

**Table 1. Complete list of *Streptococcus agalactiae* predicted genes**

| ORF     | Size,<br>aa | Annotation  |
|---------|-------------|---|
| SAG0001 | 453         | chromosomal replication initiator protein DnaA                                  |
| SAG0002 | 378         | DNA polymerase III, beta subunit  |
| SAG0003 | 293         | diacylglycerol kinase catalytic domain protein, putative                        |
| SAG0004 | 65          | conserved hypothetical protein  |
| SAG0005 | 67          | hypothetical protein  |
| SAG0006 | 371         | GTP-binding protein YchF  |
| SAG0007 | 191         | peptidyl-tRNA hydrolase   |
| SAG0008 | 1165        | transcription-repair coupling factor  |
| SAG0009 | 31          | hypothetical protein  |
| SAG0010 | 90          | S4 domain protein   |
| SAG0011 | 123         | cell division protein DivIC, putative   |
| SAG0012 | 44          | conserved hypothetical protein  |
| SAG0013 | 428         | protein of unknown function   |
| SAG0014 | 424         | MesJ/Ycf62 family protein   |
| SAG0015 | 180         | hypoxanthine-guanine phosphoribosyltransferase                                  |
| SAG0016 | 658         | cell division protein FtsH  |
| SAG0017 | 447         | pcsB protein  |
| SAG0018 | 322         | ribose-phosphate pyrophosphokinase  |
| SAG0019 | 391         | aminotransferase, class I   |
| SAG0020 | 253         | recombination protein O   |
| SAG0021 | 283         | protease, putative  |
| SAG0022 | 330         | fatty acid/phospholipid synthesis protein PlsX                                  |
| SAG0023 | 79          | acyl carrier protein  |
| SAG0024 | 234         | phosphoribosylaminoimidazole-succinocarboxamide synthase                        |
| SAG0025 | 1241        | phosphoribosylformylglycinamidine synthase, putative                            |
| SAG0026 | 484         | amidophosphoribosyltransferase  |
| SAG0027 | 340         | phosphoribosylformylglycinamidine cyclo-ligase                                  |
| SAG0028 | 182         | phosphoribosylglycinamide formyltransferase                                     |
| SAG0029 | 250         | acetyltransferase, GNAT family  |
| SAG0030 | 515         | phosphoribosylaminoimidazolecarboxamide<br>formyltransferase/IMP cyclohydrolase |
| SAG0031 | 299         | peptidase, M23/M37 family   |
| SAG0032 | 434         | group B streptococcal surface immunogenic protein                               |
| SAG0033 | 232         | <i>N</i> -acetylmannosamine-6-P epimerase, putative                             |
| SAG0034 | 438         | sugar ABC transporter, sugar-binding protein                                    |
| SAG0035 | 295         | sugar ABC transporter, permease protein   |
| SAG0036 | 276         | sugar ABC transporter, permease protein   |
| SAG0037 | 147         | conserved hypothetical protein  |
| SAG0038 | 220         | conserved hypothetical protein  |
| SAG0039 | 305         | <i>N</i> -acetylneuraminatase lyase, putative                                   |
| SAG0040 | 293         | ROK family protein  |
| SAG0041 | 325         | Acetyl xylan esterase, putative   |
| SAG0042 | 267         | phosphosugar-binding transcriptional regulator, RpiR family,                    |

putative  
SAG0043 421 phosphoribosylamine--glycine ligase  
SAG0044 162 phosphoribosylaminoimidazole carboxylase, catalytic subunit  
SAG0045 363 phosphoribosylaminoimidazole carboxylase, ATPase subunit  
SAG0046 463 membrane protein, putative  
SAG0047 432 adenylosuccinate lyase  
SAG0048 303 transcriptional regulator, Cro/CI family  
SAG0049 332 Holliday junction DNA helicase RuvB  
SAG0050 145 phosphotyrosine protein phosphatase, low molecular weight  
SAG0051 126 MORN motif family protein  
SAG0052 592 membrane protein, putative  
SAG0053 880 aldehyde-alcohol dehydrogenase  
SAG0054 338 alcohol dehydrogenase, propanol-preferring  
SAG0055 496 threonine synthase  
SAG0056 412 MATE efflux family protein  
SAG0057 102 ribosomal protein S10  
SAG0058 208 ribosomal protein L3  
SAG0059 207 ribosomal protein L4  
SAG0060 98 ribosomal protein L23  
SAG0061 277 ribosomal protein L2  
SAG0062 92 ribosomal protein S19  
SAG0063 114 ribosomal protein L22  
SAG0064 217 ribosomal protein S3  
SAG0065 137 ribosomal protein L16  
SAG0066 68 ribosomal protein L29  
SAG0067 86 ribosomal protein S17  
SAG0068 122 ribosomal protein L14  
SAG0069 101 ribosomal protein L24  
SAG0070 180 ribosomal protein L5  
SAG0071 61 ribosomal protein S14, putative  
SAG0072 132 ribosomal protein S8  
SAG0073 178 ribosomal protein L6  
SAG0074 118 ribosomal protein L18  
SAG0075 164 ribosomal protein S5  
SAG0076 59 ribosomal protein L30  
SAG0077 146 ribosomal protein L15  
SAG0078 434 preprotein translocase, SecY subunit  
SAG0079 212 adenylate kinase  
SAG0080 72 translation initiation factor IF-1  
SAG0081 38 ribosomal protein L36  
SAG0082 121 ribosomal protein S13  
SAG0083 118 ribosomal protein S11  
SAG0084 312 DNA-directed RNA polymerase, alpha subunit  
SAG0085 128 ribosomal protein L17  
SAG0086 85 lipoprotein, putative  
SAG0087 59 hypothetical protein  
SAG0088 56 hypothetical protein  
SAG0089 183 conserved hypothetical protein  
SAG0090 139 conserved hypothetical protein  
SAG0091 144 transcriptional regulator ComX1, putative

|         |     |   |
|---------|-----|---|
| SAG0092 | 230 | phosphoglycerate mutase family protein                                  |
| SAG0093 | 250 | D-alanyl-D-alanine carboxypeptidase family protein                      |
| SAG0094 | 191 | <i>N</i> -acetylmuramoyl-L-alanine amidase, family 4 protein            |
| SAG0095 | 344 | heat-inducible transcription repressor HrcA                             |
| SAG0096 | 190 | heat shock protein GrpE   |
| SAG0097 | 609 | dnaK protein  |
| SAG0098 | 379 | dnaJ protein  |
| SAG0099 | 415 | transcriptional regulator, GntR family                                  |
| SAG0100 | 258 | tRNA pseudouridine synthase A   |
| SAG0101 | 252 | phosphomethylpyrimidine kinase, putative                                |
| SAG0102 | 154 | conserved hypothetical protein  |
| SAG0103 | 189 | conserved hypothetical protein TIGR01440                                |
| SAG0104 | 280 | conserved hypothetical protein  |
| SAG0105 | 427 | trigger factor  |
| SAG0106 | 191 | DNA-directed RNA polymerase, delta subunit, putative                    |
| SAG0107 | 534 | CTP synthase  |
| SAG0108 | 308 | conserved hypothetical protein  |
| SAG0109 | 148 | deoxyuridine 5'-triphosphate nucleotidohydrolase                        |
| SAG0110 | 454 | DNA repair protein RadA   |
| SAG0111 | 165 | carbonic anhydrase-related protein                                      |
| SAG0112 | 439 | pyridine nucleotide-disulphide oxidoreductase family protein            |
| SAG0113 | 484 | glutamyl-tRNA synthetase  |
| SAG0114 | 322 | ribose ABC transporter, periplasmic D-ribose-binding protein            |
| SAG0115 | 310 | ribose ABC transporter, permease protein                                |
| SAG0116 | 492 | ribose ABC transporter, ATP-binding protein                             |
| SAG0117 | 132 | ribose ABC transporter protein RbsD                                     |
| SAG0118 | 303 | ribokinase  |
| SAG0119 | 328 | ribose operon repressor RbsR  |
| SAG0120 | 32  | hypothetical protein  |
| SAG0121 | 362 | permease, putative  |
| SAG0122 | 228 | ABC transporter, ATP-binding protein                                    |
| SAG0123 | 223 | DNA-binding response regulator  |
| SAG0124 | 356 | sensor histidine kinase   |
| SAG0125 | 396 | argininosuccinate synthase  |
| SAG0126 | 462 | argininosuccinate lyase   |
| SAG0127 | 293 | fructose-bisphosphate aldolase  |
| SAG0128 | 305 | L-2-hydroxyisocaproate dehydrogenase                                    |
| SAG0129 | 62  | ribosomal protein L28   |
| SAG0130 | 121 | conserved hypothetical protein  |
| SAG0131 | 543 | DAK2 domain protein   |
| SAG0132 | 294 | SPFH domain/Band 7 family protein                                       |
| SAG0133 | 38  | conserved hypothetical protein  |
| SAG0134 | 96  | hypothetical protein  |
| SAG0135 | 246 | amino acid ABC transporter, ATP-binding protein                         |
| SAG0136 | 516 | amino acid ABC transporter, amino acid-binding protein/permease protein |
| SAG0137 | 627 | conserved hypothetical protein  |
| SAG0138 | 279 | undecaprenol kinase, putative   |
| SAG0139 | 251 | negative regulator of competence MecA, putative                         |
| SAG0140 | 386 | glycosyl transferase, group 4 family protein                            |

