

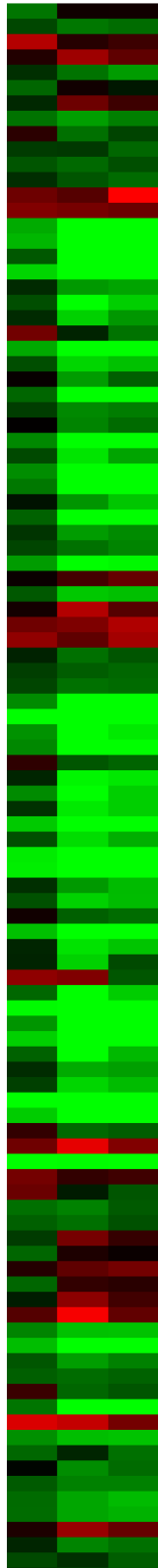
Supplementary Material S1 – Expression patterns of the 724 *Z. mobilis* genes identified as modulated in response to AI-2.

Alencar *et al.* (2021). The quorum sensing auto-inducer 2 (AI-2) stimulates nitrogen fixation and favors ethanol production over biomass accumulation in *Zymomonas mobilis*. *Int. J. Mol. Sci.* Submitted.

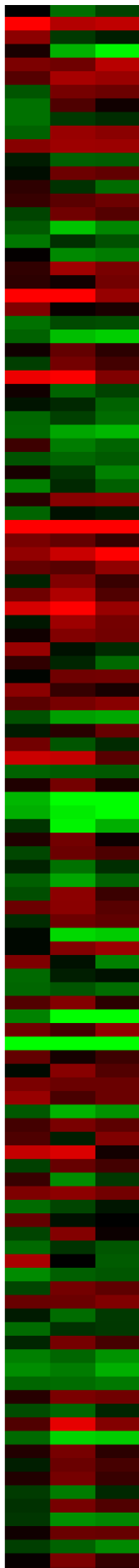
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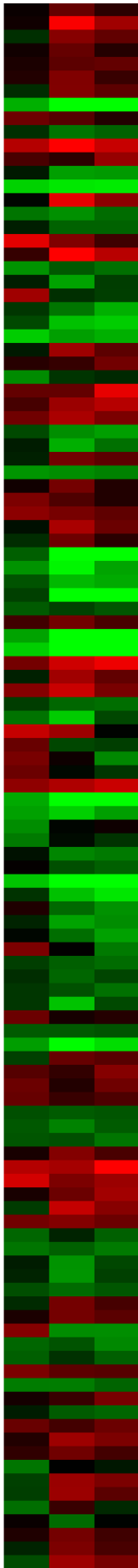
14h x 20h
14h x AI-2 16 h
14h x AI-2 20h



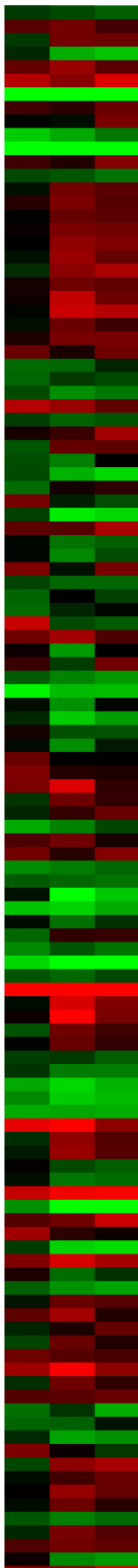
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(D)CMP KINASE ZMO_R808085
(FE-S)-BINDING PROTEIN ZMO_R800110
1-(5-PHOSPHORIBOSYL)-5 ZMO_R806730
16S RNA (CYTOSINE(1402)-N(4))-METHYLTRANSFERASE RSMH ZMO_R803675
16S RNA (GUANINE(966)-N(2))-METHYLTRANSFERASE RSMO ZMO_R802565
16S RNA (URACIL(1498)-N(3))-METHYLTRANSFERASE ZMO_R806555
16S RNA PROCESSING PROTEIN RIMM ZMO_R804815
2,3-DIPHOSPHOGlycerate-DEPENDENT PHOSPHOGlycerate MUTASE ZMO_R805570
23S RNA (GUANOSINE(2251)-2\''-O)-METHYLTRANSFERASE RIMB ZMO_R801000
23S RNA (PSEUDOURIDINE(1915)-N(3))-METHYLTRANSFERASE RIMH ZMO_R807480
2-HYDROXYACID DEHYDROGENASE ZMO_R805565
2-ISOPROPYLMALATE SYNTHASE ZMO_R804030
3,4-DIHYDROXY-2-BUTANONE-4-PHOSPHATE SYNTHASE ZMO_R802035
30S RIBOSOMAL PROTEIN S1 ZMO_R808090
30S RIBOSOMAL PROTEIN S11 ZMO_R802375
30S RIBOSOMAL PROTEIN S12 ZMO_R802235
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3-DEOXY-8-PHOSPHOCTULONATE SYNTHASE ZMO_R806665
3-HYDROXYACYL-ACP DEHYDRATASE FAB2 ZMO_R805130
3-ISOPROPYLMALATE DEHYDRATASE LARGE SUBUNIT ZMO_R800435
3-ISOPROPYLMALATE DEHYDROGENASE ZMO_R803015
3-METHYL-2-OXOBUTANONE HYDROXYMETHYLTRANSFERASE ZMO_R808905
3-METHYL-2-OXOBUTANONE HYDROXYMETHYLTRANSFERASE ZMO_R808995
3-OXOACYL-ACP REDUCTASE FABG ZMO_R805485
4-HYDROXY-3-METHYLBUT-2-ENYL DIPHOSPHATE REDUCTASE ZMO_R803915
5-(CARBOXYAMINO)IMIDAZOLE RIBONUCLEOTIDE MUTASE ZMO_R806355
5-(CARBOXYAMINO)IMIDAZOLE RIBONUCLEOTIDE SYNTHASE ZMO_R806360
50S RIBOSOMAL PROTEIN L1 ZMO_R803245
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6-PHOSPHOGLUCONOLACTONASE ZMO_R806615
ABC TRANSPORTER ATP-BINDING PROTEIN ZMO_R804610
ABC TRANSPORTER PERMEASE ZMO_R801745
ABC TRANSPORTER PERMEASE ZMO_R804400
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ABC TRANSPORTER SUBSTRATE-BINDING PROTEIN ZMO_R808315
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ACETYL-COA CARBOXYLASE BIOTIN CARBOXYL CARRIER PROTEIN ZMO_R803290
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ACYLGLYCEROL KINASE FAMILY PROTEIN ZMO_R806215
ADENOSINE KINASE ZMO_R808590
ADENOSYLHOMOCYSTEINASE ZMO_R800775
ADENOSYL-HOPENE TRANSFERASE HENH ZMO_R803910
ADENYLATE KINASE ZMO_R802365
ADENYLOSUCCINATE LYASE ZMO_R802940
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AI-2E FAMILY TRANSPORTER ZMO_R802895
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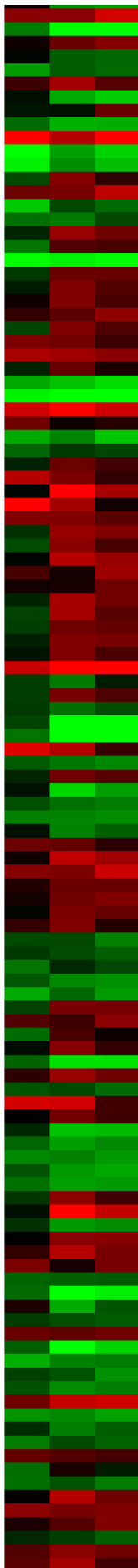
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ANAEROBIC RIBONUCLEOSIDE-TRIPHOSPHATE REDUCTASE ACTIVATING PROTEIN ZMO_R804605
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ANTIBIOTIC BIOSYNTHESIS MONOOXYGENASE ZMO_R805240
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ASPARTATE AMINOTRANSFERASE FAMILY PROTEIN ZMO_R806175
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ASPARTATE-SEMIALDEHYDE DEHYDROGENASE ZMO_R806290
