

**Identification and characterisation of G-quadruplex DNA-forming sequences in the**  
***Pseudomonas aeruginosa* genome**

Lindsay Evans, Anita Kotar, Martina Valentini, Alain Filoux, Shirin Jamshidi, Janez Plavec,  
Khondaker Miraz Rahman\*, Ramon Vilar\*

Table S1: Genes that were studied to identify putative G-quadruplex forming sequences.

| gene name   | Function                                                                              |
|-------------|---------------------------------------------------------------------------------------|
| <i>ftsB</i> | Cell division protein                                                                 |
| <i>mexR</i> | multidrug resistance operon repressor MexR                                            |
| <i>mexA</i> | Resistance-Nodulation-Cell Division (RND) multidrug efflux ( <i>mexABoprM</i> operon) |
| <i>mexB</i> | Resistance-Nodulation-Cell Division (RND) multidrug efflux ( <i>mexABoprM</i> operon) |
| <i>oprM</i> | Resistance-Nodulation-Cell Division (RND) multidrug efflux ( <i>mexABoprM</i> operon) |
| <i>gacS</i> | sensor/response regulator hybrid                                                      |
| <i>oprD</i> | basic amino acid, basic peptide and imipenem outer membrane porin OprD precursor      |
| <i>oprF</i> | Major porin and structural outer membrane porin                                       |
| <i>mexT</i> | transcriptional regulator                                                             |
| <i>mexE</i> | Resistance-Nodulation-Cell Division (RND) multidrug efflux ( <i>mexEFoprN</i> operon) |
| <i>mexF</i> | Resistance-Nodulation-Cell Division (RND) multidrug efflux ( <i>mexEFoprN</i> operon) |
| <i>oprN</i> | Resistance-Nodulation-Cell Division (RND) multidrug efflux ( <i>mexEFoprN</i> operon) |
| <i>czcC</i> | Resistance-Nodulation-Cell Division (RND) multidrug efflux ( <i>czcCBA</i> operon)    |
| <i>czcB</i> | Resistance-Nodulation-Cell Division (RND) multidrug efflux ( <i>czcCBA</i> operon)    |
| <i>czcA</i> | Resistance-Nodulation-Cell Division (RND) multidrug efflux ( <i>czcCBA</i> operon)    |
| <i>czcR</i> | two-component system                                                                  |
| <i>czcS</i> | two-component system                                                                  |
| <i>gacA</i> | response regulator                                                                    |
| <i>ftsK</i> | cell division protein                                                                 |
| <i>sagS</i> | surface attachment and growth sensor hybrid                                           |
| <i>ladS</i> | lost adherence sensor                                                                 |
| <i>ampR</i> | transcriptional regulator                                                             |
| <i>ampC</i> | beta-lactamase precursor                                                              |
| <i>mexC</i> | Resistance-Nodulation-Cell Division (RND) multidrug efflux ( <i>mexCDoprJ</i> operon) |
| <i>mexD</i> | Resistance-Nodulation-Cell Division (RND) multidrug efflux ( <i>mexCDoprJ</i> operon) |
| <i>oprJ</i> | Resistance-Nodulation-Cell Division (RND) multidrug efflux ( <i>mexCDoprJ</i> operon) |
| <i>nfxB</i> | transcriptional regulator                                                             |
| <i>morA</i> | mucin-adaptive protein, motility regulator                                            |

|              |                                                       |
|--------------|-------------------------------------------------------|
| <i>cbrA</i>  | two-component <i>cbrAB</i> system                     |
| <i>cbrB</i>  | two-component <i>cbrAB</i> system                     |
| <i>retS</i>  | regulator of exopolysaccharide and type III Secretion |
| <i>parC</i>  | topoisomerase IV subunit A                            |
| <i>Pile</i>  | type IV pili biogenesis                               |
| <i>recQ</i>  | DNA helicase                                          |
| <i>pvrR</i>  | Two component <i>pvrRS</i> system                     |
| <i>pvrS</i>  | Two component <i>pvrRS</i> system                     |
| <i>ndvB</i>  | Biofilm resistance                                    |
| <i>bjffA</i> | Biofilm regulator                                     |

Nucleotide sequence of the genes studied to identify putative G-quadruplex forming sequences. Start and stop codons are highlighted in red. Where found, G4 forming regions are highlighted in yellow. The nucleotide sequence of the upstream regulatory region (500 nucleotides upstream the start codon) and the sequence of the downstream region (250 nucleotides after the stop codon) were extracted and added using the KEGG database (<https://www.genome.jp/kegg/>).

> mexR (P52003)

TGAGGATGATGCCGTTACCTGGGGACGCACCTCGGCGATGCGGAACGCATTGGTCCGGC  
CCGGCAGCTCGGTATTCAGGGTCACCGTCTGCGCTTCCAGGGTCACGATCCCGACCTCCG  
GCGTTTGCGCCGGCGGCCGCTCGCTTTTTCCGCACCCGGAAGGGCCGAAATCGCGA  
CCAGCAGGGCCGGAACAGTACACGCATGGCTGGCGTTTCGTTGCATAGCGTTGTCTCAT  
GAGCGAAAGCGGCCGATGCAGCGTGAAGGCGCTGCACCGGCTCGAAGAAGGCAGGCAAAA  
TACTTACATTCATAGGTGTTTGTAAACGTCCGAAAGCCTCGCGTGAAAAACACCTGAAACG  
TTTTAGCTCGATGGCCGGTTATCCACCCGGCGCCATGGCCCATATTCAGAACCTGAAACA  
AGGTTGATAAGGTCAACTAAAATAAGCAAAATAGTTGACTGGATCAACCACATTTACATT  
AGGTTTACTCGGCCAAACCAATGAACTACCCCGTGAATCCCGACCTGATGCCCGCGCTGA  
TGGCGGTCTTCCAGCATGTGCGGACGCGCATCCAGAGCGAGCTCGATTGCCAGCGACTCG  
ACCTGACCCCGCCCGACGTCCATGTATTGAAGCTTATCGACGAACAACGCGGGCTGAACC  
TGCAGGACCTGGGACGCCAGATGTGCCGCGACAAGGCACTGATCACCCGGAAGATCCGCG  
AGCTGGAGGGAAGAAACCTGGTCCGCCGCGAGCGCAACCCAGCGACCAGCGCAGCTTCC  
AGCTCTTCCCTCACCGACGAGGGGCTGGCCATCCACCAGCATGCGGAGGCCATCATGTCAC  
GCGTGCATGACGAGTTGTTTGTCCCGCTCACCCCGGTGGAACAGGCCACCTGGTGCATC  
TCCTCGACCAAGTGCCTGGCCGCGCAACCGCTTGAGGATATTAAAGAACATCTTTTCGAA  
GCACAATGAAAAACGCCGGCGATCGCCGGCGTTTTTCGTTTCAGGTATCCGCTTACTGGC  
GAATGCCTTCGACGGAGAGCAGCAGCTCGACTTCTGGGATGCCGGGCCGAGGTCCATCT  
TGATGCCGAAGTCTTTCAGCTTCAGGGTGGCGCTGCCTTCGAAGCCGGCACGGTAGCCGC  
CCCACGGGTGCTCGCCCTGGCCGATCAGCTTGGCCTTGATGGTGACCGGCTTGG

> mexA (P52477)

CCAGCTCGCGGATCTTCCGGGTGATCAGTGCCTTGTTCGCGGCACATCTGGCGTCCCAGGT  
CCTGCAGGTTTCAGCCCGCTTGTTCGTGATAAGCTTCAATACATGGACGTCGGGCGGGG  
TCAGGTCGAGTCGCTGGCAATCGAGCTCGCTCTGGATGCGCGTCCGCACATGCTGGAAGA  
CCGCCATCAGCGCGGGCATCAGGTCCGGATTACCGGGTAGTTTCATTGGTTTGGCCGAGT  
AAACCTAATGTAAATGTGGTTGATCCAGTCAACTATTTTGCTTATTTTAGTTGACCTTAT  
CAACCTTGTTTCAGGTTCTGAATATGGGCCATGGCGCCGGGTGGATAACCGGCCATCGAG  
CTAAACGTTTTAGGTGTTTTACGCGAGGCTTTCGGACGTTTACAAACACCTATGAATG  
TAAGTATTTTGCCTGCCTTCTTCGAGCCGGTGCAGCGCCTTCACGCTGCATCGGCCGCTT  
TCGCTCATGAGGACAACGCTATGCAACGAACGCCAGCCATGCGTGTAAGTTCCGGCCCC  
TGCTGGTTCGCGATTTCCGGCCCTTTCGGGTGCGGAAAAAGCGAGGCGCCGCCGCGCGC  
AAACGCCCGAGGTTCGGGATCGTGACCCTGGAAGCGCAGACGGTGACCCTGAATACCGAGC  
TGCCGGGCCCGACCAATGCGTTCCGCATCGCCGAGGTGCGTCCCCAGGTGAACGGCATCA  
TCCTCAAGCGCCTGTTCAAGGAAGGCAGCGACGTCAAGGCCGGGCAGCAGCTCTACCAGA  
TGGAACCCGCCACCTACGAGGCCGACTACCAGAGCGCCAGGCCAACCTGGCTTCGACCC  
ACGACAGGCCACCGCTACAAGCTGACTGGTTCGCCGACCAGGCCGTGAGCAAGCAGCAGT  
ACGCCGACGCCAATGCCGCCTACCTGCAGTCCAAGGCGGCGGTGGAGCAGGCGCGGATCA  
ACCTGCGCTACACCAAGGTGCTGTGCGCCGATCTCCGGCCGCATCGGCCGCTTCCGCGGTGA  
CCGAAGGCGCCCTGGTGACCAACGGCCAGGCCAACGCGATGGCCACCGTGCAACAGCTCG  
ACCCGATCTACGTCGACGTACCCAGCCGTCCACCGCCCTGCTGCGCCTGCGCCGCGAAC  
TGGCCAGCGGCCAGTTGGAGCGCGCCGGCGACAACGCGGCGAAGGTCTCCCTGAAGCTGG  
AGGACGGTAGCCAATACCCGCTGGAAGGTGCGCTCGAATTCTCCGAGGTTTCCGTGCGACG  
AAGGCACCGGCTCGGTACCATCCGCGCCGTGTTCCCAACCCGAACAACGAGCTGCTGC  
CCGGCATGTTTCGTTACGCGCAGTTGCAGGAAGGCGTCAAGCAGAAGGCCATCCTCGCTC  
CGCAGCAAGGCGTGACCCGCGACCTCAAGGGCCAGGCTACCGCGCTGGTGGTGAACGCGC  
AGAACAAGGTGAGCTGCGGGTGATCAAGGCCGACCGGGTGATCGGCGACAAGTGGCTGG  
TTACCGAAGGCCTGAACGCCGGCGACAAGATCATTACCGAAGGCCTGCAGTTTCGTGCAGC  
CGGGTGTGAGGTGAAGACCGTGCCGGCGAAGAATGTGCGCTCCGCGCAGAAGGCCGACG  
CCGCTCCGGCGAAAACCGACAGCAAGGGCTGAATCAAGGGGATTCGTAATGTGCAAGTTTT  
TCATTGATAGGCCCATTTTCGCGTGGGTGATCGCCTTGGTGATCATGCTCGCGGGCGGCC

TGTCGATCCTCAGTCTGCCGGTCAACCAGTACCCGGCCATCGCCCCGCCGGCCATCGCCC  
TGCAGGTGAGCTACCCGGGCGCCTCGGCCGAGACGGTGCAGGACACCGTGGTCCAGGTGA  
TCGAGCAGCAGATGAACGGGATCGACAATCTGCGCTACATCT

> mexB (P52002)

GCGACAACGCGGCGAAGGTCTCCCTGAAGCTGGAGGACGGTAGCCAATACCCGCTGGAAG  
GTCGCCTCGAATTCTCCGAGGTTTCCGTCGACGAAGGCACCGGCTCGGTACCCATCCGCG  
CCGTGTTCCCCAACCCGAACAACGAGCTGCTGCCCGGCATGTTCTGTTACGCGCAGTTGC  
AGGAAGGCGTCAAGCAGAAGGCCATCCTCGCTCCGCAGCAAGGCGTGACCCGCGACCTCA  
AGGGCCAGGCTACCGCGCTGGTGGTGAACGCGCAGAACAAGGTCGAGCTGCGGGTGATCA  
AGGCCGACCGGGTGATCGGCGACAAGTGGCTGGTTACCGAAGGCCTGAACGCCGGCGACA  
AGATCATTACCGAAGGCCTGCAGTTCTGTGCAGCCGGGTGTCGAGGTGAAGACCGTGCCGG  
CGAAGAATGTGCGCTCCGCGCAGAAGGCCGACGCCGCTCCGGCGAAAAACCACAGCAAGG  
GCTGATCAAGGGGATTCTGTAATGTCGAAGTTTTTTCATTGATAGGCCCATTTTTCGCGTGGG  
TGATCGCCTTGGTGATCATGCTCGCGGGCGGCCTGTCGATCCTCAGTCTGCCGGTCAACC  
AGTACCCGGCCATCGCCCCGCCGGCCATCGCCGTGCAGGTGAGCTACCCGGGCGCCTCGG  
CCGAGACGGTGCAGGACACCGTGGTCCAGGTGATCGAGCAGCAGATGAACGGGATCGACA  
ATCTGCGCTACATCTCCTCGGAGAGTAACTCCGACGGCAGCATGACCATCACCGTGACCT  
TCGAACAGGGCACCGACCCCCGACATCGCCCAGGTCCAGGTGCAGAACAAGCTGCAACTGG  
CCACCCCGCTACTGCCGCAGGAAGTGCAGCGCCAGGGGATCCGGGTGACCAAGGCGGTGA  
AGAACTTCCTCATGGTGGTGGTGTGGTTTTCCACCGACGGCAGCATGACCAAGGAAGACC  
TGTCGAACCTACATCGTTTTCCAACATCCAGGACCCACTCTCGCGGACCAAGGGCGTCCGGT  
ACTTCCAGGTGTTTCGGCTCGCAGTACTCGATGCGCATCTGGCTCGACCCGGCCAAGCTGA  
ACAGCTACCAGCTGACCCCGGCGACGTGAGCAGCGCGATCCAGGCGCAGAACGTGCAGA  
TTTTCTCCGGCCAGCTCGGCGGCTTGCCGGCGGTCAAGGGCCAGCAGCTCAACGCCACCA  
TCATCGGCAAGACCCGCTGCAGACCGCGGAGCAATTTCGAGAACATCCTGCTCAAGGTCA  
ATCCCGACGGTTCCAGGTGCGCCTGAAGGACGTGCGCGATGTAGGCCTGGGCGGCCAGG  
ACTACAGCATCAACGCGAGTTCAACGGCAGCCCGGCGTCCGGTATCGCGATCAAGCTGG  
CCACCGGCGCCAACGCGCTGGATAACGCCAAGGCGATCCGCCAGACCATCGCCAACCTGG  
AACC GTTCATGCCGCAGGGCATGAAGGTGGTCTACCCGTACGACACCACCCCGTGGTCT  
CGGCCTCGATCCATGAGGTAGTGAAGACCTCGGCGAGGCGATCCTCCTCGTGTTCCTGG  
TGATGTACCTGTTCTGCAGAACTTCCGCGCCACGCTGATCCCGACCATCGCCGTACCGG  
TGGTGTCTGCTGGGGACCTTCGGCGTGCTCGCCGCGTTCGGCTTCTCGATCAACACCCTGA  
CCATGTTTCGGCATGGTGTGGCCATCGGCTTGCTGGTGGACGACGCCATCGTGGTGGTGG  
AGAACGTGCAGCGGGTGATGGCCGAGGAAGGCCTGTCGCCAAGGGAGGCGGCGCGCAAGT  
CCATGGGCCAGATCCAGGGCGCGCTGGTCCGTATCGCCATGGTGTCTCTCGGCGGTATTCC  
TGCCGATGGCGTTCTTCGGCGGCTCCACCGGGGTGATCTACCGGCAGTTCTCCATCACCA  
TCGTGTGCGCCATGGCCCTCTCGGTGATCGTGGCGCTGATCCTCACCCCGGCGCTCTGCG  
CGACCATGCTCAAGCCGATCGAGAAAGGCGACCATGGCGAGCACAAGGGCGGGCTTCTTCG  
GCTGGTTCAACCGGATGTTTCTTCCACCACCCACGGCTACGAGCGGGGCGTGCGCTCGA  
TCCTCAAGCATCGCGCGCCGTACCTGCTGATCTACGTGGTGATCGTGGCCGGGATGATCT  
GGATGTTACCCGCATTCCCACCGCTTCTCCCCGACGAGGACCAGGGCGTACTGTTTCG  
CCCAGGTACAGACCCCGCCGGGCTCCAGTGCCGAGCGTACCCAGGTGGTGGTGGACTCGA  
TGCGCGAATACCTGCTGGAGAAGGAAAGCTCTTCGGTCAGCTCGGTGTTACCGTGACCG  
GCTTCAACTTCGCCGCGCGCGGCCAGAGTTCGGGCATGGCGTTCATCATGCTCAAGCCCT  
GGGAAGAGCGTCCCGGTGGCGAGAACAGCGGTGTTTGAAGTGGCCAAGCGCGCGCAGATGC  
ACTTCTTCAGCTTCAAGGACGCGATGGTGTTCGCCTTCGCGCCGCCGTCGGTACTGGAAC  
TGGGTAACGCCACCGGCTTCGACCTGTTCTTCCAGGACCAGGCGGGTGTCGGCCACGAAG  
TCCTGTCTCAGGCGCGCAACAAGTTCTCATGCTCGCCGCGCAGAACCCGGCGCTGCAAC  
GCGTGCGCCCCAACGGCATGAGCGACGAACCGCAGTACAAGCTGGAGATCGACGACGAGA  
AGGCCAGCGCCCTCGGCGTGTCCCTTGCCGACATCAACAGCACCGTGTCCATCGCCTGGG  
GTTCCAGCTACGTCAACGATTTTCATCGACCGTGGCCGGGTCAAGCGGGTCTACCTGCAGG  
GCAGGCCGGACGCGCGGATGAACCCGGACGACCTGAGCAAGTGGTACGTGCGCAACGACA  
AGGGCGAGATGGTGCCGTTCAACGCCTTCGCCACCGCAAGTGGGAATACGGTTCGCCGA  
AGCTGGAGCGCTACAATGGCGTGCCGGCGATGGAGATCCTCGGCGAGCCGGCGCCCGGCC  
TGAGTTCGGGTGACGCCATGGCGGCGGTGAGGAGATCGTCAAGCAATTGCCGAAAGGCG  
TTGGCTACTCCTGGACCGGCTGTCTTACGAGGAGCGCTTGTCCGGCTCGCAGGCGCCGG  
CGCTGTATGCGCTGTGCTGTGGTGGTGTTCCTCTGCCTGGCGGCCCTGTACGAAAGCT  
GGTGCATTCCGTTCTCGGTGATGCTGGTGGTGGCGTGGGCGTGATCGGTGCGCTGCTGG  
CGACGTCCATGCGCGGCTGTCCAACGACGTGTTCTTCAGGTGGGCGCTGTTGACGACCA  
TCGGCCTGTGCGCGAAGAAGCCATTCTCATCGTGGAGTTCGCCAAGGAGCTGCACGAGC

AGGGCAAGGGCATCGTCGAGGCGGCCATCGAAGCCTGCCGCATGCGTCTGCGGCCGATCG  
TGATGACCTCCCTGGCGTTTCATCTCGGCGTGGTCCCGCTGGCGATCTCCACCGGCGCCG  
GCTCGGGCAGCCAGCATGCGATCGGTACCGGCGTGATCGGCGGCATGGTCACTGCGACCG  
TCCTGGCGATCTTCTGGGTACCGCTGTTCTACGTGGCGGTGACGACGCTGTTCAAGGACG  
AGGCGTCCAAGCAGCAGGCGTCCGTCGAAAAGGGGCAA**TGA**TATGAAACGGTCCTTCCTT  
TCCCTGGCGGTAGCCGCTGTCTGTTCTGTCCGGCTGCTCGCTGATCCCCGACTACCAGCGC  
CCCGAGGCGCCGGTAGCCGCGGCCTACCCGCAAGGGCAGGCTACGGGCAGAACACCGGC  
GCGGCGGCCGTTCCGGCCGCCGACATCGGCTGGCGCGAGTTCTTCCGCGACCCGCGAGTTG  
CAGCAACTGATCGGCGTGGCGCTGGAAAACAACCGCGACCTGCGGGTCGCC

> oprM (Q51487)

GGTGGTGTTCCCTCTGCCTGGCGGCCCTGTACGAAAGCTGGTTCGATTCCGTTCTCGGTGAT  
GCTGGTGGTGCCGTTGGGCGTGATCGGTGCGCTGCTGGCGACGTCCATGCGCGGCCCTGTC  
CAACGACGTGTTCTTCCAGGTGGGCTGTTGACGACCATCGGCCTGTCGGCGAAGAACGC  
CATTCTCATCGTGGAGTTCGCCAAGGAGCTGCACGAGCAGGGCAAGGGCATCGTCGAGGC  
GGCCATCGAAGCCTGCCGCATGCGTCTGCGGCCGATCGTGATGACCTCCCTGGCGTTTCAT  
CCTCGGCGTGGTCCCGCTGGCGATCTCCACCGGCGCCGGCTCGGGCAGCCAGCATGCGAT  
CGGTACCGGCGTGATCGGCGGCATGGTCACTGCGACCGTCTTGGCGATCTTCTGGGTACC  
GCTGTTCTACGTGGCGGTGACGACGCTGTTCAAGGACGAGGCGTCCAAGCAGCAGGCGTC  
CGTCGAAAAGGGGCAATGAT**ATG**AAACGGTCCTTCCTTTCCCTGGCGGTAGCCGCTGTGCG  
TTCTGTCCGGCTGCTCGCTGATCCCCGACTACCAGCGCCCCGAGGCGCCGGTAGCCGCGG  
CCTACCCGCAAGGGCAGGCTACGGGCAGAACACCGGCGCGGCCGGCTTCCGGCCGCCG  
ACATCGGCTGGCGCGAGTTCTTCCGCGACCCGCGAGTTGCAGCAACTGATCGGCGTGGCGC  
TGGAACAACAACCGCGACCTGCGGGTCGCCGCGCTGAACGTCGAGGCCTTCCGGGCGCAGT  
ACCGCATCCAGCGGGCCGACCTGTTCCCGCGGATCGGCGTGGACGGTAGCGGCACCCGCC  
AGCGTTTGCCGGGCGACCTGTGACACCGGCAGTCCGGCGATTTCAGCCAGTACGGGG  
TGACCTGGGCGACTACCGCCTGGGAACTCGATCTCTTGGCCGCTGCGCAGCCTGCGCG  
ACCAGTCCCTGGAGCAGTACCTGGCGACCGAACAGGCGCAGCGCAGCGCGCAGACCACCC  
TGGTGGCCAGCGTGGCGACCGCTACCTGACGCTGAAGGCCGACAGGCGCAGTTGACAGC  
TGACCAAGGACACCCTGGGCACCTACCAGAAGAGTTTCGACCTGACCCAGCGCAGCTACG  
ACGTGCGCGTCGCTCCGCGCTCGACCTGCGCCAGGCGCAGACCGCCGTGGAAGGCGCCC  
GCGCGACCCCTGGCGCAGTACACCCGCTGGTAGCCAGGACCAGAATGCGCTGGTCCTGC  
TGCTGGGCTCCGGGATCCCGGCAACCTGCCGCAAGGCCTGGGCTGGACCAGACCCTGC  
TGACCGAAGTGCCGGCGGGTCTGCCGTGCGACCTGCTGCAACGGCGCCCGGACATCCTCG  
AGGCCGAGCACCAGCTCATGGCTGCCAACGCCAGCATCGGCGCCGCGCGCGCGCGTTCT  
TCCCGAGCATCAGCCTGACCGCCAACGCCGGCACCATGAGCCGCCAACTGTCCGGCCTGT  
TCGACGCCGGTTCCGGTTCTTGGTTGTTCCAGCCGTCGATCAACCTGCCGATCTTCACCG  
CCGGCAGCCTGCGTGCCAGCCTGGACTACGCGAAGATCCAGAAGGACATCAACGTGCGCG  
AGTACGAGAAGGCGATCCAGACGGCGTTCCAGGAAGTCGCCGACGGCCTGGCCGCGCGCG  
GTACCTTCACCGAGCAGTTGCAGGCGCAGCGCGATCTGGTCAAGGCCAGCGACGAGTACT  
ACCAGCTCGCCGACAAGCGCTATCGCACGGGGGTGGACAACCTACCTGACCCTGCTCGACG  
CGAACGCTCGCTGTTACCGCGCAGCAGCAACTGATCACCGACCGCCTCAATCAGCTGA  
CCAGCGAGGTCAACCTGTACAAGGCCCTCGGCGGCGGCTGGAACCAGCAGACCGTGACCC  
AGCAGCAGACCGCGAAGAAGGAAGATCCCCAGGCT**TGA**TCGCCTTCCGCGCCATGCAAGA  
ACGCCGACCCTAGGGTCGGCGTTTTTTTATCCTCGCGGAAGTCGGCGGGTCCGCGTCACG  
GACCCGCTCGGCC**TTAG**CGGTTGCGGGTGACAGTGCGGGGCGCTCGCCCTTGCGGCCGCG  
GTTCCAGCTCGTCGAGCTGCTCGGCGGTGGGGAAGCGATCCATGCGCACCAAGGTGCGCGT  
TGTTGATCACCAACGGCTGGCGGCTCGGCTGCTTGCCGGTGCCATACT

> gacS (G3XD98)

ATAATCGTCGGCGCCCTGGCTGAACCCGGGCGATGCGGTCTGCTCGGCGCCAGGGCTGA  
CATCAGGATCACCGGCAGCGCTGCTCCTGGCGGAGTTGGCGAAGAATCTCGAGGCCATC  
GCGCCCCGGGCAGCATGATGTCCATCAGGATCAGGTATAGCCGCGCTGCGCGCAGCCGC  
CAACCCCTCTTCCCCGTCTCGGCACCAGGTCACTCGAAACCGCTGCCATTGAGGTGCTG  
GAACAGATGTGCGCCAGTGTGCGATCGTCCTCGATGGCCAGCAGTCGGGGGTGCGGGCGT  
CAGGGATGGGAACATGGCAGCCAAATAAGATTGATTAGCAATCGTGCCAGTATTCACGAT  
CTTTCCGCTTCGTGCGAAGCCGAATCCGCCGGGTGCGCACATCGGTGCAGATTCCCCCTT  
CCGCGACCCGCTAAACTGCGCGGGGTAAACGTATGGCCGGGGAGCGTCGGCCATCCCCGAT  
CTGGCTCGACGGAGAGACGT**GTG**TTCAAGGATCTCGGCATCAAGGGGCGCGTACTGCTGC  
TCACCTGCTCCCCACCAGCCTGCTGGCGATGGTGCTTGGCGGTTACTTCACCTGGGTCC  
AGCTGTCCGACATGCGCGCCAGTTGATCGAGCGGGGCAACTGATCGCCGAACAACCTGG

CGCCGCTGGCCGCCACCGCGCTGGCGCGAAAGGATACCGCCGTGCTCAACCGCATCGCCA  
ACGAGGCGCTGGACCAACCGGACGTGCGCGCGGTGACCTTCTCGACGCCCGCCAGGAAC  
GCCTCGCCCATGCCGGGCCAAGCATGCTCACCGTCGCCCCGGCCGGCGACGCCAGCCATT  
TGAGCATGTCCACCGAACTGGACACCACGCACTTCTGCTACCGGTTCTTGGCCGCCACC  
ACAGCCTGTCCGGCGCCACCGAGCCTGACGACGAGCGCGTACTCGGCTGGGTGGAAGTGG  
AACTGTGCGACACGGGACTCTGCTGCGCGGATATCGCAGCCTGTTACACGACCTCTTGC  
TGATCGCCGCCGGCCTCGGCGTCACCGCCCTCCTCGCCCTGCGCATGAGCCGCGCGATCA  
ACGCGCCGCTGGAAGTATGATCAGCCAGGGCGTCGCCAGCTCAAGGAAGGCCGCATGGAAA  
CCCGCCTGCCACCGATGGGCAGCAACGAGCTGGACGAACTGGCCTCTGGCATCAACCGCA  
TGGCGGAAACGCTGCAGAGCGCCCAGGAGGAAATGCAGCACAACATCGACCAGGCCACCG  
AGGACGTACGGCAGAACCTGGAAACCATCGAGATCCAGAACATCGAGCTGGACCTGGCGC  
GCAAGGAGGCCCTGGAGGCGAGCAGGATCAAGTCCGAGTTCTCGCCAACATGAGCCACG  
AGATCCGCACCCCGCTCAACGGCATCCTCGGTTTTACCAACCTGCTGCAGAAAGAGCGAGC  
TCAGCCCGCGCCAGCAGGACTACCTCACGACCATCCAGAAAATCGGCGGAAAGCCTGCTGG  
GGATCATCAACGAGATCCTCGATTTCTCGAAGATCGAGGCCGGCAAGCTGGTTCTGGAAA  
ACCTCCCTTTCAATCTCCGCGACCTGATCCAGGACGCCCTGACCATGCTGGCTCCGGCCG  
CCCACGAGAAGCAACTGGAAGTGGTCAGCCTGGTCTACCGGGATACCCCGATCCAATTGC  
AGGGCGACCCGACGCGGTGAAGCAGATCCTACCAACCTGGTCGGCAACGCCATCAAGT  
TCACCCAGGGCGGCACCGTCGCCGTACGCGCCATGCTCGAGGACGAAAGCGACGACCGCG  
CGCAGCTGCGGATCAGCGTCCAGGACACCGGTATCGGCCTCTCCGAGGAAGACCAGCAAG  
CCTTGTTCAAGGCCTTCAGCCAGGCCGACAACCTCACTGTGCGGCAAGCCGGTGGCACCG  
GCCTGGGCCTGGTGATCTCCAAGCGCCTGATTGAGCAGATGGGCGGCGAGATCGGCGTGC  
ACAGTACGCCTGGGGAAGGCGCCGAGTTCTGGATCAGCCTGAGTCTGCCGAAAAGTCGCG  
ACGACAACGAGGAGCCGGGCGCCTCCTGGGCCGCGGCCAACGCGTGGCGCTGCTCGAAC  
CGCAGGAAGTACGCGCGCGCTCGCTGCACCACCAGCTCACCGACTTCGGCCTGGAAGTGA  
GCGAATTGCGCGACCTCGACAGCCTCCAGGAAAGCCTGCGCAACCCGCCGCCCGGCCAGT  
TGCCGATCAGCCTGGCGGTGCTCGGCGTCTCGGCCGCGATCCATCCGCCGGAAGAGCTGA  
GCCAGTCGTTCTGGGAATTCGAACGGCTCGGCTGCAAGACCCCTGGTGCTCTGCCCCGACCA  
CCGAGCAGGCGCAATACACGCGACCCTGCCCGACGAACAGGTGAGGCGCAAGCCCGCCT  
GCACCCGCAAGCTGCAACGCAAGCTGCAGGAGTTGCTTCAAGTCCGCCCGACGCGCAGCG  
ACAAGCCCCACGCCATGGTTTCCGGACGGCCGCCACGGCTGCTATGCGTCGACGACAACC  
CGGCCAACCTGCTGCTGGTGAGACCCCTGCTCAGCGACCTCGGCGCCCAGGTACCCGCGG  
TGGACAGCGGCTACGCGGCCCTCGAGGTAGTGAGCGCGAGCGCTTCGACCTGGTCTTCA  
TGGACGTGCAGATGCCCCGCATGGACGGCCGCCAGGCCACCGAGGCGATCCGCCGCTGGG  
AGGCCGAGCGGGAAGTCAGCCCGGTGCCGGTGATCGCGCTCACCGCACATGCGCTTTCCA  
ACGAGAAGCGCGCATTGCTGCAGGCCGGCATGGACGACTACCTGACCAAGCCGATCGACG  
AGCAGCAATTGGCCCAGGTAGTGCTGAAGTGGACCGGACTGAGCCTGGGCCAGTCGCTGG  
CCAGCATGAGCCGTGCGCCCGAGCTCGGCCAGTTGAGCGTGCTCGACCCCGAGGAAGGGC  
TGCGCCTGGCCGCCGGCAAGGCCGACCTCGCCGCCGACATGCTGGCGATGCTGCTGGCCT  
CGCTGGCGGCGGACCGCCAGGCGATTTCGCCAGGCCCGCGACAACGACGACCGCACCGCTT  
TGCTCGAGAGGGTCCACCGGCTGCATGGCGCCACCCGCTACTGTGGCGTGCCGAGTTGC  
GCGCGGCCTGCCAGACCAGCGAAACCCCTGCTCAAGCAGAACGATCCGGCGGCGGCCGCGG  
CCCTGGACGAGCTGGACAAGGCCATCGAGGCCCTGGCCGACACTGCCTCGGCCACCACCC  
ACCTGTCTCTCCACGACCTCGACTCCAGCGAACTCTGAACCATGCGCATCCTGTTCTTCA  
CAGCCAGGCCCTACGACAGCGAGAGCTTCCAGGCCAGCAACCACCGGCACGGCTTCGAACT  
GCATTTCCAGCAGGCCACCTGCAGGCGGACACGGCGGTCTCTCGCCAGGGCTTCGAAAGT  
AGTCTGCGCCTTCGTCAACGACGACCTCTCGCGGCCGGTGCTGGAACGCCCTGGCGGCCG  
CGGCACGCGCCTGGTCGCCCTGCGCTCGGCCGGCTACAACCACGTCTGA