|         |      |   |
|---------|------|---|
| SAG0141 | 256  | ABC transporter, ATP-binding protein                              |
| SAG0142 | 420  | conserved hypothetical protein                                    |
| SAG0143 | 410  | selenocysteine lyase  |
| SAG0144 | 147  | NifU family protein   |
| SAG0145 | 472  | conserved hypothetical protein                                    |
| SAG0146 | 395  | penicillin-binding protein 4, putative                            |
| SAG0147 | 411  | D-alanyl-D-alanine carboxypeptidase family protein                |
| SAG0148 | 551  | oligopeptide ABC transporter, substrate-binding protein, putative |
| SAG0149 | 304  | oligopeptide ABC transporter, permease protein                    |
| SAG0150 | 343  | oligopeptide ABC transporter, permease protein                    |
| SAG0151 | 348  | oligopeptide ABC transporter, ATP-binding protein                 |
| SAG0152 | 310  | oligopeptide ABC transporter, ATP-binding protein                 |
| SAG0153 | 283  | 4-diphosphocytidyl-2C-methyl-D-erythritol kinase                  |
| SAG0154 | 147  | adc operon repressor AdcR   |
| SAG0155 | 236  | zinc ABC transporter, ATP-binding protein                         |
| SAG0156 | 270  | zinc ABC transporter, permease protein                            |
| SAG0157 | NA   | deoxyribonuclease-related protein, degenerate                     |
| SAG0158 | 419  | tyrosyl-tRNA synthetase   |
| SAG0159 | 765  | penicillin-binding protein 1B, putative                           |
| SAG0160 | 1191 | DNA-directed RNA polymerase, beta subunit                         |
| SAG0161 | 1216 | DNA-directed RNA polymerase beta' subunit                         |
| SAG0162 | 121  | conserved hypothetical protein                                    |
| SAG0163 | 323  | competence protein CglA   |
| SAG0164 | 282  | competence protein CglB   |
| SAG0165 | 151  | conserved hypothetical protein                                    |
| SAG0166 | 123  | conserved domain protein  |
| SAG0167 | 324  | conserved hypothetical protein                                    |
| SAG0168 | 397  | acetate kinase  |
| SAG0169 | 68   | transcriptional regulator, Cro/CI family                          |
| SAG0170 | 45   | hypothetical protein  |
| SAG0171 | 151  | hypothetical protein  |
| SAG0172 | 221  | protease, putative  |
| SAG0173 | 256  | pyrroline-5-carboxylate reductase                                 |
| SAG0174 | 355  | glutamyl-aminopeptidase   |
| SAG0175 | 79   | hypothetical protein  |
| SAG0176 | 94   | conserved hypothetical protein                                    |
| SAG0177 | 107  | thioredoxin family protein  |
| SAG0178 | 208  | tRNA binding domain protein                                       |
| SAG0179 | 238  | conserved hypothetical protein                                    |
| SAG0180 | 131  | single-strand binding protein                                     |
| SAG0181 | 214  | hydrolase, haloacid dehalogenase-like family                      |
| SAG0182 | 581  | sensor histidine kinase, putative                                 |
| SAG0183 | 246  | response regulator  |
| SAG0184 | 151  | conserved hypothetical protein                                    |
| SAG0185 | 242  | membrane protein, putative  |
| SAG0186 | 36   | hypothetical protein  |
| SAG0187 | 542  | oligopeptide ABC transporter, oligopeptide-binding protein        |
| SAG0188 | 325  | oligopeptide ABC transporter, permease protein                    |
| SAG0189 | 273  | oligopeptide ABC transporter, permease protein                    |
| SAG0190 | 267  | peptide ABC transporter, ATP-binding protein                      |

|         |     |   |
|---------|-----|---|
| SAG0191 | 208 | peptide ABC transporter, ATP-binding protein      |
| SAG0192 | 676 | PTS system, IIABC components                      |
| SAG0193 | 541 | alpha amylase family protein                      |
| SAG0194 | 639 | transcriptional antiterminator, BglG family       |
| SAG0195 | 377 | IS1548, transposase                               |
| SAG0196 | 66  | conserved domain protein                          |
| SAG0197 | 94  | PTS system, IIB component, putative               |
| SAG0198 | 451 | PTS system, IIC component, putative               |
| SAG0199 | 285 | transketolase, N-terminal subunit                 |
| SAG0200 | 309 | transketolase, C-terminal subunit                 |
| SAG0201 | 419 | oxidoreductase, putative                          |
| SAG0202 | 89  | ribosomal protein S15                             |
| SAG0203 | 709 | polyribonucleotide nucleotidyltransferase         |
| SAG0204 | 250 | conserved hypothetical protein                    |
| SAG0205 | 194 | serine O-acetyltransferase                        |
| SAG0206 | 60  | lipoprotein, putative                             |
| SAG0207 | 447 | cysteinyl-tRNA synthetase                         |
| SAG0208 | 128 | conserved hypothetical protein                    |
| SAG0209 | 251 | RNA methyltransferase, TrmH family, group 3       |
| SAG0210 | 172 | conserved hypothetical protein                    |
| SAG0211 | 286 | DegV family protein                               |
| SAG0212 | 32  | hypothetical protein                              |
| SAG0213 | 39  | hypothetical protein                              |
| SAG0214 | 148 | ribosomal protein L13                             |
| SAG0215 | 130 | ribosomal protein S9                              |
| SAG0216 | 33  | hypothetical protein                              |
| SAG0217 | 384 | site-specific recombinase, phage integrase family |
| SAG0218 | 158 | transcriptional regulator, Cro/CI family          |
| SAG0219 | 101 | hypothetical protein                              |
| SAG0220 | 92  | conserved hypothetical protein                    |
| SAG0221 | 76  | hypothetical protein                              |
| SAG0222 | 108 | conserved domain protein                          |
| SAG0223 | 209 | conserved hypothetical protein, fusion            |
| SAG0224 | 332 | replication initiation protein, putative          |
| SAG0225 | 144 | hypothetical protein                              |
| SAG0226 | 418 | recombination protein                             |
| SAG0227 | 156 | hypothetical protein                              |
| SAG0228 | 111 | conserved hypothetical protein                    |
| SAG0229 | 95  | conserved hypothetical protein                    |
| SAG0230 | 96  | conserved hypothetical protein                    |
| SAG0231 | 135 | hypothetical protein                              |
| SAG0232 | 186 | hypothetical protein                              |
| SAG0233 | 226 | hypothetical protein                              |
| SAG0234 | 128 | hypothetical protein                              |
| SAG0235 | 93  | hypothetical protein                              |
| SAG0236 | 32  | hypothetical protein                              |
| SAG0237 | 34  | hypothetical protein                              |
| SAG0238 | 41  | hypothetical protein                              |
| SAG0239 | 286 | transcriptional regulator MutR family             |
| SAG0240 | 393 | transporter, putative                             |

|         |     |  |
|---------|-----|--|
| SAG0241 | 213 | amino acid ABC transporter, permease protein               |
| SAG0242 | 308 | amino acid ABC transporter, amino acid-binding protein     |
| SAG0243 | 211 | amino acid ABC transporter, permease protein               |
| SAG0244 | 381 | amino acid ABC transporter, ATP-binding protein            |
| SAG0245 | 152 | protein of unknown function/lipoprotein, putative          |
| SAG0246 | 268 | hypothetical protein                                       |
| SAG0247 | 116 | hypothetical protein                                       |
| SAG0248 | 90  | hypothetical protein                                       |
| SAG0249 | 116 | hypothetical protein                                       |
| SAG0250 | 193 | membrane protein, putative                                 |
| SAG0251 | 72  | transcriptional regulator, Cro/CI family                   |
| SAG0252 | 186 | acetyltransferase, GNAT family                             |
| SAG0253 | 192 | acetyltransferase, GNAT family                             |
| SAG0254 | 226 | acetyltransferase, GNAT family                             |
| SAG0255 | 315 | conserved hypothetical protein                             |
| SAG0256 | 163 | RNA polymerase sigma factor, ECF subfamily                 |
| SAG0257 | 53  | lipoprotein, putative                                      |
| SAG0258 | 202 | transcriptional regulator, TetR family                     |
| SAG0259 | 365 | ABC transporter efflux protein, DrrB family, putative      |
| SAG0260 | 238 | ABC transporter, ATP-binding protein                       |
| SAG0261 | 129 | IS1381, transposase OrfB                                   |
| SAG0262 | 127 | IS1381, transposase OrfA                                   |
| SAG0263 | 171 | hypothetical protein                                       |
| SAG0264 | 103 | conserved hypothetical protein                             |
| SAG0265 | 235 | conserved hypothetical protein                             |
| SAG0266 | 382 | <i>N</i> -acetylglucosamine-6-phosphate deacetylase        |
| SAG0267 | 180 | conserved hypothetical protein                             |
| SAG0268 | 304 | glycyl-tRNA synthetase, alpha subunit                      |
| SAG0269 | 213 | acyl carrier protein phosphodiesterase, putative           |
| SAG0270 | 679 | glycyl-tRNA synthetase, beta subunit                       |
| SAG0271 | 85  | conserved hypothetical protein                             |
| SAG0272 | 87  | membrane protein, putative                                 |
| SAG0273 | 502 | glycerol kinase  |
| SAG0274 | 609 | alpha-glycerophosphate oxidase                             |
| SAG0275 | 232 | glycerol uptake facilitator protein                        |
| SAG0276 | 445 | NADH oxidase, putative                                     |
| SAG0277 | 476 | conserved hypothetical protein                             |
| SAG0278 | 661 | transketolase  |
| SAG0279 | 101 | conserved hypothetical protein                             |
| SAG0280 | 244 | ABC transporter, ATP-binding protein                       |
| SAG0281 | 534 | membrane protein, putative                                 |
| SAG0282 | 461 | PTS system, IIBC components                                |
| SAG0283 | 267 | glutamate 5-kinase   |
| SAG0284 | 417 | gamma-glutamyl phosphate reductase                         |
| SAG0285 | 298 | conserved hypothetical protein TIGR00006                   |
| SAG0286 | 108 | cell division protein FtsL, putative                       |
| SAG0287 | 752 | penicillin-binding protein 2X                              |
| SAG0288 | 336 | phospho- <i>N</i> -acetylmuramoyl-pentapeptide-transferase |
| SAG0289 | 447 | ATP-dependent RNA helicase, DEAD/DEAH box family           |
| SAG0290 | 270 | ABC transporter, substrate-binding protein                 |