ASP-TRNA(ASN)/GLU-TRNA(GLN) AMIDOTRANSFERASE SUBUNIT GATA ZMO_R803490
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ATP-DEPENDENT PROTEASE SUBUNIT HSLV ZMO_R801065
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BACTERIOFERRITIN ZMO_R807120
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BETA-KETOACYL-ACP SYNTHASE II ZMO_R805725
BETA-N-ACETYLHEXOSAMINIDASE ZMO_R805245
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BIFUNCTIONAL ASPARTATE TRANSAMINASE/ASPARTATE 4-DECARBOXYLASE ZMO_R807560
BIFUNCTIONAL POLYLPOLYGLUTAMATE SYNTHASE/DIHYDROFOLATE SYNTHASE ZMO_R802585
BIFUNCTIONAL PHOSPHORIBOSYLAMINOIMIDAZOLECARBOXAMIDE FORMYLTRANSFERASE/IMP CYCLOHYDROLASE ZMO_R800130
BIOPOLYMER TRANSPORTER EXBD ZMO_R807715
BIOPOLYMER TRANSPORTER EXBD ZMO_R807720
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CAPSULE BIOSYNTHESIS PHOSPHATASE ZMO_R805810
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CARBON-NITROGEN HYDROLASE FAMILY PROTEIN ZMO_R805415
CATALASE ZMO_R804105
CATA-LIKE O-ACETYLTRANSFERASE ZMO_R805115
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CELL DIVISION PROTEIN ETS2 ZMO_R803745
CELL WALL HYDROLASE ZMO_R801935
CHEMOTAXIS PROTEIN CHEW ZMO_R800320
CHORISMATE MUTASE ZMO_R802500
CINA FAMILY PROTEIN ZMO_R805050
CLASS A BETA-LACTAMASE ZMO_R808985
CLASS I FRUCTOSE-BISPHOSPHATE ALDOLASE ZMO_R800765
CLASS I SAM-DEPENDENT METHYLTRANSFERASE ZMO_R804625
CLASS II FRUCTOSE-BISPHOSPHATASE ZMO_R802075
COBALTOCHELATASE SUBUNIT COBT ZMO_R806905
COLD SHOCK DOMAIN-CONTAINING PROTEIN ZMO_R804140
COLD-SHOCK PROTEIN ZMO_R801220
COMEC/REC2 FAMILY COMPETENCE PROTEIN ZMO_R808975
COMF FAMILY PROTEIN ZMO_R805790
COMPETENCE/DAMAGE-INDUCIBLE PROTEIN A ZMO_R806035
COPD FAMILY PROTEIN ZMO_R809090
COPPER-TRANSLOCATING P-TYPE ATPASE ZMO_R804090
COPROPORPHYRINOGEN III OXIDASE ZMO_R800060
CROSSOVER JUNCTION ENDOXYRIBONUCLEASE RUVF ZMO_R800650
CSBD FAMILY PROTEIN ZMO_R803310
CTP SYNTHASE ZMO_R801990
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CYSTEINE--TRNA LIGASE ZMO_R800790
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DEAMINATED GLUTATHIONE AMIDASE ZMO_R806445
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DIHYDROOROTASE ZMO_R807595
DISULFIDE BOND FORMATION PROTEIN B ZMO_R807495
DMT FAMILY TRANSPORTER ZMO_R800120
DNA POLYMERASE III SUBUNIT BETA ZMO_R804390
DNA POLYMERASE III SUBUNIT CHI ZMO_R805860
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DNA PRIMASE ZMO_R807270



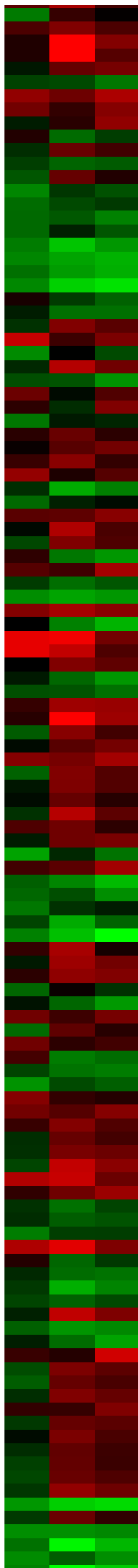
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DNA REPAIR PROTEIN RAD5 ZMO_R808780
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DNA TOPOISOMERASE IV SUBUNIT B ZMO_R801770
DNA TRANSLOCASE FTSK ZMO_R807660
DNA-3-METHYLADEININE GLYCOSYLASE 2 FAMILY PROTEIN ZMO_R801620
DNA-DIRECTED RNA POLYMERASE SUBUNIT ALPHA ZMO_R802380
DNA-DIRECTED RNA POLYMERASE SUBUNIT BETA\\' ZMO_R803270
DNA-DIRECTED RNA POLYMERASE SUBUNIT OMEGA ZMO_R807745
DNAJ DOMAIN-CONTAINING PROTEIN ZMO_R807600
DNTP TRIPHOSPHOHYDROLASE ZMO_R806650
DO FAMILY SERINE ENDOPEPTIDASE ZMO_R801015
DUF1013 DOMAIN-CONTAINING PROTEIN ZMO_R803830
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DUF2474 DOMAIN-CONTAINING PROTEIN ZMO_R807035
DUF2497 DOMAIN-CONTAINING PROTEIN ZMO_R808500
DUF308 DOMAIN-CONTAINING PROTEIN ZMO_R806870
DUF3297 FAMILY PROTEIN ZMO_R807830