> oprD (P32722)

CAAACGCATTGCGCCACAGACAACCTCGATGGCAACCAACCCTTGAAGCAGACGGATTACAA  
TCAGGTTTTCAAAGCATAATTGTTTTGCTTTCAAACAGAATAGCCTCGCTCTCGAAGAGAC  
CAACTGGAATACATAGGCGAAGCCATTTTCCAATTTGTGCACGGAGTTTGCTTATACCTC  
TTTCATCACAGTAAGAGGGGGCCGTACGGAACATGACATTTTATTACAAGGCCCCGCCAA  
TCGGGAAAAGCGACTTGAGAAGCGACCTCAACAAGAGTGACCAACCCCGCGACATACGTC  
ATTTTTTCAACTGCGCACCTACGCAGATGCGACATGCGTCATGCAATTTTGCACAGCAC  
GGTAAAGAATCCGTCGCTTCGGAACCTCAACTATCGCCAAGAAACACTGCGTGCTATAAG  
TTAGCGCCGACAAGAAGAACTAGCCGTCACTGCGGCACTGTGATGGCAGAGATAATTTCA  
AAACCAAAGGAGCAATCACAATGAAGTGATGAAGTGGAGCGCCATTGCACTGGCGGTTTT  
CCGCAGGTAGCACTCAGTTTCGCCGTGGCCGACGCATTTCGTGAGCGATCAGGCCGAAGCGA  
AGGGGTTTCATCGAAGACAGCAGCCTCGACCTGCTGCTCCGCAACTACTATTTCAACCGTG

ACGGCAAGAGCGGCAGCGGGGACCGCGTCGACTGGACCCAAGGCTTCCTCACCACCTATG  
AATCCGGCTTCACCCAAGGCACTGTGGGCTTCGGCGTCGATGCCTTCGGCTACCTGGGGCC  
TGAAGCTCGACGGCACCTCCGACAAGACCGGCACCGGCAACCTGCCGGTGATGAACGACG  
GCAAGCCGCGCGATGACTACAGCCGCGCCGGCGGCCGTGAAGGTGCGCATCTCCAAGA  
CCATGCTGAAGTGGGGCGAGATGCAACCGACCGCCCCGGTCTTCGCCGCTGGCGGCAGCC  
GCCTGTTCCCGCAGACCGCGACCGGCTTCCAGCTGCAGAGCAGCGAATTCGAAGGGCTCG  
ACCTCGAGGCAGGCCACTTCACCGAGGGCAAGGAGCCGACCACCGTCAAATCGCGTGCGC  
AACTCTATGCCACCTACGCAGGCGAGACCGCCAAGAGCGCCGATTTTCATTGGGGGCCGCT  
ACGCAATCACCGATAACCTCAGCGCCTCCCTGTACGGCGCCGAACCTCGAAGACATCTATC  
GCCAGTATTACCTGAACGCAACTACACCATCCCACTGGCATCCGACCAATCGCTGGGCT  
TCGATTTTCAACATCTACCGCACAAACGATGAAGGCAAGGCCAAGGCCGGCGACATCAGCA  
ACACCACCTTGGTCCCTGGCGGCAGCCTACACTCTGGATGCGCACACTTTCACCTTGGCCT  
ACCAGAAGGTCCATGGCGATCAGCCGTTTGTATTATATCGGCTTCGGCCGCAACGGCTCTG  
GCGCAGGTGGCGACTCGATTTTCTCGCCAACCTCTGTCCAGTACTCCGACTTCAACGGCC  
CTGGCGAGAAATCCTGGCAGGCTCGCTACGACCTGAACCTAGCCTCCTATGGCGTTCCCG  
GCCTGACTTTTCATGGTCCGCTATATCAATGGCAAGGACATCGATGGCACCAAGATGTCTG  
ACAACAACGTCGGCTATAAGAACTACGGCTACGGCGAGGATGGCAAGCACCACGAAACCA  
ACCTCGAAGCCAAGTACGTGGTCCAGTCCGGTCCGGCCAAGGACCTGTCGTTCCGCATCC  
GCCAGGCCTGGCACCGTGCCAACGCCGACCAGGGCGAAGGCGACCAGAACGAGTTCCGCC  
TGATCGTCGACTATCCGCTGTTCGATCCTG**TAA**TCGACCGACAGGCAACGAAAAACCCGG  
CATCGCCGGGTTTTTTCTTCTTGGCGGCAACGCGC**CTATAAAGGAAGGGCGTAGGTACCG**  
**GTGACATGGGGCCACCAGGTCTTCTCATTACTCTGCGAAAAACACCCGACCTCGCAGACG**  
**ACCTGGCGCCGCCCCAGCTTGAGGATGCTCGCCTCGGCCAACAGGTCTCGGGCCTGGGC**  
**TTGCTGAGGAAGTTGATGTTTCAGGTTTCAGGTCACGGCCATC**

> murE (Q59650)

ACCGCATCCAGTTGGCGCATGCCTATGCGGCCCTGGCCAACGACGGCAAGAGCGTGCCG  
CTGAGCATGACCCGAGTCGACCGCGTGCCGGATGGTGTGACAGGTGATCTCGCCTGAAGTG  
GCTTCCACCGTGCAAGGCATGCTGCAACAAGTGGTCGAGGCCAGGGCGGGGTGTTCCGC  
GCCAGGTGCCGGGTTACCACGCCGCCGGCAAGAGCGGGACCGCGCGCAAGGTCTCGGTC  
GGCACCAAGGGCTACCGGGAAAAACGCCTATCGCTCGCTGTTTCGCCGGTTTTCGCCCCGGCC  
ACCGATCCGCGCATCGCGATGGTTCGTGGTGATCGACGAGCCGAGCAAGGCGGGCTACTTC  
GGCGGCCTGGTGTGCGCGCCGGTGTTCAGTAAGGTCATGGCTGGCGCGCTGCGCCTGATG  
AACGTGCCGCCGGATAACCTGCCGACGGCCACCGAACAGCAGCAGGTCAATGCTGCGCCC  
GCAAAAGGAGGGCGTG**GTG**CCTATGAGCCTGAACCAACTGTTTCCCAGGCCGAGC  
GCGATCTGCTGATCCGCGAGCTGACCCTGGATAGCCGCGGCGTTCGTCCGGGCGACCTGT  
TCCTGGCGGTGCCGGGCGGGCGCCAGGATGGTTCGTGCGCACATCGCCGATGCCCTGGCCA  
AGGGCGCGGTGCCGTGGCTTACGAGGCGGAAGGCGCCGGAGAGTTGCCGCCAGCGATG  
CGCCGCTGATCGCGGTGAAGGGGCTGGCCGCGCAACTGTTCGGCGGTTCGCCGGGCGTTTCT  
ACGGCGAGCCGAGCCGCGGGCTGGACCTGATCGGCGTCACCGGCACCAACGGCAAGACCA  
GCGTCAGCCAACTGGTGGCCAGGCCCTGGATCTGCTCGGCGAGCGCTGCGGCATCGTCG  
GCACCTCGGCACCGGTTTCTACGGCGCCCTGGAGAGCGGCCGGCACACCACGCCGGACC  
CGCTCGCGGTGCAGGCCACGCTGGCCACGCTGAAGCAGGCCGGCGCCCGCGCGGTAGCGA  
TGGAAGTGTCTTCCACGGCCTCGACCAGGGCCGCGTGCGGCGCTCGGTTTCGATATCG  
CGGTGTTACCAATCTGTCCCGCGACCACCTCGACTATCACGGTTCGATGGAAGCCTATG  
CCGCCGCCAAGGCCAAGCTGTTTCGCCTGGCCGGGCGCTGCGCTGCCGGGTGATCAACCTGG  
ACGACGATTTTCGGCCGTGCGACTGGCCGGCGAGGAGCAGGACTCGGAGCTGATCACCTACA  
GCCTCACCGACAGCTCGGCGTTCTCTATTGCCGCGAAGCGCGCTTCGGCGACGCCGGCA  
TCGAGGCGGCGCTGGTCACTCCGCACGGCGAGGGCCTGCTGCGCAGCCCGTTGCTCGGCC  
GCTTCAACCTGAGCAACCTGCTGGCGGCGGTGGTGGCTTGGCTTGGCTTATCCCC  
TGGGCGATATCTCCGCACTTTGCCGCAACTGCAGGGGCGGTTCGGCCGATGCAGCGCC  
TGGGAGGCGGCGACAAGCCGCTGGTGGTGGTGGACTACGCGCATACTCCCGACGCCCTGG  
AAAAAGTCCTGGAGGCCCTGCGTCCGCACGCGCGCGCGCTGCTGTGCCTGTTTCGGCT  
GCGGTGGCGATCGCGATGCCGGCAAGCGTCCGCTGATGGCTGCGATCGCCGAACGCCTGG  
CGGATGAGGTGCTGGTCAACGACGACAACCCGCGCACCGAGGCCAGTGCGGCGATCATCG  
CCGATATCCGCAAAGGCTTCGCTGCCGCTGACAAGGTTACCTTCCTGCCGTCGCGCGGTG  
AGGCGATCGCCCATCTGATCGCTTCCGCTGCGGTGGATGACGTGGTGTCTTGGCCGGCA  
AGGGTCACGAGGATTATCAGGAGATCGACGGCGTACGCCATCCGTTCTCCGACATCGAGC  
AGGCCGAGCGCGCCCTGGCCGCCTGGGAGGTGCCGC**ATGCTTGA**GCCTCTTCGCCTCAGC  
CAGTTGACGGTTCGCGCTGGACGCCCCGCTGATCGGCGAGGACGCCGTCTTTTCGGCGGTT  
TCCACCGACAGTCGCGCCATCGGGCCCGGCCAACTGTTTCATTGCCCTGAGTGGGCGCGT

TTCGACGGCCACGACTATCTCGCCGAGGTTGCCGCCAAGGGCGCGGTGGCTGCGCTGGTG  
GAGCGCGAAGTCGCCGACGCGCCCCCTGCCGCAATTGCTGGTGCGGATAACCCGT

> ftsB (Q9HXZ6)

CATCTCCATCGAGGACGGCATGGACGAGTCCGACTGGGCGGGCTGGAAAGGCCTGACCGA  
CAAGATCGGCGCCAAGGTCCAACCTGGTCGGCGACGACCTGTTCTGTGACCAACACCAAGAT  
CCTCAAGGAAGGCATCGAGAAGGGCATCGGCAATTCGATCCTGATCAAGTTCAACCAGAT  
CGGTTTCGCTCACCAGAGACCCTGGAGGCCATCCAGATGGCCAAGGCCGCCGCTATACCGC  
GGTGATCTCGCACCCTCCGGCGAAACCGAGGACTCGACCATCGCCGACCTGGCCGTGGG  
TACCCGCGCCGGTCAGATCAAGACCGGTTTCGCTGTGCCGCTCCGACCGCGTGTCCAAGTA  
CAACCAGTTGCTGCGCATCGAAGAGCAACTGGGCGCCAAGGCGCCGTACCGTGGTCGCGC  
GGAATTCCGCGGCTGAGCCTAGTCTGGTACGGTGAAGGGGTGGCAAGAGCCACCCCTTTT  
CTTCTCAAGGAGTTTCGAGGC**TTG**AGGTTACGTAGCCCCCTACTGGCTGTTCTGTGGTGCTGA  
TCCTGGCGCTGGCGGGCCTGCAATATCGCCTGTGGGTGGCGATGGCAGCCTGGCGCAGG  
TGCGCGACCTGCAGAAGCAGATCGCCGACCAGCATGGCGAGAACGAGCGCCTGCTGGAGC  
GCAACCGGATTCTCGAAGCCGAAGTCGCCGAGCTGAAGAAAGGCACCGAGACCGTCGAGG  
AGCGTGCGCGGCACGAGCTCGGCATGGTCAAGGACGGCGAAACCCCTCTACCAGCTCGCCA  
**AGTGA**GCTGACGACCCCTTCTCCCGATGACGACTTCCGACCTTCCCGCCTTCTGGACGGTG  
ATCCCCGCCGCCGGCGTGGGTTTCGCGCATGCGCGCCGACCGCCCGAAGCAATATCTCGAT  
CTTGCCGGTTCGACCGTGATCGAGCGTACCCTCGATTGTTTCTCGAACACCCGATGCTC  
AGGGGCCTGGTGGTCTGCCTGGCCGAGGACGATCCCTACTGGCCCGGGCTGGACTGCGCC  
GCCAGCCGGCATGTG

> oprF (P13794)

AGGTGATGCTGAAAGTTTTGTACGGGTTGAAGAACTTTGAGGGCAAGTCGAAGTTCAAAA  
CGTGGCTATATAGCATCACGTACAACGAGTGCATCACGCAGTACCGCAAGGAGCGCCGCA  
AGCGCCGATTGATGGATGCGCTCAGCCTCGACCCGCTGGAGGAGGCTTCCGAGGAGAACT  
CGCCGAAGGTTGAGGAGCGGGGCGGATTGGATCGTTGGCTCGTCCATGTCAATCCGATAG  
ATCGGGAGATTCTGGTTCTTCGCTTCGTTCGCGGAAGTGGAGTTTCAGGAGATAGCGGATA  
TCATGCACATGGGTCTGAGTGCGACGAAAATGCGCTACAAGCGGGCACTGGACCGCCTGC  
GCGAAAAGTTTTTCAGATGCGACCGAAACATAGTTGGGTAAATATTGTCTCTCTATGCGGG  
AAGTTCTGATAAACTTGCCACCCAAGTTGTGCGGCTGATTGTTGGACAACCTAACTGACCA  
TCAAGATGGGGATTTAACGG**ATG**AACTGAAGAACACCTTAGGCGTTGTCATCGGCTCGC  
TGTTTGCCGCTTCGGCAATGAACGCCTTTGCCAGGGCCAGAAGTTCGGTAGAGATCGAAG  
CCTTCGGCAAGCGCTACTTCACCGACAGCGTTTCGCAACATGAAGAACGCGGACCTGTACG  
GCGGCTCGATCGGTTACTTCCTGACCGACGACGTCGAGCTGGCGCTGTCTACGGTGAGT  
ACCATGACGTTTCGTGGCACCTACGAAACCGGCAACAAGAAGGTCCACGGCAACCTGACCT  
CCCTGGACGCCATCTACCACTTCGGTACCCCGGGCGTAGGTCTGCGTCCGTACGTGTCGG  
CTGGTCTGGCTCACCAGAACATCACCAACATCAACAGCGACAGCCAAGGCCGTCAGCAGA  
TGACCATGGCCAACATCGGCGCTGGTCTGAAGTACTACTTCACCGAGAACTTCTTCGCCA  
AGGCCAGCCTCGACGGCCAGTACGGTCTGGAGAAGCGTGACAACGGTCAACAGGGCGAGT  
GGATGGCTGGCCTGGGCGTCGGCTTCAACTTCGGTGGTTTCGAAAGCCGCTCCGGCTCCGG  
AACCGGTTGCCGACGTTTGTCTCCGACTCCGACAACGACGGCGTTTGCGACAACGTCGACA  
AGTGCCCGGATACCCCGGCCAACGTCACCGTTGACGCCAACGGCTGCCCGGCTGTGCGCG  
AAGTCGTACGCTACAGCTGGACGTGAAGTTCGACTTCGACAAGTCCAAGGTCAAAGAGA  
ACAGCTACGCTGACATCAAGAACCTGGCTGACTTCATGAAGCAGTACCCGTCCACTTCCA  
CCACCGTTGAAGGTACACCGACTCCGTCGGCACCGACGCTTACAACAGAAAGCTGTCCG  
AGCGTCGTGCCAACGCCGTTTCGTGACGTACTGGTCAACGAGTACGGTGTAGAAGGTGGTC  
GCGTGAACGCTGTTGGTTACGGCGAGTCCCGCCCGGTTGCCGACAACGCCACCGCTGAAG  
GCCGCGCTATCAACCGTCGCGTTGAAGCCGAAGTAGAAGCTGAAGCCAAG**TAA**TCGGGCTG  
AGCCTCTAAGGAAAAACCCGGCCAGGCCGGGTTTTTCTTTGCCTGGAAAAAGACCGCTC  
GTCAGGCGCTCAGGGAAATCGGTTGCGACACGATGTCGCGGGTTACTTCGCCGATCACCA  
GGATCGCCGGGCTTTTTCAAGGCGAAACGTCGGCGTCCCGCAGTAGCTCGCCGAGGTTGC  
TGCGGCATTTCGCGCTGGTTGCCAGGGTGCGGTTCTCGATCATCGCCAGCGGCGTATCCT  
CGG

> MexT (A0A069QAM9)

GGGTATGGGCGGGGAACTGGCCACGCGGGAACCCAGCGGCAGGTCGCCGACGCCGGCGC  
CGACCGCCAGCACCTCGCCGGCCAGTTTCAAGCCGAGACCGGACGGCAGCGCAGCCTGCT  
CCGGGGCCAGGTTCTGACGCCAGAGCACATCCTTCCAGCTCACGCCGATCGCCTGGACAC

GCACCAGGACTTCCCCTGCGGCCGGCGCCGGGGTTCGGCAGCTCTTCGCATTTGAGGACCT  
CTGGCGGGCCAAACTGATGAAAACGGATCACTCGGGACATCGCAAACCTCTGCAGTGCAT  
CACGGGGTGAATAACCTCATGGGTTGTGACTGTATCCGCCCATGCCTGACAAAACCACCC  
GTCGTTATTGATAATGGCTATGCCTGTCAGTGATCCTATGCCCCCCTCCGGCACCTCGCCAG  
GCCCCGCCCCGTCTCGCACGCAAGGCTTGACGGCGAGCCCCCGCGGTTGCAGCCTCTAGC  
CCCTGGAAACGAGGAACGCC**ATG**AACCGAAACGACCTGCGCCGCGTCGATCTGAACCTGC  
TGATCGTGTTCGAGACTCTGATGCACGAACGCAGCGTGACCCGCGCCGAGAGAAACTGT  
TCCTCGGCCAGCCGGCCATCAGCGCCGCGCTGTGCGCCTGCGCACGCTGTTGACGACC  
CGCTGTTTCGTCCGTACCGGACGCAGCATGGAGCCACCGCGCGAGCCCAGGAAATCTTCG  
CCCACCTGTGCGCGCGCTGGACTCCATCTCCACCGCCATGAGCCGCGCCAGCGAGTTTCG  
ATCCGGCGACCAGCACCGCGGTGTTCCGCATCGGCCCTTTCGACGACGTCGAGTTTCGGCC  
TGTTGCGGCCCTGTCTCCGCCGCTGCGCGCGGAGGCGCCGGGATCGTCCTCGTCTGTC  
GCCGCGCAACTATCTATTGATGCCGAACCTGCTGGCCTCGGGGGAGATCTCGGTGGGCG  
TCAGCTACACCGACGAACCTGCCGGCCAACGCCAAGCGCAAGACCGTGCGCCGCGAGCAAGC  
CGAAGATCCTCCGCGCCGACTCCGCGCCCGGCCAGCTGACCTCGACGACTACTGCGCGC  
GACCGCACGCGCTGGTGTCTTCGCCGGCGACCTCAGCGGCTTCGTCGACGAGGAACTGG  
AGAAATTTCGGCCGCAAGCGCAAGGTGGTCTTGGCGGTGCCGCAGTTCAACGGCCTCGGCA  
CCCTCCTCGCCGGCACCGACATCATCGCCACCGTGCCCGACTACGCCGCCAGGCGCTGA  
TCGCCGCCGGCGGCCTACGCGCCGAGGACCCGCCGTTTCGAGACCCGCGCCTTCGAACTGT  
CGATGGCCTGGCGCGGCGCCAGGACAACGACCCGGCGGAACGCTGGCTGCGCTCGCGGA  
TCAGCATGTTTCATCGGCGATCCGGACAGTCTC**TGA**GCCCTCCGGCAACTACCCGCGACGAG  
GCGTCGCAACGGGGAAATCGATCGCGCACCGCGAGCCTGTGGCTTATTCCATCGAAAGCA  
CTGTCCATAACCATGGACTGTTACAGAAAACGAAAAACCATGTATCACTGTTTCGTGATAA  
TCAAAATCTCATCGTTTCGATTAGTTCCCTGCCGGAGCAGCCCGCAGACTTCGCCAATCCC  
GAAAAACCGACTGGCGGAGTCAAGC**ATGGTACAGTCATCCCACTT**

> mexE (Q9I0Y9)

TTCGGCCGCAAGCGCAAGGTGGTCTTGGCGGTGCCGCAGTTCAACGGCCTCGGCACCCTC  
CTGGCCGGCACCGACATCATCGCCACCGTGCCCGACTACGCCGCCAGGCGCTGATCGCC  
GCCGGCGGCCTACGCGCCGAGGACCCACCGTTTCGAGACCCGGGCCTTCGAACTGTCGATG  
GCTTGGCGCGGCGCCAGGACAACGATCCGGCCGAACGCTGGCTGCGCTCGCGGATCAGC  
ATGTTTCATCGGCGATCCGGACAGTCTCTGAGCCCTCCGGCAGCTACCCGCACGAGGCGTC  
GCAACGGGAAAATCGATCGCGCGCCGCGGGTGTGCGGCTTATTCCATCGAAAGCACTGTC  
CATAACCATCGACTGTTACAGAAAACGAAAAACCATGTATCACTGTTTCGTGATAATCAAA  
ATCTCGTCGTTTCGATTAGTTCCCTGCCGGAGCAGCCCGCAGACTTCGCCAATCCCGAAAA  
ACCGACTGGCGGAGTCAAGC**ATG**GAACAGTCATCCCACTTCTCCTGGCGCTACCCCTCG  
CACTCGCGGCCGTACTGGTCTGAGCGCCTGCGGCAAGGCCCCGAAAACCACCAAGGCA  
TGGCGGCGCCCAAGGTTCAGCGTCGCCGAAGTCATCGAACAACCGCTGAACGAGTGGGACG  
AATTACACGGCCGCTGGAGGCCCCGGAGTCGGTGGAGCTGCGCCCGCGGGTGTGCGGGCT  
ACATCGACCCGCTGGCCTTCCATGAAGGCGCACTGGTGAAGAAAGGCGACCTGCTGTTCC  
AGATCGACCCGCGCCCGTTTCGAGGCCGAGGTCAAGCGCCTCGAAGCCCAGCTGCAACAGG  
CCCGCGCGGCCAGGCGCGGAGCGTCAACGAAGCCCAGCGCGGCGAACGCCTGCGCGCCA  
GCAACGCGATCTCCGCGGAACCTCGCCGACGCCCGCACCAACCGCCGCCAGGAAGCCAAGG  
CGGCGGTTCGCCGCGACCCAGGCGCAACTGGACGCGGCGCGCCTGAACCTGAGCTTACCC  
GGATCACCGCGCCGATCGACGGTCGCGTCAGCCGCGCCGAGGTACCGCCGGCAACCTGG  
TCAACTCCGGGGAGACCTGCTCACCACCTGGTCAGCACCGACAAGGTCTACGCCCTACT  
TCGACGCCGACGAGCGCGTGTTCCTCAAGTACGTCGAGCTGGCCCGCCAGGCGGTCGCG  
ACACGCGCAGCGAGAGCCCGGTGTACCTCGGCCTGAGCAGCGAGGACGGCAACCCGCGACC  
TGGGCCGGCTGGACTTCTTCGACAACCAGGTCAACCCGCGTACCGGCACCATCCGCGGCC  
GCGCCGTGTTTCGACAACGCCAAGGGCGAGTTACCCCGGGCCTCTACGTGCGCCTGAAGC  
TGGTCGGCAGCAAGACCTACGCCGCCACCTGATCAAGGACGAAGCGGTTCGGCACCGACC  
TGGGCAAGAAGTTTCGTGCTGGTCTGGATGGCGACAACAAGACCGTCTACCGCACCGTCG  
AGATGGGACCGAAGCTGGAGGGCCTGCGCATCGTCCGACGCGCCTGAGCAAGGGCGACC  
GGATCGTCGTGAATGGCCTGCAGCGGGTCCGCCCGGGCATGCAGGTGGATCCGCAGAAGG  
TCGAGATGGCCAGCGCCGACACCTGGCCACCTCGCGCGCCTGCGGCAGTCGGTTCGGCG  
ACAGCGAACCACCGAAGGTGGCGGCGTCCAAGGACAACGCCACTCGCAACGAGCCGCGCG  
GCT**TGA**GCGCGGCGATAGGAAGAACCGATGAATTTCTCCCAATTCTTCATCCAGCGGCCGA  
TCTTCGCCGCGGTGCTGTGCTGCTGATCCTGATTGGCGGCGCCATCTCCCTGTTCCAGC  
TACCCATCAGCGAATACCCGGAAGTGGTGCCGCCGACCGTCGTGGTCCGCGCCAACCTCC  
CCGGCGCCAACCCGAAAGTCATCGGCGAGACCGTCGCTCTCCCTTGAACAGGCGATCA  
CCGGGGTGGAGAACA

> mexF (Q9I0Y8)