|         |     |   |
|---------|-----|---|
| SAG0291 | 267 | amino acid ABC transporter, permease protein  |
| SAG0292 | 247 | amino acid ABC transporter, ATP-binding protein   |
| SAG0293 | 74  | conserved hypothetical protein  |
| SAG0294 | 304 | thioredoxin reductase   |
| SAG0295 | 486 | conserved hypothetical protein  |
| SAG0296 | 273 | NAD synthetase  |
| SAG0297 | 444 | aminopeptidase C  |
| SAG0298 | 750 | penicillin-binding protein 1A   |
| SAG0299 | 199 | recombination protein U   |
| SAG0300 | 172 | conserved hypothetical protein  |
| SAG0301 | 40  | hypothetical protein  |
| SAG0302 | 110 | conserved hypothetical protein  |
| SAG0303 | 384 | conserved hypothetical protein  |
| SAG0304 | 487 | conserved hypothetical protein  |
| SAG0305 | 160 | autoinducer-2 production protein LuxS   |
| SAG0306 | 535 | KH domain protein   |
| SAG0307 | 33  | hypothetical protein  |
| SAG0308 | 298 | ABC transporter, ATP-binding protein  |
| SAG0309 | 246 | ABC transporter, permease protein, putative   |
| SAG0310 | 361 | conserved hypothetical protein  |
| SAG0311 | NA  | DNA-binding response regulator, authentic point mutation                                      |
| SAG0312 | 234 | conserved hypothetical protein  |
| SAG0313 | 209 | guanylate kinase  |
| SAG0314 | 104 | DNA-directed RNA polymerase, omega subunit, putative  |
| SAG0315 | 796 | primosomal protein N'   |
| SAG0316 | 311 | methionyl-tRNA formyltransferase  |
| SAG0317 | 440 | sun protein   |
| SAG0318 | 245 | serine/threonine phosphatase, putative  |
| SAG0319 | 651 | serine/threonine protein kinase   |
| SAG0320 | 231 | conserved hypothetical protein  |
| SAG0321 | 339 | sensor histidine kinase, putative   |
| SAG0322 | 213 | DNA-binding response regulator  |
| SAG0323 | 466 | hydrolase, haloacid dehalogenase family/peptidyl-prolyl cis-trans isomerase, cyclophilin type |
| SAG0324 | 124 | general stress protein, putative  |
| SAG0325 | 258 | pyruvate formate-lyase-activating enzyme  |
| SAG0326 | 251 | transcriptional regulator, DeoR family  |
| SAG0327 | 327 | transcriptional regulator, putative   |
| SAG0328 | 107 | PTS system, cellobiose-specific IIA component   |
| SAG0329 | 106 | PTS system, cellobiose-specific IIB component   |
| SAG0330 | 433 | PTS system, cellobiose-specific IIC component   |
| SAG0331 | 818 | formate acetyltransferase   |
| SAG0332 | 222 | transaldolase family protein  |
| SAG0333 | 362 | glycerol dehydrogenase  |
| SAG0334 | 308 | cysteine synthase A   |
| SAG0335 | 214 | conserved hypothetical protein TIGR00257  |
| SAG0336 | 429 | helicase, putative  |
| SAG0337 | 221 | competence protein F, putative  |
| SAG0338 | 184 | ribosomal subunit interface protein   |
| SAG0339 | 450 | aspartate kinase family protein   |

|         |     |   |
|---------|-----|---|
| SAG0340 | 216 | hydrolase, haloacid dehalogenase-like family                |
| SAG0341 | 49  | hypothetical protein  |
| SAG0342 | 263 | enoyl-CoA hydratase/isomerase family protein                |
| SAG0343 | 144 | transcriptional regulator, MarR family                      |
| SAG0344 | 323 | 3-oxoacyl-(acyl-carrier-protein) synthase III               |
| SAG0345 | 74  | acyl carrier protein  |
| SAG0346 | 319 | enoyl-(acyl-carrier-protein) reductase II                   |
| SAG0347 | 308 | malonyl CoA-acyl carrier protein transacylase               |
| SAG0348 | 244 | 3-oxoacyl-[acyl-carrier protein] reductase                  |
| SAG0349 | 410 | 3-oxoacyl-(acyl-carrier-protein) synthase II                |
| SAG0350 | 166 | acetyl-CoA carboxylase, biotin carboxyl carrier protein     |
| SAG0351 | 140 | (3R)-hydroxymyristoyl-(acyl-carrier-protein) dehydratase    |
| SAG0352 | 456 | acetyl-CoA carboxylase, biotin carboxylase                  |
| SAG0353 | 291 | acetyl-CoA carboxylase, carboxyl transferase, beta subunit  |
| SAG0354 | 257 | acetyl-CoA carboxylase, carboxyl transferase, alpha subunit |
| SAG0355 | 210 | conserved hypothetical protein                              |
| SAG0356 | 425 | seryl-tRNA synthetase                                       |
| SAG0357 | 330 | membrane protein, putative                                  |
| SAG0358 | 120 | conserved hypothetical protein                              |
| SAG0359 | 303 | PTS system, mannose-specific IID component                  |
| SAG0360 | 270 | PTS system, mannose-specific IIC component                  |
| SAG0361 | 336 | PTS system, mannose-specific IIAB components                |
| SAG0362 | 270 | hydrolase, haloacid dehalogenase-like family                |
| SAG0363 | 194 | hypothetical protein  |
| SAG0364 | 203 | membrane protein, putative                                  |
| SAG0365 | 473 | xanthine/uracil permease family protein                     |
| SAG0366 | 169 | conserved hypothetical protein TIGR00150                    |
| SAG0367 | 186 | acetyltransferase, GNAT family                              |
| SAG0368 | 435 | protein of unknown function                                 |
| SAG0369 | 98  | conserved hypothetical protein                              |
| SAG0370 | 139 | HIT family protein  |
| SAG0371 | 167 | hypothetical protein  |
| SAG0372 | 85  | hypothetical protein  |
| SAG0373 | 241 | ABC transporter, ATP-binding protein                        |
| SAG0374 | 344 | ABC transporter, permease protein                           |
| SAG0375 | 266 | conserved hypothetical protein                              |
| SAG0376 | 211 | conserved hypothetical protein TIGR00091                    |
| SAG0377 | 127 | conserved hypothetical protein                              |
| SAG0378 | 379 | N utilization substance protein A                           |
| SAG0379 | 98  | conserved hypothetical protein                              |
| SAG0380 | 100 | ribosomal protein L7A family                                |
| SAG0381 | 927 | translation initiation factor IF-2                          |
| SAG0382 | 122 | ribosome-binding factor A                                   |
| SAG0383 | 334 | protein of unknown function/lipoprotein, putative           |
| SAG0384 | 138 | transcriptional repressor CopY                              |
| SAG0385 | 744 | copper-transporter ATPase CopA                              |
| SAG0386 | 68  | copper-transporter protein CopZ                             |
| SAG0387 | 204 | membrane protein, putative                                  |
| SAG0388 | 270 | hydrolase, haloacid dehalogenase-like family                |
| SAG0389 | 880 | DNA polymerase I  |



|         |      |   |
|---------|------|---|
| SAG0390 | 146  | CoA-binding domain protein                            |
| SAG0391 | 159  | transcriptional regulator, Fur family                 |
| SAG0392 | 521  | cell wall surface anchor family protein               |
| SAG0393 | 228  | DNA-binding response regulator                        |
| SAG0394 | 345  | sensor histidine kinase                               |
| SAG0395 | 246  | membrane protein, putative                            |
| SAG0396 | 380  | queuine tRNA-ribosyltransferase                       |
| SAG0397 | 102  | conserved hypothetical protein                        |
| SAG0398 | 179  | BioY family protein                                   |
| SAG0399 | 258  | AtsA/ElaC family protein                              |
| SAG0400 | 168  | cytidine/deoxycytidylate deaminase family protein     |
| SAG0401 | 44   | hypothetical protein                                  |
| SAG0402 | 449  | glucose-6-phosphate isomerase                         |
| SAG0403 | 175  | 5-formyltetrahydrofolate cyclo-ligase family protein  |
| SAG0404 | 225  | rhomboid family protein                               |
| SAG0405 | 347  | protein of unknown function/lipoprotein, putative     |
| SAG0406 | 299  | UTP-glucose-1-phosphate uridylyltransferase           |
| SAG0407 | 338  | glycerol-3-phosphate dehydrogenase (NAD(P)+)          |
| SAG0408 | 109  | ribonuclease P protein component                      |
| SAG0409 | 271  | SpoIIIJ family protein                                |
| SAG0410 | 273  | R3H domain protein                                    |
| SAG0411 | 177  | conserved hypothetical protein                        |
| SAG0412 | 258  | recX protein  |
| SAG0413 | 451  | RNA methyltransferase, TrmA family                    |
| SAG0414 | 153  | conserved hypothetical protein                        |
| SAG0415 | 142  | acetyltransferase, GNAT family                        |
| SAG0416 | 1233 | protease, putative                                    |
| SAG0417 | 302  | glycosyl transferase, group 2 family protein          |
| SAG0418 | 336  | ribonucleoside-diphosphate reductase 2, beta subunit  |
| SAG0419 | 137  | nrdI protein  |
| SAG0420 | 721  | ribonucleoside-diphosphate reductase 2, alpha subunit |
| SAG0421 | 1055 | cell wall surface anchor family protein               |
| SAG0422 | 129  | conserved hypothetical protein                        |
| SAG0423 | 132  | conserved domain protein                              |
| SAG0424 | 94   | hypothetical protein                                  |
| SAG0425 | 105  | carboxymuconolactone decarboxylase family protein     |
| SAG0426 | 131  | conserved hypothetical protein                        |
| SAG0427 | 129  | transcriptional regulator, MerR family                |
| SAG0428 | 345  | alcohol dehydrogenase, zinc-containing                |
| SAG0429 | 284  | oxidoreductase, aldo/keto reductase family            |
| SAG0430 | 287  | cation efflux system protein                          |
| SAG0431 | 174  | transcriptional regulator, TetR family                |
| SAG0432 | 397  | transcriptional regulator, AraC family                |
| SAG0433 | 1389 | surface protein Rib                                   |
| SAG0434 | 61   | transposase, IS256 family, truncation                 |
| SAG0435 | 97   | DNA-damage-inducible protein J, putative              |
| SAG0436 | 62   | hypothetical protein                                  |
| SAG0437 | 123  | lipoprotein, putative                                 |
| SAG0438 | 145  | bacteriophage L54a, integrase, truncation             |
| SAG0439 | NA   | conserved hypothetical protein, degenerate            |

