cell division protein FtsI
[Peptidoglycan synthetase] (EC 2.4.1.129)|Transpeptidase, Penicillin binding protein
transpeptidase domain(BSU25000)">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: ( BSU25000 or BSU16950 )</p>
      <p>GENE_LIST: BSU25000 BSU16950</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
    </html>
  </notes>

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</notes>
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  <speciesReference species="M_C05898_c"/>
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  <speciesReference species="M_cpd15665_c"/>
</listOfProducts>
<kineticLaw>
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  </math>
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    <parameter id="OBJECTIVE_COEFFICIENT" value="0"/>
  </listOfParameters>
</kineticLaw>
</reaction>
<reaction id="R_rxn10200" name="">
  <notes>
    <html xmlns="http://www.w3.org/1999/xhtml">
      <p>GENE_ASSOCIATION: </p>
      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
    </html>
  </notes>
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    <speciesReference species="M_cpd15752_c" stoichiometry="0.009356"/>
    <speciesReference species="M_cpd15761_c" stoichiometry="0.00435"/>
    <speciesReference species="M_cpd15779_c" stoichiometry="0.01236"/>
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    <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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synthesis)">
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      <p>GENE_LIST: BSU21920</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
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      <p>GENE_LIST: BSU21920</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
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      <p>GENE_LIST: BSU13350</p>
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      <p>GENE_LIST: BSU13350</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: BSU13350</p>
        <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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      <p>GENE_LIST: BSU35720</p>
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  <speciesReference species="M_C00055_c" stoichiometry="24"/>
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    </math>
    <listOfParameters>
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    </listOfParameters>
  </kineticLaw>
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    <parameter id="UPPER_BOUND" value="1000" units="mmol_per_gDW_per_hr"/>
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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>
    </html>
  </notes>
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    <speciesReference species="M_cpd15735_c"/>
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    <speciesReference species="M_cpd15753_c"/>
  </listOfProducts>
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glycerophosphotransferase (EC 2.7.8.12)">
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      <p>GENE_LIST: BSU35720</p>
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    </listOfParameters>
  </kineticLaw>
</reaction>
<reaction id="R_rxn10298" name="Poly(glycerol-phosphate) alpha-glucosyltransferase (EC
2.4.1.52)">
  <notes>
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      <p>GENE_LIST: BSU35730</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
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  </notes>
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      <p>GENE_LIST: BSU35730</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
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</reaction>
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2.4.1.52)">
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      <p>GENE_LIST: BSU35730</p>
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2.4.1.52)">
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      <p>GENE_LIST: BSU35730</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
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  </notes>
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2.4.1.52)">
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      <p>GENE_LIST: BSU35730</p>
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    <speciesReference species="M_cpd15750_c"/>
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  </listOfProducts>
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    </listOfParameters>
  </kineticLaw>
</reaction>
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2.4.1.52)">
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      <p>GENE_LIST: BSU35730</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
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    <speciesReference species="M_cpd15751_c"/>
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    <speciesReference species="M_C00015_c" stoichiometry="24"/>
    <speciesReference species="M_cpd15760_c"/>
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      <p>GENE_LIST: BSU35730</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
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  </listOfReactants>
  <listOfProducts>
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    <speciesReference species="M_cpd15761_c"/>
  </listOfProducts>
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    </math>
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2.4.1.52)">
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      <p>GENE_LIST: BSU35730</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
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  </notes>

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  </notes>
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  </listOfProducts>
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    </math>
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    </listOfParameters>
  </kineticLaw>
</reaction>
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2.4.1.52)">
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      <p>GENE_LIST: BSU35730</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
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  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00015_c" stoichiometry="24"/>
    <speciesReference species="M_cpd15763_c"/>
  </listOfProducts>
  <kineticLaw>
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</kineticLaw>
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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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  </listOfProducts>
  <kineticLaw>
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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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  </listOfProducts>
  <kineticLaw>
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    </math>
    <listOfParameters>
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    </listOfParameters>
  </kineticLaw>
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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>
    </html>
  </notes>
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    <speciesReference species="M_C00043_c" stoichiometry="24"/>
  </listOfReactants>
  <listOfProducts>
    <speciesReference species="M_C00015_c" stoichiometry="24"/>
    <speciesReference species="M_cpd15766_c"/>
  </listOfProducts>
  <kineticLaw>
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    </math>
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      <p>GENE_LIST: BSU35530</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
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    <speciesReference species="M_cpd15749_c"/>
  </listOfReactants>
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  </listOfProducts>
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    </math>
  </kineticLaw>
  <listOfParameters>
    <parameter id="LOWER_BOUND" value="-1000" units="mmol_per_gDW_per_hr"/>
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  </listOfParameters>
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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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  </notes>
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  </listOfReactants>
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    </math>
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    </listOfParameters>
  </kineticLaw>
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      <p>GENE_LIST: BSU35530</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
    </html>
  </notes>
  <listOfReactants>
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  </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"/>
    </listOfParameters>
  </kineticLaw>
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  <p>GENE_LIST: BSU35530</p>
  <p>SUBSYSTEM: Cell Wall and Capsule</p>
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  <speciesReference species="M_cpd15770_c"/>
</listOfProducts>
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  </math>
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</kineticLaw>
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      <p>GENE_LIST: BSU35530</p>
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      <p>GENE_LIST: BSU35530</p>
      <p>SUBSYSTEM: Cell Wall and Capsule</p>
    </html>
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      <p>GENE_LIST: BSU35520</p>
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      <p>GENE_LIST: BSU36590 BSU37240</p>
      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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      <p>GENE_LIST: BSU36590 BSU37240</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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      <p>SUBSYSTEM: Fatty Acids and Lipids</p>
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      <p>SUBSYSTEM: Membrane Transport</p>
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and cobalt transport protein corA(BSU24740)" reversible="false">
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      <p>SUBSYSTEM: Membrane Transport</p>
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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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      <p>SUBSYSTEM: Membrane Transport</p>
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      <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>
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  </notes>
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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>SUBSYSTEM: Fatty Acids and Lipids</p>
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      <p>SUBSYSTEM: Membrane Transport</p>
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      <p>SUBSYSTEM: </p>
    </html>
  </notes>
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    <speciesReference species="M_C00152_c" stoichiometry="0.086943"/>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Carbohydrates</p>
    </html>
  </notes>
  <listOfReactants>
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    <speciesReference species="M_C00003_c"/>
  </listOfReactants>
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    <speciesReference species="M_C00004_c"/>
    <speciesReference species="M_C00080_c"/>
  </listOfProducts>
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    </math>
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      <p>GENE_LIST: BSU39680</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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    <speciesReference species="M_C00691_c"/>
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      <p>GENE_LIST: BSU39700</p>
      <p>SUBSYSTEM: Carbohydrates</p>
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    <speciesReference species="M_C19891_c"/>
  </listOfReactants>
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  </listOfProducts>
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  <speciesReference species="M_C00004_c"/>
  <speciesReference species="M_C00691_c"/>
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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>
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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
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  </listOfReactants>
  <listOfProducts>
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  </listOfProducts>
  <kineticLaw>
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      <parameter id="LOWER_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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      <p>GENE_LIST: </p>
      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
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  </listOfReactants>
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      <p>SUBSYSTEM: Membrane Transport</p>
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      <p>SUBSYSTEM: Membrane Transport</p>
    </html>
  </notes>
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</model>
</sbml>
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