GGCTGGACTTCTCGACAACCAGGTCAACCCGCGTACCGGCACCATCCGCGGCCGCGCCG  
TGTTTCGACAACGCCAAGGGCGAGTTACCCCCGGGCTCTACGTGCGCCTGAAGCTGGTTCG  
GCAGCAAGACCTACGCCGCCACCTGATCAAGGACGAAGCGGTTCGGCACCGACCTGGGCA  
AGAAGTTTCGTGCTGGTCTGGATGGCGACAACAAGACCGTCTACCGCACCGTCGAGATGG  
GACCGAAGCTGGAGGGCTGCGCATCGTCCGACGCGGCTGAGCAAGGGCGACCGGATCG  
TCGTGAATGGCTGCAGCGGGTCCGCCCCGGGCATGCAGGTGGATCCGCAGAAGGTCGAGA  
TGGCCAGCGCCGACACCTGGCCACCTCGCGCGCTGCGGCAGTCGGTCGGCGACAGCG  
AACCACCGAAGGTGGCGGCGTCCAAGGACAACGCCACTCGCAACGAGCCGCGCGGCTGAG  
CGCGGCATAGGAAGAACCGATGAATTTCTCCCAATTCTTCATCCAGCGGCCGATCTTCG  
CCGCGGTGCTGTCGCTGCTGATCTTGATTGGCGGCGCCATCTCCCTGTTCCAGCTACCCA  
TCAGCGAATACCCGGAAGTGGTGGCCGCCACCGTCGTGGTCCGCGCCAACCTCCCCGGCG  
CCAACCCGAAAGTCATCGGCGAGACCGTCGCTCTCCCTTGAACAGGCGATCACCGGGG  
TGGAGAACATGCTCTACATGTCTCCAGTCGACCTCCGACGGCAAGCTGACCTGACCA  
TCACCTTCGCCCTCGGCACCGACCTGGACAACGCCCAGGTGCAGGTGCAGAACC CGCTCA  
CCCGGACCGAGCCGAAGCTCCCGGAAGAAGTGACCCGGCTCGGCATCACCGTCGACAAGG  
CCTCGCCCCGACCTGACCATGGTTCGTGCACCTGACCTCGCCGATAACCGCTACGACATGC  
TCTACCTGTGCAACTACGCGGTGCTCAACGTGAAGGACGAAGTGGCCCGCTCGACGGCG  
TCGGCGACGTCCAGTTGTTTCGGCCTCGGCGACTATTCGCTGCGCGTCTGGCTGGACCCGA  
ACAAGGTCGCCTCGCGCAACCTCACCGCCACCGACGTGGTCAACGCCATCCGCGAGCAGA  
ACCGCCAGGTTCGCCGCCGGCACCTGGGCGCGCCCGCGCGCGGAGCGATACCAGCTTCC  
AGTTGTTCGATCAACACCCAGGGTCGCCTGGTCAACCGAGGAAGAGTTCGAGAACATCATCA  
TCCGCGCCGGCGCCAACGGCGAGATCACCCGTCTGCGCGACATCGCCCCGGGTCGAGCTGG  
GCTCCAACCAGTACGCCCTGCGTTTCGCTGCTGAACAACAAGCCGGCGGTGGCGATCCCCGA  
TCTTCCAGCGTCCCGGCTCGAACGCCATCGAGATCTCCAACCTGGTTCGGGAGAAAGATGG  
CCGAGCTGAAGCAGAGCTTCCCGCAAGGCATGGACTACTCCATCGTCTACGACCCGACCA  
TCTTCGTCCGCGGCTCCATCGAGGCGGTGGTGCACACCTGTTTGAAGCCCTGGTGTGTTG  
TGGTGCTGGTGGTGTATCTGTTCTCGAGACCTGGCGCGCCTCGATCATCCCGCTGGCCG  
CGGTGCCGGTGTTCGCTGATCGGCACCTTCGCGGTGATGCACATGCTCGGCTTCTCGCTCA  
ACGCGCTGTTCGCTGTTTCGGCCTGGTGTGCTGGCCATCGGCATCGTGGTGGACGACGCCATCG  
TGGTGGTGGAGAACGTTCGAGCGCAACATCGGCCTCGGCCTCAAGCCGGTGGAAAGCCACCA  
AGCGTGCCATGCGCGAGGTGACCGGGCCGATCATCGCCACGGCGCTGGTGTCTGCGCGG  
TGTTTCATCCCGACCGCGTTTCATCTCCGGCCTCACCGGGCAGTTCTACCGCCAGTTTCGCCC  
TGACCATCGCGATCTCCACGGTGTCTCGGCGTTCAACTCGCTGACCTGTTCGCCAGCGC  
TGGCGGCGGTCTGTCTCAAGGGCCACCACGAGCCGAAGGACCGCTTCTCGGTGTTCTCTCG  
ACAAGCTCCTCGGCAGTTGGCTGTTCCGTCCGTTCAACCGTTTCTTCGACCGCGCCAGCC  
ATGGCTACGTTCGGCACGGTGAACCGGGTCTGCGCGGCAGCTCGATCGCCCTGCTGGTCT  
ACGGCGGACTGATGGTGTGACCTACTTCGGCTTCTCCAGCACGCCGACCGGTTTCGTCC  
CGCAGCAGGACAAGCAGTACCTGGTGGCCTTCGCCCAGTTGCCCCGACGCGGCCAGCCTGG  
ACCGTACCGAGGCGGTGATCAAGCAGATGTCCGAGATCGCCCTGGCGCAGCCCGGCGTGG  
CGGACTCGGTGGCCTTCCCCGGCCTGTTCGATCAACGGCTTCACCAACAGCCCGAACAGCG  
GCATCGTGTTCACCCCGCTGAAGCCGTTTCGACGAGCGCAAGGACCCGAGCCAGTCGGCCG  
GGGCCATCGCCGCCGCGCTGAACGCCAAGTACGCCGACATTCAGGACGCTACATCGCGA  
TCTTCCCGCCGCCCGGCTACAGGGGCTGGGGACCATCGGCGGCTTCCGCCTGCAGATCG  
AGGACCGTGGCAACAGGGCTACGAGGAGCTGTTCAAGCAGACCCAGAACATCATACCA  
AGGCCCGTGCCTGAGCTGGAACCCAGCTCGGTGTTCTCCAGCTACCAGGTCAACG  
TGCCGCAGATCGACGCCGACATCGACCGCGAGAAGGCCAAGACCCACGGCGTGGCGATCA  
GCGACATCTTCGACACCTGCAGGTCTACCTCGGCTCGCTGTACGCGAACGACTTCAACC  
GCTTCGGCCGTACCTATCAGGTCAACGTCCAGGCCGAGCAGTTCGCTTCGAACCCG  
AGCAGATCGGCCAGCTGAAGGTGCGCAACAACCTCGGCGAGATGGTCCCGCTGGCGTCTCT  
TCATCAAGGTTCAGCGACACCTCCGGTCCGGACCGTGTGATGCACTACAACGGCTTCATCA  
CCGCCGAACCTCAACGGCGCCCCGGCGCGGGCTACAGCTCCGGCCAGGCGCAGGCGGCGA  
TCGAGAAGCTGCTGAAGGAGGAAGTGCCTAACGGCATGACCTACGAGTGGACCGAGCTGA  
CCTACCAGCAGATCCTCGCCGGCAATACCGCGCTGTTCGTCTTCCCGCTCTGCGTGTGTC  
TGGCCTTCTCTGTGCTGGCCGCCAGTACGAGAGCTGGAGCCTACCGCTGGCGGTGATCC  
TGATCGTGCCGATGACCTGTGTCGGCGATCACCGGGGTGATCCTGGCCGGCAGCGACA  
ACAACATCTTTACCCAGATCGGCCTGATCGTTCTGGTGGGGCTGGCGTGCAGAACGCGA  
TCCTGATCGTCGAGTTCGCCAAGGACAAGCAGGAGGAAGGCATGGACCGCGTCGCCGCGG  
TGCTGGAAGCCTGCCGCTGCGCCTGCGGCCGATCCTGATGACGTCCATCGCCTTCATCA  
TGGGTGTGGTGGCGCTGGTGTATCTCACCGGCGCCGGCGCGCGAGATGCGCCATGCGATGG

GCGTGGCGGTGTTCTCCGGGATGATCGGGGTGACCTTCTTCGGCCTGCTGCTGACGCCGG  
TGTTCTACGTCTCATCCGCCGCTTCGTGGAGAACC CGGAAGCGCGCCGCGCCGCCAACG  
ACAAAGGCCTGCCAGAGGTGCATGCA**ATGA**TTACGCGCAGTCGATCCGGAGCGGGCTCGC  
GTCCGCCCTGGGTCTGTTCA GTCTGCTGGCGCTCAGCGCCTGCACGGTGGGTCCGGACTA  
CCGGACCCCCGACACCGCGGGCGGCGAAGATCGACGCCACGGCGAGCAAGCCCTACGACCG  
CAGCCGCTTCGAAAGCCTGTGGTGGAACAGTTTCGACGATCCGACCCTGAACCAGTTGGT  
CGAACAGTCGCTGAGCGGCAACCGCGACCTGCGCGTGGC

> oprN (Q9I0Y7)

TTCTTCGTGCTGGCCGCCAGTACGAGAGCTGGAGCCTACCGCTGGCGGTGATCCTGATC  
GTCCGATGACCTCGCTGTGTCGGCGATCACCGGGGTGATCCTGGCCGGCAGCGACAACAAC  
ATCTTTACCCAGATCGGCCTGATCGTTCTGGTGGGGCTGGCGTGCAAGAACGCGATCCTG  
ATCGTCGAGTTTCGCCAAGGACAAGCAGGAGGAAGGCATGGACCGCGTCGCCGCGGTGCTG  
GAAGCCTGCCGCTGCGCCTGCGGCGGATCCTGATGACGTCCATCGCCTTCATCATGGGT  
GTGGTGCCGCTGGTGTCTCCACCGGCGCCGGCGCCGAGATGCGCCATGCGATGGGCGTG  
GCGGTGTTCTCCGGGATGATCGGGGTGACCTTCTTCGGCCTGCTGCTGACGCCGGTGTTT  
TACGTCTCATCCGCCGCTTCGTGGAGAACC CGGAAGCGCGCCGCGCCGCCAACGACAAA  
GGCCTGCCAGAGGTGCATGCA**ATGA**TTACGCGCAGTCGATCCGGAGCGGGCTCGCGTCCG  
CCCTGGGTCTGTTCA GTCTGCTGGCGCTCAGCGCCTGCACGGTGGGTCCGGACTACCGGA  
CCCCCGACACCGCGGGCGGCGAAGATCGACGCCACGGCGAGCAAGCCCTACGACCGCAGCC  
GCTTCGAAAGCCTGTGGTGGAACAGTTTCGACGATCCGACCCTGAACCAGTTGGTCGAAC  
AGTCGCTGAGCGGCAACCGCGACCTGCGCGTGGCCTTCGCCCGCCTGCGCGCCGCCCGCG  
CCCTGCGCGACGACGTGGCCAACGATCGCTTCCCGGTGGTCAACAGCCGCGCCAGCGCCG  
ACATCGGCAAGGGCCAGCAACCGGGAGTGACCGAGGACCGGGTCAACAGCGAGCGCTACG  
ACCTTGGCCTGGATAGCGCCTGGGAGCTTGACCTGTTTCGGGCGCATCCGCCGTCAGCTGG  
AGTCCAGCGACGCCCTCAGCGAAGCGGCCGAGGCCGACCTGCAGCAACTGCAGGTCAGCC  
TGATCGCCGAGCTGGTGGACGCCTACGGCCAAC TGCGCGGCGCGCAACTGCGCGAGAAGA  
TTGCCCTGAGCAACCTGGAGAACCAGAAGGAGTCGCGCCAGCTCACCAGCAACTGCGCG  
ACGCCGGGGTCGGTGCCGAAC TCGACGTACTGCGCGCCGATGCGCGCCTGGCGGGCCACCG  
CCGCCAGCGTGCCGCAACTGCAGGCGGAAGCCGAGCGCGCCAGGCACCGTATCGCCACCC  
TCCTCGGCCAACGGCCGGAAGAGTTGACAGTGGAACCTTTCGCCGCGCGACCTGCCGGCGA  
TCACCAAGGCCCTGCCGATCGGCGATCCCGGCGAAGTCTGCGCCGCCGGCCGGACATCC  
GCGCCGCCGAACGGCGCCTGGCCGCCAGCACCGCCGACGTGCGCGTGGCCACCGCCGACC  
TGTTCCCGCGGGTCAGCCTCAGCGCCTTCTCGGCTTCACCGCCGGGCGGGGCTCGCAGA  
TCGGCTCAAGCGCCGCCCGCGCCTGGAGCGTCGGCCGAGCATCAGTTGGGCCGCCTTCG  
ACCTCGGCAGCGTGCGTGCCCGCTGCGCGGCCCAAGGCCGACGCCGACGCCGCGCTGG  
CCAGCTACGAACAGCAGGTGCTGCTGGCCCTGGAAGAATCGGCGAATGCCTTCAGCGACT  
ATGGCAAGCGCCAGGAGCGCCTGGTCTCGCTGGTCCGCCAGTCGGAAGCCAGCCGCGCCG  
CCGCGCAACAGGCGGGCATCCGCTACCGCGAAGGCACCAACCGATTTCTGGTGCTGCTGG  
ACGCCGAACGCGAGCAACTCTCCGCCGAAGATGCCCAGGCCCAGGCCGAGGTGCGAGCTGT  
ACCGCGGCATCGTGGCGATCTACCGCTCCCTCGGCGGTGGCTGGCAACCCAGCGCC**TGA**A  
CCGGCTATCCCCCGGCCGATGGAAATCGGCCACTCCAGCCCCGCGATTGCAGCTCCTGGT  
CGCGGGGCTTTTTTATGCGCAGCGCGGGGGCTCGGTCGAGCCCCACGTCGTTTCTCGGCG  
ATGGCGTAGAGGCTCGGCGGCCATTGCCGCGGG**GTATTCCGCGCGCTCCGGCTGCGCGGA**  
**GTGGATATACAGGGTGTAGGTATCCGCGCGCGGGGCGCGCCCGCCAGGTCGAGGGCATG**  
**ACCGATGGC**

> czcC (Q9I0W0)

ATAAAGTATGGATTCAATTTGCAAGTAAATGTTTAAAGTGCATTGCTATAAAGTTACATTT  
GGGCGTTGCTGATAGAATCCTGGAAATGTAATTTTATATCGTTGCGCTGCTTCGATGA  
TAATTATCGAATGACCGGGTAGTTCTCCCGGAGACCGCTGAGAACTTTGGAAATGTCC  
GCGGCGCAAGCACCGCTGGGCGTGAGGGGCAATGCCTTTTGTAAGCGCATGTTGCTTTTG  
TCCCTATGTTTCATCCAATATTGCCAGTCTCTTCGAAGGTTGCCGAAGTGTAACCGCTA  
ATTGTCCGTGGAGAATATTCATTACCGACTTGTAATTCTTCGTCACCTTGCCGATAAGC  
CCCGCTACCTAACATCTGCCGCATCCCGGAAGTGCAACTTCGAATATCGCCGGCGAGATA  
TCGCCGATGAACGGTTGCGTGGTTCCGGGCCGGTAATGGATCGCCGTCGCCGACGACGAT  
CAGCAGACGAGGAGCGGAAC**ATG**CCGATACTTCGGCCACTGGCCAGCGCGGGGAAACGCG  
CCTGCTGGCTACTGATGGGACTCTGCCTGGGCCTGCCGGCCCTGGCGAACGAGGCGCCGG  
TGAGTTTCAACGGCACTTCGATCAGCCTCGAGCAGGCGTTGGAGCGGGCCCTGCGGAGCA  
ACCCCGAGCTGGCGGCGGTGGGGCGCGAGACCGAGATCGCCAGCGGCGCGCGGCAGCAGG  
CCGGGCTGATCCCCAACCCGATCTGTCTTGAGCGTCGAGGACACCCGCCAAGGCAATC

GCCAGACCAGCGTCAGCATCGCCCAGCCGCTGGAGCTGGGCGGCAAGCGCGGTGCGCGGG  
TGGAGGTGGCGAAACGCGGCAGCGAGATCGCCTGGACCCAAGTGAAGTCCGTCGCGCCC  
AACTGCGCGCCCAGGTCCGCGGCGCCTACTACGCGGCGCTGACCGCGCAGGAGCGGGTGC  
GCCTGGCGAAGACCTCCCTGGACCTGGCCAGGCGCGCGCTGCAGGCCGCCGACCGACGGG  
TCAAGGCCCGGCAGCATCTCCTCGGTGGAACGGGTTCGCGCCCCAGGTCTTGGCGGACAAACG  
CCCAGCTCGACCTGAGCCAGGCGGAGCTGGAGCAGCAGCGCACCTATGTGCAGCTGTCTGA  
GCACCTGGGACGAGCCGAGCCAGGCTTCGCCAGGGTCGGCGGCGCGCTCGACGCGGTGC  
CGGCGAGCATCACCCGTGGCGCCTTGCTGCGCCATCTCGACGAGTCGCCGACCTGCGCC  
TGGCGGCCCCAGGAGGTAGCGCGCGGCGAGGCCAGGTTCGACCTGGAGAAGCGCCAGCGCA  
TCCCCAACCTGACGGTCAGCATCGGCAGCAAGTACGACCAGACCGCCCCGCGACGGACGTG  
GCGAACGGGTCAACCTGATCGGCCTGTCTGATGCCGCTGCCGCTGTTTCGACCGCAACCAGG  
GCAACATCTACGCCGCCAGAGCCGCGCCGACCAGGCCCGCGACCTGCAGCGCGCGCACCC  
TGCTGCGCCTGCGCAGCGAAGCGGTACAGGCCCTACGACCAGTTGCGCACCTCGGAACAGG  
AGCTGGCGCTGGTCCGTGCGACCTGCTGCCCCGCGCACAGAGCGCGCTGGACTCGATGA  
CCCGCGGCTTCGAGATGGGCAAGTTCAACTTCCTCGACGTGCTCGATGCCAGCGCACCC  
TGGTCGGCGTCCGTGCCCAGTACGTGCGCGCGCTGGACGCCGCGGCACAGGCGCGGGTGA  
GCATGGAGCGCCTGCTCGGCGAAGACATCGGCCACCTCGGCCAGTGAATTTCCGGGGCG  
GGCCGCCGGCGCGCCCCCGAACGGTTTCGGGAGAACAGAATGGGCAAGAAGACGATTATC  
GCGGTGACCGCACTGGCACTGCTCGGCCTGGGCGGCGGTGCCTACCTGGAGCTGGGCGGC  
AAGGCGCCGGCGGCGCGCGCGAAGCGGCCGCCGAGGGCGAGGGCAGCGGACCGCGCGGC  
GGCATGTTGTTGCGCCAGGGCGACCTGACCCTGGAACCTGCTGGTGCCGAGGACGGC

> czcB (Q9I0W1)

CATCGGCAGCAAGTACGACCAGACCGCCCCGCGACGGACGTGGCGAACGGGTCAACCTGAT  
CGGCCTGTCTGATGCCGCTGCCGCTGTTTCGACCGCAACCAGGGCAACATCTACGCCGCCCA  
GAGCCGCGCCGACCAGGCCCGCGACCTGCAGCGCGCGACCTGCTGCGCCTGCGCAGCGA  
AGCGGTACAGGCTACGACCAGTTGCGCACCTCGGAACAGGAGCTGGCGCTGGTCCGTTCG  
CGAGCTGCTGCCCGCGCAGAGCGCGCTGGACTCGATGACCCGCGGCTTCGAGATGGG  
CAAGTTCAACTTCCTCGACGTGCTCGATGCCAGCGACCTGGTCGGCGTCCGTGCCCA  
GTACGTGCGCGCGCTGGACGCCGCGGCACAGGCGCGGGTGAGCATGGAGCGCCTGCTCGG  
CGAAGACATCGGCCACCTCGGCCAGTGAGATTTCCGGGGCGGGCCGCCGCGCGCCCCC  
GAACGGTTTCGGGAGAACAGAATGGCAAGAAGACGATTATCGCGGTGACCGCACTGGCAC  
TGCTCGGCCTGGGCGGCGGTGCCTACCTGGAGCTGGGCGGCAAGGCGCGCGCGCGCCG  
GCGAAGCGGCCGCCGAGGGCGAGGGCAGCGGACCGCGCGGCGGCATGTTGTTGCGCCAGG  
GCGACCTGACCTGGAACCTGCTGGTGCCGAGGACGGCAGCCCGCTCAAGGCCTGGGTTCG  
AGCGCGGCGGCAAGGCGCTGGCGCCGAGGAGGTGGTCTCGGCGCGGACGTCGAGCGTG  
CCACCGGCGAGGTGAGGACCTGCTGTTCAAGGCCAGCGCGCATGGCTGGTGGCCAATG  
CCGGGATCGCCGAGCCGCATGCCTTACCGCGCGCCTCAAGCTGATGGCCGGCAAGCAGG  
GCTACGACTTCGCCTTACCCGCGAGGAGGGCAAGCTGGAGCTGGATGCCGAGCAGATCG  
AGGCCGCCGGCATCACCTCGATACGGCGCGGACGATCAGCCTGGCCCAGGTGGTCTCGC  
TGCCCGGCGAGATCCGCTTCAACGAGGACCGCACCGCGCATATCGTCCCGCGCCTGCCGG  
GGATCGTCGACAGCGTGCCCGCCAATCTTGCCAGGCGGTGAAGCAGGGCGAGCTGCTGG  
CGGTGATCAGCAGCCCGCAGTTGTCCGACCAGCGCAGCGAATTCGCCGCCGCCAGCGCC  
GCCTGAGCCTGGCGCAGAGCACCTACAAGCGCGAGCAGCAGCTGTGGAAGGAGGGCATTTC  
CCGCCGAGCAGGAATTCCTGCTCGCCCGCCAGGGTTTGAGGAAGCCGAGATCGCGCTGA  
ACAACGCGCGGGCGAAGATCGCCGCGCTCGGCGGCAATCCAGCCTGCAGGGCGGCAACC  
GCTACGAGCTGCGCGCGCCGTTTCGCCGGGGTGCTGGTGGAAGAACCTGACCCAGGGCG  
AGCCGGTGAGCGGCACCGCCAACGTCTTACCCCTGTCCGACCTGTCTCGGTCTGGGCCA  
CCTTCAACGTGCCCCGCGCAACTGCTCGGCCAGGTCCGCGTCGGCAGCAAGGTCAAGGTGC  
TCGCCAGGCGCTGGATAGCGAGGTGGAGGGCACCGTGTCTACATCGGCGACCTGCTCG  
GCGAGCAGACCCGCGCGGCCACCGCCGGGTACCCCTGAGCAACCCGAGAGCACCTGGC  
GCCCGGGCCTGTTTCGTTTCCGTGCGAGGTGGCCGAGGCGACCCGCAAGGAAGTCTTGACGG  
TCGCCGACGGCGCGGTGCAGAACGTGACGGCGAGGACGTGGTGTTCGTCCGCGTGCCCG  
ATGGCTTCGTGGTCCAGCCGGTCAAGCTGGGCATCAGCGACGGCCAGCGCTCGAGGTCC  
TCGAGGGCCTGCGCGCCGGCAGCCAGGTGCGCCGCCAGCGGCAGCTTCATCCTCAAATCCG  
AACTGGGCAAGGGCTCGGCGGAACACGGTCACCTGAGTCCCCTCCAGGAGTCTTCGCATG  
TTCGAACGCATCATCAATTCGCCATCGAGCAACGCTGGGTGGTCTGCTGGCGGTGCTG  
GGGATGGCCGGGGTCGGCATCGGCAGCTACCAGAAGCTGTCCATCGACGCGGTCCCGGAC  
ATCACCAACGTCCAGGTGAGATCAATACCGCCGCCCGGCTACTCGCCGCTGGAAGTG  
GAGCAGCGGATCACCTACCCGGTGGAGACCGTCATGGCCGGCCTG

> czcA (Q9I0W2)

CGACCTGTCTCGGTCTGGGCCACCTTCAACGTGCCCCGCGCAACTGCTCGGCCAGGTCCG  
CGTCGGCAGCAAGGTCAAGGTGCTCGCCAGGCGCTGGATAGCGAGGTGGAGGGCACCGT  
GTCCTACATCGGCGACCTGCTCGGCGAGCAGACCCGCGCGGCCACCGCCCGGGTCACCCCT  
GAGCAACCCCCGAGAGCACCTGGCGCCCGGGCCTGTTCTGTTTCCGTGCAGGTGGCCGAGGC  
GACCCGCAAGGAAGTCCTGACGGTCGCGGACGGCGCGGTGCAGAACGTCGACGGCGAGGA  
CGTGGTGTTCTGTCGCGGTGGCCGATGGCTTCGTGGTCCAGCCGGTCAAGCTGGGCATCAG  
CGACGGCCAGCGCGTCGAGGTCTCGAGGGCCTGCGCGCCGGCAGCCAGGTGCGCCGCCAG  
CGGCAGCTTCATCCTCAAATCCGAACCTGGGCAAGGGCTCGGCGGAACACGGTCACTGAGT  
CCCCTCCAGGAGTCTTCGCA**ATG**TTTCGAACGCATCATCCAATTGCCATCGAGCAACGCT  
GGCTGGTCTCTGCTGGGTGCTGGGGATGGCCGGGGTTCGGCATCGGCAGCTACCAGAAGC  
TGTCCATCGACGCGGTCCCGGACATCACCACGTCCAGGTGCAGATCAATAACCGCCGCC  
CCGGCTACTCGCCGCTGGAAGTGGAGCAGCGGATCACCTACCCGGTGGAGACCGTCATGG  
CCGGCCTGCCGGGTTTTCAGGAAACCCGTTTCGCTGTCGCGGCCGGGGATTTCACAGGTGA  
CGGTGATCTTCGAGGAGGGCACCGACATCTACTTCGCCCCGCCAGCAGGTCAACGAACGCC  
TGAGCACGGCGCGCGAGCAACTGCCGGAAGACATCTCGCCGACCCTCGGGCCGATCTCCA  
CCGGTCTCGGCGAGATCTACCTGTGGACGGTGGAGGCCGAGGAGGGCGCGACCAAGGAGG  
ACGGCAGCGCCTACACGCCCACCGACCTGCGCACCATCCAGGACTGGATCATCCGTCCGC  
AGTTGCGCAACGTGAAGGGCGTGGCCGAGATCAACACCATCGGCGGCTACGCCAAGCAAT  
TCCTCATCGCCCCGGATCCGAAGAAGCTCGCGGCCTACAAGCTGACCCTCGGCGACCTGC  
AGAACGCCGTGCTGCGCAACAACGAGAACGTGCGCGCCGGCTACATCGAGCGGCGCGGCG  
AGCAGTTGCTGATCCGCGCGCCGGGCCAGGTCAAGGACATGGACGATATCCGCGGGATAA  
TCGTTTTCCAACGTGACGGCGTGCCGATCCGTATCCGCGACGTGCGCGAGGTGCGCCTGG  
GCAAGGAGCTGCGCACCGGCGCGGCCACCGAGAACGGCCGCGAAGTGGTGCTCGGCACGG  
TGTTTCATGCTGATCGGCGAGAACAGCCGGGAAGTGGCCAGGCGGTGCGCCAGCGCCTGG  
AGGAGATCAACCGGACCCTGCCCAAGGGGGTCAAGGCGATCACCGTCTACGACCGCACCA  
CCCTGGTGGACAAGGCCGTGGCCACGGTGAAGAAGAACCTGGTGGAAGGCGCGGCGCTGG  
TGATCGGCTGCTCTTCTGTTCTTCCTCGGCAACATCCGCGCGGCGTTGATCACCGCCACCA  
TCATCCCGCTATCGATGTTTCACTTCACTTCACCGGGATGGTCGGCAACAGGGTCAGCGCCA  
ACCTGATGAGCCTCGGCGCGCTGGACTTCGGCATCATCGTCGACGGCGCCGTGGTGATCG  
TCGAGAACGCCATCCGCCGCTGGCCACGCCCAGGCCCCACCGGCCGCCAGCTGACCC  
GCGCGGAACGTTTCCACGAGGTCTTCGCGCGTCCAGGGAGGCGCGCCGGGCGCTGGTCT  
TCGGCCAGATCATCATCATGGTGGTGACCTGCCGATCTTCGCCCTCACCGGGGTCGAGG  
GGAAGATGTTCCACCCGATGGCGTTACCGTGGTCACCGCGCTGCTCGGCGCGATGATCC  
TCTCGGTGACCTTCGTCCCGGCGGCGATCGCGCTGTTTCATCACCGGCAAGGTCAAGGAGG  
AGGAGAACTTCGTATGCGCCGCGCGCTGTGGCTACGAACCGGCGCTGCGCTGGGTGC  
TCGGGCACCGCGCGCTGGTGGTTCGGCGGCGCCCTCGGCGCGATCCTGCTCACCGGGCTGG  
TGGCCTCGCGGATGGGCAGCGAGTTTATTCCCAGCCTCAGCGAGGGCGACTTCGCCATGC  
AGGGCCTGCGGGTGCCGGGCACCGAGCCTGACCCAGTCGGTTCGAGATGCAGCAGACCCCTGG  
AGAGGAAGCTGATGGGCAAGTTCCCGGAGATCGAGCGGGTCTTCGCCCCGACCGGGACCG  
CCGAGATCGCCTCCGACCTGATGCCGCCGAACGCCTCCGACAGCTACGTGATGCTCAAGC  
CGCAGAGCCAGTGGCCGGACCCGAAGAAGTCGCGGGAGGCGCTGCTGGAAGAATTGCAGG  
CCGCGGCCCTTGAGGTGCCGGGCAGCGTCTACGAGTTCTCCCAGCCGATCCAGTTGCGCT  
TCAACGAACCTGATCTCCGGGGTTCGCGAGCGACGTGCGGGTGAAGGTCTTCGGCGACGACA  
TGCAGGTGCTCAACGACACCGCGGAGAAGATCTCCAAGGTGCTGCAAGGCATCGACGGCG  
CCTCCGAGGTGAAGGTGAGCAGACACCGCCCTGCCGGTGTGACGGTGGACATCGACCC  
GCGACAAGGCGGCACGCTTCGGCCTCAATGTGCGCGACATCCAGGACACCGTGGCCACCG  
CCCTCGGCGGACGCAACGCCGTTACCTGTTTCGAGGGCGACCGCCGCTTCGACATCGTCA  
TCCGCTGCCGGAACCCCTGCGCGCCGACCTGCCGGCACTGTCCAACCTGCTGATCCCGC  
TGCCGCCGAACAACCTGGCGCGGATCGACTTCATCCCGCTGTGCGACGTGGCGCGCCTCG  
ACCTCTCGCCGGGACCGAACCCAGATCAGCCGGGAGAACGGCAAGCGGCGCATCGTGGTCA  
GCGCCAACGTGCGCGGCCGCGACATCGGCTCGTTCGTGCTGGAAGCGCAACAGAAGCTGC  
AGGACGGGGTGAAGATCCCGGCCGGCTACTGGACCACCTGGGGCGGCCAGTTCGAACAGT  
TGCAGTCCGCCGCCAAGCGCTTGCAGGTAGTGGTGCCGGTGGCGCTGCTGCTGGTGTTCA  
CCTTGCTCTTCGCCATGTTTCAACAACGTCAAGGACGGCCTGCTGGTGTTTACCGGCATCC  
CCTTCGCCCTCACCGGCGGGGTGCTGGCCCTGTGGCTGCGCGGGATAACCGCTGTCGATCT  
CGGCGGCGGTGGGTTTTCATCGCCCTGTCCGGGGTGGCGGTGCTCAACGGCCTGGTGATGA  
TCTCCTTCATCCGCAACCTGTTGCAAGGAAGGACGCGACCTCGACCAGGCGGTGTGGGAGG  
GCGCCATCACCCGCCTGCGTCCGGTGCTGATGACCGCCCTGGTGGCGTCCCTCGGTTTCG  
TGCCGATGGCCCTGGCCACCGGCACCGGCGCCGAGGTGCAGCGGCCGCTGGCGACGGTGG  
TGATCGGCGGCATCCTGTCTCGACCATGCTGACCCTGCTGGTGCTGCCGGTGCTCTATC

GCTGGACCCACGGGCGCGACGCCGGACCGCGCGAGGAGACGCCGGCGGCCGGC**TGA**AGCG  
GGCGCGCAAGCGGGCCGGCAGGGGAAACCTGGCGGCCCTTTTCGTTGGCCGTTGGACG  
GATTCCGTTTCGATTACCGCACGCGATTGCCGGCCCGGATTGTCGCCGGCGGAGGGCTTGC  
GTAGTGTGGGTGGACGTTCCGCGCCCCGGCGCTTGGTGCCGCGCGCGGATAACAACAACGA  
TAGCAGCCTGAGTGTCTTGCCTGCCCATGAATGCCTCCTTGCTCAGCGAGCGCAGCCGGGTGTT  
CGAACG

> czcR (A0A072ZL37)