|         |     |  |
|---------|-----|--|
| SAG0440 | 84  | conserved hypothetical protein   |
| SAG0441 | 103 | conserved domain protein   |
| SAG0442 | 189 | acetyltransferase, GNAT family   |
| SAG0443 | 194 | acetyltransferase, GNAT family   |
| SAG0444 | 188 | conserved hypothetical protein   |
| SAG0445 | 883 | valyl-tRNA synthetase  |
| SAG0446 | 319 | oxidoreductase, Gfo/Idh/MocA family  |
| SAG0447 | 287 | magnesium transporter, CorA family   |
| SAG0448 | 391 | transposase, IS256 family  |
| SAG0449 | 354 | conserved hypothetical protein   |
| SAG0450 | 330 | aspartate--ammonia ligase  |
| SAG0451 | 149 | bacteriocin transport accessory protein, putative  |
| SAG0452 | 179 | type II DNA modification methyltransferase, putative   |
| SAG0453 | 96  | hypothetical protein   |
| SAG0454 | 161 | phosphopantetheine adenylyltransferase   |
| SAG0455 | 357 | conserved hypothetical protein   |
| SAG0456 | NA  | conserved hypothetical protein, degenerate   |
| SAG0457 | 192 | conserved hypothetical protein   |
| SAG0458 | 368 | conserved hypothetical protein TIGR00048   |
| SAG0459 | 171 | VanZF domain protein   |
| SAG0460 | 581 | ABC transporter, ATP-binding/permease protein  |
| SAG0461 | 579 | ABC transporter, ATP-binding/permease protein  |
| SAG0462 | 188 | anthranilate synthase component II   |
| SAG0463 | 179 | BioY family protein  |
| SAG0464 | 330 | biotin synthetase  |
| SAG0465 | 164 | hypothetical protein   |
| SAG0466 | 371 | thiolase   |
| SAG0467 | 409 | AMP-binding enzyme domain protein  |
| SAG0468 | 210 | endonuclease III   |
| SAG0469 | 131 | type IV prepilin peptidase-related protein   |
| SAG0470 | 69  | conserved hypothetical protein   |
| SAG0471 | 322 | glucokinase  |
| SAG0472 | 126 | rhodanese-like family protein  |
| SAG0473 | 613 | elongation factor Tu family protein  |
| SAG0474 | 81  | conserved hypothetical protein   |
| SAG0475 | 451 | UDP- <i>N</i> -acetylmuramoylalanine-D-glutamate ligase  |
| SAG0476 | 358 | UDP- <i>N</i> -acetylglucosamine- <i>N</i> -acetylmuramyl-(pentapeptide) pyrophosphoryl-undecaprenol <i>N</i> -acetylglucosamine transferase |
| SAG0477 | 378 | cell division protein DivIB, putative  |
| SAG0478 | 429 | cell division protein FtsA   |
| SAG0479 | 426 | cell division protein FtsZ   |
| SAG0480 | 224 | ylmE protein, putative   |
| SAG0481 | 201 | ylmF protein   |
| SAG0482 | 84  | YGGT family protein  |
| SAG0483 | 262 | ylmH protein   |
| SAG0484 | 256 | cell division protein DivIVA, putative   |
| SAG0485 | 930 | isoleucyl-tRNA synthetase  |
| SAG0486 | 100 | conserved hypothetical protein   |
| SAG0487 | 151 | MutT/nudix family protein  |
| SAG0488 | 753 | ATP-dependent Clp protease, ATP-binding subunit  |

|         |     |  |
|---------|-----|--|
| SAG0489 | 34  | hypothetical protein   |
| SAG0490 | 76  | conserved hypothetical protein   |
| SAG0491 | 230 | amino acid ABC transporter, permease protein                                       |
| SAG0492 | 244 | amino acid ABC transporter, ATP-binding protein                                    |
| SAG0493 | 564 | phosphoglucomutase/phosphomannomutase family protein                               |
| SAG0494 | 284 | methylenetetrahydrofolate<br>dehydrogenase/methenyltetrahydrofolate cyclohydrolase |
| SAG0495 | 278 | protein of unknown function  |
| SAG0496 | 446 | exodeoxyribonuclease VII, large subunit  |
| SAG0497 | 71  | exodeoxyribonuclease VII, small subunit  |
| SAG0498 | 290 | geranyltranstransferase, putative  |
| SAG0499 | 275 | hemolysin A  |
| SAG0500 | 157 | arginine repressor ArgR, putative  |
| SAG0501 | 552 | DNA repair protein RecN  |
| SAG0502 | 278 | DegV family protein  |
| SAG0503 | 279 | lipase/acylhydrolase   |
| SAG0504 | 200 | conserved hypothetical protein   |
| SAG0505 | 91  | DNA-binding protein HU   |
| SAG0506 | 65  | hypothetical protein   |
| SAG0507 | 310 | dihydroorotate dehydrogenase A   |
| SAG0508 | 411 | beta-lactam resistance factor  |
| SAG0509 | 403 | beta-lactam resistance factor  |
| SAG0510 | 406 | murM protein, putative   |
| SAG0511 | 270 | hydrolase, haloacid dehalogenase-like family                                       |
| SAG0512 | 438 | HD domain protein  |
| SAG0513 | 128 | conserved hypothetical protein   |
| SAG0514 | 894 | cation-transporting ATPase, E1-E2 family   |
| SAG0515 | 286 | conserved hypothetical protein   |
| SAG0516 | 643 | fructose-1,6-bisphosphatase, putative  |
| SAG0517 | 374 | iron-sulfur cluster-binding protein, putative                                      |
| SAG0518 | NA  | peptide chain release factor 2, programmed frameshift                              |
| SAG0519 | 230 | cell division ABC transporter, ATP-binding protein FtsE                            |
| SAG0520 | 309 | cell division ABC transporter, permease protein FtsX                               |
| SAG0521 | 236 | carboxymethylenebutenolidase-related protein                                       |
| SAG0522 | 232 | metallo-beta-lactamase superfamily protein   |
| SAG0523 | 254 | oxidoreductase, short chain dehydrogenase/reductase family                         |
| SAG0524 | 835 | DNA polymerase III, epsilon subunit/ATP-dependent helicase<br>DinG                 |
| SAG0525 | 397 | aspartate aminotransferase   |
| SAG0526 | 448 | asparaginyl-tRNA synthetase  |
| SAG0527 | 185 | conserved hypothetical protein   |
| SAG0528 | 327 | inosine-uridine preferring nucleoside hydrolase                                    |
| SAG0529 | 38  | hypothetical protein   |
| SAG0530 | 137 | OsmC/Ohr family protein  |
| SAG0531 | 296 | conserved hypothetical protein   |
| SAG0532 | 324 | conserved hypothetical protein   |
| SAG0533 | 303 | conserved hypothetical protein   |
| SAG0534 | 465 | dipeptidase  |
| SAG0535 | 506 | zinc ABC transporter, zinc-binding adhesion liprotein                              |
| SAG0536 | 86  | ribosomal protein L31  |

|         |     |   |
|---------|-----|---|
| SAG0537 | 311 | DHH family protein  |
| SAG0538 | 340 | adenosine deaminase, putative   |
| SAG0539 | 147 | flavodoxin  |
| SAG0540 | 91  | chorismate mutase, putative   |
| SAG0541 | 398 | voltage-gated chloride channel family protein                         |
| SAG0542 | 127 | IS1381, transposase OrfA  |
| SAG0543 | 129 | IS1381, transposase OrfB  |
| SAG0544 | 115 | ribosomal protein L19   |
| SAG0545 | 359 | prophage LambdaSa1, site-specific recombinase, phage integrase family |
| SAG0546 | 67  | conserved domain protein  |
| SAG0547 | 185 | hypothetical protein  |
| SAG0548 | 265 | prophage LambdaSa1, repressor protein, putative                       |
| SAG0549 | 47  | hypothetical protein  |
| SAG0550 | 74  | conserved hypothetical protein  |
| SAG0551 | 52  | conserved hypothetical protein  |
| SAG0552 | 62  | hypothetical protein  |
| SAG0553 | 268 | hypothetical protein  |
| SAG0554 | 63  | prophage LambdaSa1, transcriptional regulator, Cro/CI family          |
| SAG0555 | 249 | prophage LambdaSa1, antirepressor, putative                           |
| SAG0556 | 47  | hypothetical protein  |
| SAG0557 | 76  | hypothetical protein  |
| SAG0558 | 74  | hypothetical protein  |
| SAG0559 | 286 | conserved hypothetical protein  |
| SAG0560 | 77  | conserved hypothetical protein  |
| SAG0561 | 46  | hypothetical protein  |
| SAG0562 | 84  | hypothetical protein  |
| SAG0563 | 53  | hypothetical protein  |
| SAG0564 | 160 | conserved hypothetical protein  |
| SAG0565 | 224 | conserved domain protein  |
| SAG0566 | 138 | prophage LambdaSa1, single-strand binding protein                     |
| SAG0567 | 439 | prophage LambdaSa1, reverse transcriptase/maturase family protein     |
| SAG0568 | 67  | conserved hypothetical protein  |
| SAG0569 | 158 | conserved hypothetical protein  |
| SAG0570 | 115 | hypothetical protein  |
| SAG0571 | 43  | hypothetical protein  |
| SAG0572 | 138 | conserved hypothetical protein  |
| SAG0573 | 54  | hypothetical protein  |
| SAG0574 | 89  | conserved hypothetical protein  |
| SAG0575 | 110 | hypothetical protein  |
| SAG0576 | 43  | hypothetical protein  |
| SAG0577 | 177 | conserved hypothetical protein  |
| SAG0578 | 88  | conserved hypothetical protein  |
| SAG0579 | 142 | conserved hypothetical protein  |
| SAG0580 | 111 | conserved hypothetical protein, truncation                            |
| SAG0581 | 118 | conserved hypothetical protein  |
| SAG0582 | 422 | conserved hypothetical protein  |
| SAG0583 | 406 | conserved hypothetical protein  |
| SAG0584 | 62  | conserved hypothetical protein, truncation                            |