DUF3576 DOMAIN-CONTAINING PROTEIN ZMO_R806430
DUF3617 FAMILY PROTEIN ZMO_R805605
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DUF465 DOMAIN-CONTAINING PROTEIN ZMO_R804430
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DUF721 DOMAIN-CONTAINING PROTEIN ZMO_R807530
EFFLUX RND TRANSPORTER PERIPLASMIC ADAPTOR SUBUNIT ZMO_R803470
ELECTRON TRANSFER FLAVOPROTEIN SUBUNIT ALPHA ZMO_R806620
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ELECTRON TRANSPORT COMPLEX SUBUNIT RSXC ZMO_R808145
ELECTRON TRANSPORT COMPLEX SUBUNIT RSXG ZMO_R808135
ELONGATION FACTOR G ZMO_R802245
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ELONGATION FACTOR TS ZMO_R805175
ELONGATION FACTOR TU ZMO_R802250
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ENDOPEPTIDASE LA ZMO_R801615
ENERGY TRANSDUCER TONB ZMO_R807730
ENERGY-DEPENDENT TRANSLATIONAL THROTTLE PROTEIN ETTA ZMO_R800780
EPOXYQUEUOSINE REDUCTASE QUEH ZMO_R808540
ETHANOLAMINE PERMEASE ZMO_R806160
EXCINUCLEASE ABC SUBUNIT UVRB ZMO_R801550
EXODEOXYRIBONUCLEASE III ZMO_R806260
EXODEOXYRIBONUCLEASE VII SMALL SUBUNIT ZMO_R803825
F0F1 ATP SYNTHASE SUBUNIT ALPHA ZMO_R801035
F0F1 ATP SYNTHASE SUBUNIT C ZMO_R802975
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F0F1 ATP SYNTHASE SUBUNIT GAMMA ZMO_R801040
FAD:PROTEIN FMN TRANSFERASE ZMO_R808290
FERREDOXIN FAMILY PROTEIN ZMO_R800940
FERREDOXIN--NADP REDUCTASE ZMO_R807885
FERROUS IRON TRANSPORT PROTEIN A ZMO_R806890
FKBP-TYPE PEPTIDYL-PROLYL CIS-TRANS ISOMERASE ZMO_R807705
FLAGELLAR BASAL BODY L-RING PROTEIN FLGH ZMO_R802705
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FLAGELLAR BASAL-BODY ROD PROTEIN FLGF ZMO_R802715
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FLAGELLAR HOOK CAPPING PROTEIN ZMO_R802725
FLAGELLAR HOOK-BASAL BODY COMPLEX PROTEIN ZMO_R802720
FLAGELLAR MOTOR SWITCH PROTEIN FLIG ZMO_R802815
FLAGELLAR MOTOR SWITCH PROTEIN FLIN ZMO_R802855
FLAGELLAR M-RING PROTEIN FLIF ZMO_R802810
FLAGELLAR PROTEIN FLIS ZMO_R802890
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FORMATE--TETRAHYDROFOLATE LIGASE ZMO_R801960
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GLUCONOKINASE ZMO_R807905
GLUCOSE-6-PHOSPHATE ISOMERASE ZMO_R805445
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GLUTAMATE--TRNA LIGASE ZMO_R804015
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GLYCOSYLTRANSFERASE ZMO_R807815
GLYOXYLATE/HYDROXYPYRUVATE REDUCTASE A ZMO_R808535
GNAT FAMILY N-ACETYLTRANSFERASE ZMO_R800900
GNTP FAMILY PERMEASE ZMO_R807900
GTPASE ERA ZMO_R806180
GTPASE OBGE ZMO_R800895
GUANYLATE KINASE ZMO_R801870
HAD FAMILY PHOSPHATASE ZMO_R808410
HAD-IB FAMILY HYDROLASE ZMO_R802925
HEAT-INDUCIBLE TRANSCRIPTIONAL REPRESSOR HRCA ZMO_R800075
HELICASE ZMO_R800935
HELIX-TURN-HELIX DOMAIN-CONTAINING PROTEIN ZMO_R800875
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HEME ABC EXPORTER ATP-BINDING PROTEIN CCMA ZMO_R801125
HEME LYASE CCMP/NRFE FAMILY SUBUNIT ZMO_R805625
HEPARINASE II/III FAMILY PROTEIN ZMO_R800095
HISTIDINE KINASE ZMO_R803055
HYD FAMILY EFFLUX TRANSPORTER PERIPLASMIC ADAPTOR SUBUNIT ZMO_R801105
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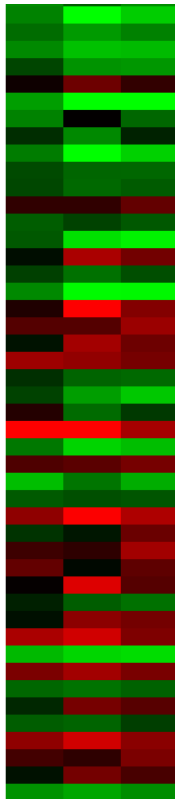
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HOMOSERINE O-ACETYLTRANSFERASE ZMO_RS00965
HPNL FAMILY PROTEIN ZMO_RS04365
HPNM FAMILY PROTEIN ZMO_RS03920
HPR FAMILY PHOSPHOCARRIER PROTEIN ZMO_RS05950