CCAGGACTTCTCGATCATGGCGCTGATCGGCATCGTGCTGCTGATCGGTATCGTCAAGAA  
GAACGGCATCCTCATGGTCGACTTCGCCATCGTCGCCAGCGCGAGCAGGGCATGAGCGC  
GGAGCAGGCGATCTACCAGGCTGCCTGACCCGTTTCCGGCCGATCATGATGACCACCCT  
GGCCGCGCTGCTGGGCGCGATACCCCTGATGATCGGCTTCGGCACCGGTTCCGAGCTGCG  
CCAGCCTCTGGGCATCGCGGTGGTCGGCGGGCTGCTGGTGAGCCAGGTGCTGACCCTGTT  
CAGCACGCCGGTGGTATACCTGGCCCTGGAGCGGCTGTTCCACCGCGCGGGGCGACGAC  
CTCGGACGGCGGAACCGCTGGGGCGACGGCGAC**ATGA**GGCGTAACGGACACGGCTTTCCCT  
GGACGGCGGCGCGTGGCTAGGATGCAGGCAGGCATGCGTCCCGCCCGGGATGCGAAGGCG  
AACAGAGGATCGGGCGATAG**ATGCGGGTACTGA**TTGTCGAGGACGAGGCGAAGACGGCGG  
ACTACCTGAACCGTGGCCTCAGTGAACAGGGGTTACCGTGGACCTGGCGGACAACGGCA  
TCGACGGTCGCCACCTGGCGCTCCATGGCGAGTACGACGTGATCGTGCTCGACGTGATGC  
TGCCGGGCGTCGACGGCTACGGCGTTCTGCGGGCGTTGCGCGAGCGGCGGCAGACCCCG  
TGATCATGCTCACCGCGCGCGAGCGCGTGGAAGACCGGGTGCGCGGGCTGCGCGAGGGCG  
CTGACGACTACCTGATCAAGCCGTTCTCCTTCCTCGAACTGGTTGCCCGCCTGCAGGCC  
TGACCCGGCGCGGGCGGCAACCACGAAAGCCATTTCGCAGATGCGCATCGCCGACCTGTCCA  
TCGACCTGCTCAGCCGCAAGGTCTTCCGCGGCAACACTCGCCTGGAGCTGACTGCCAAGG  
AGTACGCGCTGCTCTGCGTGCTGGCCAGCGCAGCGGCGAGATCCTATCGAAGACGGCGA  
TCGCCGAACCTGGTCTGGGACATCAACTTCGATAACCGATAACCAATGTCGTGGAGGTGGCGA  
TCAAGCGCCTGCGCGCCAAGCTCGACGGTCCGTTTCGAGAACAAGCTGCTGCATACCATCC  
GGGGCATGGGCTACGTCCTGGAGAACCCTGCGCTGGCGGAGTCGGGC**TGA**GGTGGGCATG  
TCCTTGTCGACCCGCGCTGGCGGGAATGTTTCGCCGGCGCCGCGGTGGTGATCTTCGCCCTC  
ATCGGCACCATGCTCTATTGCATCCTCGACCGCCAGACCGAGCGCCTGCAGCAGGGCGAG  
GTGGACGTGCGCTTCAACATGGTCTCGCGGATGCTCGACCATCCCGACCTGGCCGAGCGC  
TGGCCGCACCTGCAGGGCAAGCTGGACAACCTGAGCCAGGAGTACGAGCTGATCCGTTTC

> czcS (M4NAR4)

GACGGCTGGGACCTGCTCCGCCGCTGCGCGAACGCAGCAGCGCGCGGGTGATGATGCTC  
ACCGGGCATGGCAGGCTGACCGACAAGGTGCGCGGCCTCGATCTCGGCGCCGACGACTTC  
ATGGTCAAGCCGTTCCAGTTCCCCGAAGTCTGGCGCGGGTCCGCTCGCTGCTGCGCCGC  
CACGACCAGGCACCGATGCAGGACGTCTGCGGGTCGCCGACCTGGAGCTGGACGCCAGC  
CGCCACCGGGCCTTCCGCGGCCCGGGTGCGGATCAACCTGACGACCAAGGAGTTCGCCCTG  
CTGCACCTGCTGATGCGGCGCAACGGCGACGTCAACCCGGACGCAGATCATCTCGCTG  
ATCTGGGACATGAACCTTCGACAACGACTCCAACGTGGTGGAAGTCGCCATCTGCCGCCCTG  
CGGGCGAAGATCGACGACGGCTTCGACCTCAAGCTGATCCATAACCATTCGCGGCGTCGGC  
TACGTCCTGGAAGCGCGCCG**ATGA**CGCCACCAGGCCGACTGTCGCTGCGCCTGGCCCTGC  
TGGTCGGCGCCCTCGGCGCGCTGCTGGCCCTGGCGCTCGGCGCGATGGCGCACTGGAACC  
TCGGCCGCGAGCTGGAAGCCCGCGAGCGGGAAAACCTGCAATTGAAGCTGGAGCAGATCC  
GCCACAGCCTGGAAGACGATCTCGACCTGCGCAGCGACCCGGCCGTACAGGCGCATGCC  
TGCAGGACCAACTGGTGGCCACAGCGGCCTGCACCTGAGCATTCCTCGACAGCCGACGC  
GCCAGCCGCTGATGAGCTTCGGCGACCAAGGCCCGCGGCCAGCGTCGCGGCCAACCGCGCGC  
TTCTCGCCCGCTTGAGGCGGACGCCCCGCCAGCCGGTGTTCCAGAGCTGGAGCACCGGCA  
ACGACCAGCGCCTGCTGAGCATCGGCGCTTCCATGCGCATGAAGAACGGCACCCCGGTAC  
AGGTGTTGCTGAGCAGCGAGCGCAACGCCGACGAGCGCCTGCTCGACGGTTTCCTCCGCG  
CCACCCTGCTGGCCCTGCCCTTCTCCTGCCATTGATCGCCCTGGCCGCTGGTGGGTGG  
TGCGTGCCGGCCTCGAACCGTTGAACCGCTTCGCGCGGGTGGCCGCCAGGTCAGCCCGC  
AGGATCTCTCCTACCGCATCCCCGAGCAGAACCTGCCGCGCGAGCTGGACAGCCTGGCCC  
GCAGCTTCAACCACATGCTCGGCCGCCTCGAGGATGGCGTACGCCAGCTCTCGCAGTTCT  
CCGACGACCTGGCCACGAACTGCGCGCGCCGATCTGCAACCTGCTGGTGCGCAACCAGG  
TGCTGCTCAGCCAGCATCGCGACAGCGCGGCATACCGCGAAGCCCTGGAGTCCAATGCCG  
AGGAACTGGAGCGGCTGTGCGGGATCGTCAACGACATGCTGTTCCCTGGTGAGGTGGACA  
ACCCGGCGATCCAGGCCAGTTTCGGCTGCGTCGCCCTGCACGAGCAGGCGGCCAAGGTCA  
TCGACCTGTACGAGATGGTCGCCGAGGACAAGGGCGTCGAACTGCGCCTGTCCGGCAGCG  
GCTTCGCCCACGGCGACAACCTGATGATCCAGCGCGCCATTTCCAACCTGGTGTCCAACG

CCGTGCGCCACACCCCGCAAGGCGGGCGCATCGACGTGCGGATCGGGGAGCGCGGGGGC  
ACACCGAGGTGAGGGTCAGCAACGACGGCCCGGCATCCCGCCGAGTACCTGCCGCACC  
TGTTTCGAGCGCTTCTACCGCCGCGCCGGACGCCAGACTGGAGCCCAGGCCGGCACCGGCC  
TGGGACTGGCCATCGTGCAATCGATCATGGCCTACCACGGCGGCCGCGCCGAAGCGGAAA  
GCGTACCGCAGCAGAAGACCCACCTGCGCCTGCTGTTCCCTTCGACGGGCGCTGCC**TGAC**  
GCCGGT**TT**CAGCAACCGGCGCGGGCGCCACAGCCGGTACTCGCCGCAGAAACCGGCCGA  
GGAACAGCGCCAGGCCGAGCGCCAGCAGGGTCCAGGGCGTCCGCAGCGGGGCGCGCTGGA  
GCGGCGGATCGCCGTGCAGCAGGACGAAGCATTGCAGCAGCGCCAGAACATCGCGGCCGA  
CGCCGCCAAGCATGGCCAGGCGGCACAACCAGCCGAGCCAGTAGCCTCGGCGCGAGGGCA  
TTTCCGGAA

> gacA (Q51373)

CATCAGGAAGCAATCTGGATCGTCGGCCGCCCTTGGTCACTGGGAATCGCCCTGGAGCGT  
CTGGCTGAGGAATACCCTCGTTTCGCCTGGTGCCGAATGCCAGTCGCAGGCGCCTCCACCA  
GCGTCTTTTACCGGTGTGGTGAGATGGCCGCACAGTAGCCGCCGGTGCCAGTGGCGTC  
TTGGTCGCCTGTTTCGACTTCGGCGATGGTCGCTATGGAGAAGTCCCGGGCAACCAGGGT  
GCTTGCGCTTTACCAGGCCCGGCGTCGCTGGGCTCTCCACAGGTTCGCCGGTTTTTGTCTG  
CGATCCGGTCTGCCGCTCGCCGGGGGCTGGCGGTATACTTAGCAGCGCCCGTTTCGATGCC  
GTCGAATGATGTTTCCATGACGCTTGATTTATGACGCCTTTGCGCCAAGCTAGGTCATGG  
GATGGCTTTCTGTAAAGGTTGCCGAAATCTCCTGGGGGCCCCGTGTGGGCGGTTGTCTGCT  
AATGCGCGACGAGGTGCAGC**GTG**ATTAAGGTGCTGGTGGTCGACGACCACGATCTGGTAC  
GCACCGGTATTACCCGCATGCTGGCCGACATCGAAGGCTTGCAAGTGGTCGGCCAGGCCG  
ACTGCGGTGAAGACTGTCTGAAACTGGCCCCGCAACTGAAGCCGGATGTCTGCTCTGATGG  
ACGTGAAGATGCCCGGTATCGGCGGCCTGGAGGCGACCCGCAAGCTGCTGCGCAGCCAGC  
CCGACATCAAGGTGCTGGTAGTCACCGTCTGCGAAGAGGATCCGTTCCCCACCCGCCCTCA  
TGCAGGCCGGCGCCGCCGGCTACATGACCAAGGGCGCGGGGCTGGAGGAAATGGTCCAGG  
CGATTTCGCCAGGTCTTCGCCGGCCAGCGCTATATCAGCCCGCAGATCGCCAGCAACTGG  
AGATCCAGATCGCCCTGATGATCGCCAACATGCCACAAGGTGCAGAGCATCTCCGACAAGC  
TGTGCCTGTGCGCGAAGACCGTGAATACCTATCGCTACCGCATCTTCGAGAAGCTCTCGA  
TCACCAGCGACGTGGAAGTGGCGCTGCTCGCCGTCCGCCACGGCATGGTCGATGCCGCCA  
GCT**TAG**ATGAGCGCCGTTTTTCGACGCGAGCGCCTTCTCTGCTACCTGTAGCAATCGTCCGG  
GCGTCTACCGCATGTTTCGATGCGGAGGCCAAGCTTCTCTACGTGGGCAAGGCGAAGAGCC  
TGAAGAAGCGCCTGGCCAGCTATTTCCGCAAGTCCGGCCTGGCGCCGAAGACCGCTGCGC  
TGGTGGCGCGCATCGCCAGGTGGAACCACCATCACCGCCAATGAAACCGAGGCGTTGC  
TGCTGGAGCAGACGC

> ftsK (Q9I0M3)

TTGCAACTCGGCGGTGTGGATGTGGTTCGTAGACGATCTCGGTGTGCGAAACGCTCGGCGTG  
CTGCTGCATGCGGGTCATCAGCGCCGGGCGGGTAAGGCCTTCGACGTCGCCCCGGCCAGTT  
GTCGACTTCGGTGGTGGTGGTCAGCTGGCCGCCTGGCTGGATGCCGGTGATCACCCTGG  
CTTGAGATTGGCGCGTGGCGGTACACGGCGGCGGTATAGCCGGCCGGACCGGAGCCAG  
GATGATGAGGCGCGAATGCTTGACTTCACTCATAAAAAGACTCCATAAGCCTTTGTACACA  
TAAGAAAATGCGTGCTCCAATGGAGCCGCCTGAAGAGTTCTGCCGGCTATGCTACACCTA  
TCCGCAAAAGGCCGCAAAACCCCGGGGCGGGATCAGCCACGCACGGATTGCCGCTGAT  
TTCGGGTGTGATTTTTTCAGAGTTTCCCTAAAGCCGTACAATAGGCGCGTTTTGACCAAGA  
CAGCTTCTAAAGCACCAGCC**GTG**CGCAGGAAAAATAGCGATTTGAAGGATTTCGACCACCG  
CGAGCCATGCCGCCGCATGGCGTCAGCAACTGCATTCCCGCCTGAAGGAAGGGGTCTGTA  
TCGCGCTGGGCGCGCTCTGCCTCTACTTGTGGATGGCTCTGCTCACCTATGACTCGGCCG  
ATCCGAGCTGGAGTCACTCGAGCCAGGTTGACCAGGTGCAGAATGCCGCCGGTCCGGCTCG  
GTGCGGTATCCGCCGATATCCTGTTTCATGACGCTCGGCTACTTCGCCTACCTCTTTCCGC  
TGTTGCTGGGCATCAAGACCTGGCAGGTATTCCGCCGCCGCAACCTGCCGTGGGAATGGA  
ACACCTGGCTGTTTTCTGGCGCCTGGTCGGGCTGATCTTCTGATCTTGCCGGCTCGG  
CACTGGCCTACATCCATTTCCACGCCAGCGGCCACATGCCGCCAGCGCTCGGCCGGCG  
GCGCCATCGGCCAGAGCCTGGGCCGCGTCGCGGTGGATGCGCTGAACGTGCAGGGCAGCA  
CGCTGGTGTCTTTCGCCCTGTTCTCTTCGGCCTGACGGTGTTTCGCCGACCTCTCTGGT  
TCAAGGTGATGGATGTACCCGGCAAGATCACCTGGACTTCTTCGAACTGATCCAGAAGC  
CCTTCAATCGCTGGATGGGCGCGCGCCGAGCGCAAGCAACTGGTCGCGCAACTGCGCG  
AGGTTCGACGAGCGCGTCGCCGAGGTGGTGGCGCCGAGCGTGCCGGACCGCCGCAACAGT  
CCAAGGCCAAGGAGCGCCTGCTGGAACGCGAAGAGGCCCTGGCCAAGCACATGAGCGAGC  
GGGAGAAGCGCCCGCCCGCAAGATCGATCCGCCACCGTCGCCGAAGGCCCGGAGCCGA

GCAAGCGCGTGTCTGAAAGAGAAGCAGGCGCCGCTGTTTCGTCGATACGGCGGTGGAGGGCA  
CCCTGCCGCGCGTGTCTGCTGCTCGACCCGGCGGAAGTGAAGCAGAAGAGCTACTCGCCCC  
AGTCGCTGGAGGCGATGTCTGCGCCTGCTGGAGATCAAGCTGAAGGAGTTCGGCGTCGAGG  
TCAGCGTGGACTCGGTGCATCCGGGCCCCGTGATCACCCGTTTCGAGATCCAGCCCGCGG  
CGGGGGTCAAGGTTCAGCCGCATTTCCAACCTGGCCAAGGACCTGGCGCGCTCGCTGGCGG  
TGATCAGCGTGGGGTGGTGGAAAGTGATTCCCGGCAAGACCACTGTCTGGCATCGAGATTC  
CCAACGAAGACCGGCAGATGGTGGCTTCTCCGAAGTGCTGTCTGTCGCCGGAGTACGACG  
AGCACAAGTCCACCGTGCCGCTGGCCCTGGGCCACGACATCGGCGGTTCGGCCGATCATCA  
CCGACCTGGCGAAGATGCCGCACCTGCTGGTGGCCGGTACCACCGGCTCCGGTAAGTCGG  
TGGGGGTCAACGCCATGCTCCTGTCTGATCCTGTTCAAGTCCACGCCGAGTGAGGCGCGAC  
TGATCATGTATCGACCCGAAGATGCTCGAACTGTCTGATCTACGAAGGGATCCCGCACCTGC  
TCTGCCCGGTGGTACCGACATGAAGGAAGCCGCCAACGCCCTGCGCTGGAGCGTGGCGG  
AGATGGAGCGGCGCTACCGCCTGATGGCGGCCATGGGCGTGCACAACCTGGCTGGCTTCA  
ACCGCAAGGTGAAGGACGCCGAGGAGGCCGGCACGCCGCTGACCGACCCGCTGTTCCGTC  
GCGAAAGCCCGGACGACGAGCCGCCGAGCTGAGCACCTGCCGACCATCGTGGTGGTGG  
TCGACGAATTCGCCGACATGATGATGATCGTCGGCAAGAAGGTTCGAGGAGCTTATCGCCC  
GTATCGCGCAGAAGGCGCGGGCGGCCGGTATCCACCTGATCCTGGCGACCCAGCGGCCGT  
CGGTGGACGTGATCACCGCCTGATCAAGGCCAACATTCCGACCCGGATCGCCTTCCAGG  
TCTCCAGCAAGATCGACTCGCGCACCATCCTCGACCAGGGGGCGCCGAACAACTGCTCG  
GCCACGGCGACATGCTCTACCTGCCGCCGGGCACAGGCCTGCCGATTTCGCTACACGGCG  
CCTTCGTTTCCGACGACGAGGTGCACCGGGTGGTCGAGGCCTGGAAGCTGCGCGGCGCGC  
CCGACTACATCGAGGACATCCTCGCTGGCGTTCGACGAAGGCGGCGGCGGTGGCGGTTCT  
TCGATGGCGGCGACGGCTCCGGCGAAGGCAGCGAGGACGACCCGCTCTACGACGAGGCGG  
TACGTTTCGTCACCGAGAGTCGCCGGGCATCGATCTCCGCCGTGCAACGCAAGCTGAAGA  
TCGGCTACAACCGCGCCGCGCGGATGATCGAGGCGATGGAGATGGCCGGCGTGGTCACCC  
CGATGAATACCAACGGCTCCCGCGAAGTCATCGCGCCGGCGCCGGTTCGTGAT**TGA**ACCC  
GACAGGTTTTAGAGGATTCCGATGCGACTGATCCGCACGTTGTTTCGTTGCCGCCCTGGCC  
ATGGCGCTTCGCTGGCCCATGCGGACGACGCGCCGCGCTCCAGCGCCTGACCGGCCCTG  
CTGAACAAGGCCAGACCCGACCGCGCGCTTTTCCAGCTGACCCGAGCGGTAGCGGC  
ACGCGCCTGCAGGAAACCGCCGGCCAACCTGAGCCTGAAGCGGCCGGGACTGTTCCGCTGG  
CATACC

> sagS (S6AG12)

GCCTCCACCACGCGGGGAGGTGGGCCAGGTGGTTCGCTTCGATCTCGATCAGGCGCAGG  
CCCGCGCCGGCGTGTTCGGCCAGCAGCGCGCGCACCAAGGAAGACTTGCCGGTGCCACGG  
GCGCCCCAGAGCAGCGCGTGGTTGGCCGGCAGGCCATCGACGAACAGCGGTATTGGCG  
GCAAGCTGCTCGCGCTGCCTGTCTGACGCCGATCAGGTTCGGCCAGGGACAGGTCCAGGCTC  
ACCTCCAGCGGTTGCAGGTAGCCGCTGCGGCCGTCGCGATGCCAACGCGCGGCCAGGCTC  
TTCTGCCAGTCGATCTCCGGACGGATCGCCGGCAACAGGGGTTTCGAGGCGCGCCAGCACC  
GCATCGGCGCGCTCGAGAATTTCTATACAGACGGGAATCCACGTTCAACTCCTTGACTCAG  
CCGCAGTCACCAGGCGCTGCCGGCAGACCGGATAGGCTATGCTTGGCAAGCCCTCGGAAC  
AAGGCCAAATCCTACGCCCC**ATG**GATATTCCGCTGACAAAACGGCTGTCTGTTCAAGCAGG  
CCAGCCTCACGGTGTCTGGTGGCGTTCATCCTCGGCACCATCCTCAGCGTCATCCAGGTCC  
CCAGCGACTACTTCAACGAAAACGCCCTCGATCGACCGGGAGATCAAGGCGCTGCTGGAAA  
TCTCCCACAGCCCCGCGGCACGCATCGCCTACAACATCGACGCCGAGCTGGCCCAGGAGC  
TGGTGTCTCGGCCTGTTTGCCTCGCCGGCGGTGATCCGCGCCGAGATCATCGACAACAATG  
GCGCGGTGCTGTCCAGTGTCTAGCCGCCCGCGCACCGAGAGCGACTTCCGCATCTTCAGCG  
ACTACCTGTTTCGGCGAACGCCGCGAGTTCGAGGACCCGCTCTACATCGTCCACGCGCCCA  
ACGAAACCCTCGGCGTACTGCGCCTGGAGGTGGACACCTTCGCCTTCGGCAACCACTTCC  
TGCGCCGCGCCATGTTACCCCTGCTCAGCGGCTTCGTGCGCAGCCTGCTGCTGTCTGCTGA  
TCCTCCTGGTGTCTTCTACAGCATGCTGACCAAGCCGCTGGTGGAGCTGATCCGCGCCC  
TCAGCGAACGCGACCCGCGCGCCGCGCCGGAAGCCAAGCTGCCCTGCCCGCCGGCCACG  
AACAGGACGAGATCGGCGTACTGGTGGAGGTTCATCAATCGGCAACTGGCCAGCCTGTCCG  
CGGAAATGCAGCAGCGCCGCGAAGCCGACCGCGCTCAACCAATACCTGGCGGAGCTGG  
AAAACATCGTGTCTGGCGCGCACCGCCGAGCTGAAGGCCGCCAACAGCCGCTCAGCCGCT  
ACAACCAGGAACCTGGAAGCCGCGCGCGGCCACCGCCCTGGAAATGGCCAAGGCTCGCGCCG  
CCTTCTCTGCCAACATGAGCCACGAGATCCGCACCCCGCTCAATGGCCTGCTGGGCATGC  
TCGACCTCGCCATCGACGGCCCGCTGAACAACGAGCAGCGCCGCCAGCTGCAGATCGCCC  
ACAACCTCCGGCAGCGTGTCTGGTGGAGTTGCTCAACGACATCCTCGACCTGTCCAAGTTCG  
AGGCCCGCCAGCTGGAGCTGGAGCAGATCCCTTCGACCTCGGCACCCCTGCTGGAAGACA  
CCGCCAACCTGCTCTCGCAGAACGCCGGGGCGGAGGTGGAGCTGACCTGCCTGATCGACC

CGCAGCTGCCGGCGCTGCTGGTGGGCGACCCGACGCGGGTGCGCCAGGTGGCCAGCAACC  
TCTTGTCCAACGCCCTCAAGTTCACCCGCTCCGGGCGCGTCGACCTGCGGGCCGCACCGA  
GCCCCGGCGGGCGTGCTGATCAGCGTGCGCGATAACCGGTATCGGCATCTCCGCGCAGGCAT  
TGCCCAAGCTGTTCCAGCCCTTCTCCCAGGGCAACGCGGGCATCACCCGGCAGTTCGGCG  
GCACCGGCCTCGGCCTGGCGCTGACCCGGCACCTCTGCGAAGCCATGCAGGGCCAGCTGG  
ACGTCAAATCCCAGGAAGGCATGGGCAGCGTGTTCAAGTGCCGAAGTGCCTGGTGGAAAC  
ACACCTCGGCCGAGCGGCGAGCGCCGCTACGGGGCAAGGTGATCGCCCTGTGCGACGCCA  
AGAGCGGCCTGGCCGAGATGCTCGGCACCTGGCTGCCGTTATGGGGGCTGGAGCTGCAGC  
GCCATGACGGCGACTTCGACCTCAGCGGCGTGAGGCGGACCTGCTGATCAGCGACGACC  
CCGAGCGCCTGGAGCCTTTGCGGCGCACCGGCCAACTGCCGATCCTGCTGGTGACCGGTT  
ACGACAGCTTCCTGCGGCCACCCCGTGCGGCCACCCCTGACACCGCTGCACCAACTGGCTC  
GCCCCGTATCCCGCGCGGCGCTCTACCAGGCCCTGCAACGGGTGCTGCTGCAACTCCCGG  
AGGAGGCGCCGGCGCCGAGACGGCAATGGCCGAACCCAGCACCGCCATGCGCGGGTAC  
TGCTGGTGGAGGACAACGCGGTGAACCAGCTGGTGGCCAAGGGCATGCTCGCCAAGCTCG  
GCTGCGAGGTGCTGCTGGCGGGACATGGCGCCGAGGCCCTGAGCCGCTGGAAACAGAGCA  
CCGTGGACCTGGTGTGCTGATGGACTGCAACATGCCGGTCATGGATGGCTACGAGGCGACCC  
GGCGCATCCGCCAGAGCGGGCGCTGGCCGGACCTGCCGATCATCGCCCTGACCGCCAACG  
CCCTGCCGGACGAACGCGAGCGCTGCCGCGCCCGGCATGGACGACTACCTGGCCAAGC  
CCTTCCGTCGCGAAGAGCTGGTGGCGCTGCTCGACACCTGGTTGCCCGCTACTCAGGCAG  
TCCCATGAGCTGGCCCAACAGCTCGCCCAGGCGCGCGCGCAGTTCGGCCATCTCGTTGAG  
ATCCAGGCCGCTGGCGCAGATCAGCTCATTGCGCAGGGGTCCACCTTGCCGCGCAGGGC  
GGCGCCCTCCTCGCTCAGCGCCAGATGCACTTCGCGCTCGTCTGGGCGGCGCGCCGGCG  
CCGACACGAGCCCGAGTTGCTCCAGGCGCTTGAGCAGCGGCGTGAGGGTTCCCGAGTCCAG  
CAACAGGCGCTCGCCCCAG

> ladS (Q9HX42)

ATCTCGGCCACCGTGTGACCATCTCCAGCGAACCGAGCATACCCAGCTTGACCGCCGCG  
ACGGGCAGGTTCGGCGAGTACGGCGTTGGCCTGGGCCAGCACCCACTCGCGGTTCGAGGACG  
CGGAAGTCGCTGACGTTGACGGTGTCTTGCACGGTCAGCGCGGTGACCGCCGGGGCGGGCG  
TGGCAGCCCTGGGCGAGCAGGGCTTCGATGTGCGCTTGCAGTCCGGCGCCACCACTGGGG  
TCGTGACCGGACAGGCAGAGCACTACGGGGCGGGAAGTCGGTGTTCATGGCGCGTGAG  
CTTACCCTAAAAGCGCTTCGTGGCGGCTGCGCGGACGACCTTCGGGCACCGCGCCCCG  
GCCCTGCGTGACACGTCCCGGGCCTGACGTGGCGTGGCGTGTGCTAAAGTTTCGGCGAATA  
TTCATACAACGCTCGCCAAGGGCGGACCATGACAAGGGAGGTGGGGCTCCCGGTCCGTTT  
GAGGAGCACTGCGGGGCATCATGCGGCACTGGCTGATTCTCTTTCTTCTTTCGCTTGCCGT  
GCCTGGCGGGTTCGGGTGAGCTTCAACGAGCAGGTTCGAGCGCTGCGCTGGGGCAGTCCA  
TCGACGTGTTTCGAGGACGTGCGCGGTAGCGCCGATATCAACGACATCACCTCGCGGGCCA  
TCGACAGCAGCTTCCGCCGCCATGACAAGGACGTGCTCAATGCCGGCTATTTCGCGCTCGG  
TGTTCTGGTTGCGCCTGGACCTGGACTACCGGCCGGTTCGCTCCAGCGATCCGCGCACCT  
GGCTGCTGGAGCTGGCCTATCCGCCGCTGGACAAGCTCGACCTCTACCTGCCCCGATGGCC  
AGGGCGGCTACCGCCTCGCCAGCGCACCGGCGACACATTGCCGTTTCGCCAGTCGGCCGA  
TCCGGCAGAACAACCTACCTGTTTCAACTCGGCCTCGAGCCGAACAAGCCGAGCGTGTCT  
ACCTGCGGCTGGAAAGCCAGGGGTGATCCAGGCGCCGCTGACCTGTGGTTCGCCCAAGG  
CCTACCTGGAGGAGCAGCCCGAACGCATCTATGTGCTCGGCATCATCTATGGCGTGCTGC  
TGGTGATGCTGATCTACAACCTGTTTTCATCTTCTCAGCGTCCGCGATACCACTATCTCT  
ACTACATCCTCTATATCGCTTCGTTTCGGGCTCTACCAGGTCTCGGTGAACGGCGCCGGCA  
TCGAGTACTTCTGGCCCGACAGCCCTGGTGGGCGAACGCCGCCACGCCATTCTGATCG  
GTTTCGGCGGCGCTGTTTCGGCTGCCAGTTCGCGCGCAGCTTCTTGCATACCCGCGACCACA  
GCGTGTGGGTTCGACCGCGGCTGCTGGCGCTGATGGCGGTTCGGCGCGCTGGTTCATGCTGA  
TGGCGCTGACCATGAGCTACGCCGTGGCCCTGCGCCTGGCCACCTACCTGGCGCTGGCCT  
TCACCGGCCTGATCTTCGCCGCCGCGCATCCTCGCCTGGCTGCGCGGCATGCGCGTGGCGC  
GCTATTTTCATCATCGCCTGGACCGCCTTCTTCTCGCGGCATCGTCAACACCCTGATGG  
TCCTCGGCTACCTGCCGAACATGTTTCTTACCATGTATGCCAGCCAGATCGGTTTCGGCGC  
TGGAGGTGGGCTTGCTGTGCTGGCACTGGCCGACCGGATCAACGCAATGAAGGAGGAGC  
GCGCGCGAATCCTCCAGGAGTCCAGCCGCAAGCTGGAAGCGCTGAACCCAGGAACTGGCCA  
ACAGCAACCGCCTGAAGGACGAGTTTCTTCGCCACCGTCACCCACGAACTGCGCACCCCCGA  
TGAGCGGGGTGATCGGTTTCGCTGGAGCTGATGCAGACGGTGCCGATGGACGTCGAACTCG  
CCGAGTACCAGCGCACCGCCGCCGGTTTCGGCGCGGGACATGATGCGGATGGTCAACGACA  
TCCTCGCCCTCATCGAACTGCAGGCCGGCAAGCTCTACCCGCGCCGCGAGCCGTTTCAGCC  
TGCGCGGCTGTTTCGACAGCCTGCGCGCGCAGTACGCGCCGCGCGTTCGAGGAGAAGGGCC