|         |      |  |
|---------|------|--|
| SAG0585 | 471  | conserved hypothetical protein   |
| SAG0586 | 154  | conserved hypothetical protein   |
| SAG0587 | 300  | prophage LambdaSa1, structural protein, putative                         |
| SAG0588 | 71   | conserved hypothetical protein   |
| SAG0589 | 143  | conserved hypothetical protein   |
| SAG0590 | 112  | conserved hypothetical protein   |
| SAG0591 | 78   | conserved hypothetical protein   |
| SAG0592 | 111  | conserved hypothetical protein   |
| SAG0593 | 185  | prophage LambdaSa1, structural protein                                   |
| SAG0594 | 81   | conserved hypothetical protein   |
| SAG0595 | 123  | conserved hypothetical protein   |
| SAG0596 | 670  | prophage LambdaSa1, pblA protein, internal deletion                      |
| SAG0597 | 506  | prophage LambdaSa1, minor structural protein, putative                   |
| SAG0598 | 1374 | prophage LambdaSa1, <i>N</i> -acetylmuramoyl-L-alanine amidase, family 4 |
| SAG0599 | 668  | prophage LambdaSa1, minor structural protein, putative                   |
| SAG0600 | 109  | hypothetical protein   |
| SAG0601 | 70   | hypothetical protein   |
| SAG0602 | 100  | conserved hypothetical protein   |
| SAG0603 | 111  | conserved hypothetical protein   |
| SAG0604 | 239  | prophage LambdaSa1, lysin, putative                                      |
| SAG0605 | 323  | conserved hypothetical protein   |
| SAG0606 | 66   | conserved hypothetical protein   |
| SAG0607 | 56   | conserved hypothetical protein   |
| SAG0608 | 59   | hypothetical protein   |
| SAG0609 | NA   | prophage LambdaSa1, integrase, degenerate                                |
| SAG0610 | 134  | conserved hypothetical protein   |
| SAG0611 | NA   | transposase, degenerate  |
| SAG0612 | 53   | conserved hypothetical protein   |
| SAG0613 | 425  | transmembrane protein Vexp1  |
| SAG0614 | 218  | ABC transporter, ATP-binding protein Vexp2                               |
| SAG0615 | 458  | transmembrane protein Vexp3  |
| SAG0616 | 217  | DNA-binding response regulator VncR                                      |
| SAG0617 | 439  | sensor histidine kinase VncS   |
| SAG0618 | 195  | transposase OrfB, IS3 family, truncation                                 |
| SAG0619 | 66   | conserved hypothetical protein   |
| SAG0620 | 62   | hypothetical protein   |
| SAG0621 | 401  | rod shape-determining protein RodA, putative                             |
| SAG0622 | 186  | hydrolase, haloacid dehalogenase-like family                             |
| SAG0623 | 650  | DNA gyrase, B subunit  |
| SAG0624 | 574  | septation ring formation regulator EzrA, putative                        |
| SAG0625 | 213  | phosphoserine phosphatase SerB   |
| SAG0626 | 161  | MutT/nudix family protein  |
| SAG0627 | 151  | conserved hypothetical protein   |
| SAG0628 | 435  | enolase  |
| SAG0629 | 354  | conserved domain protein   |
| SAG0630 | 427  | 3-phosphoshikimate 1-carboxyvinyltransferase                             |
| SAG0631 | 170  | shikimate kinase   |
| SAG0632 | 457  | psr protein  |
| SAG0633 | 451  | RNA methyltransferase, TrmA family                                       |

|         |      |  |
|---------|------|--|
| SAG0634 | 70   | hypothetical protein   |
| SAG0635 | 245  | acid phosphatase, class B  |
| SAG0636 | 172  | conserved hypothetical protein   |
| SAG0637 | NA   | transcriptional regulator, TetR family, putative, authentic frameshift |
| SAG0638 | 109  | cell wall surface anchor family protein, truncation                    |
| SAG0639 | 273  | transposase OrfB, IS3 family   |
| SAG0640 | 91   | transposase OrfA, IS3 family   |
| SAG0641 | NA   | Tn5252, Orf 10 protein, degenerate                                     |
| SAG0642 | 59   | hypothetical protein   |
| SAG0643 | NA   | chaperonin, 33 kDa, degenerate   |
| SAG0644 | 402  | transcriptional regulator, AraC family                                 |
| SAG0645 | 554  | cell wall surface anchor family protein                                |
| SAG0646 | 307  | cell wall surface anchor family protein                                |
| SAG0647 | 305  | sortase family protein   |
| SAG0648 | 260  | sortase family protein   |
| SAG0649 | 890  | cell wall surface anchor family protein, putative                      |
| SAG0650 | 189  | sortase family protein   |
| SAG0651 | 201  | protein of unknown function  |
| SAG0652 | NA   | Tn5252, Orf 28 protein, degenerate                                     |
| SAG0653 | NA   | conserved hypothetical protein, degenerate                             |
| SAG0654 | 34   | hypothetical protein   |
| SAG0655 | 57   | conserved hypothetical protein   |
| SAG0656 | 36   | hypothetical protein   |
| SAG0657 | 89   | hypothetical protein   |
| SAG0658 | 383  | lipoprotein, putative  |
| SAG0659 | 330  | ABC transporter, ATP-binding protein                                   |
| SAG0660 | 272  | membrane protein   |
| SAG0661 | 261  | conserved hypothetical protein   |
| SAG0662 | 101  | cylX protein   |
| SAG0663 | 282  | cylD protein   |
| SAG0664 | 240  | cylG protein   |
| SAG0665 | 101  | acyl carrier protein AcpC  |
| SAG0666 | 158  | cylZ protein   |
| SAG0667 | 309  | cylA protein   |
| SAG0668 | 292  | cylB protein   |
| SAG0669 | 667  | cylE protein   |
| SAG0670 | 317  | cylF protein   |
| SAG0671 | 731  | cylI protein   |
| SAG0672 | 403  | cylJ protein   |
| SAG0673 | 191  | cylK protein   |
| SAG0674 | 113  | hypothetical protein   |
| SAG0675 | 171  | putative secreted protein  |
| SAG0676 | 885  | proteinase, putative   |
| SAG0677 | 1062 | hypothetical protein   |
| SAG0678 | NA   | endopeptidase O, degenerate  |
| SAG0679 | 343  | protein of unknown function  |
| SAG0680 | 339  | protein of unknown function  |
| SAG0681 | 353  | conserved domain protein   |
| SAG0682 | 409  | permease, putative   |

|         |      |  |
|---------|------|--|
| SAG0683 | NA   | transmembrane protein Vexp3, putative, degenerate                            |
| SAG0684 | 223  | ABC transporter, ATP-binding protein   |
| SAG0685 | 472  | conserved hypothetical protein   |
| SAG0686 | 261  | DNA-entry nuclease, putative   |
| SAG0687 | 212  | DedA family protein, putative  |
| SAG0688 | 218  | ABC transporter, ATP-binding protein   |
| SAG0689 | 257  | membrane protein, putative   |
| SAG0690 | 272  | conserved hypothetical protein   |
| SAG0691 | 294  | transcriptional regulator, LysR family                                       |
| SAG0692 | 193  | regulatory protein, putative   |
| SAG0693 | 377  | IS1548, transposase  |
| SAG0694 | 173  | regulatory protein, putative, truncation                                     |
| SAG0695 | 330  | D-lactate dehydrogenase  |
| SAG0696 | 516  | sodium:galactoside symporter family protein, putative                        |
| SAG0697 | 341  | 2-keto-3-deoxygluconate kinase   |
| SAG0698 | 599  | beta-glucuronidase   |
| SAG0699 | 223  | transcriptional regulator, GntR family                                       |
| SAG0700 | 205  | 2-dehydro-3-deoxyphosphogluconate aldolase/4-hydroxy-2-oxoglutarate aldolase |
| SAG0701 | 466  | glucuronate isomerase  |
| SAG0702 | 348  | mannonate dehydratase  |
| SAG0703 | 279  | D-mannonate oxidoreductase   |
| SAG0704 | 270  | hydrolase, haloacid dehalogenase-like family                                 |
| SAG0705 | 596  | glycosyl hydrolase, family 3   |
| SAG0706 | 361  | proline dipeptidase  |
| SAG0707 | 334  | transcriptional regulator, RegM family                                       |
| SAG0708 | 488  | alpha amylase family protein   |
| SAG0709 | 332  | glycosyl transferase, group 1 family protein                                 |
| SAG0710 | 444  | glycosyl transferase, group 1 family protein                                 |
| SAG0711 | 647  | threonyl-tRNA synthetase   |
| SAG0712 | 234  | DNA-binding response regulator   |
| SAG0713 | 339  | conserved hypothetical protein   |
| SAG0714 | 188  | conserved hypothetical protein   |
| SAG0715 | 216  | amino acid ABC transporter, permease protein                                 |
| SAG0716 | 231  | amino acid ABC transporter, permease protein                                 |
| SAG0717 | 266  | amino acid ABC transporter, amino acid-binding protein                       |
| SAG0718 | 251  | amino acid ABC transporter, ATP-binding protein                              |
| SAG0719 | 236  | DNA-binding response regulator   |
| SAG0720 | 449  | sensory box histidine kinase   |
| SAG0721 | 269  | metallo-beta-lactamase superfamily protein                                   |
| SAG0722 | 122  | conserved hypothetical protein   |
| SAG0723 | 236  | ribonuclease III   |
| SAG0724 | 1179 | chromosome segregation SMC protein   |
| SAG0725 | 265  | hydrolase, haloacid dehalogenase-like family                                 |
| SAG0726 | 274  | hydrolase, haloacid dehalogenase-like family                                 |
| SAG0727 | 536  | signal recognition particle-docking protein FtsY                             |
| SAG0728 | 270  | ABC transporter, substrate-binding protein                                   |
| SAG0729 | 300  | ABC transporter, permease protein, putative                                  |
| SAG0730 | 42   | ABC transporter, ATP-binding protein   |
| SAG0731 | 347  | bacterial luciferase family protein  |