HSP20 FAMILY PROTEIN ZMO_RS04435
HU FAMILY DNA-BINDING PROTEIN ZMO_RS01060
HYDROXYACYLGLUTATHIONE HYDROLASE ZMO_RS03395
HYPOTHETICAL PROTEIN ZMO_RS00055
HYPOTHETICAL PROTEIN ZMO_RS00660
HYPOTHETICAL PROTEIN ZMO_RS00785
HYPOTHETICAL PROTEIN ZMO_RS00995
HYPOTHETICAL PROTEIN ZMO_RS01285
HYPOTHETICAL PROTEIN ZMO_RS01635
HYPOTHETICAL PROTEIN ZMO_RS01640
HYPOTHETICAL PROTEIN ZMO_RS01645
HYPOTHETICAL PROTEIN ZMO_RS01660
HYPOTHETICAL PROTEIN ZMO_RS01665
HYPOTHETICAL PROTEIN ZMO_RS01670
HYPOTHETICAL PROTEIN ZMO_RS01675
HYPOTHETICAL PROTEIN ZMO_RS01690
HYPOTHETICAL PROTEIN ZMO_RS01695
HYPOTHETICAL PROTEIN ZMO_RS01700
HYPOTHETICAL PROTEIN ZMO_RS01705
HYPOTHETICAL PROTEIN ZMO_RS01715
HYPOTHETICAL PROTEIN ZMO_RS01895
HYPOTHETICAL PROTEIN ZMO_RS02050
HYPOTHETICAL PROTEIN ZMO_RS02070
HYPOTHETICAL PROTEIN ZMO_RS02785
HYPOTHETICAL PROTEIN ZMO_RS03000
HYPOTHETICAL PROTEIN ZMO_RS03335
HYPOTHETICAL PROTEIN ZMO_RS03430
HYPOTHETICAL PROTEIN ZMO_RS03535
HYPOTHETICAL PROTEIN ZMO_RS03635
HYPOTHETICAL PROTEIN ZMO_RS03680
HYPOTHETICAL PROTEIN ZMO_RS04165
HYPOTHETICAL PROTEIN ZMO_RS04505
HYPOTHETICAL PROTEIN ZMO_RS04955
HYPOTHETICAL PROTEIN ZMO_RS05405
HYPOTHETICAL PROTEIN ZMO_RS05460
HYPOTHETICAL PROTEIN ZMO_RS05785
HYPOTHETICAL PROTEIN ZMO_RS05825
HYPOTHETICAL PROTEIN ZMO_RS05890
HYPOTHETICAL PROTEIN ZMO_RS05900
HYPOTHETICAL PROTEIN ZMO_RS05910
HYPOTHETICAL PROTEIN ZMO_RS06135
HYPOTHETICAL PROTEIN ZMO_RS06210
HYPOTHETICAL PROTEIN ZMO_RS06240
HYPOTHETICAL PROTEIN ZMO_RS06245
HYPOTHETICAL PROTEIN ZMO_RS06420
HYPOTHETICAL PROTEIN ZMO_RS06530
HYPOTHETICAL PROTEIN ZMO_RS06560
HYPOTHETICAL PROTEIN ZMO_RS06580
HYPOTHETICAL PROTEIN ZMO_RS06610
HYPOTHETICAL PROTEIN ZMO_RS06640
HYPOTHETICAL PROTEIN ZMO_RS06755
HYPOTHETICAL PROTEIN ZMO_RS07230
HYPOTHETICAL PROTEIN ZMO_RS07235
HYPOTHETICAL PROTEIN ZMO_RS07305
HYPOTHETICAL PROTEIN ZMO_RS07310
HYPOTHETICAL PROTEIN ZMO_RS07325
HYPOTHETICAL PROTEIN ZMO_RS07515
HYPOTHETICAL PROTEIN ZMO_RS07650
HYPOTHETICAL PROTEIN ZMO_RS07735
HYPOTHETICAL PROTEIN ZMO_RS07785
HYPOTHETICAL PROTEIN ZMO_RS07875
HYPOTHETICAL PROTEIN ZMO_RS07880
HYPOTHETICAL PROTEIN ZMO_RS08030
HYPOTHETICAL PROTEIN ZMO_RS08045
HYPOTHETICAL PROTEIN ZMO_RS08520
HYPOTHETICAL PROTEIN ZMO_RS08580
HYPOTHETICAL PROTEIN ZMO_RS08625
HYPOTHETICAL PROTEIN ZMO_RS08720
HYPOTHETICAL PROTEIN ZMO_RS08790
HYPOTHETICAL PROTEIN ZMO_RS08835
HYPOTHETICAL PROTEIN ZMO_RS09020
IMIDAZOLE GLYCEROL PHOSPHATE SYNTHASE SUBUNIT HISF ZMO_RS06725
IMIDAZOLEGLYCEROL-PHOSPHATE DEHYDRATASE HISB ZMO_RS06740
IMP DEHYDROGENASE ZMO_RS05920
INORGANIC DIPHOSPHATASE ZMO_RS06760
INOSITOL MONOPHOSPHATASE FAMILY PROTEIN ZMO_RS06805
INOSITOL MONOPHOSPHATASE ZMO_RS01415
INTEGRATION HOST FACTOR SUBUNIT BETA ZMO_RS08100
IRON ABC TRANSPORTER PERMEASE ZMO_RS00985
IRON ABC TRANSPORTER PERMEASE ZMO_RS08310
IRON-CONTAINING ALCOHOL DEHYDROGENASE ZMO_RS07970
IRON-SULFUR CLUSTER ASSEMBLY ACCESSORY PROTEIN ZMO_RS06265
IRON-SULFUR CLUSTER ASSEMBLY SCAFFOLD PROTEIN ZMO_RS02630
KETOL-ACID REDUCTOISOMERASE ZMO_RS05105
L-2-AMINO-THIAZOLINE-4-CARBOXYLIC ACID HYDROLASE ZMO_RS01345
LACTATE UTILIZATION PROTEIN ZMO_RS00105
LARGE CONDUCTANCE MECHANOSENSITIVE CHANNEL PROTEIN MSC1 ZMO_RS04675
L-ASPARTATE OXIDASE ZMO_RS00610
LEMA FAMILY PROTEIN ZMO_RS04670
LEUCINE--TRNA LIGASE ZMO_RS06425
LEUCYL AMINOPEPTIDASE FAMILY PROTEIN ZMO_RS03595
LEUCYL AMINOPEPTIDASE ZMO_RS05865