TGCGCTTCGCCCTGCAACTGGACGACAGCCTGCCGGACACCCTCGAAGGTGATGCCGGCA  
AGCTGGCCCAGGCGCTGGGCTACCTGGTCGACAACGCGATCAAGTTCACCGCCAGGGGCA  
GCGTGACCCCTGCGCGTCGCCGCCGGGCGTACCCATGACGGGGTGGCGCTGCGGGTGGAAG  
TGATCGACACCGGCATCGGTTTTCGACATGGCCGCCGGCAGCGACCTCTACCAGCGTTTCG  
TCCAGGCCGACAGCTCGTTGACCCGTGGCTACGGAGGCCTCGGCATCGGCCTGGCGCTGT  
GCCGCAAGCTGGTGGAAGTCTTGGCGGCGAGCTGACCCACGAGTCCCAGGCCGGGGCAGG  
GCAGCCGCTTCCTCCTGCGCCTGCAACTGACCCAGCCGGCCCAGGGCCTGGCGCCGCCGC  
CGCGGCGCGCCGGCGGGCAGGCGGTGCGGCGTCCCGAGGAGTGACGGTGCTGGTGGTGG  
AGGACAACGCCATCAACCAGTTGGTGACTCGCGGCATGCTGCTCAAGCTCGGCTACCGGG  
TGCGTACCGCCGACAACGGCAGCGAGGCCCTGGAGTTGCTGGCGCGGAGCGGCCGGAC  
GCGTACTGCTCGACTGCCAGATGCCGGTGATGGACGGCTTCGCCACCTGTCGGGCGATCC  
GCGCGCTGCCCGGCTGCGCGGAAGTGCCGGTGCTGGCGTTGACCGCCCACAGCCACAGCG  
GCGATCGCGAGCGCTGCCTGGCGGCGGGCATGAGCGACTACATGGCCAAGCCGGTCAAGT  
TCGAAGAGTTGCAGACCCTGCTGCACGATTGGCTGCTGTGCCAGCCGATCGTCACCAAGT  
CCGCC**TGA**AGCCGTTCCGCGGCTGGCTGAAATGCCGGCCTGCGCGACCTGTATGTCTCTT  
TAGGCAAAGCCTGAAGCGTGATTCACTGGGAAAAAGTGAATCCGGATTCAAGTCATGGTCT  
ATCGTGTCACCGAACGCCGCTGCAACGCGATTCCGCGCTGCGCGAGCGCATCCTCCAGC  
TAGGCCTGCGGCGTGCTGTTGAGGGCGGTTTCGCCGCGCTGACCATGCAGGCCCTGGCCG  
ACGACGCGGGGATTGCCA

> ampR (P24734)

GCTGGCTGGCGCGGTTCGTCGAGGCGCATCTTGTCTGGGTACAGGCATAGCCGGCGAGGG  
TGGCGGTGAAGGTCTTGCTCACCGAGCCGATCTCGAACAGGGTCTCCGGCGTCACCCGGC  
GGCCGTCCTCTTTTCGAGGCCAGCCCATAGCTGAAGTAATGCGGTTCTCCTTTACAGGCTGA  
TGGCTACGGCCAGGCCCCGAATGTCAATTGGCCTTCATCACCGGTTGTACGGCGGCGTCGA  
CCAGTGCCCTTCAGGCGATCCGCCGGGGCCTCGCCGGCAATGGCCGGGGTGGTGGCGAACA  
GCAGTTGGAAGCGGCGATGCCGCACAGGCAAGGGAATCTGGTATCGCGCATGAGGATTG  
GCGTCCTTTTGTGCTGGCTGCATGAGAAACCGCCCCGGGAGCGCTCCTTGATCGGCGGGC  
GGGGAATAATCTAGGCTTGCGCAGGATTTGCGGCAACGACGAATACTCGCGGCAGCCATT  
AGAAAAATTTGGAGCAGAGA**TTG**GTTTCGACCCCATTTGCCGCTGAACGCCCTGCGCGCCT  
TCGAAGCTTCGGCCCCGCACCTGAGCTTCACCCGCGCGGCCATCGAGCTGTGCGTGACCC  
AGGCGGCGGTTCAGCCACCAGGTGAAGAGCCTCGAGGAGCGTCTCGGCGTGGCCCTGTTCA  
AGCGTCTGCCGCGCGGCTCATGCTGACCCACGAGGGCGAGAGCCTGCTGCCGGTGCTGT  
GTGACTCCTTCGACCGCATCGCCGGCCTGCTGGAACGTTTCGAGGGTGGCCACTACCGGG  
ACGTGCTCACCGTCGGCGCGGTTCGGAACCTTCACGGTCGGTTGGCTGCTGCCGCGGCTGG  
AGGACTTCCAGGCGCGCCATCCCTTCATCGATCTGCGCCTGTCCACCCACAACAACCGCG  
TCGACATCGCCGCCGAGGGGCTCGACTACGCGATCCGCTTCGGCGGCGGCGCCTGGCACG  
GCACCGAGGCGCTGGCGTTGTTTCGAGGCGCCGCTGACGGTGCTCTGCTGCCCGGAGGTGC  
CCGCCCAGTTGCACAGTCCCGCCGACCTGCTGCAGCACACCCTGCTGCGCTCCTACCGCG  
CCGACGAGTGGCCGCTGTGGTTCCAGGCGGCCGGACTGCCGGCGCACGCGCCACTGACCC  
GGAGCATCGTCTTCGACACCTCGCTGGCCATGCTCGAGGCGGCCCGCCAGGGTGTTCGGCG  
TGGCCCTGGCGCCGGCGGCGATGTTTGCCCGGCAACTGGCCAGCGAGAGCATCCGGCGTC  
CGTTTCGCCACCGAAGTGAGTACCGGCAGCTACTGGCTGACGCGCTTGACAGTCGCGGGGG  
AGACCAGCGCATGCTGGCGTTCCGGGGGTGGTTGCTGGAGATGGCTGCCGTTGAGGCGC  
GGGGGAGAT**TAA**CGGTTATGCAGGCGATTCAAGTGTCGATGAAGAAGTAATCACCTTCCTC  
GCGCCTTTTTTATACGCTCGGGCCCTCCCAAGGTTGATACGGTTTGAGGCGTTGGGGTT  
GTGATTGGAATTGCTGACGGCGTGGCGGATATGGACCGGCTCGTCGGCGTTGCTGATCGC  
TCCGCTAAGCGTCACTCCAGGCTGGCGGCATAGGCCCGGCGTGCCGCAACGATCTCGCT  
CTCGAGCATGCCTGCTTTCCC

> ampC (P24735)

CCTGGAAGTCCTCCAGCCGGGCGAGCAGCCAACCGACCGTGAAGGTTCCGACCGCGCCGA  
CGGTGAGCACGTCCCGGTAGTGGCCACCCTCGAAACGTTCCAGCAGGCCGGCGATGCGGT  
CGAAGGAGTCACACAGCACCGGCAGCAGGCTCTCGCCCTCGTGGGTGAGCATGAGGCCGC  
GCGGCAGACGCTTGAACAGGGCCACGCCGAGACGCTCCTCGAGGCTCTTCACCTGGTGGC  
TGACCGCCGCCTGGGTACGCACAGCTCGATGGCCGCGCGGGTGAAGCTCAGGTGCCGGG  
CCGAAGCTTCGAAGGCGCGCAGGGCGTTTCAGCGGCAAAATGGGGTTCGAACCAATCTCTGCT  
CCAAATTTTTCTAATGGCTGCCGCGAGTATTCTGTCGTTTGCCGCAAAATCCTGCGCAAGCC  
TAGATTTTCCCCGCCCGCGATCAAGGAGCGCTCCCGGGGCGGTTTCTCATGCAGCCAAC  
GACAAAGGACGCCAATCCTC**ATG**CGCGATAACAGATTCCCCTGCCTGTGCGGCATCGCCG  
CTTCACACTGCTGTTTCGCCACCACCCCGGCCATTGCCGGCGAGGCCCCGGCGATCGCC

TGAAGGCACTGGTCGACGCCGCCGTACAACCGGTGATGAAGGCCAATGACATTCCGGGCC  
TGGCCGTAGCCATCAGCCTGAAAGGAGAACCGCATTACTTCAGCTATGGGCTGGCCTCGA  
AAGAGGACGGCCGCCGGGTGACGCCGGAGACCCTGTTTCGAGATCGGCTCGGTGAGCAAGA  
CCTTCACCGCCACCCTCGCCGGCTATGCCCTGACCCAGGACAAGATGCGCCTCGACGACC  
GCGCCAGCCAGCACTGGCCGGCACTGCAGGGCAGCCGCTTCGACGGCATCAGCCTGCTCG  
ACCTCGCGACCTATAACCGCCGGCGGCTTGCCGCTGCAGTTCCCCGACTCGGTGCAGAAAG  
ACCAGGCACAGATCCGCGACTACTACCGCCAGTGGCAGCCGACCTACGCGCCGGGCAGCC  
AGCGCCTCTATTCCAACCCGAGCATCGGCCTGTTTCGGCTATCTCGCCGCGCGCAGCCTGG  
GCCAGCCGTTTCGAACGGCTCATGGAGCAGCAAGTGTTCGCGCACTGGGCCTCGAACAGA  
CCCACCTCGACGTGCCCCGAGGCGGCGCTGGCGCAGTACGCCCAGGGCTATGGCAAGGACG  
ACCGCCCGCTACGGGTTCGGTCCCGGCCCGCTGGATGCCGAAGGCTACGGGGTGAAGACCA  
GCGCGGCCGACCTGCTGCGCTTCGTTCGATGCCAACCTGCATCCGGAGCGCCTGGACAGGC  
CCTGGGCGCAGGCGCTCGATGCCACCCATCGCGGTTACTACAAGGTCGGCGACATGACCC  
AGGGCCTGGGCTGGGAAGCCTACGACTGGCCGATCTCCCTGAAGCGCCTGCAGGCCGGCA  
ACTCGACGCCGATGGCGCTGCAACCGCACAGGATCGCCAGGCTGCCCGCGCCACAGGCGC  
TGGAGGGCCAGCGCCTGCTGAACAAGACCGGTTCCACCAACGGCTTCGGCGCCTACGTGG  
CGTTTCGTCCCGGGCCGCGACCTGGGCCTGGTGATCCTGGCCAACCGCAACTATCCCAATG  
CCGAGCGGGTGAAGATCGCCTACGCCATCCTCAGCGGCTGGAGCAGCAGGGCAAGGTGC  
CGCTGAAGCGCTGAAGCGCGCTCGCGAGGGCGACGGAGCGTAGCGGCGCGGGACGCCGGT  
CCTGGCTATGATGGTGCCATGAGCGCTTCCCCGCCCCCTCCGCCAGCCCTGCCCGCCCGGC  
GCCTGCGTCTGCGAACGCGAGCGCCTGGAGGCGCCCCGGCGCGGACCGTCGCATCCTCCTC  
CTGACCCGCCAGGAAGAGCAGCGCCTGGCCGCTCGCCTGGAAGCCCTGCGCAGCCTGGAA  
GACCTGGAACACCTGCTGCGGCGC

> mexC (G3XD25)

GTGCGCCTTCGCGCTGCGGGTCGAGGAAGTCCGGGCGGTACTGGAATACCAGGAATACCA  
GCAGCTCGCGGTGGGTGAGGTGTTCTTTGATCAGGCGCTGCAACGCCTCCAGAGGCTCGG  
CATGCTCCAGGTTCGAGGCTGGATGATCTGGTTTCAGTACGGTCTCTCCGTGGTCTCGA  
GCATCTGCACCAGGTTGTCCCGCTGCCGAGAAGCGGTGCAGGGTGGCCTTGCTTACGC  
CGGCCGCTCGGCCAGTTCTTTTCAGCGCTCGCTCGCGGGCGGTTCGACGATAGCGACTGCCA  
GCGCCTTGATGAGTCGCTCGTCATGGGAAATCAGGGTCATCGATGGGTCCCGGTTGGTTT  
TTCTGATTGTGCGCATTGTGCAGAAAACCTGGCCTCGCGTCCAAAGGAATTAGCTGTCAA  
AGATCATTTGAGACAATATTGACTCAATTAGCTCGAAAAAGTACCATTTCGATCCGTTTTTC  
AATCAACGGTCGGGTGTGTCATGCTGATTTGCGTGCAATAGGAAGGATCGGGGCGTTGG  
CTATGGCCATCGCGTTGGCGGGTTGTGGGCCGGCGGAAGAGCGACAGGAGGCCGCCGAAA  
TGGTGTTCGCCGTGGAGGTCTTGACGGTGCAGGCCGAGCCCCCTGGCGCTGAGTTCGGAAC  
TGCCTGGGCGGATCGAACCGGTGCGGGTTCGCCGAGGTGCGCGCGCGGGTGGCCGGCATCG  
TCGTGCGGAAGCGCTTCGAGGAGGGCGCCGACGTCAAGGCTGGCGACCTGCTGTTCCAGA  
TCGATCCGGCACCGCTGAAGGCTGCGGTGTGCGCGCGCGAGGGTTCGAGTGGCGCGGAACC  
GCGCGGTGCTGTTTCGAGGCGCAGGCGCGGGTTCGTGCTACGAGCCGCTGGTGAAGATCC  
AGGCGGTTCAGCCAGCAGGACTTCGATACCGCCACCGCCGACCTGCGCAGCGCCGAGGCGG  
CGACCCGCTCGGCCAGGCCGACCTGGAGACCGCGCGCCTGAACCTCGGCTACGCCCTCGG  
TCACTGCGCCGATCTCCGGGCGCATCGGCCGCGCGCTGGTGACCGAGGGCGCGCTGGTTCG  
GGCAGGGCGAGGCGACGCTGATGGCGCGCATCCAGCAGCTCGATCCGATCTATGCGGATT  
TCACCCAGACCGCGGCCGAGGCCCTGCGCCTGCGCGACGCCCTGAAGAAAAGGCACCTTGG  
CCGCCGGCGACAGCCAGGCGCTGACCCTGCGCGTCGAAGGGACGCCCTACGAGCGCCAGG  
GCGCGTTGAGTTTCGCCGACGTGGCGGTGGATCGCGGCACCGGCCAGATCGCCCTGCGCG  
GCAAGTTTCGCCAACCCCGACGGGTCTGCTGCGGGCATGTACGTGCGCGTACGTACGC  
CCCAGGGCATCGACAACAGGCGATCCTGGTGCCGCAACGGGCCGTGCACCGCTCCAGCG  
ACGGCAGCGCCCAGGTGATGGTGGTGGGCGCCGACGAGCGCGCCGAGTTCGCGCAGCGTTCG  
GTACCGGCGTCATGCAGGGTTTCGCGCTGGCAGATCACCGAGGGCCTGGAGCCGGGTGACC  
GGGTTCATAGTCGGCGGCCTGGCTGCGGTGCAGCCGGGGGTGAAGATCGTGCCGAAGCCGG  
ATGGTGCCAGGCGCAAGCCAGTCACTGCGCCGCAACAGTAAAGGGCGGGTTTCGCCCCG  
AGGATTTTCCGATGTCCGAATTCTTCATCAAGCGGCCGAACCTTCGCCTGGGTGGTGGCC  
TGTTTCATCTCCCTGGCCGGCCTGCTGGTCATTTCCAAATTGCCGGTAGCGCAGTACCCCA  
ATGTGCGCGCCGCCACAGATCACCATCACCGCCACCTATCCCGGCGCCTCGGCCGAAGGTGC  
TGGTGGACTCCGTACACAGTGTGCTCGAGGAGTCGCTGAACGGCGCCAAGGGCC

> mexD (Q9HVI9)

GCACCTTGGCCGCCGGCGACAGCCAGGCGCTGACCCTGCGCGTCGAAGGGACGCCCTACG  
AGCGCCAGGGCGCGTTGTCAGTTTCGCCGACGTGGCGGTGGATCGCGGCACCGGCCAGATCG  
CCCTGCGCGGCAAGTTTCGCCAACCCCGACGGGGTCTCTGCTGCCGGGCATGTACGTGCGCG  
TACGTACGCCCCAGGGCATCGACAACCAGGCGATCCTGGTGCCGCAACGGGCCGTGCACC  
GCTCCAGCGACGGCAGCGCCAGGTGATGGTGGTGGGCGCCGACGAGCGCGCCGAGTCGC  
GCAGCGTCGGTACCGGCGTCATGCAGGGTTTCGCGCTGGCAGATCACCGAGGGCCTGGAGC  
CGGGTGACCGGGTCATAGTCGGCGGCCTGGCTGCGGTGCAGCCGGGGGTGAAGATCGTGC  
CGAAGCCGGATGGTGCCAGGCGCAAGCCCAGTCACCTGCGCCGCAACAGTAAGGGCGGG  
TTCGCCCCGAGGATTTTCCG**ATG**TCCGAATTCTTCATCAAGCGGCCGAACCTTCGCCTGGG  
TGGTGGCCCTGTTTCATCTCCCTGGCCGGCCTGCTGGTCATTTCCAAATTGCCGGTAGCGC  
AGTACCCCCAATGTTCGCGCCGCCACAGATCACCATCACCGCCACCTATCCCGGCGCCTCGG  
CGAAGGTGCTGGTGGACTCCGTACCAAGTGTGCTCGAGGAGTCGCTGAACGGCGCCAAGG  
GCCTGCTCTACTTCGAGTCGACCAACAACCTCCAACGGCACCGCCGAGATCGTCGTCACCT  
TCGAGCCGGGCACCGATCCGGACCTGGCCCAGGTGGACGTGCAGAACCGCCTGAAGAAAG  
CCGAGGCGCGCATGCCGAGGCGGTGCTGACCCAGGGCCTGCAGGTCGAGCAGACCAGCG  
CCGGTTTTCTGCTGATCTATGCGCTCAGCTACAAGGAAGGCGCTCAGCGCAGCGACACCA  
CCGCCCTCGGCGACTACGCCGCGCGCAATATCAACAACGAGCTGCGGCGCCTGCCGGGCG  
TCGGCAAGCTGCAATTCTTCTCTTCCGAGGCGGCCATGCGGGTCTGGATCGATCCGCAGA  
AGCTGGTGGGCTTCGGCCTCTCCATCGACGACGTGAGCAATGCCATCCGCGGGCAGAACG  
TGCAGGTGCCGGCCGGCGCCTTCGGCAGCGCACCGGGCAGTTCCGCGCAGGAGCTGACGG  
CGACCCTGGCGGTGAAGGGCACCCCTGGACGATCCGCAGGAGTTTCGGCCAGGTAGTGCTGC  
GCGCCAACGAGGACGGCTCGCTGGTCCGGCTCGCCGATGTTCGCGCGCCTGGAACTCGGCA  
AGGAGAGCTACAACATTTCTTCGCGACTGAACGGCACGCCCACCGTGGGCGGGGCTATCC  
AGCTGTTCGCCCCGGGGCCAACGCGATCCAGACCGCTACCCTGGTGAAACAGCGTCTCGCCG  
AACTGTTCGGCGTTCTTCCCGGAGGACATGCAGTACAGCGTGCCCTACGACACCTCGCGCT  
TCGTCGACGTGGCCATCGAGAAGGTGATCCACACCCTGATCGAAGCGATGGTCTCTGGTGT  
TCCTTCGATGTTTCTTCTTCTGCGAAGCTCCGCTACACCCTGATCCCGTCCATCGTGG  
TGCCGGTGTGCTGCTGGGTACGCTGATGGTGTGATGTACCTGCTGGGGTTCTCGGTGAACA  
TGATGACCATGTTTCGGCATGGTCTTCGGCATCGGCATCCTGGTGGACGACGCCATCGTGG  
TGGTGGAGAACGTTCGAGCGGATCATGGCGGAGGAGGGGATTTCCCGGCCGAGGCCACGG  
TCAAGGCGATGAAGCAGGTATCCGGCGCCATCGTTCGGCATCACCCCTGGTGCTCTCGGCGG  
TGTTCTCGCGCTGGCTTTTCATGGCCGGTTCGGTGGGGGTGATCTACCAGCAGTTCTCGG  
TGTCGCTGGCGGTCTCGATCCTGTTCTTCGGCTTCTTCGCCCTGACCTTCACCCCGGCGC  
TGTGCGCCACGCTGCTCAAGCCCATTTCCGAAGGGCACACGAGAAGCGCGGCTTCTTCG  
GCGCCTTCAACCGTGGCTTCGCCCCGCTCACCGAGCGCTATTCGCTGCTCAACTCGAAGC  
TGGTGGCGCGCGCCGGACGCTTCATGCTGGTGTACGCCGGCCTGGTGGCCATGCTCGGCT  
ACTTCTACCTGCGCCTGCCGGAAGCCTTCGTGCCGGCGGAAGACCTCGGCTACATGGTGG  
TCGACGTGCAACTGCCGCCTGGCGCTTTCGCGCGTGCGCACCGATGCCACCGGCGAGGAGC  
TCGAGCGCTTCTCAAGTCCCGCGAGGCGGTGGCTTCGGTGTTCCTGATCTCGGGCTTCA  
GCTTCTCCGGCCAGGGCGACAATGCCGCGCTGGCCTTCCCAACCTTCAAGGACTGGTCCG  
AGCGAGGCGCCGAGCAGTCGGCCGCCCGGAGATCGCCGCGCTGAACGAGCATTTTCGCGC  
TGCCCGACGATGGCACGGTCATGGCCGTGTTCGCCGCCACCGATCAACGGTCTGGGTAAC  
CCGGCGGCTTCGCATTGCGCCTGATGGACCGTAGCGGGGTTCGGCCGGAAGCGCTGCTGC  
AGGCTCGCGATACTCTTCTTGGCGAGATCCAGACCAACCCGAAATTCCTTTACGCGATGA  
TGGAAGGACTGGCCGAAGCGCCGCAACTGCGCCTGTTGATCGACCGGGAGAAGGCCCGTG  
CCCTGGGGGTGAGCTTCGAGACCATCAGCGGCACGCTGTCCGCTGCCTTCGGCTCGGAGG  
TGATCAACGACTTCACCAATGCCGGGCGCCAACAGCGGGTGGTGTATCCAGGCCGAACAGG  
GCAACCGGATGACCCCGGAAAGCGTGCTCGAGCTATACGTGCCTAACGCTGCTGGCAACC  
TGGTACCGCTCAGCGCCTTCGTTCAGCGTGAAATGGGAAGAGGGACCGGTGCAATTGGTGC  
GCTATAACGGCTACCCGTGATCCGCATCGTCGGTGACGCCGCGCCCGGCTTCAGTACCG  
GCGAAGCCATGGCGGAAATGGAGCGCCTGGCCTCGCAGCTGCCGGCCGGCATCGGCTACG  
AGTGGACCGGCCTGTCTATCAGGAGAAGGTCTCCGCCGGGACGGCCACCAGCCTGTTTCG  
CCCTCGCCATCCTGGTGGTGTTCCTGTTGCTGGTGGCGCTCTACGAGAGCTGGTCGATCC  
CGCTGTTCGGTGTGCTGATCGTGCCGATCGGCGCCATCGGCGCGGTGCTCGCGGTGATGG  
TCAGCGGTATGTCCAACGACGTGTATTTCAAGGTTCGGCCTGATCACCATCATCGGTCTTT  
CGGCGAAGAACGCGATCCTCATCGTTCGAGTTTCGCCAAGGAACTCTGGGAGCAGGGGCATA  
GCCTGCGCGACGCCGCCATCGAGGCCGCGCGCCTGCGCTTCCGGCCGATCATCATGACTT  
CCATGGCGTTTCATCCTCGGCGTGATACCCCTGGCCCTGGCCAGCGGTGCCGGCGCGGCGA  
GCCAGCGTGCCATCGGCACCGGAGTGATCGGCGGGATGCTCAGCGCCACCTTCTTCGGCG  
TGCTGTTTCGTACCTATCTGTTTCGTCTGGCTGCTGTTCGCTGCTGCGCAGCAAGCCGGCAC

CCATCGAACAGGCCGCTTCGGCCGGGGAG**TGA**ACGAGATGCGCAAACCTGCTTTTCGGCGT  
ATCGGCGCTGCTGATCGCCCTGACCCTCGGCGCCTGCTCCATGGCGCCGACCTACGAACG  
TCCCCGCCGCGCCGGTGGCCGACAGCTGGAGCGGCGCCGCCAGCGCCAGGGCGCGGC  
GATCGACACGCTGGATTGGAAGAGTTTCATCGTCGATGCCGAACACGCCGCTGGTGA  
CATGGCCCTGGATAACAACCGCTCGCTGCGCCAGACCCTCCT

> oprJ (Q51397)

GTGTTCTCTGTTGCTGGTGGCGCTCTACGAGAGCTGGTCGATCCCGCTGTCGGTGATGCTG  
ATCGTGCCGATCGGCGCCATCGGCGCGGTGCTCGCGGTGATGGTCAGCGGTATGTCCAAC  
GACGTGTATTTCAAGGTTCGGCTGATCACCATCATCGGTCTTTTCGGCGAAGAACGCGATC  
CTCATCGTCGAGTTTCGCCAAGGAACCTCTGGGAGCAGGGGCATAGCCTGCGCGACGCCGCC  
ATCGAGGCCGCGCCTGCGCTTCCGGCGGATCATCATGACTTCCATGGCGTTTCATCCTC  
GGCGTGATAACCCCTGGCCCTGGCCAGCGGTGCCGGCGCGGCGAGCCAGCGTGCCATCGGC  
ACCGGAGTGATCGGCGGGATGCTCAGCGCCACCTTCCTCGGCGTGCTGTTCTGTACCTATC  
TGTTTTCGTCTGGCTGCTGTCGCTGCTGCGCAGCAAGCCGGCACCCATCGAACAGGCCGCT  
TCGGCCGGGGAGTGAACGAG**ATG**CGCAAACCTGCTTTTCGGCGTATCGGCGCTGCTGATCG  
CCCTGACCCTCGGCGCCTGCTCCATGGCGCCGACCTACGAACGTCCCGCCGCGCCGGTGG  
CCGACAGCTGGAGCGGCGCCGCCGCCAGCGCCAGGGCGCGGCGATCGACACGCTGGATT  
GGAAGAGTTTCATCGTCGATGCCGAACACGCCGCTGGTGGACATGGCCCTGGATAACA  
ACCGCTCGCTGCGCCAGACCCTCCTGGATATCGAGGCGGCCCGCGCGCAGTACCGAATCC  
AGCGCGCCGACCGGGTTCCGGGCCTGAATGCCGCTGCCACCGCAACCGCCAGCGGCAGC  
CGGCCGACCTGTCCGCCGGCAATCGCTCGGAAGTGGCCAGCAGCTACCAGGTGCGGGCTGG  
CCCTGCCGGAGTACGAACCTGGACCTCTTCGGTTCGGGTCAAGAGCCTGACCGACGCAGCCC  
TGCAACAGTACCTGGCCAGCGAGGAGGCAGCGCGCGCGGCACGGATCGCCCTGGTCGCCG  
AGGTTCAGCCAGGCCTACCTGAGCTACGACGGCGCCCTGCGGCGCCTGGCGCTGACCCGTC  
AGACCCTGGTCAGCCGCGAGTATTCTTCGCCCTGATCGACCAGCGCCGCGCGGCCGGCG  
CCGCCACCGCGCTGGACTACCAGGAAGCCCTTGGCCTGGTGGAGCAGGCGCGCGCCGAGC  
AGGAGCGCAACCTGCGGCAGAAACAGCAGGCATTCAACGCGCTGGTGTGCTGCTGGGTA  
GCGACGATGCCGCGCAGGCGATTCCGCGGAGTCCGGGGCAGCGGCCGAAGCTGCTGCAGG  
ACATCGCTCCCGGCACGCCGTCCGAGCTGATCGAGCGACGTCCGGACATCCTTGCCGCCG  
AACATCGTTTTGCGGGCGCGCAACGCGGATATCGGCGCGGCGCGCGCGGCGTTCTTCCCGC  
GCATCAGCCTGACCGGCAGCTTCGGCACCTCCAGCGCGGAAATGTCCGGCCTGTTTCGATG  
GCGGCTCGCGCTCCTGGAGCTTCTGCCGACGTTGACGCTGCCGATCTTCGATGGCGGGC  
GCAACCGTGCCAACCTGAGCCTGGCCGAGGCGCGCAAGGATTTCGGCGGTGGCCGCCCTACG  
AGGGGACCATCCAGACCGCTTTCCGCGAGGTGCGCGACGCCCTGGCGGCCAGCGATACCC  
TGCGTCGCGAAGAGAAGGCCCTGCGCGCCCTGGCGAACAGCAGCAACGAAGCCCTGAAGC  
TGGCCAAGGCACGCTACGAGAGTGGCGTCGACAACCACCTGCGCTACCTCGATGCGCAGC  
GCAGCAGCTTCTCAACGAGATCGCCTTCATCGACGGCAGCACCCAGCGGCAGATCGCCC  
TGGTCGACCTGTTCCGCGCGCTCGGCGGAGGCTGGGACGAGGGACGGAGCCTGGTGGTAC  
ATCGAGGCGGCAGGAGT**TGA**CGGGGTAAACGTGTGGGAAACGGTGCTAGCGGGTGGCAAC  
TGCCGCCCGCTCAAGGGCTGGCAGGTTGTGCGGGGTTCGACGCGCCACGCAGGAACAGCT  
CCTCCAGCGTGGCGGACAACCCGGCGCTGGCCGCGGACCGCGGCGCTCGGCATCGACCA  
TGCCGTAGATCAGGACGATGAAGAGTTTCGCTGAAGGTGCGCGCGCTGATATCGATACGGA  
ACACACGCTTCTGCTGGCCGCGCAGGAAGA

> nfxB (P32265)

GGTTCCGCGCCAGCTCACCCCTCGGCGCGCGACACCGCAGCCTTCAGCGGTGCCGGATCGA  
TCTGGAACAGCAGGTGCGCCAGCCTTGACGTCGGCGCCCTCCTCGAAGCGCTTCCGCACGA  
CGATGCCGGCCACCCGCGCGCGCACCTCGGCGACCCGCACCGGTTTCGATCCGCCCAGGCA  
GTTCCGAACCTCAGCGCCAGGGGCTCGGCCTGCACCGTCAGGACCTCCACCGGCAACACCA  
TTTCGGCGGCCTCCTGTGCTCTTCCGCCGGCCACAACCCGCCAACGCGATGGCCATAG  
CCAACGCCCCGATCCTTCTATTGCACGCAAAATCAGCCATGACACACCCGACCGTTGATT  
GAAAACGGATCGAATGGTACTTTTTTCGAGCTAATTGAGTCAATATTGTCTCAAATGATCT  
TTTGACAGCTAATTCTTTGGACGCGAGGCCAGTTTTCTGCACAATGCGCACAATCAGAA  
AAACCAACCGGGACCCATCG**ATG**ACCCTGATTTCCTATGACGAGCGACTCATCAAGGCGC  
TGGCAGTCGCTATCGTCGACCGCCCGCGAGCGACGCTGAAGGAACTGGCCGAGGCGGCCG  
GCGTAAGCAAGGCCACCCCTGCACCGCTTCTGCGGCACGCGGGACAACCTGGTGCAGATGC  
TCGAGGACCACGGAGAGACCGTACTGAACCAGATCATCCAGGCCTGCGACCTGGAGCATG  
CCGAGCCTCTGGAGGCGTTGCAGCGCCTGATCAAGGAACACCTCACCCACCGCGAGCTGC  
TGGTATTCTCTGGTATTCCAGTACCGCCCGGACTTCTTCGACCCGCACGGCGAAGGCGCAC  
GCTGGCAGTCTACCTGGAAGCGCTGGACGCCTTCTTCTGCGCGGACAGCAGAAAGGCG