|         |     |   |
|---------|-----|---|
| SAG0732 | 720 | transcriptional accessory protein Tex, putative   |
| SAG0733 | 142 | conserved hypothetical protein  |
| SAG0734 | 87  | phage shock protein C, putative   |
| SAG0735 | 44  | hypothetical protein  |
| SAG0736 | 311 | HPr(Ser) kinase/phosphatase   |
| SAG0737 | 257 | prolipoprotein diacylglyceryl transferase   |
| SAG0738 | 132 | conserved hypothetical protein  |
| SAG0739 | 143 | conserved hypothetical protein  |
| SAG0740 | 91  | conserved hypothetical protein  |
| SAG0741 | 303 | peptidase, U32 family, putative   |
| SAG0742 | 428 | peptidase, U32 family   |
| SAG0743 | 70  | conserved hypothetical protein  |
| SAG0744 | 265 | membrane protein, putative  |
| SAG0745 | 446 | Mn <sup>2+</sup> /Fe <sup>2+</sup> transporter, NRAMP family                                |
| SAG0746 | 369 | riboflavin biosynthesis protein RibD  |
| SAG0747 | 208 | riboflavin synthase, alpha subunit  |
| SAG0748 | 397 | riboflavin biosynthesis protein RibA  |
| SAG0749 | 156 | riboflavin synthase, beta subunit   |
| SAG0750 | 496 | lysyl-tRNA synthetase   |
| SAG0751 | 300 | hydrolase, haloacid dehalogenase-like family  |
| SAG0752 | 213 | phosphoglycerate mutase family protein  |
| SAG0753 | 157 | ebsC family protein, putative   |
| SAG0754 | 205 | conserved domain protein  |
| SAG0755 | 282 | peptidase, U32 family   |
| SAG0756 | 174 | conserved hypothetical protein  |
| SAG0757 | 129 | protein of unknown function/lipoprotein, putative   |
| SAG0758 | 599 | oligoendopeptidase F, putative  |
| SAG0759 | 931 | phosphoenolpyruvate carboxylase   |
| SAG0760 | 377 | IS1548, transposase   |
| SAG0761 | 422 | cell division protein, FtsW/RodA/SpoVE family   |
| SAG0762 | 398 | translation elongation factor Tu  |
| SAG0763 | 252 | triosephosphate isomerase   |
| SAG0764 | 230 | phosphoglycerate mutase family protein  |
| SAG0765 | 681 | penicillin-binding protein 2b   |
| SAG0766 | 198 | recombination protein RecR  |
| SAG0767 | 348 | D-alanine--D-alanine ligase   |
| SAG0768 | 455 | UDP- <i>N</i> -acetylmuramoylalanyl-D-glutamyl-2,6-diaminopimelate-D-alanyl-D-alanyl ligase |
| SAG0769 | 406 | oxalate:formate antiporter  |
| SAG0770 | 228 | membrane protein, putative  |
| SAG0771 | 512 | cell wall surface anchor family protein   |
| SAG0772 | 514 | peptide chain release factor 3  |
| SAG0773 | 126 | conserved hypothetical protein  |
| SAG0774 | 244 | ABC transporter, ATP-binding protein  |
| SAG0775 | 220 | ABC transporter, permease protein   |
| SAG0776 | 276 | YaeC family protein, putative   |
| SAG0777 | 528 | ATP-dependent RNA helicase, DEAD/DEAH box family  |
| SAG0778 | 88  | conserved hypothetical protein  |
| SAG0779 | 254 | conserved hypothetical protein  |
| SAG0780 | 246 | acyltransferase family protein  |



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|---------|-----|---|
| SAG0781 | 217 | competence protein CeiA                                   |
| SAG0782 | 745 | DNA internalization-related competence protein ComEC/Rec2 |
| SAG0783 | 269 | hydrolase, haloacid dehalogenase-like family              |
| SAG0784 | 314 | sugar-binding transcriptional regulator, LacI family      |
| SAG0785 | 330 | conserved hypothetical protein                            |
| SAG0786 | 242 | conserved domain protein                                  |
| SAG0787 | 345 | DNA polymerase III, delta subunit, putative               |
| SAG0788 | 202 | superoxide dismutase, Fe-Mn                               |
| SAG0789 | 283 | transcriptional antiterminator LicT                       |
| SAG0790 | 622 | PTS system, beta-glucosides-specific IIABC components     |
| SAG0791 | 475 | 6-phospho-beta-glucosidase                                |
| SAG0792 | 364 | conserved hypothetical protein                            |
| SAG0793 | 380 | glycerate kinase 2  |
| SAG0794 | 418 | permease, GntP family                                     |
| SAG0795 | 354 | conserved hypothetical protein                            |
| SAG0796 | 147 | transcriptional regulator, MarR family                    |
| SAG0797 | 342 | S-adenosylmethionine:tRNA ribosyltransferase-isomerase    |
| SAG0798 | 226 | membrane protein, putative                                |
| SAG0799 | 233 | glucosamine-6-phosphate isomerase                         |
| SAG0800 | 318 | glutathione S-transferase family protein                  |
| SAG0801 | 239 | ribosomal small subunit pseudouridine synthase A          |
| SAG0802 | 38  | hypothetical protein                                      |
| SAG0803 | 383 | major facilitator family protein                          |
| SAG0804 | 315 | competence protein CeiA                                   |
| SAG0805 | 601 | oligoendopeptidase B                                      |
| SAG0806 | 208 | hydrolase, haloacid dehalogenase-like family              |
| SAG0807 | 235 | O-methyltransferase family protein                        |
| SAG0808 | 309 | protease maturation protein, putative                     |
| SAG0809 | 161 | conserved hypothetical protein                            |
| SAG0810 | 872 | alanyl-tRNA synthetase                                    |
| SAG0811 | 238 | membrane protein, putative                                |
| SAG0812 | 272 | glycosyl transferase, family 8                            |
| SAG0813 | 81  | hypothetical protein                                      |
| SAG0814 | 95  | conserved hypothetical protein                            |
| SAG0815 | 71  | transcriptional regulator, Cro/CI family                  |
| SAG0816 | 253 | membrane protein, putative                                |
| SAG0817 | 187 | membrane protein, putative                                |
| SAG0818 | 319 | ribonucleoside-diphosphate reductase 2, beta subunit      |
| SAG0819 | 719 | ribonucleoside-diphosphate reductase 2, alpha subunit     |
| SAG0820 | 74  | ribonucleoside-diphosphate reductase 2, NrdH-redoxin      |
| SAG0821 | 87  | phosphocarrier protein HPr                                |
| SAG0822 | 577 | phosphoenolpyruvate-protein phosphotransferase            |
| SAG0823 | 475 | glyceraldehyde-3-phosphate dehydrogenase, NADP-dependent  |
| SAG0824 | 417 | polysaccharide deacetylase family protein                 |
| SAG0825 | 360 | ATP-dependent RNA helicase, DEAD/DEAH box family          |
| SAG0826 | 209 | uridine kinase  |
| SAG0827 | 165 | conserved hypothetical protein                            |
| SAG0828 | 554 | DNA polymerase III, gamma and tau subunits                |
| SAG0829 | 64  | conserved hypothetical protein                            |
| SAG0830 | 311 | biotin--acetyl-CoA-carboxylase ligase                     |

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|---------|------|---|
| SAG0831 | 398  | S-adenosylmethionine synthetase   |
| SAG0832 | 753  | protein of unknown function   |
| SAG0833 | 181  | hypothetical protein  |
| SAG0834 | 42   | hypothetical protein  |
| SAG0835 | 188  | conserved hypothetical protein  |
| SAG0836 | 184  | conserved hypothetical protein  |
| SAG0837 | 428  | ABC transporter, ATP-binding protein                                      |
| SAG0838 | 233  | hypothetical protein  |
| SAG0839 | 226  | transcriptional regulator, TenA family                                    |
| SAG0840 | 265  | phosphomethylpyrimidine kinase  |
| SAG0841 | 256  | hydroxyethylthiazole kinase   |
| SAG0842 | 223  | thiamine-phosphate pyrophosphorylase                                      |
| SAG0843 | 419  | UDP- <i>N</i> -acetylglucosamine 1-carboxyvinyltransferase                |
| SAG0844 | 184  | acetyltransferase, GNAT family  |
| SAG0845 | 427  | CBS domain protein  |
| SAG0846 | 286  | methionine aminopeptidase, type I   |
| SAG0847 | 306  | ribonuclease BN, putative   |
| SAG0848 | 151  | GtrA family protein   |
| SAG0849 | 169  | conserved hypothetical protein  |
| SAG0850 | 652  | DNA ligase, NAD-dependent   |
| SAG0851 | 339  | bmrU protein, putative  |
| SAG0852 | 766  | pullulanase, putative   |
| SAG0853 | 622  | 1,4-alpha-glucan branching enzyme   |
| SAG0854 | 379  | glucose-1-phosphate adenylyltransferase                                   |
| SAG0855 | NA   | glycogen biosynthesis protein GlgD, authentic frameshift                  |
| SAG0856 | 476  | glycogen synthase   |
| SAG0857 | 66   | ATP synthase F0, C subunit  |
| SAG0858 | 238  | ATP synthase F0, A subunit  |
| SAG0859 | 165  | ATP synthase F0, B subunit  |
| SAG0860 | 178  | ATP synthase F1, delta subunit  |
| SAG0861 | 501  | ATP synthase F1, alpha subunit  |
| SAG0862 | 293  | ATP synthase F1, gamma subunit  |
| SAG0863 | 468  | ATP synthase F1, beta subunit   |
| SAG0864 | 137  | ATP synthase F1, epsilon subunit  |
| SAG0865 | 76   | conserved hypothetical protein  |
| SAG0866 | 423  | UDP- <i>N</i> -acetylglucosamine 1-carboxyvinyltransferase                |
| SAG0867 | 63   | conserved hypothetical protein  |
| SAG0868 | 285  | DNA-entry nuclease  |
| SAG0869 | 346  | phenylalanyl-tRNA synthetase, alpha subunit                               |
| SAG0870 | 173  | acetyltransferase, GNAT family  |
| SAG0871 | 801  | phenylalanyl-tRNA synthetase, beta subunit                                |
| SAG0872 | 300  | conserved hypothetical protein  |
| SAG0873 | 1077 | exonuclease RexB  |
| SAG0874 | 1207 | exonuclease RexA  |
| SAG0875 | 305  | magnesium transporter, CorA family, putative                              |
| SAG0876 | 458  | tRNA modification GTPase TrmE   |
| SAG0877 | 636  | ABC transporter, ATP-binding protein                                      |
| SAG0878 | 322  | acetoin dehydrogenase, thymine PPi dependent, E1 component, alpha subunit |
| SAG0879 | 332  | acetoin dehydrogenase, thymine PPi dependent, E1 component,               |