LEUCYL/PHENYLALANYL-TRNA--PROTEIN TRANSFERASE ZMO_RS04150
LIPOPOLYSACCHARIDE BIOSYNTHESIS PROTEIN ZMO_RS00980
LL-DIAMINOPELMATE AMINOTRANSFERASE ZMO_RS07780
LON PEPTIDASE SUBSTRATE-BINDING DOMAIN-CONTAINING PROTEIN ZMO_RS07670
LOW MOLECULAR WEIGHT PHOSPHOTYROSINE PROTEIN PHOSPHATASE ZMO_RS00590
LPS EXPORT ABC TRANSPORTER PERMEASE LPTF ZMO_RS06225
LPTA/OSTA FAMILY PROTEIN ZMO_RS01205
LRF/ASNC FAMILY TRANSCRIPTIONAL REGULATOR ZMO_RS01970
LRF/ASNC FAMILY TRANSCRIPTIONAL REGULATOR ZMO_RS04950
LUD DOMAIN-CONTAINING PROTEIN ZMO_RS00100
LYSE FAMILY TRANSLOCATOR ZMO_RS00205
LYSE FAMILY TRANSLOCATOR ZMO_RS05990
LYSR FAMILY TRANSCRIPTIONAL REGULATOR ZMO_RS00210
LYSR FAMILY TRANSCRIPTIONAL REGULATOR ZMO_RS05980
LYSR FAMILY TRANSCRIPTIONAL REGULATOR ZMO_RS07805
LYSR FAMILY TRANSCRIPTIONAL REGULATOR ZMO_RS08065
LYTIC MUREIN TRANSGLYCOSYLASE ZMO_RS04860
M13 FAMILY METALLOPEPTIDASE ZMO_RS03220



M20 PEPTIDASE AMINOACYLASE FAMILY PROTEIN ZMO_R801340
M23 FAMILY METALLOPEPTIDASE ZMO_R806270
M48 FAMILY METALLOPEPTIDASE ZMO_R800050
MANNOSE-1-PHOSPHATE GUANYLYLTRANSFERASE/MANNOSE-6-PHOSPHATE ISOMERASE ZMO_R805545
MARC FAMILY PROTEIN ZMO_R801775
MCE FAMILY PROTEIN ZMO_R804555
MECHANOTENSITIVE ION CHANNEL ZMO_R805965
MEMBRANE LIPOPROTEIN LIPID ATTACHMENT SITE-CONTAINING PROTEIN ZMO_R807340
MEMBRANE PROTEIN INSERTASE YDC ZMO_R807290
MERC DOMAIN-CONTAINING PROTEIN ZMO_R803955
METALLOREGULATOR ARSR/SMTB FAMILY TRANSCRIPTION FACTOR ZMO_R807860
METHIONINE ADENOSYLTRANSFERASE ZMO_R801190
METHYL-ACCEPTING CHEMOTAXIS PROTEIN ZMO_R800355
METHYLATED-DNA- ZMO_R809070
METHYLENETETRAHYDROFOLATE REDUCTASE ZMO_R807855
METHYLENETETRAHYDROFOLATE--TRNA-(URACIL(54)-C(5))-METHYLTRANSFERASE (FADH(2)-OXIDIZING) TRMFO ZMO_R803080
MFS TRANSPORTER ZMO_R800215
MFS TRANSPORTER ZMO_R800410
MFS TRANSPORTER ZMO_R806525
MFS TRANSPORTER ZMO_R807055
MFS TRANSPORTER ZMO_R808350
MFS TRANSPORTER ZMO_R809025
MLIC FAMILY PROTEIN ZMO_R804115
MODD PROTEIN ZMO_R808270
MOLECULAR CHAPERONE DNAJ ZMO_R802935
MOLECULAR CHAPERONE DNAK ZMO_R802930
MONOFUNCTIONAL BIOSYNTHETIC PEPTIDOGLYCAN TRANSGLYCOSYLASE ZMO_R804290
MOT/TOLO/EXEBB PROTON CHANNEL FAMILY PROTEIN ZMO_R807725
MUCR FAMILY TRANSCRIPTIONAL REGULATOR ZMO_R806320
MULTISPECIES: HELIX-TURN-HELIX DOMAIN-CONTAINING PROTEIN ZMO_R808820
MULTISPECIES: L-THREONINE DEHYDROGENASE ZMO_R807165
MULTISPECIES: TRANSLATION INITIATION FACTOR IF-1 ZMO_R804545
MUREIN TRANSGLYCOSYLASE A ZMO_R807335
N-ACETYLGLUCOSAMINE-6-PHOSPHATE DEACETYLASE ZMO_R804300
NAD(P)H: QUINONE OXIDOREDUCTASE ZMO_R805975
NAD(P)H-DEPENDENT OXIDOREDUCTASE ZMO_R808880
NAD-DEPENDENT SUCCINATE-SEMIALDEHYDE DEHYDROGENASE ZMO_R807890
NIFU FAMILY PROTEIN ZMO_R806335
NIFU FAMILY PROTEIN ZMO_R808250
NIFX-ASSOCIATED NITROGEN FIXATION PROTEIN ZMO_R808230
NITROGEN FIXATION PROTEIN NIFX ZMO_R808225
NITROGEN FIXATION PROTEIN NIFZ ZMO_R808180
NITROGENASE COFACTOR BIOSYNTHESIS PROTEIN NIFB ZMO_R808170
NITROGENASE IRON PROTEIN ZMO_R808200
NITROGENASE IRON-MOLYBDENUM COFACTOR BIOSYNTHESIS PROTEIN NIFE ZMO_R808215
NITROGENASE IRON-MOLYBDENUM COFACTOR BIOSYNTHESIS PROTEIN NIFN ZMO_R808220
NITROGENASE MOLYBDENUM-IRON PROTEIN ALPHA CHAIN ZMO_R808205
NITROGENASE MOLYBDENUM-IRON PROTEIN SUBUNIT BETA ZMO_R808210
NITRONATE MONOOXYGENASE ZMO_R808400
NUCLEAR TRANSPORT FACTOR 2 FAMILY PROTEIN ZMO_R801010
NUCLEOSIDE TRANSPORTER ZMO_R804325
NUCLEOTIDYLTRANSFERASE FAMILY PROTEIN ZMO_R804925