TGTTTCGCATCGACATCACGGCGGCCGTGTTACCGAACTGTTTCATCACCTGGTCTACG  
GCATGGTTCGATGCGGAACGTCGCGGACGGGCGGCCAGCTCCAATTCCGCGCATACCCTGG  
AGCAGATGTTCTCCATGGCGCCTCCAATCCGGCTCGCTCC**TGA**CCCTCGCGCCCCGCGGC  
GGCGCCCCCTCTCGTCGCGCATGGCACGGACCGATCCGCGTGCCGTGCGACTTCGGCCGCC  
CGGAGGCCTGCTCGACACTCGGGAAGATCAGTCCTCACCGGCCCTGCGACAAAGTGCCCTC  
GACAGCCGGAAGGACCGTGACGCTCGTCGGCGATACTGGCACTTGGCCTTGCTTCCGGG  
CATCCTAACTGTCTACCGAATCACACCTCCCCCAGGAATTCCGGTCAGTGT**CGA**

> morA (Q9HVI8)

CGGACTTCCTCGACCCGCACGGCGAAGGCGCACGCTGGCAGTCCTACCTGGAAGCGCTGG  
ACGCCTTCTTCTCTGCGCGACAGCAGAAAGGCGTGTTTCGCATCGACATCACGGCGGCCG  
TGTTACCGAACTGTTTCATCACCTGGTCTACGGCATGGTCGATGCGGAACGTCGCGGAC  
GGGCGGCCAGCTCCAATTCCGCGCATACCCTGGAGCAGATGTTCTCCATGGCGCCTCCA  
ATCCGGCTCGCTCCTGACCCCTCGCGCCCGCGGCGGCCCTCTCGTCGCCGCATGGCAC  
GGACCGATCCGCGTGCCGTGCACTTCGGCCCGCGGAGGCCTGCTCGACACTCGGGAAGA  
TCAGTCCTCACCGGCCCTGCGACAAAGTGCCCTCGACAGCCGGAAGGACCGTGACGCTCG  
TCGGCGATACTGGCACTTGGCCTTGCTTCCGGGCATCCTAACTGTCTACCGAATCACACC  
TCCCCCAGGAATTCCGGTCA**CTG**TCGACCCCCCTCGCTAACCCCGTCGCCGCCTCCCGCCG  
GCGACCCACTGACCGTACCCGACCGACCGGCAGCCAAGGCTGGCCTGCTGTTGCTGGTCC  
TGTTGATGCTCGGCCTGCTGCTCTGGCAGATGAGCCAGGAGCTGCGCCAGCAGGAACGCT  
TCGAACACGAGCGGGCCGCGGCCAGCTCGATCGTCTCAACGACCGCCTGTCCCTGACCC  
TCGAACTCAAGGCGCGCACCCGCCCTCGCCCTGCTCCCGGGCGTGCCCCCAGCGAGCGTG  
GCGAGATACAGGGCAGGCTGTTGCCGCGCATCAGCGATGCGCTGCCGAGGTGCGCCAGT  
TGCAATGGGTGGACAGCGCCCCGACAGCGACAGCCGTGCGCGGAAACGACGCTGCCCG  
AGCAGTTGCGCCAGCACGCCGGCTCCGGTCTCTACCACTATTGCCTCGACCCGCGCGACG  
GCGAATCCCTCTACCTGACCCCTGCGCGAACCCGGCAGCCGCCGCGACAGTGGCTTCTGGC  
TGCTTGCGCCTGGCAAGACCAATACGCCGGCGGGTGCTCTGGCATAACCCGGGGAGCA  
CGGCGCTGCTCGACGACATGCAGACCTCGGCGTGGAACCGCTGCGCAACAGCGACTGGC  
AGCTTCGCGGACTCTACGACAGCACGCGAGTGCGGCTCGGCCTGCTGCCGGGAATCGGCG  
GCGAGCTGGCGATCTTCTCCTGCTGGTTCGGCGTCAACGTGTACATGCTGCTGCGCCTGC  
ACCGCGAGCAACAGGGCCTGCGCGCCATGACCCCTGGCCTCGCAGCGCAGCCTGCGCCAGG  
CGGCCACGGCACTGGCGGCGATCGACGAGCGGGTGCTGGTGACCCGCGCCGACGGCCGCC  
TCAGCTACCTCAATCCCCAGGCCGAACGCCTCTTCGGCATCAGTTCGGCCAGGCCCGCC  
AGCATCACCTGCTGGGCCTGCTGCCGGACCTCGAGCCAGGCTGGCTGACGGACGCCGGTG  
GCGACGGCGAGACCCGTAGCGAGTTGCTGCCGCTGCGGGTACGCGGCGAGCCGCGGACGT  
TCACCTCAGCCGCCATCCGCTGGCCAGCTATCCGGCGCTCGCCGACCAGGCCTGGACCC  
TCCGCGAGCAGATCCTCCAGGGCGGGCAGGTCTGGGTGTTGCGCGACGTCACCGAGGAAC  
AGCACGCCCTCGGCGTCTTGGAGGAAACCCGGCGGCGCTACCAGGACATCTTCGAAGGGG  
TCGGCGTGCCCTCTGCGTGCTCGACCTCTCCGCCCTGCGCCAGGCTCTTGTGGAGCAAG  
GCTTGGAACAGCTGCGCCGCACTGCGCGCCTGGCTCGCCGGCGAACC CGGCGGCAGCAGG  
CGCTGCTGGAGCGGATCCGCATCACCGAGATCAACGATGTCTAGTCGCCGCTGCTACAGA  
TCGATTCCACCGAACAGGCCTGGCAGCGCTTGCTCGACCACGGCCCCTACAACCGGACA  
GCCTGCGCCTGCAGGTGATCGAGGCGCTCATCGAGCGCCGGCCGGTACTCGAACTTGAAG  
CCACGCTGCGCTGCGGCAAGAGCACGCCGCGGCACCTGTGGTTGCAACTGCGCCTGCCCG  
AAAACCCCGGCGAATGGCATGCGGTGACCCCTCAGCCTGTCCGACGTACCAAGTCGCAAG  
AAGTCGAACTGTGCTGATCGAGCGCGAGAAGTTCTGGTTCGGACGCGGTCCAGGCGGTGC  
CCGATACCTCTACATCCACGACCTGCACGCGCGCCGGGTGATCTTCAGCAACCATCACC  
TGGGCCAGCAGTTGGGCTACAACCAGGAAGAACTGGCGCGGATGGGCGAGAACTTCTGGG  
AAACCTGCTGCACCCCGACGACCAGGAATACTACTGGCGCATCCGCAACCTGCAGCACG  
TGGTTCGGCGACGGCCTGCTGCTCGACAGCCAGTTGCGCTGGCGCCACCGCGACGGCCGCT  
GGCACTGGTTTCGACATCCGCGAGCAGGCCTTCAGCCGCGACCGCAGCGGTGCGGTGGCGC  
GCCTGATCGGCGTGCCCAAGGACATCACCTTCACCGTCGAGGCGAACAACGCGCTGCGCG  
AGAACGGCCGACGCTACCGCATGCTGGCGGAAAACATCAGCGACGTGATCTTCTCCACCG  
ACGCCGAACCTCAACGCCAGCTACGTACAGCCCTCGGTACAGCACGTGTTCGGCTACAGCC  
CGGAATGGGCGCTGCTCAACGGCCTCCATCAGACCGCCACCAACCCGCGCCAGCTCGGCC  
GCCTGAACGGCCTGCTGCGCCGCGTGCGGCACGCCATCGGCGACCGCCAGAAAGCTCGCCG  
AGCTGCGGGAAAACCTGGCCAGCATCTGTTTCGCCCTCGACTGCCTGCGCGCCGACGGAC  
GCAAGATTCCCATCGAACTGCGGATCGTCTGATGTGGGACGAGCACGACCGCTTCGAAG  
GCCTGCTCGGCATCGCCCGCGACATCAGCCAGCAGCGCCGCGCCGAACGCGAGCTGCGGA  
TGGCGGCGACGGTATTTCGAACACTCCACGGCGGCGATCATGGTCACCGACCCGGCCGGCT

ACATCGTCCAGGTCAACGATTTCCTTCTCGCGCCTGACCGGCTACAGCCCGGCCGACGTGC  
TCGACCAGCAGCCGCGCCTGCTCACCGCCGACCGCCAGGAAGCCAACCAGCTCAAGCACG  
TGCTCGCCAGCCTGCAGCACAGCGGCAGCTGGGAAGGCGAGATCCTGCAGAAGCGCAAGA  
CCGGCGAGCTCTATCCATCCTGGGTTCGGCATCACCGCGGTGCGCGACGAGGAAGGCGACC  
TGGTCAGCTTCGTCTGCTTCTTCAGCGACATCAGCGAGCGCAAGGCCAGCGAGCGGCGCA  
TCCACCGCCTGGCCTACTACGACGCCCTCACCCACCTGCCCAACCGCACGCTGTTCCAGG  
ACCGTCTGCATACCGCCCTGCAGCAGGCCGAGCGCAACGGCCAGTGGGTGGTGTGATGT  
TCCTCGACCTCGACCGCTTCAAGCCGATCAACGACTCCCTCGGCCACGCCGCCGGCGACC  
GCATGCTGCAGGAAGTGGCGACCCGCCTGAGCGCCTGCGTCAGCCAGGACGATAACCGTGG  
CGCGCATGGGCGGCGACGAATTACCCCTGCTGCTGCCTTCCCAGGGCGACCGCGAGATCG  
CCCTGAAACGGGCGATCCAGGTGCGCGAGCTGATCCTCGGCCGTCTGGCCCGGCCGTTCA  
CCCTGGAAGGCCGTGAATTCTTCGTACCCGCCAGCATCGGCCGTGGCCTTGTCGCCCCAGG  
ACGGCGCCGAAGTGAAGCTGCTGATGAAGAACGCCGACACGGCGATGTACCACGCCAAGG  
AGATGGGCAAGAACAACCTTCCAGTTCTACCAGGCCGAGATGAACGCTCGCGCCCTGGAGC  
GCCTGGAAGTGAAGCGACCTGCGCCGCGCCCTTGAAGTGGGCGAGTTTCGTCTCCACT  
ACCAGCCGAGTTTACCGGCGACGGCCGCCGCTGACCGGCGCCGAGGCCCTGCTGCGCT  
GGCAGCATCCGCGCCGCGGACTGGTTCCGCCGAGCGAGTTTCAATCCGGTGTGAGGAGA  
TCGGCCTGGTGGCCAGGTGCGCGACTGGCTGCTGGCGGAAGCCTGCAAGCAGTTGCGCA  
GCTGGCACAAGGCCAAGGTGCGGGTGCCAAAGGTCTCGGTGAACCTCTCGGCACGGCAGT  
TCGCCGATGGCCAGTTGGGCGAGCGGATCGCCCGCATCCTCTACGAGACAGGCATCCCGC  
CGGCATGCCTGGAGCTGGAAGTGAACGAAAGCATCCTGATGAGTGACGTGCGCCGAGGCCA  
TGCAGATCCTCTCCGGGCTCAAGCGCCTCGGCCTGGCCATCGCGGTGGACGACTTCGGCA  
CCGGCTACTCCTCGCTGAAGTACCTCAAGCAGTTCCCCATCGACGTGCTGAAGATCGACC  
GCAGCTTCGTGACGGCCTGCCCCACGGCGAACAGGACGCACAGATCGCCCGGGCGATCA  
TTGCCATGGCCACAGCCTGAACCTGATGGTGATCGCCGAGGGCGTGGAGAGCCAGGCC  
AGCTGGACTTCCTTCGCGAGCACGGCTGCGACGAGGTGCAAGGCTACCTGTTTCGGCCGGC  
CGATGCCCGCCGAGCAGTTTCGGCATGCTCTACGCCAGCGACGTGCTGTTTCATGTTCAACG  
AGGGCTGAGACCCGCGTTCGGCGCGCTTGAGCGCCGCTTGTCGCGACATGATGGCCTTTT  
ATGTGTCAGCACCCGCGCGGTTAGAGTTAGATGCGCGCCTTTTCCAGCACCGATCCTTAT  
GAGGACCGCCATGTTTCAGCCGTGATTTGACCCTCGCCCGCTACGATGCCGAACCTTTTGC  
CGCGATGGAGCAGGAAGCCCAGCGCCAGGAAGAGCACATCGAGCTGATCGCCTCCGAGAA  
CTACACCAGCCCGGCGGT

> cbrA (G3XCM7)

GGAAGTGTGGGGTTGAGCCAGCCGCGCTACCTGCACGTGCCGCTGATCGTCCAGCCGGA  
CGGGCACAAGCTCGGCAAGTCTACCGCTCCCCACCACTGCCCGCCGAGCAGGCCGCCGC  
GCCGCTGACCCGCGCCCTGCGCGCGCTCGGCCAGCGCCGCCGGCCGAAGTGGCCAGGC  
CAGCGCCAGCGAGGCGCTGGCCTGGGGCGTGGCGCACTGGGACGCCACGCGCATCCCGCG  
CTGCGCTACCTTTCCCCGAGGAACGCCTGTAGCCCGCCCGGCGGCTTGCCGGCACCCACCC  
GCAGCCTGTAGCCTGCCGGCCCAAGCATGAGGGAAAGCGGCATGTACATCTACCGACTGGT  
CCTGCTCCTGGTCGTGGGCATCTATCTCTTTTCCCCCGCCATCATGGACTGGTGATCGA  
CCCCAACGGCGCCTGGTACCGCCCGTACCTGCTGTGGCTGATCCTCATCGTGGTCACTTT  
CATCCTGCAGAGCCAGCGCGATGCTGACGAGCTTACCTGACCCAGCTGATCCTGATCA  
GCGTCACCTACCTCTCCACCCTCTTCGGCATCGCCTGGATCACCGAGCGCGGCTACGTGC  
CGCGCCGGCTGGTACGCCACCCGCTGGTCTACACCCTGTGCTGGGCGTCTACGCCAGTG  
CCTGGGCGTTCTACGGCACGGTAGGCCTAGGCCTACAGTACGGCTACGGGTTCTTCGCCA  
TCTACCTGGGGATTTCCGGGGCCTTCTGCTCGCCCCGGTGTGCTCTATCCGATCCTGC  
GGGTGACACGCGCCTACCAGCTGTCTCGCTGGCCGACCTCTTCGCCTTCCGTTTCCGCA  
GTACCTGGGCCGGCGCCCTGACCACGCTGTTTCATGCTGATCGGCGTGCTGCCGATGCTGG  
CCCTGCAGATCCAGGCGGTACCGACTCGATCAGCATTTCTACCCGCGACCCGGGCCAGG  
AGCGGGTCGATTTCGTCTTCTGCACCCTGATCACCTGTTTCGCGATCCTCTTCGGCGCTC  
GCCACATCGCCACCCGCGAACGCCACGAGGGACTGGTGTTCGCCATCGCCTTCGAGTCGC  
TGGTCAAGCTGGTGATGCTCGGCAGTATCGGCCTCTACGCCCTGTACGGCGTCTTCGGCG  
GGCCGGAAGGCCTGGAAGTCTGGCTGCTGCAGAACAGACCGCGCTGACCACCCTGCACA  
CGCCGCTGGCCGAAGGTCCATGGCGAACGCTGCTGCTGGTGTTCCTTCGCCGCGGCCATCG  
TGATGCCGCACATGTTCCACATGATCTTACCCGAGAACCTCAACCCGCGCGCGCTGATTT  
CCGCCAGTTGGGGCCTGCCGCTGTTTCTGCTGCTGATGAGCCTGGCGGTACCGCCGATCC  
TCTGGGCCGGGCTGCGCCTCGGCGCCTCGACCACACCGGAGTACTACACCATCGGCCCTCG  
GCCTGGCGGTGGACAGCCCGGCCCTGGCCCTGGCCGCTTCATCGGCGGCATCTCCGCCG  
CCAGCGGGCTGACCATCGTGATGACCCTGGCGCTCTCGGGAATGGTCTCAACCACCTGG  
TGCTGCCGCTCTACCAGCCGCCGGCGCAGGGCAACATCTACCGCTGGGTGAAATGGACCC

GGCGCCTGCTGATCGTCGCCATCATCATGGCCAGCTACGCCTTCTACCTGCTGCTGGGCG  
CCGAACAGGACCTCTCCAACCTGGGCATAGTGTCTTCGTGCGCACCTGCAATTCCCTTC  
CCGGCGCCCTCTCGGTGCTGTACTGGCCGACCGCCAACCGCCGTGGCTTCATCTCCGGGC  
TGATCGCCGGCATGCTGGTCTGGGCGATCACCATGCTGCTGCCCCCTGATGGGGAACGTAC  
AGGGCCTGTACCTGCCGCTGTTTCGACGTGATCTACGTGCTGGACGATTGAACTGGCACC  
TGGCGGCGCTGTCTCGCTGGCGGCCAACGTGCTGGTATTACCCCTGGTGTGCTGTTCA  
CCGAGGCCAGCGACGAGGAAAAAGGCGCCGCCGAGGCCTGCGCGGTGGACAACGTACGCC  
GTCCGCAACGCCGCGAACTGTTTCGCCGGTTCGCCGCGAGGATTGCCAGCCAGTTGGCCA  
AGCCGCTGGGCGCCAAGACCGCGCAGAAGGAGGTCGAGCAGGCCCTGCGCGATCTCCACC  
TGCCCTTCGACGAACGTGCCCCCTATGCCCTGCGTCGCTTGCGCGACCGCATCGAGGCGA  
ACCTTTCCGGGCTGATGGGACCCAGTGTGCGCCAGGACATCGTGAGACCTTCCTTCCCT  
ACAAGACCAGCGAAGAAAGCTACGTACCGAGGACATCCACTTCATCGAGAGCCGCCTGG  
AGGACTATCACTCCCGGCTGACTGGCCTGGCTGCCGAACCTCGACACCTTGCGCCGCTACC  
ACCGGCAGACCCTGCAAGACCTGCCGATGGGCGTCTGCTCCCTGGCCAAGGACCAGGAAG  
TGCTGATGTGGAACCGCGCCATCGAGGAACCTACCGGGGTGCGCGCGCAGAAGGTCGTG  
GTTTCGCGCCTGTGCGCCTTGCCCGAACCTGGAAGGGCCTGCTGGAACGTTTCATCGACG  
CCCCCGACGAGCACCTGCACAAGCAGCGCCTGGTCTACGACGGCCACACCCGCTGGCTGA  
ACCTGCACAAGGCGGCCATCGAGGAACCCCTGGCGCCGGGCAACAGCGGCCTGGTGCTAC  
TGGTGGAAGACCTACCGAAACCCAACTGTTGGAAGACAAGCTGGTCCACTCCGAGCGCC  
TGGCTTCCATCGGCCGCTAGCCGCCGGGGTGGCCACGAGATCGGCAATCCGATCACCG  
GCATCGCCTGCCTGGCGCAGAACCTGCGCGAGGAACGCGAAGGCGACGGCGAGCTGACCG  
AAATCAGCGAGCAGATCCTCGACCAGACCAAGCGGTATCGCGCATCGTCCAGTCGTTGA  
TGAGCTTCGCCCCTCCGGCAGCCACCTGCAGGCCCTGGAACCGGTGTGCCTGAGCGAAG  
TCGCCCAGGAGGCCATCGGACTGCTGTGCTGAACCGGCGTAGCGTCGAAGTAGAGTTCT  
TCAACCTCTGCGATCCGGCGCACTGGGTGAGGGCGACTCGCAGCGCCTGGCCCAGGTGC  
TGATCAACCTGCTCTCCAATGCTCGCGACGCCAGCCCGCCGGGCGGCGGATCCGGGTCC  
GCAGCGAAGCCTCGGAACATAACCGTGACCTGGTCTGTCGAGGACGAGGGCAGCGGCATTC  
CGAAGGCGATCATGGACAGTTGTTTCGAACCGTTCTTACCACCAAGGACCCCGGCAAGG  
GGACCGGGCTCGGCCCTCGCACTGGTCTATTTCGATCGTGGAAGAGCATTATGGACAGATAA  
CCATCGAGAGCCCGACGGATCACACGCGAGAAGGCGGCACCCGCTTCCGCGTGACCTGCG  
CGCGGCACCCCTGGCCCGACGGCCGAGCTG**TAG**ACGAGCACGTCGAGAGAGCTGAATACAT  
GGCACATATTCTGATCGTCGAAGACGAAACCATTTATCCGATCTGCATTGCGACGCCTGCT  
GGAGCGCAACCAGTACCAGGTGAGCGAAGCCGGCTCGGTGAGGAAGCCCAGGAGCGCTA  
CACCATCCCTCCTTCGACATGGTGGTCAGCGACCTGCGCCTGCCGGGCGCCCCGGGCAC  
CGAACTGATCAAGCTCGCCGAAGGCATTCCGGTGCTGATCAT

> cbrB (G3XCK7)

GAACCGGTGTGCCTGAGCGAAGTCGCCCAGGAGGCCATCGGACTGCTGTGCTGAACCGG  
CGTAGCGTCGAAGTAGAGTTCTTCAACCTCTGCGATCCGGCGCACTGGGTGAGGGCGAC  
TCGCGAGCGCCTGGCCCAGGTGCTGATCAACCTGCTCTCCAATGCTCGCGACGCCAGCCCG  
CCGGGCGGCGCGATCCGGGTCCGCGAGCGAAGCCTCGGAACATAACCGTGACCTGGTCTGTC  
GAGGACGAGGGCAGCGGCATTCCGAAGGCGATCATGGACCAGTTGTTTCGAACCGTTCTTC  
ACCACCAAGGACCCCGGAAGGGGACCGGGCTCGGCCTCGCACTGGTCTATTTCGATCGTG  
GAAGAGCATTATGGACAGATAACCATCGAGAGCCCGACGGATCACACGCGAGAAGGCGGC  
ACCCGCTTCCGCGTGACCTGCGCGCGCACCCCTGGCCCGACGGCCGAGCTGTAGACGAGC  
ACGTCGAGAGAGCTGAATAC**ATG**GCACATATTCTGATCGTCGAAGACGAAACCATTTACC  
GATCTGCATTGCGACGCCTGCTGGAGCGCAACCAGTACCAGGTGAGCGAAGCCGGCTCGG  
TGCAGGAAGCCCAGGAGCGCTACACCATCCCTCCTTCGACATGGTGGTCAGCGACCTGC  
GCCTGCCGGGCGCCCCCGGCACCGAACTGATCAAGCTCGCCGAAGGCATTCCGGTGCTGA  
TCATGACCAGCTACGCCAGCCTGCGTTTCGGCGGTGGATTTCGATGAAGATGGGCGCGGTGG  
ACTACATCGCCAAGCCTTTCGACCACGACGAAATGCTCCAGGCCGTGGCGCGCATCCTCA  
AGGACCGCCAGGAGAACCGCAGCGCGGCCCGGTCTCCGCCAACGGCGGCAAGGCCGGCG  
GCGAGCGCGGCGCCAGCCCGGCGGTAGCCGACGGCGAGATAGGCATCATCGGCTCCTGTG  
CGCCGATGCAAGAGCTGTACAGCAAGATTTCGAAGGTGCGCGCGACCGACTCCACGGTAC  
TGATCCAGGGCGAGTCCGGCACCGGCAAGGAACTGGTCGCCCCGCGCCCTGCACAACCTGT  
CGAAGCGCGCCAAGGCGCCGCTGATCTCGGTGAACTGTGCGGCGATTCCGGAAACCCCTGA  
TCGAATCCGAGCTGTTTCGGCCATGAAAAAGGCGCCTTCACCGGTGCCAGCGCCGGGCGCG  
CCGGGCTGGTTCGAAGCGGCGGACGGCGGCACCCCTGTTTCCTCGACGAGATCGGCGAACTGC  
CGCTGGAGGCCCAGGCCCGCCTGCTGCGCGTATTGCAGGAAGGCGAGATCCGCCGGGTGCG  
GCTCGGTGCAATCGCAGAAGGTGACGTGCGCCTGATCGCCGCCACCCACCGCGACCTGA  
AAACCTGGCCAAGACCGGGCAATTCCGCGAAGACCTCTATTACCGCCTGCATGTGATCT

CGCTGAAGCTGCCCCCCTGCGCGAGCGTGGCAACGACGTGATGGAGATCGCCCCGCGCCT  
TTCTGGCTCGCCAGTGCACCCGGATGGGGCGCGCGCGCTCAGCTTCGCCCACGACGCCG  
AACAGGCGATCCGCCATTACCCATGGCCGGGCAACGTGCGCGAACTGGAAAACGCCATCG  
AGCGGGCGGTGATCCTCAGCGAGAGCCAGGAAATCCACGCCGACCTGCTGGGTATCGACA  
TCGAGCTGGACGACCTCGAGGACGACTTCGCCGCCGACCTCGGCCTCGGCCCCGGCGGGCG  
CCGCGGCCAGCAACCACGAGCCCACCGAGGACCTTTTCGCTGGAAGACTACTTCCAGCACT  
TCGTCTCGAGCACCAGGACCACATGACCGAGACCGAACTGGCCCCGAAGCTGGGCATCA  
GCCGCAAATGCCTGTGGGAACGCCGCCAGCGCCTGGGCATTCCGCGGCGTAAATCAGGGG  
CCTCGGCCGACTCG**TAA**CACCCTGCAACCTGTTACCGCGGACGTACCGCGTAACAGAAAC  
CGGGTTCATCGGTAACGGGAACCCGGTTTTTTTGTGCCCTCCGCCGACCCACCGAAAAC  
TCAACCTCATTTTACTGGGTTTTCGAAAACTGGCACGGCATCTGCTTATGTATTGGC  
ACAACAACAATAACAAGCAACGACGAAGACAATAAAAAACAACACGTAACGACTCCAGCAC  
AACAAAAACAAAATCGCGGAGGCGCAG

> retS (Q9HUV7)

CATGGTCCGCCTGGAGTCCTCCCTGGTCCTGCTGGTCGAGGCCGCCCTGGCCAAGGCGCT  
GGACAAGGTTCGAGGCGACCTGGGACCCGCGTCCGACCGTGGGCGTGGTACTGGCCGCCG  
CGGCTATCCGGGCGACTACGCCAAGGGCGAGGTCATCGAAGGCCTGGCCGAGGCCGCCG  
GCTGGACGGCAAGGTGTTCCACGCCGGCACCGCGCTGAAGGATGGCCAGGTGGTCACCTC  
CGGCGGCCGCGTGTCTGTGCCACCGCCATCGGCGAGAGCGTGTCCGCCGCCAGCAACA  
GGCCTATCGCCTGGCCGAGAAGATCCGCTGGAACGGCTGCTTCTACCGCAAGGACATCGG  
CTACCGTGGCATCGCCCCGCGAGCGCGGCGAGTCCTGACCGGGCCCGAAGCCGCGGGCGCC  
GCACGGCGCTTCCGCGGCCTATGCCGTTGCCACGGCCACTTGGCTATAATCCGGCCATTC  
ACCTTCGAAGGGACTTCGCC**GTG**TACGGCTTCGGATCGCCATAGGACTACTCGTCAGCT  
TCCTGCTGCTTCTGCTCGGTCCGATGTGCGCGGGTTCGCGGACGACGCCGGCGTTTCCA  
GCGTTCCCCTGCAAACCACCGCCACTACTCCCAGCGCCAACCAGAACTGGCGCCTGCTGC  
GCGACGAGAGCGCGCAACTGCGGATCGCCGACGTCTCCAGCGCAAGGAGCAGTTCCGCC  
CGCTGGCCCAAGCGCTTTCATCTTCCCCGCCAGCCCCAGGCGGTCTGGCTGCAGGTCC  
AGCTTCCCGCGCAGAAGGTGCCGAGTGGCTGTGGATCTTCGCCCCACGGGTGCAGTACC  
TGGACTACTACCTGGTGCAGGACGGCCAACCTGGTGCGGGACCAGCACACCGGCGAGTCGC  
GACCGTTCCAGGAGCGCCCGCTGCCCTCGCGCTCCTACCTGTTCTCGCTGCCGGTTCGACG  
GCAAGCCGATGACCCTGTACGTGCGGATGACCTCCAACCATCCGCTGATGGCCTGGTTCG  
ACCAGATCGACGAAGCCGGCCTGGTCGGCCTGGAGAAGCCCGCTACGCCCTTCGGCATGC  
TGCTCGGCGGCATGCTCCTGCTGCTGATGTACAACCTGATCCGCTTCGCCTACTCGCGCA  
GCGCCAGCAGCCTGTGGCTGGCGGCGGTGCACGCGGCGCTGGCGGTCTGCGCCGCGGCGA  
ACCTGGGGCTGGTGGCGTTCTGGCTGCCGGGACTCAAGTTCAACCAGTCGCTGACCGCCG  
ACCTCGGCGCCCTCGGCGCCGCGGTGAGCCTGCTGTGGTTCGCCTGCAGCTTCTTCCGCG  
GCACTGCGGAAAGCCGCTGAACCGCCTCCTGCAAGGCGAGGCGCTGTTGATCCTGGCGG  
TCGGCGCGATCATCGCCTTACCCAGCAACTCTGGTTTCAGTTGGCTGATCTACCTGCTGG  
TGATCCTCAGTTTCGCTCAGCGTCCCGCTGATCGCGGCCTGGCACTGGTATCGCGGCTACC  
AGCCGGCGCGCCTGATCGTTGCCGGGATGATCGTGTTCAACGCCGGCTTCATGGTGTTC  
TGCCGGTACTGTTTCGGCACCAAGCAACTCGATCCGGGCTGGCTGGTGTCTGGCGTGTTC  
GCTTCGCCACCCTCGCCGGGCTGGTCCTGAGCGTCTCGCTCACCGAACGCCAGCGGCTGA  
TCCAGCAGCTCAACCTGCAACAGCGCACCCAGCGAGGCGGCGCACACCGCGGAATTGCAGA  
CCAAGGCCGAGTTCTTGCCCAAGATCAGCCACGAGATCCGCACGCCCATGAACGGCGTGC  
TGGGCATGACCGAACTGCTCCTCGGCACCCGTTGTTCGGCGAAGCAGCGGACTACGTGC  
AGACCATCCACAGCGCCGCAACGAGCTGCTCACGCTGATCAACGAGATACTCGACATCT  
CCAAGCTGGAGTCCGGGCAGATCGAGCTGGACGAAGTGCAGTTTCGACCTCAACGCGTTGA  
TCGAGGACTGCCTGGATATCTTCCGGGTCAAGGCCGAGCAGCAGCGCATCGAGCTGATCA  
GCTTCACCCAGCCGAGGTGCCGCGGGTCATCGGCGGCATCCGACGCGCCTGCGCCAGG  
TGGTCTTGAGCCTGCTGGACAACGCGTTCAAGCAGACCGAGGAAGGCGAGATCCTGCTGG  
TGGTGGCCCTCGACGACCAGGGCGAGACGCCACGCTGCGCATCGCCGTGCAGGACAGCG  
GCCACCCGTTTCGACGCCAAGGAGCGCGAGGCGCTGCTCACCGCCGAGCTGCACAGCGGCG  
ACTTCCTTTTCGCCAGCAAGCTCGGCAGCCACCTCGGCCTGATCATCGCCCGCCAACTGG  
TGCGGCTGATGGGCGGGGAGTTCGGCATCCAGTCCGGCAGCAGCCAGGGGACCCACCTGT  
CGCTGACCCTGCCGCTCGACCCGCGAGCAGCTGGAGAACCCACCGCCGACCTCGACGGCC  
CGCTGCAGGGCGCCCGGCTGCTGGTGGTGGACGACAACGAAACCTGCCGCAAGGTGCTGG  
TGCAGCAGTGCAGCGGCTGGGGCTGAACGTCAGCGCGGTGTCTGCCGCAAGGAGGCGC  
TGGCCAGTTGCGCACCAAGGCGCACCTGCGCGAGTACTTCGACGTGGTCTGCTCGACC  
AGGACATGCCCGGCATGACCGGCATGCAACTGGCGGCGAAGATCAAGGAAGACCCCAACC  
TCAACCACGACATCCTGCTGATCATGCTCACCGGGATCAGCAACGCGCCGAGCAAGATCA