|         |      |  |
|---------|------|--|
|         |      | beta subunit   |
| SAG0880 | 462  | acetoin dehydrogenase, thymine PPi dependent, E2 component, dihydrolipoamide acetyltransferase |
| SAG0881 | 585  | acetoin dehydrogenase, thymine PPi dependent, E3 component, dihydrolipoamide dehydrogenase     |
| SAG0882 | 329  | lipoate-protein ligase A   |
| SAG0883 | 261  | cobyric acid synthase, putative  |
| SAG0884 | 447  | mur ligase family protein  |
| SAG0885 | 283  | conserved hypothetical protein TIGR00159   |
| SAG0886 | 319  | protein of unknown function  |
| SAG0887 | 450  | phosphoglucomutase/phosphomannomutase family protein   |
| SAG0888 | 123  | conserved hypothetical protein   |
| SAG0889 | 126  | conserved hypothetical protein   |
| SAG0890 | 376  | oxygen-independent coproporphyrinogen III oxidase, putative                                    |
| SAG0891 | 245  | conserved hypothetical protein   |
| SAG0892 | 256  | hydrolase, haloacid dehalogenase-like family   |
| SAG0893 | 218  | conserved hypothetical protein   |
| SAG0894 | 1370 | protein of unknown function  |
| SAG0895 | 289  | lipoyl-binding domain protein  |
| SAG0896 | 108  | oxidoreductase, putative   |
| SAG0897 | 221  | conserved hypothetical protein   |
| SAG0898 | 83   | hypothetical protein   |
| SAG0899 | 57   | hypothetical protein   |
| SAG0900 | 56   | hypothetical protein   |
| SAG0901 | 127  | hypothetical protein   |
| SAG0902 | 45   | hypothetical protein   |
| SAG0903 | 44   | hypothetical protein   |
| SAG0904 | 56   | hypothetical protein   |
| SAG0905 | 138  | nucleoside diphosphate kinase  |
| SAG0906 | 610  | GTP-binding protein LepA   |
| SAG0907 | 877  | protein of unknown function/lipoprotein, putative  |
| SAG0908 | 203  | HD domain protein  |
| SAG0909 | 154  | acetyltransferase, GNAT family   |
| SAG0910 | 144  | PilB-related protein   |
| SAG0911 | 930  | cation-transporting ATPase, E1-E2 family   |
| SAG0912 | 367  | nucleoside diphosphate kinase domain protein   |
| SAG0913 | 212  | chloramphenicol acetyltransferase  |
| SAG0914 | 203  | conserved hypothetical protein   |
| SAG0915 | 405  | Tn916, transposase   |
| SAG0916 | 67   | Tn916, excisionase   |
| SAG0917 | 83   | Tn916, hypothetical protein  |
| SAG0918 | 76   | Tn916, hypothetical protein  |
| SAG0919 | 157  | Tn916, hypothetical protein  |
| SAG0920 | 23   | Tn916, hypothetical protein  |
| SAG0921 | 117  | Tn916, transcriptional regulator, putative   |
| SAG0922 | 61   | Tn916, hypothetical protein  |
| SAG0923 | 639  | Tn916, tetracycline resistance protein   |
| SAG0924 | 28   | Tn916, tetM leader peptide   |
| SAG0925 | 310  | Tn916, hypothetical protein  |
| SAG0926 | 333  | Tn916, NLP/P60 family protein  |

|         |      |   |
|---------|------|---|
| SAG0927 | 725  | membrane protein, putative                                      |
| SAG0928 | NA   | Tn916, hypothetical protein, authentic frameshift               |
| SAG0929 | 168  | Tn916, hypothetical protein                                     |
| SAG0930 | 165  | Tn916, hypothetical protein                                     |
| SAG0931 | 73   | Tn916, hypothetical protein                                     |
| SAG0932 | 401  | Tn916, transcriptional regulator, putative                      |
| SAG0933 | 461  | Tn916, FtsK/SpoIIIE family protein                              |
| SAG0934 | 128  | Tn916, hypothetical protein                                     |
| SAG0935 | 104  | Tn916, hypothetical protein                                     |
| SAG0936 | 39   | Tn916, hypothetical protein                                     |
| SAG0937 | NA   | ABC transporter, ATP-binding protein, authentic frameshift      |
| SAG0938 | 122  | transcriptional regulator, GntR family                          |
| SAG0939 | 1034 | DNA polymerase III, alpha subunit                               |
| SAG0940 | 340  | 6-phosphofructokinase   |
| SAG0941 | 500  | pyruvate kinase   |
| SAG0942 | 185  | signal peptidase I, putative                                    |
| SAG0943 | 47   | hypothetical protein  |
| SAG0944 | 604  | glucosamine--fructose-6-phosphate aminotransferase, isomerizing |
| SAG0945 | 377  | IS1548, transposase   |
| SAG0946 | 109  | phnA protein  |
| SAG0947 | 213  | amino acid ABC transporter, permease protein                    |
| SAG0948 | 209  | amino acid ABC transporter, ATP-binding protein                 |
| SAG0949 | 276  | amino acid ABC transporter, amino acid-binding protein          |
| SAG0950 | 82   | ribosomal protein S20   |
| SAG0951 | 306  | pantothenate kinase   |
| SAG0952 | 196  | conserved hypothetical protein                                  |
| SAG0953 | 129  | cytidine deaminase  |
| SAG0954 | 349  | protein of unknown function/lipoprotein, putative               |
| SAG0955 | 511  | sugar ABC transporter, ATP-binding protein                      |
| SAG0956 | 353  | sugar ABC transporter, permease protein, putative               |
| SAG0957 | 318  | sugar ABC transporter, permease protein, putative               |
| SAG0958 | 456  | NADH oxidase  |
| SAG0959 | 329  | L-lactate dehydrogenase   |
| SAG0960 | 819  | DNA gyrase, A subunit   |
| SAG0961 | 247  | sortase SrtA  |
| SAG0962 | 137  | glyoxylase family protein                                       |
| SAG0963 | 320  | conserved hypothetical protein                                  |
| SAG0964 | 375  | Na <sup>+</sup> /H <sup>+</sup> exchanger family protein        |
| SAG0965 | 127  | IS1381, transposase OrfA  |
| SAG0966 | 129  | IS1381, transposase OrfB  |
| SAG0967 | 520  | GMP synthase  |
| SAG0968 | 232  | transcriptional regulator, GntR family                          |
| SAG0969 | 444  | gid protein   |
| SAG0970 | 247  | acetyltransferase, GNAT family                                  |
| SAG0971 | 282  | protein of unknown function/lipoprotein, putative               |
| SAG0972 | NA   | conserved hypothetical protein, authentic frameshift            |
| SAG0973 | 320  | nisin-resistance protein, putative                              |
| SAG0974 | 250  | ABC transporter, ATP-binding protein                            |
| SAG0975 | 651  | ABC transporter, permease protein, putative                     |
| SAG0976 | 222  | DNA-binding response regulator                                  |

|         |     |  |
|---------|-----|--|
| SAG0977 | 312 | sensor histidine kinase  |
| SAG0978 | 356 | site-specific recombinase, phage integrase family                  |
| SAG0979 | 553 | ABC transporter, substrate-binding protein                         |
| SAG0980 | 257 | conserved hypothetical protein                                     |
| SAG0981 | 228 | satD protein   |
| SAG0982 | 521 | signal recognition particle protein Ffh                            |
| SAG0983 | 110 | conserved hypothetical protein                                     |
| SAG0984 | 437 | sensor histidine kinase CiaH                                       |
| SAG0985 | 226 | DNA-binding response regulator CiaR                                |
| SAG0986 | 849 | aminopeptidase N   |
| SAG0987 | 217 | phosphate transport system regulatory protein PhoU                 |
| SAG0988 | 252 | phosphate ABC transporter, ATP-binding protein PstB, putative      |
| SAG0989 | 267 | phosphate ABC transporter, ATP-binding protein PstB, putative      |
| SAG0990 | 295 | phosphate ABC transporter, permease protein PstA, putative         |
| SAG0991 | 305 | phosphate ABC transporter, permease protein                        |
| SAG0992 | 286 | phosphate ABC transporter, phosphate-binding protein               |
| SAG0993 | 436 | NOL1/NOP2/sun family protein                                       |
| SAG0994 | 254 | inositol monophosphatase family protein                            |
| SAG0995 | 93  | conserved hypothetical protein                                     |
| SAG0996 | 137 | conserved hypothetical protein                                     |
| SAG0997 | 310 | macrolide-efflux protein mreA/riboflavin biosynthesis protein RibF |
| SAG0998 | 294 | tRNA pseudouridine synthase B                                      |
| SAG0999 | 143 | acetyltransferase, GNAT family                                     |
| SAG1000 | 423 | conserved hypothetical protein                                     |
| SAG1001 | 196 | conserved hypothetical protein                                     |
| SAG1002 | 292 | protease, putative   |
| SAG1003 | 876 | permease, putative   |
| SAG1004 | 233 | ABC transporter, ATP-binding protein                               |
| SAG1005 | 706 | DNA topoisomerase I  |
| SAG1006 | 280 | DprA/SMF protein, putative DNA processing factor                   |
| SAG1007 | 342 | iron-compound ABC transporter, iron-compound-binding protein       |
| SAG1008 | 253 | iron compound ABC transporter, ATP-binding protein                 |
| SAG1009 | 324 | iron compound ABC transporter, permease protein                    |
| SAG1010 | 320 | iron compound ABC transporter, permease protein                    |
| SAG1011 | 182 | acetyltransferase, CysE/LacA/LpxA/NodL family                      |
| SAG1012 | 253 | ribonuclease HII   |
| SAG1013 | 283 | GTP-binding protein  |
| SAG1014 | 190 | conserved hypothetical protein                                     |
| SAG1015 | 494 | carbon starvation protein CstA, putative                           |
| SAG1016 | 244 | response regulator   |
| SAG1017 | 579 | sensor histidine kinase, putative                                  |
| SAG1018 | 40  | lipoprotein, putative  |
| SAG1019 | 39  | hypothetical protein   |
| SAG1020 | 227 | lipoprotein, putative  |
| SAG1021 | 107 | hypothetical protein   |
| SAG1022 | 177 | hypothetical protein   |
| SAG1023 | 48  | hypothetical protein   |
| SAG1024 | 183 | lipoprotein, putative  |
| SAG1025 | 149 | hypothetical protein   |