OMPA FAMILY PROTEIN ZMO_R806055
OMPH FAMILY OUTER MEMBRANE PROTEIN ZMO_R805135
ORGANIC HYDROPEROXIDE RESISTANCE PROTEIN ZMO_R803090
OROTIDINE-5\'\'-PHOSPHATE DECARBOXYLASE ZMO_R802610
OUTER MEMBRANE BETA-BARREL PROTEIN ZMO_R806155
OUTER MEMBRANE BETA-BARREL PROTEIN ZMO_R806675
OUTER MEMBRANE PROTEIN ASSEMBLY FACTOR BAMA ZMO_R805140
OUTER MEMBRANE PROTEIN ASSEMBLY FACTOR BAMD ZMO_R807910
OUTER MEMBRANE PROTEIN ASSEMBLY FACTOR BAME ZMO_R808660
OXIDOREDUCTASE ZMO_R808295
PAAI FAMILY THIOESTERASE ZMO_R808890
PANTOATE--BETA-ALANINE LIGASE ZMO_R809000
PARA FAMILY PROTEIN ZMO_R809035
PAS-DOMAIN CONTAINING PROTEIN ZMO_R804935
PBSX FAMILY PHAGE TERMINASE LARGE SUBUNIT ZMO_R801630
PENICILLIN-BINDING PROTEIN 2 ZMO_R801535
PENICILLIN-BINDING PROTEIN 2 ZMO_R803685
PEPTIDE CHAIN RELEASE FACTOR 2 ZMO_R800850
PEPTIDOGLYCAN DD-METALLOENDOPEPTIDASE FAMILY PROTEIN ZMO_R807485
PEPTIDYLPROLYL ISOMERASE ZMO_R802005
PEPTIDYLPROLYL ISOMERASE ZMO_R803445
PHAGE MAJOR TAIL TUBE PROTEIN ZMO_R800285
PHAGE SHOCK PROTEIN PSPA ZMO_R804755
PHOSPHATASE PAP2 FAMILY PROTEIN ZMO_R800545
PHOSPHATASE PAP2 FAMILY PROTEIN ZMO_R802230
PHOSPHATE ACYLTRANSFERASE PLXZ ZMO_R808620
PHOSPHATE REGULON TRANSCRIPTIONAL REGULATOR PHOB ZMO_R805215
PHOSPHOENOLPYRUVATE CARBOXYLASE ZMO_R806705
PHOSPHOGLUCONATE DEHYDRATASE ZMO_R801575
PHOSPHO-N-ACETYLMURAMOYL-PENTAPEPTIDE-TRANSFERASE ZMO_R803700
PHOSPHORIBOSYLAMINOIMIDAZOLESUCCINOCARBOXAMIDE SYNTHASE ZMO_R804710
PHOSPHORIBOSYLANTHRANILATE ISOMERASE ZMO_R802605
PHOSPHORIBOSYL-ATP DIPHOSPHATASE ZMO_R806720
PHOSPHORIBOSYLTRANSFERASE ZMO_R802910
PHOSPHOSERINE TRANSAMINASE ZMO_R807570
PHOSPHOTRANSFERASE ZMO_R806170
PHZF FAMILY PHENAZINE BIOSYNTHESIS PROTEIN ZMO_R808860
P-II FAMILY NITROGEN REGULATOR ZMO_R802130
PLP-DEPENDENT AMINOTRANSFERASE FAMILY PROTEIN ZMO_R808340
PLP-DEPENDENT AMINOTRANSFERASE FAMILY PROTEIN ZMO_R808855
POLYISOPRENOL-BINDING PROTEIN ZMO_R805970
POLYPRENYL SYNTHETASE FAMILY PROTEIN ZMO_R803820
POLYRIBONUCLEOTIDE NUCLEOTIDYLTRANSFERASE ZMO_R802430
PORIN FAMILY PROTEIN ZMO_R806680
PORPHOBILINOGEN SYNTHASE ZMO_R808515
PQQ-DEPENDENT SUGAR DEHYDROGENASE ZMO_R802475
PREPROTEIN TRANSLOCASE SUBUNIT SECE ZMO_R803230
PREPROTEIN TRANSLOCASE SUBUNIT SECG ZMO_R801995
PREPROTEIN TRANSLOCASE SUBUNIT SECY ZMO_R802360
PREPROTEIN TRANSLOCASE SUBUNIT YAJC ZMO_R808605
PRIMOSOMAL PROTEIN N\'\' ZMO_R808725
PROLINE--TRNA LIGASE ZMO_R801985
PROTEIN TRANSLOCASE SUBUNIT SECF ZMO_R808595
PSEUDOURIDINE SYNTHASE ZMO_R802570
PTS SUGAR TRANSPORTER SUBUNIT IIA ZMO_R805945
PURINE NUCLEOSIDE PERMEASE ZMO_R806505
PYRIDOXAL PHOSPHATE-DEPENDENT AMINOTRANSFERASE ZMO_R801455
PYRIDOXAL PHOSPHATE-DEPENDENT AMINOTRANSFERASE ZMO_R808885
PYRIDOXINE 5\'\'-PHOSPHATE SYNTHASE ZMO_R807685
PYRROLINE-5-CARBOXYLATE REDUCTASE ZMO_R801335
PYRUVATE DEHYDROGENASE COMPLEX E1 COMPONENT SUBUNIT BETA ZMO_R807205
PYRUVATE FORMATE LYASE-ACTIVATING PROTEIN ZMO_R807010
QUINONE OXIDOREDUCTASE ZMO_R809080



RDGB/HAM1 FAMILY NON-CANONICAL PURINE NTP PYROPHOSPHATASE ZMO_R800065
REDOX-REGULATED ATPASE YCHF ZMO_R808680
RELAXASE/MOBILIZATION NUCLEASE AND DUF3363 DOMAIN-CONTAINING PROTEIN ZMO_R808850
REPLICATION INITIATOR PROTEIN A ZMO_R809215
REPLICATION-ASSOCIATED RECOMBINATION PROTEIN A ZMO_R800510
RESPONSE REGULATOR TRANSCRIPTION FACTOR ZMO_R802055
RESPONSE REGULATOR TRANSCRIPTION FACTOR ZMO_R806195
RESPONSE REGULATOR ZMO_R800325
RESPONSE REGULATOR ZMO_R801080