TCGCCCCGAACGCCGGGATCAAGCGCATCCTGGCCAAGCCGGTGGCCGGCTACACGCTGA  
AGGCGACCCCTCGCCGACGAACCTCGCCAGCGCGGCGTCAGCGGCGTCACCAACTACCTGC  
AACC GGCCAAGGAAGCGCAGGCGCCGAGCCTGCCGAGCGACTTCCGGATCCTCGTCGCCG  
AGGACAACAGCATCTCCACCAAGGTCATCCGCGGCATGTTGAACAAGCTCAACCTCCAGC  
CGGACACCGCCAGCAACGCCAGGAGGCGCTCAGCGCGATGAAGGCGACCCAGTACGACC  
TGGTGTCTGATGGACTGCGAGATGCCGGTTCTGGACGGCTTCTCCGCCACCGAGCAGCTCC  
GCGCCTGGGAAGCCACGAACAGCGCCCCGCATACCCCGGTGGTGGCGCTCACCGCGCACA  
TCCTCAGCGAACACAAGGAACGCGCGCGGCTGGTCGGCATGGACGGGCACATGGCCAAGC  
CGGTGGAGCTGTTCGAATTGCGTGAGCTGATCGCCTACTGGGTGGCGAACGCGATCGCC  
GCCGCCAGGGGACGCCCCCTGCCCTCC**TGA**GGGCAGCGACGTGCTCCGGCGCTGCACCCGG  
CCTCCGCCACGGCGGATAACCGCACGCGGCTATTTCGCCCTACGCCCCGGTGGTCCCGGCT  
CCCGTAGGGCGCATGACGCCAACGGCGTTATCCGCCGATAACCGCCACTTCCGCCACGGCG  
GATAACCGCACGCGTTATTTCGCCCTACGCCCCGGTGGTCCCGCCTCCCGTAGGGCGCAT  
AACGCCAACGGCGTTATCCGCCGATAACCGCCACTTCCGC

> parC (Q9HUK1)

ACGGATCATGCTGGTGCTGGCCTGGATCGCCGGGCTGGCGCTGGCGACGCGCTATTTCCG  
CGTCTGGGAAGATCGACAGCGCAACCCGAACCAGGCGCCGCAATCGATCCATGGCGACGG  
CTACGTCGAGTTGCGCCTGGCCAGCAGCCGGCAGGGCCATTACCTGCTGAACGGGCAGAT  
CAACGGCCAGGGCGTGACCTTCCTGCTCGATACCGGGGCGACCCAGGTGGCGGTGCCGGA  
AGCCCTGGCGGCAAGACTCGCGCTGGAGCGCGGCGCGCCGATCACCTGAGCACGGCCAA  
CGGCCGCGCCACGGGCTGGCGCACGCGGCTGGACCAGCTGCAACTCGGCGATATCCGCCT  
GTCCGGGGTCGCGGCGCTGATTGCGCCGGGCATGGACGGCGATGAGGTGCTACTCGGCAT  
GAGCGCCCTGAAACAACTCGAATTACCCAGCGCGACGGCACCCCTGGTGTGCGCCAAAA  
CACTTCTCCGTGAGGTACGC**ATG**AGCGAATCCCTCGATCTGAGCCTGGAAGGGGTGCAAC  
GCCGGTCGTTGGCCGAGTTACCCGAGCAGGCCTATCTGAACTATTCCATGTACGTGATCA  
TGGACCGCGCCCTGCCGCATATCGGCGACGGCCTGAAACCGGTGCAGCGACGCATCGTCT  
ACGCCATGAGCGAATGGGGCTGGATGCCGATTCCAAGCACAAGAAGTCGGCGCGCACCG  
TCGGCGACGTGCTCGGCAAGTTCCACCCGACGGCGACTCGGCCCTGCTACGAGGGCATGG  
TGCTGATGGCGCAGCCGTTCTCCTATCGCTATCCGCTGGTGGACGGCCAGGGCAACTGGG  
GGGCTCCGGACGATCCCAAGTCCTTCGCCGCCATGCGTTATACCGAGGCGCGCCTGTGCG  
GCTATTCCGAGGTGCTGCTCAGCGAACTGGGCCAGGGTACCGTGGACTGGGTACCGAACT  
TCGACGGCACCCCTCGACGAGCCGGCCGTGCTGCCGGCCCGCTGCCAACCTGCTGCTCA  
ACGGCACCAACCGGCATCGCGGTGGGCATGGCCACCGACGTGCCGCCGCACAACCTGCGGG  
AAGTCGCGTCGGCCTGCGTGCGCCTGCTCGACCAGCCGGGCGGACGGTCGCCGAATTGT  
GCGAACACGTGCCGGGCCCCGACTTCCCCACCGAAGCCGAGATCATACCCCCGCGCGCCG  
ACCTGCGAGAAGGTCTACGAGACCGGCCGCGGTTCCGGTGCATGCGCGCGGTGTACCGCG  
TCGAGGACGGCGATATCGTCATCCACGCCCTGCCGCACCAGGTGTCCGGTTCCAAGGTGC  
TGGAACAGATCGCCGGGCAGATGCAGGCCAAGAAGCTGCCGATGGTGGCCGACCTGCGCG  
ACGAGTCGGACACGAGAACCCGACCCGCATCGTCATCATCCCGCGTTCGAACCGGGTCG  
ATGTGCAAGAGCTGATGACCCATCTGTTCCGCCACCACCGACCTGGAGACCAGCTACCGGG  
TCAACCTGAACATCATCGGCCTCGACGGCAAGCCGACGGTCAAGGACCTGCGCCAGTTGC  
TCTCGGAGTGGCTGCAGTTCCGCATCGGCACCGTGCGTCGACGCCTGCAGTTCCGCCTGG  
ACAAGGTGAGCGCCGCTGCATCTGCTGGATGGCTTGCTGATCGCCTTCCTCAACCTCG  
ACGAGGTGATCCACATCATCCGCACCGAGGACCAGCCCAAGGCGGTGCTGATGGAGCGCT  
TCGAATCAGCGAGGTGCAGGCCGACTACATCCTCGACACCCGCTGCGCCAGTTGGGCAC  
GCCTGGAAGAGATGAAGATCCGCGGCGAGCAGGAAGAGTTGCTGAAGGAGCAGAAGCGCC  
TGCAGACCCTGCTCGGCAGCGAGGCCAAGCTGAAGAAGCTGGTGCGCGAGGAGCTGATCA  
AGGACGCCGAGACCTACGGCGACGACCGCCGTTTCGCCGATCGTCGCCCCGCGCCGAGGCCC  
GCGCGCTGTGCGAAACCGAGCTGATGCCACCGAACCGGTGACCGTGGTGCTCTCGGAAA  
AAGGCTGGGTGCGTTGCGCCAAGGGCCACGACATCGACGCCGCGGCTCTCCTACAAGG  
CCGGCGACGGCTTCAAGGCCGCCGCGCCGGGACGCTCGAACCAAGTATGCGGTGTTTCATCG  
ACTCCACCGGGCGCAGCTACTCGCTGCCGGCCACAGCCTGCCGTCCGCGCGAGGCCAGG  
GCGAGCCACTCAGCGGCCGGCTGACGCCGCCGCCGGGGCCAGCTTCGAATGCGTGCTGC  
TGCCGGACGACGATGCGCTGTTTCGTGATCGCTTCCGACGCCGGCTATGGTTTCGTGGTCA  
AGGGCGAGGACCTGCAGGCCAAGAACAAGGCCGGCAAGGCCCTGCTCAGCCTGCCCAACG  
GCTCCGCCGTGGTGGCGCCGCGCCCGGTGCGCGATGTGGAGCAGGATTGGCTGGCGGCCG  
TGACGACCGAGGGCCGTCTGCTATTGTTCAAGGTCTCCGACCTGCCGCAGCTCGGCAAGG  
GCAAGGGCAACAAGATCATCGGCATCCCCGGCGAACCGGTGGCCAGCCGCGAGGAATACC  
TCACCGACCTGGCTGTTCTGCCAGCCGGGGCGACGTTGGTCTTCAGGCCGGAAAGCGTA  
CCCTGTGCTCAAGGGCGACGACCTGGAACACTACAAGGGGGAGCGAGGCCGGCGAGGCA

ACAAGCTGCCGCGCGGTTTCCAGCGCGTTCGACAGCCTGCTGGTGGATATTCCGCCACAGG  
ATT**TGA**AATGAGCCGTTACCGGTCTCCGATCTCTCGCATATCCGCAAGGGAATGGCGAAAG  
CGGCCTCTTCCGAGGCCGGCTTTCCGGGGGAATGTCGTCTCCCTGGCGGGTTCCGCCGGG  
TTTTCCCTGACGCAGGTGGTCCGAAACCGGTTTCGGAATACGCTCTGCCTCTGGAGCTA  
TGGCGCTGGTTAGGGGATGATACGCCCCCTTCGGCCGCCGTTTCCGATGGCGGGTGGCCAG  
TAGAATTCAAGTCTT

> pile (G3XD43)

CCGGTACCGAGCAGAAAGGCCTGGGAGGCTTGACGCTGAGCACCAACGAACAGGGCAATC  
CGGAAGTCTGCTCCTCGGGCGAATGCCTGACCGTGAACCCCGGTCCGAACACCCGTGGCC  
GCCAGAACTGGCGCCCCACTCGAAGGAAGAAGTATGATAAGTGTGCTGCCTATGCTGTG  
GCCCTGGCCGTTCCCGGCCTCTGCTGGGCCGAAGATCCCCAGACCTTCGAAGGCGCTGGC  
GTGGTCTTCGAAGTCCAGGTTCGAGAAGAACCTGGTGGACATCGACCACCGGCTCTACCGC  
CTGCCAACAGCACCGTCAGGAACGGCATGCCCAGCCTGTTCCAGGTCAAGCCGGGCTCC  
GTGGTGTCTACTCTGGCACCGTCAGCCAGCCGTGGTCCACCATCACCGATATCTACATT  
CACAAACAGATGAGCGAACAGGAGCTGGCCGAGATGATCGAGAAAGAACAGCCCCGCCAG  
GACGGGGAGGAGCAGCCCCG**ATGA**AGGACAAGACAGAAGGGCTTCACGTTGCTGGAAATGG  
TGGTGGTAGTGGCGGTGATCGGCATCCTCCTCGGCATCGCCATTCCCAGTTACCAGAACT  
ACGTGATCCGCTCCAACCGCACCGAGGGCCAGGCCCTGCTCTCGGACGCGGCCGCGCGCC  
AGGAACGCTACTACTCGCAGAACCCCGGGGTTCGGCTACACCAAGGACGTGGCCAAGCTGG  
GCATGAGTTTCGGCCAACCTCGCCGAACAACCTGTACAACCTCACCATAGCGACGCCACCA  
GCACCACCTATACCCTGACCGCCACGCGGATCAACTCGCAGACCCGCGACAAGACCTGCG  
GCAAGCTGACCCTCAATCAGCTCGGCGAACCGGGCGCAGCCGGCAAGACCGGCAACAACA  
GCACCGTCAACGACTGCTGGCGC**TGA**AACGAAAGAGCCCCCTCTACGAGAGGGGCTCTTTC  
ATTGCGCACGGT**TCACAAAGCCTTGACCCGCAGTTCTTGGGCATCGAGAAGGTAATGTT**  
**CTCCTCCCGCCCCCTCCAGTTCTCTGCTCCTCCGACGCCCCCACTCGCGTAGCTGGGCGAT**  
**CACGCCGCGCACCCAGCACTTCGGCGCGGAAGCGCTGCGGTGATTCCGATGCGACGCAC**  
**ACCGTCGAACCAGCCGCGTTGCATGTCTCGGCGCC**

> recQ (Q9HYQ1)

ATCGCGCTTTTCGTGCGGGTCTCCTAATGGGTAGGGCATCGGAAGTCGACTTCAGGGAGC  
GATCGAATGTCCGCGCCGCATCTCGATGATCGTGTTCTGGCTTCGCTGCAGGAGGTCATG  
GAGGACGAATATCCGGTCTGCTGGATACCTTCGTGCTCGACTCCGAGGAGCGCCTGCGC  
AGCCTGCATGCCGCCCTCCAGGCCGGCGATGCCCAGGCTTTGCGGCATACCGCACACAGC  
TTCAAGGGAGGCAGCAGCAACATGGGCGCGGTACTCCTCGCCGGCTACTGCAAGGAGCTG  
GAGGAAAGCGCCAGGCGCGGCGAGCTGCAACGGGCGCCGGCGCTGATCGAACAGATGGAG  
CGCGAATTCGCCATCGTCCGCATCCTTTTCAAACAGGAACGTGACGCTATCGCTGAGGT  
TTTCGTCTTTCCGGCGACAAGGTACCGGCCCCGATCGAGCCTCCCTGGCGTATAATGCGC  
CGCTCGATTTGGAGTCCTTC**ATG**CGCGAGCAAGCCCTACGCATCCTCAAAGACGTTTTTCG  
GTTACGACGCCTTCCGTGGCAACCAGGCACGGATCATCGAGCGGGTAGCCGAGGGTGGCG  
ATGCGCTGGTACTGATGCCACCGGCGGTGGCAAGTCCCTGTGTTTCCAGGTCCCGGCGC  
TGCTGCGCGAAGGCCTGACGGTGGTGGTGTGCGCGCTGATCGCGCTGATGGAGGACCAGG  
TCGCCACCCTGGACGAACCTCGGCGTGCCGGCGGTGGCGCTGAACTCCACCCTCAACCCCG  
AGCAGCAGCGGGACATCGCCGAGCGCCTGCAGCGTGGCGAGATCAAGCTGCTCTACCTGG  
CACCGGAACGGTTGGTCCAGCCGCGCATGCTGGCCTTCCTGCAACGACTGCCGCTCGGCC  
TGTTCCGCATCGACGAAGCGCACTGCGTGTGCAATGGGGCCATGACTTCCGTCCCGAAT  
ACCTGCAGCTCGGCCAGCTTGCCGAGCTGTTCCCGCAGGTGCCGCGGATCGCCCTGACCG  
CCACCGCGGACATGCGTACCCGCGAGGAGATGATCCAGCGCCTGCACCTGCAGAACGCCG  
AGCAGTTCTCTCCAGCTTCGACCGGCCGAACATCTTCTACCGCATCGTGCCCAAGGAGC  
AGCCGCGCAAGCAGTTGCTCGGCTTCCTCTCCGAGCGGCGCGGCGATGCCGGCATCGTCT  
ACTGCCTGTGCGGAAGAAGGTCGAGGAGGTGCGGAATTCTCGGCAACCAGGGCTTCC  
CCGCGCTGCCGTATCACGCCGACTGTCCAACGAACCTGCGTGCCACCACCAGAAGCGCT  
TCCTCAACGAGGAAGGCTTGATCATGGTGGCGACCATCGCCTTCGGCATGGGCATCGACA  
AGCCCAACGTGCGTTTTGTCGCCCCACCTCGACCTGCCCAAGAGCCTCGAGGCCTATTACC  
AGGAAACCGGCCGCGCCGGCCGCGATGGCCTGCCGGCCGACGCTGGATGGCTTACGGCC  
TGCAGGACGTCTGTGCTGCTGCGGCAGATGATGCAGAGTTCCGAGGGCGACGAGCGGCACA  
AGCGCGTCGAGCGGCACAAGCTGGAAGCCATGCTGGCGCTCTGCGAGGAAACCCGTTGCC  
GGCGCCAGGCGCTGCTGGCCTATTTGACGAGGAGATGCCGACGCCCTGCGGGCATTTGCC  
ACAACGTGCGTGGACGGCGTGGAACCTGGGATGCCACCGAATCCGCGCGCCAGGCGCTGT  
CGGCGATCTACCGCAGCGGCCAGCGCTACGGCGTCGGCCATCTGGTGGATATCCTGCTCG  
GCCGCGAGACCGAGAAGATCCGCAGTCTCGGCCACCAGCACCTGGCGGTGTTCTGGGATCG

GCAAGGGGCGCGGCGAAGACGAGTGGCGGACCCTGTTCCGCCAGTTGGTCGCGCGCGGCC  
TGGCCGACGTCGACCTGGACGGCTTCGGCGGCCTGCGCCTGACCGAGGCCCTGTCGTCCGC  
TGCTGCGGGGCGAGGTGCGGCTGGAGCTGCGCCGCGACCTCAAACCACAGCGCGCCAAGG  
GCTCCTCCAGCGGCGGCCAGCGCCGCCAGCCAATTGGTGCGCAGCGAAGAGCGGGAAA  
TGTGGGAGGCCCTGCGCGCGCTGCGGCGCAAGCTGGCCGAAGAGCATTCGGTGCCGCCCT  
ATGTGATCTTCCCCGACGCGACCCTGCTGGAAATGCTCCGAGCCAGCCGCGCTCGCTAT  
CCGACATGGCCCAGGTCAGCGGGGTGCGGCGCGCAAGCTGGAGCGCTACGGCCAGGCCCT  
TCCTCGATGTCTCACCAGCTCGCCGGCGGCGCCCGCCGCGCCGCGCAGGACCTGCGCC  
ACGAATTGGCCAGCCTGGCCTGTGCGGGGATGACCCCGGCGCAGATAGCCCGCCAGCTCA  
ATTGACGCGAGAAGAACGTCTACGCGATGCTCGCCGAGGCCATCGCCGGTCAGCAGGTGA  
GCCTGGAGCAGGCGCTGGATCTGCCCCGAGAACTCCTCGGCGAAATCCAGGACGCCTTCC  
TCGAGGAAGACGGCGAACTGCCGCCGGTGGCGGCGCTGGAGGAGCGTTTCGGCAAGCGGG  
TGCCGAGTGGCGTGCTGCACTGCGTGCGCGCCGCCCTGCAGGTGGAACGGAGTCTGAT  
ATGGCCATTTGCCGGTATTTTCTGACGCCAATCTTGTGACGTCTTCGCAAGCGTCTACT  
GTGACGCCAAGCCCTCCAAGAGAAGAGGTGTGCGTGACACAGAAGGACCGGTTGGACGAC  
TCCCGTTCCAATCTCTATGCCGACCAATTGAACCGCGGTTTCGCGGTCTGCGTTTCCTT  
CCCGAACTGGAGCGTGAATAACGGCGCTACATGCTGGAGGACAGCTTCGCGCTGAAACGC  
ATCGCCCTC

> pvrR (A0A0H2ZH80)

GAGCCGCAGGCACAGGGCCGCGACTGGCTGCTCGGGCTCAACAACCTGGACGGCCTGCAT  
CGTGCTCTGGGCCTGGCCCATGGGCGTCTCGCTGATCCTTCGACGCCGCCGATACGGCTG  
GCTCCGTTGCGCAATCTAGGTCTCCGCGTCTAGTGGTGGAGGATAACCGCATCAACCAG  
TTGATCTTGAGGGACCAGATGGAAGCGCTGGGCTGCAGCGTGGAGCTGCTCTTCGATGGT  
CGCGAGGCGTTGCTGCACTGCCAGACGGCCTGCTTCGACGTGGTGCTCACCGATATCAAC  
ATGCCGAACATGAACGGATACGAGCTAACCGCGGAGCTACGGCGCCAAGGGTTCCGGCAG  
CCGATCATCGGCGCGACGGCGCAACGCCATGCGTGAGGAGCGCGAGCGCTGCATGTCCGCC  
GGGATGAACGATTCCTGGTCAAACCGGTGGATCTGAATGCCCTTCAGAACTGCTTGATT  
AATATTCTCAAGGTGGATCGATGAGTGAATAATCCTATCGGGTGCTGGTGGTCTGAAGATC  
AGCCGTTTTAGCGCGAATACTGCTCAACCTGTTTTCGCGAGCGCGGCGTGCACTACCTGG  
TAGGTGCCGGCGACGGCGCGGAGGCGTTGCGCTGCTGAAGCAGGACAGGTTTCGACCTGA  
TCCTCAGCGATCTGATGATGCCGGGCATGGATGGTATCCAAATGATCCTGCAACTGCCGT  
ATCTCAAGCATCGTCCGAAGCTGGCGCTGATGAGCTCCTCGTCGACGGATGATGCTCA  
GTGCCAGCCGGGTGCGCCAGAGTCTCGGCTTGTGCGTAATCGACCTGTTGCCAAGCCGA  
CTCTGCCCCAAGGCCATCGGCCAACTTCTGGAACACCTGGAAAGATGCCTCAGGCAGAAGC  
TGGAGCCGGAACCGACGAGACTCCGCATGGGCGCACGGCGTTGCTGGATGCCCTGCATA  
ACGAGCAACTGGTGACCTGGTTCCAGGCTAAGAAATCCCTCCACACCGGGCGCATAGTCG  
GCGCCGAGGCGTTGATACGCTGGAGCCACCCGACGATGGCCTGTTGCTGCCAGCTGTT  
TCATGAGTGATGTGACGCTACCGGTCTGCACGAGGCGTTGCTCTGGCGCGTGCTCGAAC  
AGACCCTGAACGCCCAGGAATCGTGGCGCAGGGCGGGTTACGAGATTCCGGTTTCGGTGA  
ATCTGCCGCCGCACCTGCTCGATAACCAGGAACCTCCGGATCGACTCTATGAGTACGTCG  
GCGCTCGCGGGGCTTGTACCAGCTCACTATGTTTTCGAGTTGACCGAGAGCAGTGTCACAA  
CTCTGTCAAGTAACTACTATGCAGGTGCCTGTCGCTTGCATGAAAGGGTTTCGATTGG  
CCCAGGACGACTTTGGCCAGGGTTACAGCTCGTTCTATAACCTGGTCACGACGCCTTTCA  
CGGAGCTGAAGATCGACCGCTCCCTAGTCCAGGGATGCGTAGAGGATAACGGCCTCAATG  
CAGCTGTTCATCAGTTGTATTGAGTTGGGTACCGCCTGAATCTCGACGTGGTGGCCGAAG  
GCGTGGAGACCTGCGAGGAAGTGAATCTTCTTCGTCGTCCTTGGCTGCGACCGGGCGCAGG  
GTTTTCTGATTTCTAAGGCAGTGTCTGCTCGTGAGTTTCGAGCGGCAGTTAAGGGAGGACG  
GCCCCAGCCTCCTTGTTTAAACGAGTATCCCCATTATCGCGGAGTCGATCGCAGCCAACC  
ACCGTCAGCGCAACAGTGTGCTGAAGGAGGCCGATCCCGTGAAGTCTGCTAGTGCCCTT  
GGAGCACGACAACAACTTTTGTCAAATGGACAACCTCTCGCAGAGCCTGAGCATCGG  
CTTGATCTGTGTGGTGGTGTGACCGTATTGCTGTTACGATCTGTTACTGGTCGCTGGG  
GAGATTGTTTTAGGAGGAGGAGGACAAAGT

> pvrS

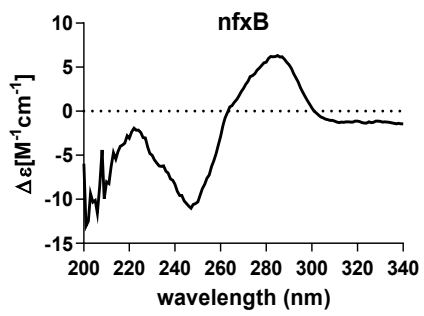
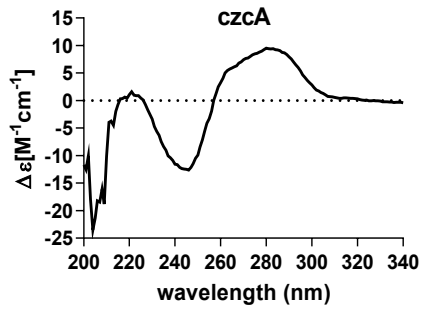
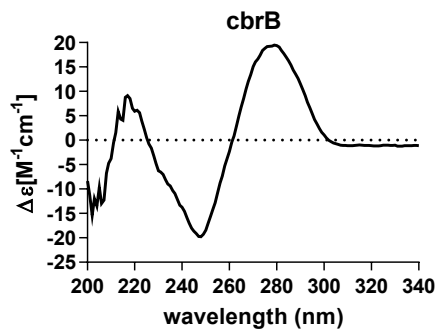
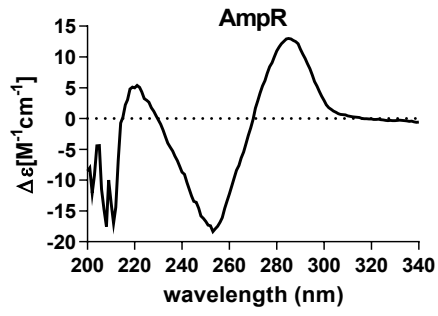
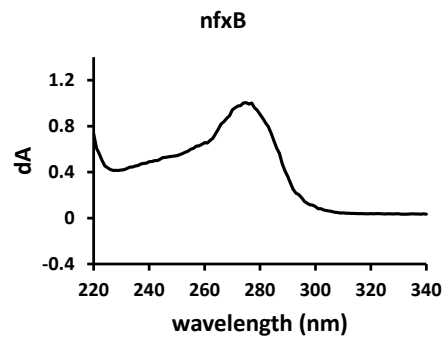
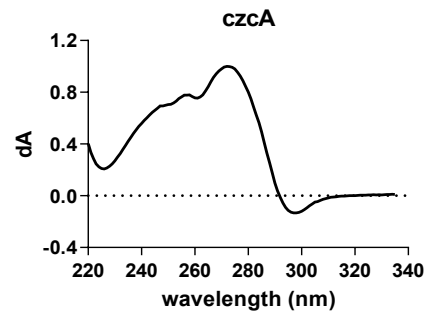
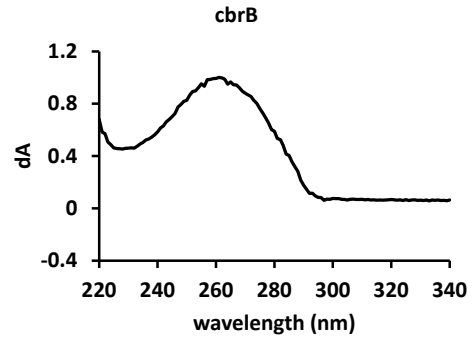
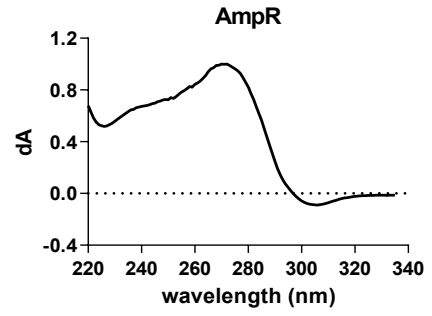
TGGCGGTTTCGACCTGGCTCCTGCACGACGACGCTGTGTAGCAGCCCTGCGACAGCCAAC  
TGAGTTTCGTACTCAAACATGGCCTGGGCATGCTTCCAGCCCGCTCAGGCCAGAAGAAAT  
ACAGGCATACCCACTCCACGATGATTGCGCCGATCAGCGACCCGAACATCACGCCGATTC  
AGGAGCAGGAGTAGGGGGGCAATCGAAAATGCCAAGACTGGTGCCGTGGGTTTTCTGGGG  
TAGCCGCGGGAGAATGAACAAAGATGTTCAAACGTTCTATAGGAACTGTGTTGTGAAC  
TCCATAGAACTCCCTTTTACACGATGCAGGTTGTTGCTTGGAGTGTGTATCCACTAGTT

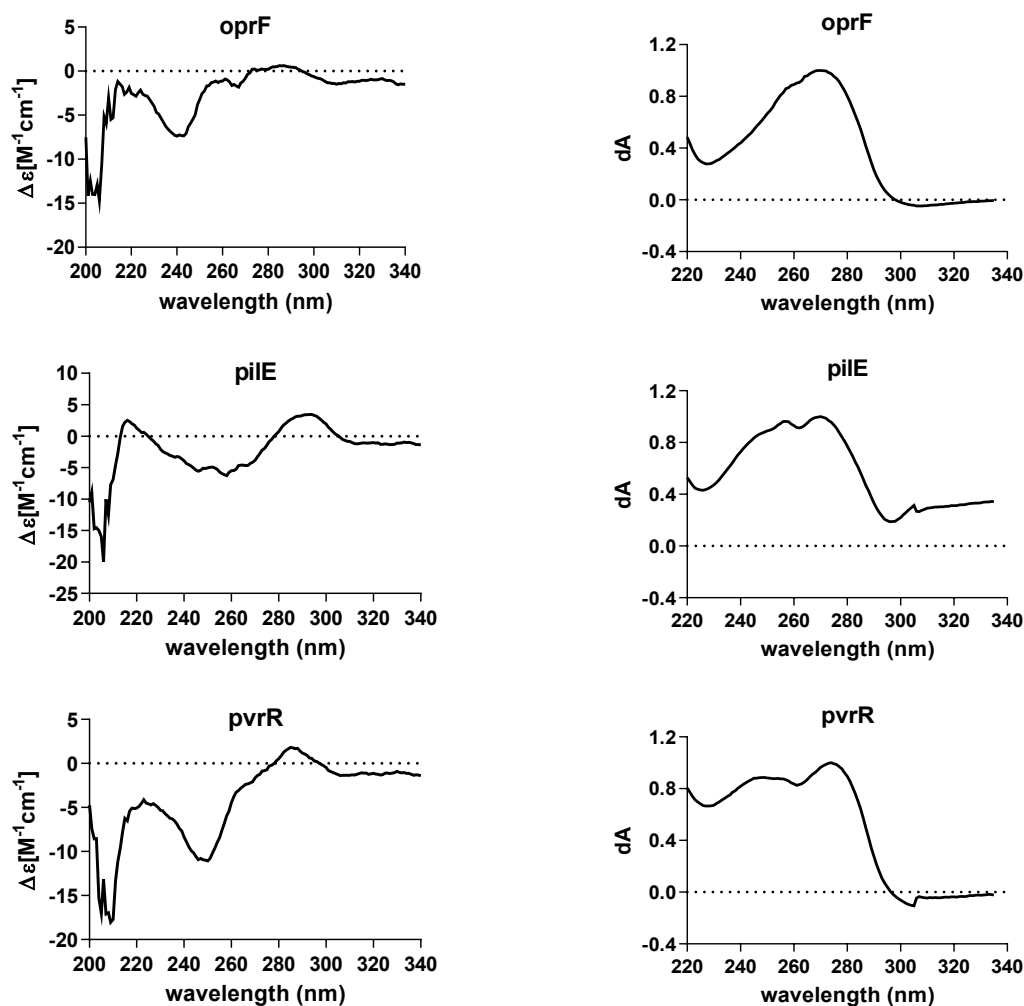
CTCGGGGAGGCCGTCACCTGTAGATTTTTTTGGGGGGGTATCTCGGCATAGGGGGGATTGAA  
TAGCGCTGTGCCTGCAGTCCTGAGACCTCATTAGGAATCATCTGATAGAGGGAATTTTTTC  
CATGCCGTGAGTCTTTTCGGC**ATGA**AAGTTGAAGAATTTCTTACAGCCTTTTGATAGCGGTT  
TCTCCACTCCGAGTGCTGCGCTCAAGCTGCTCCGCATGCTCGGTGGCGCCTTGATGTTGT  
GCGTGCTATGCAGCCTGATATTGAGTGTGAGCATGGTTTTTAAACCATCAGGTGTCCCTCA  
GTCGGCAAGCTATGAATGTGGCTATGTACGAAGCGCAGCTTTATTTTCGAGCAGCGCAGG  
CGTTGCTCAATCACTTGAGCGGCAATGTGCTGCCCTTGGCCGCGGGTAGAGCGCTCGTCA  
ACGAAGCGCCGAACAATGTGAGCATCCTGCCGTTGAGTGACGGAGGGCGAGGTCTGCTAT  
TGACCGCTCGCACGCTCGGTGATCTCCGGGAAAAGCGGCTGGCACTGATGTATCTGGTCG  
ATACCGACAAAGGCCCTCTGGTTTTACCGGCTTACCGCCGATGGTAGGCCCTCGGCAGCGA  
TATCCAGCACGATAACCAAGAGGTGTACCGAGCCTTGCTGGCGACTCCGTCGGCGCCTG  
TTCCTGAGGTGACTGACGGTGGTACCCCTCAACGGCTGTACCTTTTTGAATCCTTAGGCG  
ATGAGCCGGGCGAGGGGTGGCTAGGCCTGGAGATTCTCGGCGAAGACCTCGATTGATGT  
TGCGCCGGAATGATGCCGGAATACTACATGCTGCTGGATCAGCATGGGCAGGTGCTACTCG  
CTACGGACGCAGAGGCGCTGGGGAGCGGTGCGTCGCGGACGCTTTTGCGTGAGACGGCT  
TCGGTTTTCATCGGTGCTGGCCCACTGCCGCAGCATATGGTGCTTTTCCAGCACGTGGGGT  
CTTCGAGCTGGGATCTGATCTATCACATCGGTATCGGTGCGCTGTTGCTGGCTCTGTGGC  
TCCCTCTGTTACTTGCCTCTGCGTTGGCACTCGCAGTCGGCATCCTACTGCATTGGCTGG  
TGCGGAGCATCGAGCGACGCTTGATAGAGCCCGCAAAGCGACGCTTGAAGCATTGAAGG  
AGAGCGAAGCCTTTTCCCGTGACGTTATCCAGGCCGCGCCCGTCGCGCTGTGCGTGCTGC  
GTCGTGCCGACGCCGACGTGGTCTGGAAAATCCCCAGGCGCGCCAATGGCTGGGTGATA  
GCGAGGCGATTGCCCACGACGCGCCGAGATGGATTTCCAGGCGTTTCGAGGAGGTGTGA  
AGTGTCTTGAGAAGAAGTGGAAACCGAGGCAGGGCTACATCTTCATCTCAATTACACGC  
CCACCCGCTATAACGGTGAAGACGTATTGTTCTGCGCCTTCAGTGAAATCAGTGACAGCA  
AGCGGATGGAGGCGGAAGTGGCTCGCGCAAAAATCCCTGGCGGATGCTGCCAATGAAGCCA  
AGACGCTGTTTCTCGCCACCATGAGCCATGAAATCCGCACACCTCTGTACGGCATGCTTG  
GCACGCTTGAGCTGCTTGGGCGTACCGAGCTGAGTCGGCAGCAGGCGGTTACCTAAAGG  
CAATCCAGCATTCTCTGCTGACCTGCAACTGATCAGCGATGTGCTTGACGTATCCA  
AGATAGAGGCCGCGCAACTGGACCTAGAGTGCGTGGAATTCTCCCCGCTGGAATTGACCG  
AAGAGGTGCTGCAGTCGTTTACCGGTGCCGCGCAGGCCAAGGGGCTGCAGTTGTATACCT  
GCCTCTCTGCGGAGCTGCCGCTGCGCATGCGGGGGGCCGCGGCGTCGATCCGGCAGATTCT  
TCAACAACCTGCTGAGCAACGCGGTGAAGTTTACCGACAATGGCTATGTCAACGTCCACC  
TGAAGGCCAGCGTGGTCGATGCCGAATGTGTGATGCTGACCTGGCAGGTCAACGATACCG  
GCATGGGGATCAACGTCGAGGATCAGCCGCGTCTGTTTGAACCGTTCTACCAGATACGCC  
GCTCCGAGCATCCGGTCGAGGCACGGGCTCGGCTTGTGATCAGCCAGCGCTGGCGC  
AGCTAATGAATGGCAGTCTGAACTGGTCAGTGAGCTGGGGTTGGGCAGCAGCTTTAGCC  
TCAGGCTTCCGCTTGAGCGGATCGCGATGCAGGCTGAGCCGACGACCTAGCCGGGTGCG  
CCGTCCAAGTGCTGGCGCCTGTCCGCGACCTAACGGAATGCCTGTGTGGCTGGATCTCC  
GCTGGGGTGGAAGGGCCATGGTTCGCGACGCCGAGGTGCTGGACGAGGCGGACGCGACCT  
CGCTGCTGGTTCGAAGTGTTACTGCTGGAGGGGGCGCCGATGTTTCAAGCATGGCCAGGAT  
GCCGGGTGGAGCTTTCCCCTCAGGGTGATATGGAGCCGACGGCACAGGGCCGCGACTGGC  
TGCTCGGGCTCAACAACCTGGACGGCCTGCATCGTGCTCTGGGCTGGCCATGGGCGTC  
TCGCTGATCCTTCGACGCCGCCGATACGGCTGGCTCCGTTGCGCAATCTAGGTCTCCGCG  
TCCTAGTGGTGGAGGATAACCGCATCAACAGTTGATCTTGAGGGACCAGATGGAAGCGC  
TGGGCTGCAGCGTGGAGCTGCTCTTCGATGGTCGCGAGGCGTTGCTGCACTGCCAGACGG  
CCTGCTTCGACGTGGTGCTCACCGATATCAACATGCCGAACATGAACGGATACGAGCTAA  
CCGCGGAGCTACGGCGCCAAGGGTTCCGGCAGCCGATCATCGGCGCGACGGCGAACGCCA  
TGCGTGAGGAGCGCGAGCGCTGCATGTCCGCCGGGATGAACGATTGCCTGGTCAAACCGG  
TGGATCTGAATGCCCTTCAGAACTGCTTGATTAATATTCTCAAGGTGGATCG**ATGA**GCTG  
GAAATCCTATCGGGTGCTGGTGGTTCGAAGATCAGCCGTTTTCAGCGCGAATACCTGCTCAA  
CCTGTTTTCGCGAGCGCGGCGTGACGTACCTGGTAGGTGCCGGCGACGGCGCGAGGCGTT  
GCGCTGCCTGAAGCAGGACAGGTTTCGACCTGATCCTCAGCGATCTGATGATGCCGGGCAT  
GGATGGTATCCAAATGATCCTGCAACTGCCGTATCTCAAGCATCGTCCGAAGCTGGCGCT  
GATGAG

> ndvB (Q9I4H4)

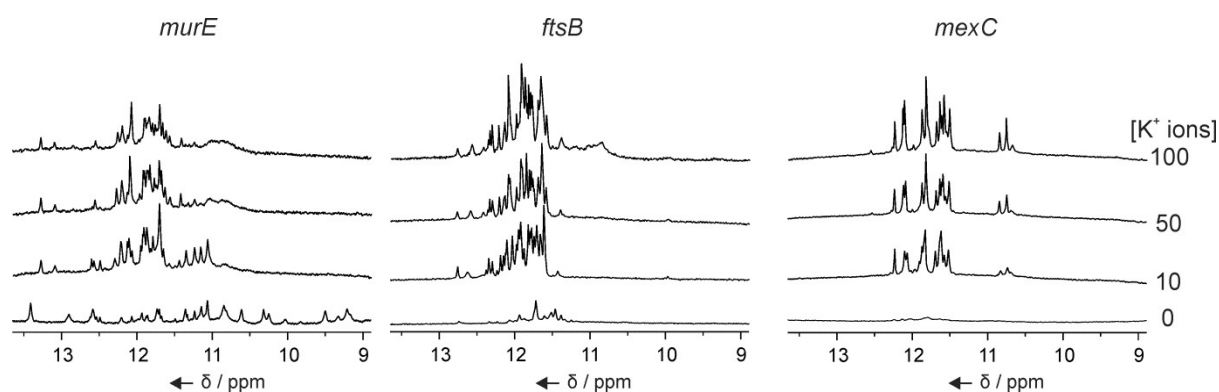
CCCGGCAGGCCGGGTTGATGGCCAGGATGCGCGCCGCCATCACCTCGACCTTGGCCTTGC  
CCACCGAGCCTTCGATGGCATGCACCTGGCGGTTGGTGTGGTCACGCAGACATCGTCGA  
GGTTCGAACAGGGAAATCTCGCCGACGCCGCTGCGGGCCAGCGCTTCCGCCGCCAGGAAC  
CGACCCCGCGATGCCGACCACCGCGACGTGGCTATCGGCCAGGCGTTGCAGCCCCCTCGC

GACCGTACAACCGGCCGATACCGCCGAAGCGCTGTTTCATCCACCTGCATCACCAACCACC  
TCTGAAACCGAATCGCGGATTGCCGCGCGCATTATAAAAAGCCGCGGCCGCCGCTCGCC  
TGCGTTCTTACGGCTCGTCGCGCAGGCCCGACTAGACTTGCAACAGACCCGCCGGCCCGG  
CGCCTGTACACCCCGGGGGGTGCGGGGTAGCATGCGCCGCCCGTGTTCAGCGAAACATC  
CGGAACCTGGTTTCATCTCT**ATG**TCTTCACGCAAGATCGGGCTCAACCTGGTGGTCATCG  
TCGCCCTGGCCGCCCTCTTCACCGGCATCTGGGCCCTGTACAACCGTCCGGTTCAGCGTAC  
CGGACTGGCCGGAACGCATCTCCGGCTTCTCCTTCTCGCCGTTCGGCTCAACCAGAACC  
CGCAGAGCGGCCGCTACCCCAGCGCCGAACAGATGCGCACCGACCTGGAACCTGGTCCGCC  
GGCACACCCACAGCATCCGCACCTATTCCGTCCAGGGCGCGCTCGGCGACATCCCGGCCG  
TGGCCGAGGCGTTTCGGCTGCGCGTCAGCCTGGGCATCTGGCTCGGCCCGGACCTGGCCA  
GCAACGAGGCCGAGATCGCCCGGCCATCCGCATCGCCAACGAGTCGCCGAGCGTGGTGC  
GAGTGATAGTCGGCAACGAGGCGCTGTTCGCCCGCGAGGTGACGGCGGAACAGTTGATCG  
CCTACCTCGACCGGGTCCGCGCGGGCGGTCAAGGTTCCGGTGACCACCGCCGAACAGTGGC  
ACGTCTACCGCGAACACCCGGAACCTGGCGCAACACGTTCGACCTGATCGCCGCCACGTCC  
TGCCCTACTGGGAGGCCACGCCGGTGGCCGACGCGGTGGACTTCGTGCTCGAACGCGCGC  
GCGAACTCAAGGCCGCCTTCCCCAGGAAGCCGCTGCTGCTCGCCGAGGTTCGGCTGGCCGA  
GCAACGGGCGCATGCGCGGCAGCGCCGAGGCGACACCCGCGGACCAGGCCATCTACCTGC  
GGCGCTGACCAACGCGCTCAACGGCGAAGGCTACAGCTACTTCGTTCATCGAAGCCTTCG  
ACCAGCCCTGGAAGGTTCAGCGCCGAAGGCTCGGTGGGCGCCTACTGGGGCGTCTACAACG  
CCGACCGCAAGGCCAAGTTCAACTTCACCGGGCCGGTGGTGGCGATTCCCAAGTGGCGCG  
CCCTGGCCATCGCCTCGGCGGTACTCGCGGTACTCGCCTTCACCCTGCTGCTGATCGACA  
GTTCTCTCGCTGCGCCAGCGCGGGAGGACCTTCCTCGCCGTGGTCTCGTTTCGCCTGCGCCT  
CGGTGCTGGTGTGGATCGCCTACGACTACAGCCAGCAGTACAGCACCTGGTTCAGCCTGA  
CCGTTCGGCGCGTTGCTGGGCGTTCGGCGCGCTAGGGGTGGTCATCGTGCTGTTACCGAGG  
CCCACGAGCTGGCCGAGGCGGTCTGGACGCGCAAGCGGCGCCGCCATTCCTGCCGATCA  
CCGCCGCGCGGGCCTATCGGCCCAAGGTGTGATCCACGTGCCCTGCTACAACGAGCCGC  
CGGAACCTGCTGAAGCAGACCCCTCGACGCCCTTGCCCGCCTCGACTACCCGGACTACGAAG  
TCCTGGTGATCGACAACAACACCCGCGACCCGGCCGTCTGGCAGCCGGTTCGAGGCGCACT  
GCGCGCGCCTGGGCGAGCGCTTCCGCTTCTTCCACGTTGCCCGCGTGAAGGCTTCAAGG  
CCGGCGCGCTGAACCTTCGCCCTGGGCCACGTGGCGGCGGACGTTCGAGGTGGTTCGCGGTGA  
TCGACGCCGACTACTGCGTCGACCCCGACTGGCTCAGGCACATGGTGCCGCACTTCGGCG  
ACCCGCGGATCGCCGTGGTGCAGTCGCCGAGGACTACCGCGACCAGCACGAGAGCGCCT  
TCAAGCGGCTCTGCTACGCCGAGTACAAGGGCTTCTTCCACATCGGCATGGTTCACCCGCA  
ACGACCGCGACGCGATCATCGAGCACGGCACCATGACCATGATCCGGCGCAGCGTGCTGG  
ACGAGCTGAGATGGCCGGAATGGTGCATCACCGAGGACGCCGAGCTGGGCCTGCGGGTGT  
TCGAGAAGGGCCTGTGCGCCGCCTACTTCGAGCGCAGCTACGGCAAGGGGGTGTATGCCCG  
ATACCTTCATCGATTTCAAGAAGCAGCGCTTCCGCTGGGCCTACGGCGCGATCCAGATCA  
TGAAGCGGCATACCGACGCCCTGCTGCGCGGCCGCGGTCCCGACGGCAGCCGCTGACCC  
GCGGCCAGCGCTACCACTTCGTGGCCGGCTGGCTGCCGTGGATCGCCGACGGCCTGAACA  
TCTTCTTCACCTCGGCGCGCTGCTCTGGTTCGGCGGCGATGATCATCGTGCCCAAGCGCG  
TCGACCCGCCGCTGCTGATCTTCGCGATCCTGCCGCTGGCCCTGTTCTGCTTCAAGGTTCG  
GCAAGATCCTCTTCTCTACCGGCGCACCGTTCGGCGTCGACCTGCGCGACTCGTTCTTCG  
CCGCCCTCGCCGGCCTGTGCTCTTCGCACACCATTGCCAAGGCGGTGCTGTACGGCTTCG  
TCACCCGCGGCATCCCGTTCTTCCGCACGCCGAAGATGCGCTCCAGCCACGGCCTGCTGG  
TGGCCCTGGCGGAGGCCCGCGAGGAAGTCTTCGTGATGCTCCTGCTGTGGGGCGCGGCCG  
CCGGCATCGTGGCGGTTACGGGCGTGCCGAGCCGCGACCTGCTGATCTGGGTTCGCCATGC  
TCCTGGTGCAATCGCTGCCCTACCTGGCGGCGCTGGTCATGGCCTTGCTCTCGTCCGTGC  
CGAAACCGCGCGAGGAACCTGGCCGGCGGCGCCGAGCAGATCGGCGGT**TGA**GGTTCGGGCGA  
GGCGTCGGGACGGCCGGCCCCGCTCGCCTAAACGGCGTCCCTTCGCCCACGTTTATGCTT  
TAAGATTCCCCCTTTCGCTCGACCCGCTCAGGATGCCCTCCCCATGACCGCCTCTTCGC  
CGAGTCTCTCGCCGACCCTCGAACTCGCCTGCGAGTTGATCCGCCGCCCTCCGTACGCG  
CGCTCGACGCCGACTGCCAGGCCCTGATGATGCGCCGCTGGAAGCCGCCGGCTTCGCCC

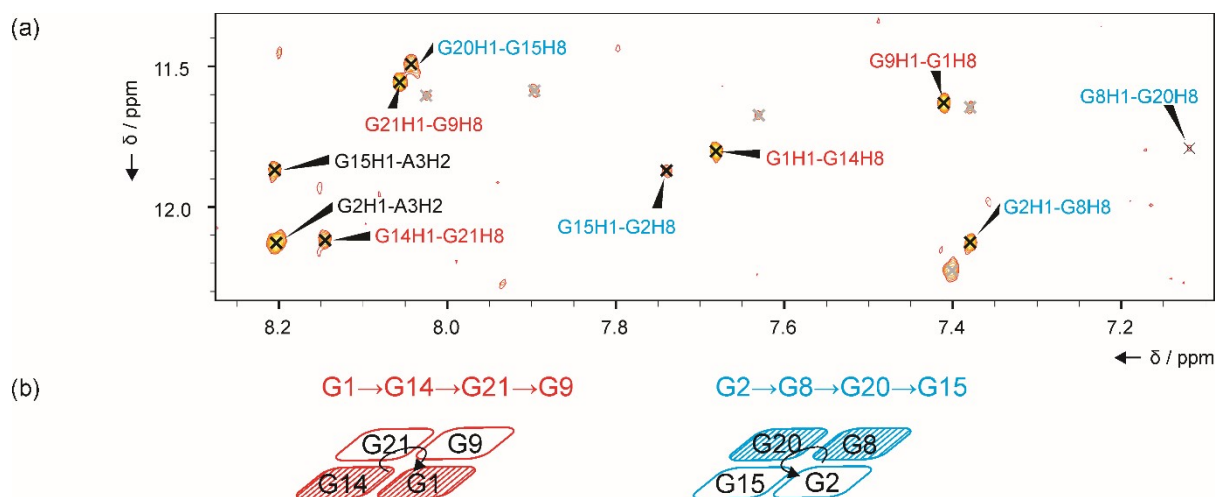
**A****B**



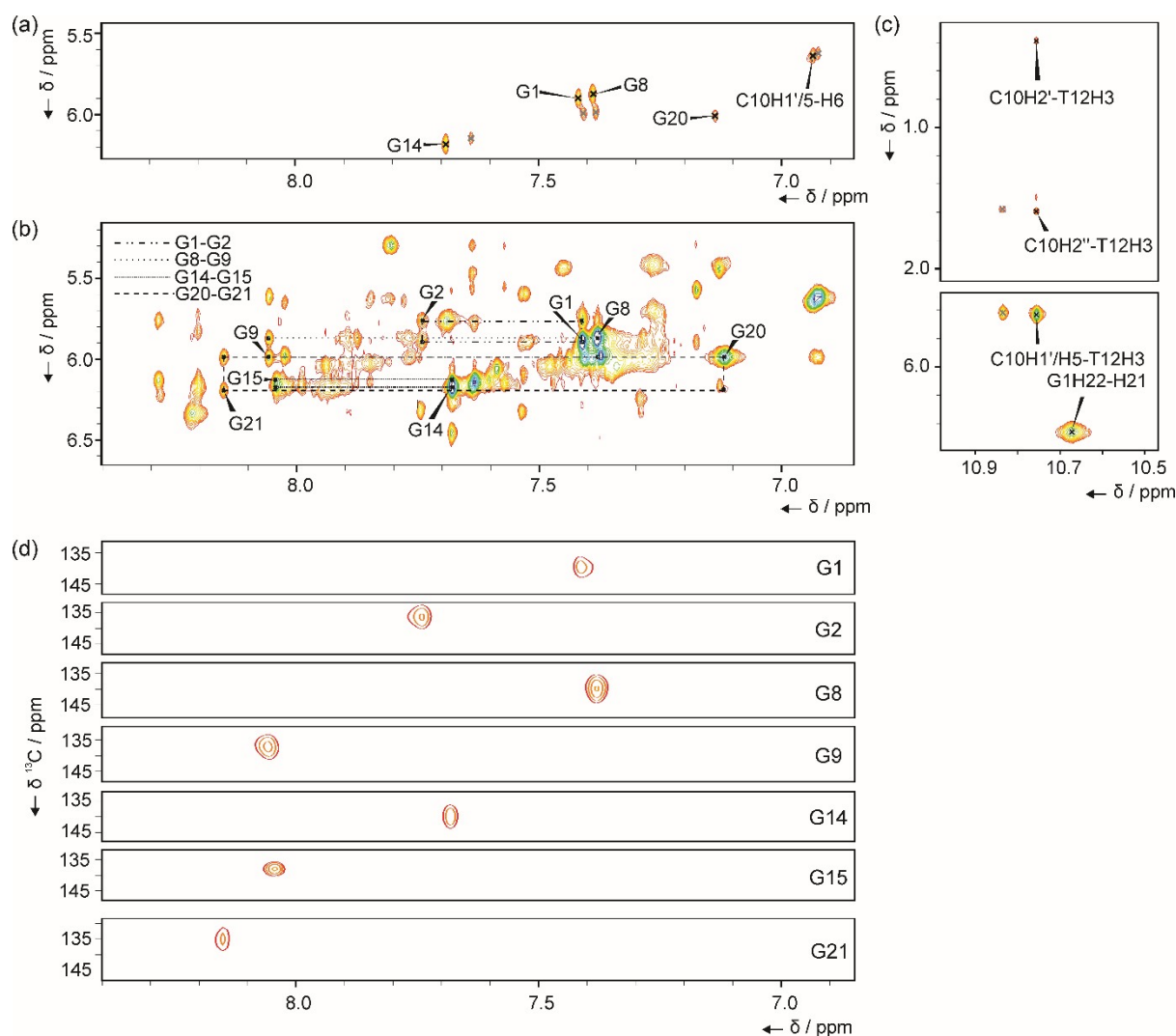
**Figure S1.** Spectroscopic characterisation, (a) CD spectra (b) thermal difference spectra, of DNA sequences not identified as forming quadruplexes.



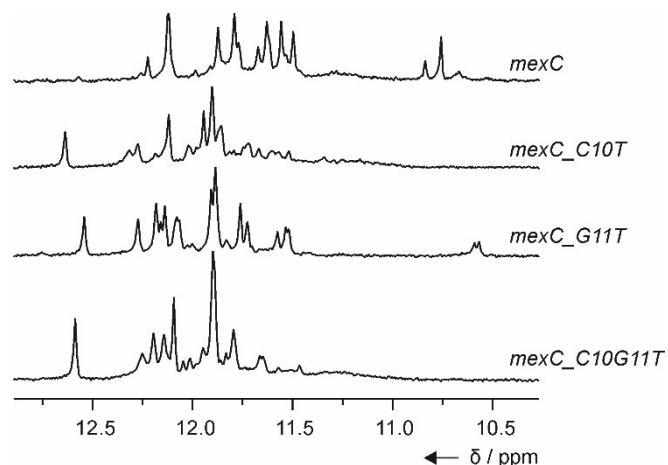
**Figure S2.** Imino region of  $^1\text{H}$  NMR spectra of *murE*, *ftsB* and *mexC* oligonucleotides in the absence and presence of 10-100 mM KCl as indicated on the right side of the spectra. NMR spectra were recorded at 0.4 mM DNA concentration per strand, pH 7.4, 25 °C, on a 600 MHz NMR spectrometer.



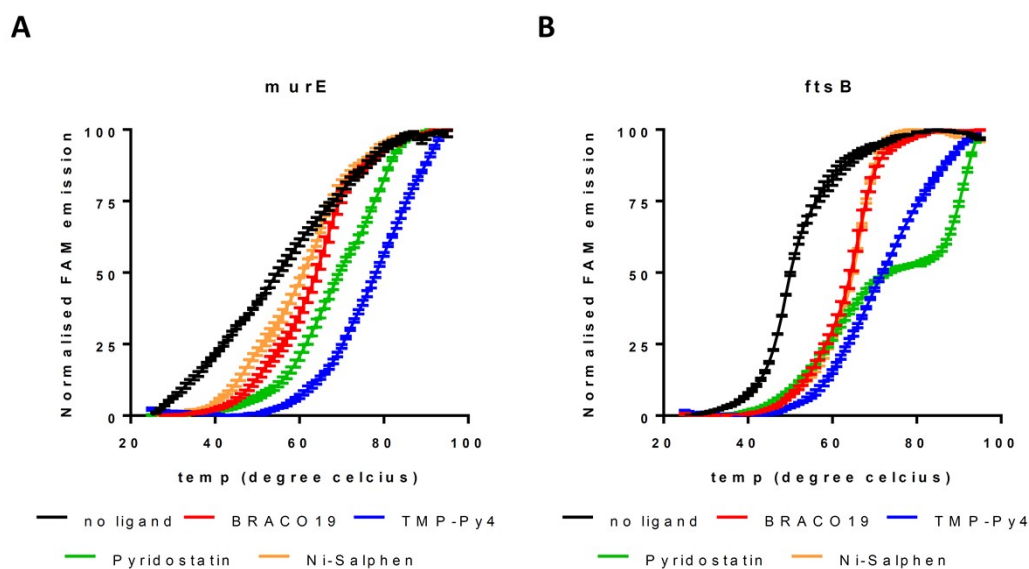
**Figure S3.** (a) Imino-aromatic region of the NOESY ( $\tau_m$  350 ms) spectrum of *mexC*. The H1-H8 cross-peaks within G1-G14-G21-G9 and G2-G8-G20-G15 quartets are designated in red and blue, respectively. Cross-peaks marked with black correspond to interactions between A3 H2 and G2-G8-G20-G15 quartet. Signals assigned to the minor species are marked with grey. NMR spectrum was recorded at 0.4 mM concentration of *mexC* per strand, 100 mM KCl, pH 7.4, 25 °C, on an 800 MHz spectrometer. (b) Representation of the clockwise and anti-clockwise donor-acceptor hydrogen-bonding directionality in G1-G14-G21-G9 and G2-G8-G20-G15 quartets, respectively. *Syn* guanines in G-quartets are striped.



**Figure S4.** (a) Four distinct and strong cross-peaks in anomeric-aromatic region of NOESY spectrum ( $\tau_m$  100 ms) of *mexC* showing that G1, G8, G14 and G20 residues adopt *syn* conformations along glycosidic torsion angles. Signals assigned to the minor species are marked with grey. (b) Anomeric-aromatic region of NOESY spectrum ( $\tau_m$  200 ms) of *mexC* with marked sequential NOE cross-peaks between G1-G2, G8-G9, G14-G15 and G20-G21 residues, characteristic for 5'-*syn*-anti-3' steps. The NOE connectivities are marked with different line styles. (c) NOE cross-peaks between T12 H3 and C10 H1', H2', H2'' in NOESY spectrum ( $\tau_m$  200 ms) of *mexC*. Signals assigned to the minor species are marked with grey. NMR spectra were recorded at 0.4 mM concentration of *mexC* per strand, 100 mM KCl, pH 7.4, 25 °C on an 800 MHz spectrometer. (d) Aromatic region of 2D  $^1\text{H}$ - $^{13}\text{C}$  HSQC spectra of *mexC*. The HSQC spectra were acquired on partially (10%) residue-specifically  $^{15}\text{N}$ - and  $^{13}\text{C}$ -labeled oligonucleotides. Assignment of H8 proton resonances of the major G-quadruplex adopted by *mexC* is indicated on the right side of the spectra. NMR spectra were recorded at ~0.5 mM concentration of *mexC* per strand, 100 mM KCl, pH 7.4, at 25 °C, on a 600 MHz spectrometer.



**Figure S5.** Imino region of the  $^1\text{H}$  NMR spectra of *mexC* and its analogs, where C10 and/or G11 were replaced with thymine residues in *mexC\_C10T*, *mexC\_G11T* and *mexC\_C10G11T*. NMR spectra were recorded at  $\sim 0.4$  mM concentration of oligonucleotide per strand, 100 mM KCl, pH 7.4, at 25  $^\circ\text{C}$ , on a 600 MHz spectrometer.



**Figure S6.** Example of FRET melting curves for (a) *murE* and (b) *ftsB* in the presence of no ligand, BRACO19, TMP-Py4, pyridostatin and Ni-salphen.