RESPONSE REGULATOR ZMO_R806280
RESTRICTION ENDONUCLEASE ZMO_R800135
RHOMBROID FAMILY INTRAMEMBRANE SERINE PROTEASE ZMO_R807245
RIBBON-HELIX-HELIX DOMAIN-CONTAINING PROTEIN ZMO_R801305
RIBONUCLEASE D ZMO_R803185
RIBONUCLEASE E/G ZMO_R800830
RIBONUCLEASE HI ZMO_R807185
RIBONUCLEASE PH ZMO_R800070
RIBONUCLEOSIDE TRIPHOSPHATE REDUCTASE ZMO_R804595
RIBONUCLEOSIDE-DIPHOSPHATE REDUCTASE SUBUNIT ALPHA ZMO_R804645
RIBOSE 5-PHOSPHATE ISOMERASE B ZMO_R805385
RIBOSE-PHOSPHATE PYROPHOSPHOKINASE ZMO_R806810
RIBOSOME RECYCLING FACTOR ZMO_R805165
RIBOSOME SILENCING FACTOR ZMO_R807475
RIBOSOME-ASSOCIATED ATPASE/PUTATIVE TRANSPORTER RBBA ZMO_R803565
RIBOSOME-ASSOCIATED TRANSLATION INHIBITOR RAIA ZMO_R800175
RIBULOSE-PHOSPHATE 3-EPIMERASE ZMO_R800090
RIDA FAMILY PROTEIN ZMO_R808870
RIP METALLOPROTEASE RSEF ZMO_R805145
RLUA FAMILY PSEUDOURIDINE SYNTHASE ZMO_R803355
RNA CHAPERONE HFQ ZMO_R801480
RNA METHYLTRANSFERASE ZMO_R805400
RNA METHYLTRANSFERASE ZMO_R805955
RNA POLYMERASE FACTOR SIGMA-54 ZMO_R801195
RNA POLYMERASE SIGMA FACTOR RPOD ZMO_R807275
RNA POLYMERASE SIGMA FACTOR RPOH ZMO_R803350
RNA POLYMERASE-BINDING PROTEIN DKSA ZMO_R804425
RNA PSEUDOURIDINE SYNTHASE ZMO_R802190
RNASE ADAPTER RAP2 ZMO_R805940
RNFABCDGE TYPE ELECTRON TRANSPORT COMPLEX SUBUNIT B ZMO_R808150
ROD SHAPE-DETERMINING PROTEIN RODA ZMO_R801540
ROD-BINDING PROTEIN ZMO_R802695
ROK FAMILY PROTEIN ZMO_R807740
S41 FAMILY PEPTIDASE ZMO_R807490
SAPC FAMILY PROTEIN ZMO_R804515
SCP2 STEROL-BINDING DOMAIN-CONTAINING PROTEIN ZMO_R803375
SDR FAMILY OXIDOREDUCTASE ZMO_R800380
SDR FAMILY OXIDOREDUCTASE ZMO_R801330
SDR FAMILY OXIDOREDUCTASE ZMO_R801360
SDR FAMILY OXIDOREDUCTASE ZMO_R801450
SDR FAMILY OXIDOREDUCTASE ZMO_R806130
SDR FAMILY OXIDOREDUCTASE ZMO_R806970
SDR FAMILY OXIDOREDUCTASE ZMO_R807050
SDR FAMILY OXIDOREDUCTASE ZMO_R808865
SELL1 REPEAT FAMILY PROTEIN ZMO_R800125
SELL1 REPEAT FAMILY PROTEIN ZMO_R800200
SELL1 REPEAT FAMILY PROTEIN ZMO_R800560
SELL1 REPEAT FAMILY PROTEIN ZMO_R800565
SELL1 REPEAT FAMILY PROTEIN ZMO_R800570
SELL1-LIKE REPEAT PROTEIN ZMO_R800280
SELL1-LIKE REPEAT PROTEIN ZMO_R800580
SEPTAL RING LYtic TRANSGLYCOSYLASE RLPA FAMILY PROTEIN ZMO_R804865
SEPTUM FORMATION PROTEIN MAF ZMO_R800195
SEPTUM FORMATION PROTEIN MAF ZMO_R804540
SERINE ACETYLTRANSFERASE ZMO_R807795
SERINE HYDROXYMETHYLTRANSFERASE ZMO_R805390
SHIKIMATE KINASE ZMO_R802645
SIGNAL PEPTIDE PEPTIDASE SPFA ZMO_R808750
SIGNAL RECOGNITION PARTICLE PROTEIN ZMO_R804805
SIMPL DOMAIN-CONTAINING PROTEIN ZMO_R801245
SINGLE-STRANDED DNA-BINDING PROTEIN ZMO_R806900
SINGLE-STRANDED-DNA-SPECIFIC EXONUCLEASE RECJ ZMO_R805530
SMP-30/GLUCONOLACTONASE/LRE FAMILY PROTEIN ZMO_R809050
SMR/MUTS FAMILY PROTEIN ZMO_R807330
SORBITOL DEHYDROGENASE FAMILY PROTEIN ZMO_R803505
SOXR REDUCING SYSTEM RSEC FAMILY PROTEIN ZMO_R808285
SPOR DOMAIN-CONTAINING PROTEIN ZMO_R803580
SPOR DOMAIN-CONTAINING PROTEIN ZMO_R803750
SPRA-BINDING PROTEIN SMPB ZMO_R803215
SUCCINATE DEHYDROGENASE CYTOCHROME B SUBUNIT ZMO_R802530
SUCCINYL-DIAMINOPIMELATE DESUCCINYLAZE ZMO_R807320
SUCROSE-6-PHOSPHATE HYDROLASE ZMO_R804220
SUF SYSTEM FE-S CLUSTER ASSEMBLY PROTEIN ZMO_R801845
SUFD FAMILY FE-S CLUSTER ASSEMBLY PROTEIN ZMO_R801835
SUGAR PORTER FAMILY MFS TRANSPORTER ZMO_R801265
SULFATE ADENYLYLTRANSFERASE SUBUNIT CYSN ZMO_R800020
SULFITE EXPORTER TAUE/SAFE FAMILY PROTEIN ZMO_R800230
SUPEROXIDE DISMUTASE ZMO_R804740
TAIL FIBER DOMAIN-CONTAINING PROTEIN ZMO_R801710
TATD FAMILY HYDROLASE ZMO_R804890
TETRATRICOPEPTIDE REPEAT PROTEIN ZMO_R801945
TETRATRICOPEPTIDE REPEAT PROTEIN ZMO_R803380
TETRATRICOPEPTIDE REPEAT PROTEIN ZMO_R807675
THIOREDOXIN ZMO_R804910
THIOREDOXIN-DISULFIDE REDUCTASE ZMO_R805110
THREONINE SYNTHASE ZMO_R808575
THREONINE--TRNA LIGASE ZMO_R803415
TOLC FAMILY OUTER MEMBRANE PROTEIN ZMO_R801095
TOLL/INTERLEUKIN-1 RECEPTOR DOMAIN-CONTAINING PROTEIN ZMO_R807135
TOL-PAL SYSTEM PROTEIN TOLE ZMO_R800695
TONB FAMILY PROTEIN ZMO_R804750
TONB-DEPENDENT RECEPTOR ZMO_R800005
TONB-DEPENDENT RECEPTOR ZMO_R800150
TONB-DEPENDENT RECEPTOR ZMO_R800540
TONB-DEPENDENT RECEPTOR ZMO_R803520
TONB-DEPENDENT RECEPTOR ZMO_R803545
TONB-DEPENDENT RECEPTOR ZMO_R804025
TONB-DEPENDENT RECEPTOR ZMO_R806600
TONB-DEPENDENT RECEPTOR ZMO_R807005
TONB-DEPENDENT RECEPTOR ZMO_R808160
TONB-DEPENDENT SIDEROPHORE RECEPTOR ZMO_R807315
TRANSCRIPTION ELONGATION FACTOR GREa ZMO_R807250
TRANSCRIPTION ELONGATION FACTOR GREB ZMO_R803200
TRANSCRIPTION TERMINATION FACTOR RHO ZMO_R809085
TRANSCRIPTION TERMINATION/ANTITERMINATION FACTOR NUSG ZMO_R803235
TRANSCRIPTIONAL REPRESSOR NRDR ZMO_R805395



TRANSCRIPTIONAL REPRESSOR ZMO_RS06315
TRANSLATION INITIATION FACTOR IF-3 ZMO_RS08650
TRANSLATIONAL GTPASE TYPEA ZMO_RS06590
TRIGGER FACTOR ZMO_RS04240
TRNA (ADENOSINE(37)-N6)-THREONYLCARBAMOYLTRANSFERASE COMPLEX DIMERIZATION SUBUNIT TYPE 1 TSAB ZMO_RS06330
TRNA (GUANOSINE(37)-N1)-METHYLTRANSFERASE TRMD ZMO_RS04820
TRNA (GUANOSINE(46)-N7)-METHYLTRANSFERASE TRMB ZMO_RS00625
TRNA PREQ1(34) S-ADENOSYLMETHIONINE RIBOSYLTRANSFERASE-ISOMERASE QUEA ZMO_RS03805
TRNA PSEUDOURIDINE(55) SYNTHASE TRUB ZMO_RS02440
TRYPTOPHAN SYNTHASE SUBUNIT ALPHA ZMO_RS02595
TRYPTOPHAN SYNTHASE SUBUNIT BETA ZMO_RS02600
TWIN-ARGININE TRANSLOCASE SUBUNIT TATB ZMO_RS05480
TYPE I DNA TOPOISOMERASE ZMO_RS05355
TYPE I GLUTAMATE--AMMONIA LIGASE ZMO_RS02135
TYPE I SECRETION SYSTEM PERMEASE/ATPASE ZMO_RS01100
TYPE II 3-DEHYDROQUINATE DEHYDRATASE ZMO_RS03295
TYPE III PLP-DEPENDENT ENZYME ZMO_RS04575
TYROSINE-TYPE RECOMBINASE/INTEGRASE ZMO_RS08765
UBIH/UBIF/VISC/COQ6 FAMILY UBIQUINONE BIOSYNTHESIS HYDROXYLASE ZMO_RS07665
UBIQUINOL-CYTOCHROME C REDUCTASE IRON-SULFUR SUBUNIT ZMO_RS04275
UDP-GLUCOSE/GDP-MANNOSE DEHYDROGENASE FAMILY PROTEIN ZMO_RS03650
UDP-N-ACETYLMURAMOYL-L-ALANYL-D-GLUTAMATE--2,6-DIAMINOPIMELATE LIGASE ZMO_RS03690
UMP KINASE ZMO_RS05170
URACIL-DNA GLYCOSYLASE ZMO_RS05310
UROPORPHYRINOGEN-III C-METHYLTRANSFERASE ZMO_RS05690
UTP--GLUCOSE-1-PHOSPHATE URIDYLYLTRANSFERASE GALU ZMO_RS07950
UVRD-HELICASE DOMAIN-CONTAINING PROTEIN ZMO_RS02560
VACJ FAMILY LIPOPROTEIN ZMO_RS07865
VALINE--TRNA LIGASE ZMO_RS08510
VIT FAMILY PROTEIN ZMO_RS08395
VOC FAMILY PROTEIN ZMO_RS00145
VOC FAMILY PROTEIN ZMO_RS03400
YBAB/EBFC FAMILY NUCLEOID-ASSOCIATED PROTEIN ZMO_RS03850
YBAK/EBSC FAMILY PROTEIN ZMO_RS08875
YBGC/FADM FAMILY ACYL-COA THIOESTERASE ZMO_RS00675
YCGN FAMILY CYSTEINE CLUSTER PROTEIN ZMO_RS00155
YDBL FAMILY PROTEIN ZMO_RS02960
YEBC/PMER FAMILY DNA-BINDING TRANSCRIPTIONAL REGULATOR ZMO_RS00645
YFDX FAMILY PROTEIN ZMO_RS03095
YGGT FAMILY PROTEIN ZMO_RS01780
YIFB FAMILY MG CHELATASE-LIKE AAA ATPASE ZMO_RS07280
YIHA FAMILY RIBOSOME BIOGENESIS GTP-BINDING PROTEIN ZMO_RS07295
YNBE FAMILY LIPOPROTEIN ZMO_RS02955
YNFA FAMILY PROTEIN ZMO_RS06995
YRAN FAMILY PROTEIN ZMO_RS07930
ZINC-RIBBON DOMAIN-CONTAINING PROTEIN ZMO_RS01785