|         |      |   |
|---------|------|---|
| SAG1026 | NA   | immunogenic secreted protein, degenerate          |
| SAG1027 | 84   | conserved hypothetical protein                    |
| SAG1028 | 196  | hypothetical protein                              |
| SAG1029 | 101  | hypothetical protein                              |
| SAG1030 | 304  | protein of unknown function                       |
| SAG1031 | 120  | conserved domain protein                          |
| SAG1032 | 85   | conserved hypothetical protein                    |
| SAG1033 | 1309 | FtsK/SpoIIIE family protein                       |
| SAG1034 | 55   | hypothetical protein                              |
| SAG1035 | 424  | conserved hypothetical protein                    |
| SAG1036 | 80   | conserved hypothetical protein                    |
| SAG1037 | 157  | hypothetical protein                              |
| SAG1038 | 1003 | phage infection protein, putative                 |
| SAG1039 | 96   | conserved hypothetical protein                    |
| SAG1040 | 260  | conserved domain protein                          |
| SAG1041 | 107  | hypothetical protein                              |
| SAG1042 | 1060 | carbamoyl-phosphate synthase, large subunit       |
| SAG1043 | 358  | carbamoyl-phosphate synthase, small subunit       |
| SAG1044 | 307  | aspartate carbamoyltransferase                    |
| SAG1045 | 430  | dihydroorotase, multifunctional complex type      |
| SAG1046 | 209  | orotate phosphoribosyltransferase                 |
| SAG1047 | 233  | orotidine 5'-phosphate decarboxylase              |
| SAG1048 | 410  | membrane protein, putative                        |
| SAG1049 | 513  | ABC transporter, ATP-binding protein              |
| SAG1050 | 112  | ribonucleotide reductase, truncation              |
| SAG1051 | 358  | aspartate-semialdehyde dehydrogenase              |
| SAG1052 | 47   | cell wall surface anchor family protein, putative |
| SAG1053 | 30   | hypothetical protein                              |
| SAG1054 | 531  | cardiolipin synthetase                            |
| SAG1055 | 556  | formate--tetrahydrofolate ligase                  |
| SAG1056 | 339  | lipoate-protein ligase A                          |
| SAG1057 | 292  | conserved hypothetical protein                    |
| SAG1058 | 272  | conserved hypothetical protein                    |
| SAG1059 | 110  | glycine cleavage system H protein, putative       |
| SAG1060 | 328  | bacterial luciferase family protein               |
| SAG1061 | 399  | oxidoreductase, FMN-binding                       |
| SAG1062 | 282  | lipoate-protein ligase A family protein           |
| SAG1063 | 228  | flavoprotein-related protein                      |
| SAG1064 | 180  | flavoprotein family protein                       |
| SAG1065 | 190  | membrane protein, putative                        |
| SAG1066 | 572  | phosphoglucomutase                                |
| SAG1067 | 178  | IS861, transposase OrfA                           |
| SAG1068 | 277  | IS861, transposase OrfB                           |
| SAG1069 | 65   | hypothetical protein                              |
| SAG1070 | 577  | ABC transporter, ATP-binding/permease protein     |
| SAG1071 | 573  | ABC transporter, ATP-binding/permease protein     |
| SAG1072 | 200  | conserved hypothetical protein                    |
| SAG1073 | 325  | conserved hypothetical protein                    |
| SAG1074 | 418  | serine hydroxymethyltransferase                   |
| SAG1075 | 183  | Sua5/YciO/YrdC/YwIC family protein                |

|         |     |  |
|---------|-----|--|
| SAG1076 | 276 | modification methylase, HemK family  |
| SAG1077 | 359 | peptide chain release factor 1   |
| SAG1078 | 189 | thymidine kinases  |
| SAG1079 | 60  | 4-oxalocrotonate tautomerase   |
| SAG1080 | 47  | hypothetical protein   |
| SAG1081 | 312 | ApbE family protein  |
| SAG1082 | 200 | conserved hypothetical protein   |
| SAG1083 | 411 | conserved hypothetical protein   |
| SAG1084 | 262 | formate/nitrite transporter family protein                                   |
| SAG1085 | 424 | xanthine permease  |
| SAG1086 | 193 | xanthine phosphoribosyltransferase   |
| SAG1087 | 327 | guanosine monophosphate reductase  |
| SAG1088 | 446 | drug resistance transporter, EmrB/QacA family, putative                      |
| SAG1089 | 230 | conserved hypothetical protein   |
| SAG1090 | 666 | potassium uptake protein, putative   |
| SAG1091 | 216 | oxidoreductase, short chain dehydrogenase/reductase family                   |
| SAG1092 | 330 | phosphate acetyltransferase  |
| SAG1093 | 294 | ribosomal large subunit pseudouridine synthase, RluD subfamily               |
| SAG1094 | 278 | conserved hypothetical protein   |
| SAG1095 | 223 | GTP pyrophosphokinase family protein   |
| SAG1096 | 190 | conserved hypothetical protein   |
| SAG1097 | 324 | ribose-phosphate pyrophosphokinase   |
| SAG1098 | 371 | cysteine desulphurase  |
| SAG1099 | 115 | conserved hypothetical protein   |
| SAG1100 | 210 | conserved hypothetical protein   |
| SAG1101 | 226 | DNA repair protein RadC  |
| SAG1102 | 377 | membrane protein, putative   |
| SAG1103 | 478 | 6-phospho-beta-glucosidase   |
| SAG1104 | 204 | platelet activating factor, putative   |
| SAG1105 | 273 | hydrolase, haloacid dehalogenase-like family                                 |
| SAG1106 | 309 | transcriptional regulator, AraC family, putative                             |
| SAG1107 | 510 | voltage-gated chloride channel family protein                                |
| SAG1108 | 357 | spermidine/putrescine ABC transporter, spermidine/putrescine-binding protein |
| SAG1109 | 258 | spermidine/putrescine ABC transporter, permease protein                      |
| SAG1110 | 264 | spermidine/putrescine ABC transporter, permease protein                      |
| SAG1111 | 384 | spermidine/putrescine ABC transporter, ATP-binding protein                   |
| SAG1112 | 300 | UDP-N-acetylenolpyruvoylglucosamine reductase                                |
| SAG1113 | 162 | 2-amino-4-hydroxy-6-hydroxymethyldihydropteridine pyrophosphokinase          |
| SAG1114 | 120 | dihydroneopterin aldolase  |
| SAG1115 | 267 | dihydropteroate synthase   |
| SAG1116 | 187 | GTP cyclohydrolase I   |
| SAG1117 | 420 | folylpolyglutamate synthase  |
| SAG1118 | 295 | rarD protein   |
| SAG1119 | 288 | homoserine kinase  |
| SAG1120 | 427 | homoserine dehydrogenase   |
| SAG1121 | 295 | polysaccharide deacetylase family protein                                    |
| SAG1122 | 515 | transporter, BCCT family protein   |
| SAG1123 | 34  | hypothetical protein   |

|         |     |  |
|---------|-----|--|
| SAG1124 | 458 | aldehyde dehydrogenase family protein  |
| SAG1125 | 335 | membrane protein, putative   |
| SAG1126 | 228 | protein of unknown function  |
| SAG1127 | 446 | conserved domain protein   |
| SAG1128 | 65  | transcriptional regulator, Cro/CI family                                     |
| SAG1129 | 36  | hypothetical protein   |
| SAG1130 | 49  | hypothetical protein   |
| SAG1131 | 164 | thiol peroxidase   |
| SAG1132 | 219 | conserved hypothetical protein   |
| SAG1133 | 254 | conserved hypothetical protein   |
| SAG1134 | 213 | transcriptional regulator, GntR family/potassium uptake protein, TrkA family |
| SAG1135 | 183 | gls24 protein, putative  |
| SAG1136 | 65  | conserved hypothetical protein   |
| SAG1137 | 180 | gls24 protein, putative  |
| SAG1138 | 64  | conserved hypothetical protein   |
| SAG1139 | 193 | conserved hypothetical protein   |
| SAG1140 | 82  | conserved hypothetical protein   |
| SAG1141 | 112 | conserved hypothetical protein   |
| SAG1142 | 759 | ATP-dependent DNA helicase PcrA  |
| SAG1143 | 128 | conserved hypothetical protein   |
| SAG1144 | 441 | uracil permease  |
| SAG1145 | 448 | sodium:alanine symporter family protein                                      |
| SAG1146 | 411 | cation efflux family protein   |
| SAG1147 | 130 | conserved hypothetical protein   |
| SAG1148 | 231 | membrane protein, putative   |
| SAG1149 | 207 | lipoprotein, putative  |
| SAG1150 | 400 | ribosomal protein S1   |
| SAG1151 | 76  | conserved hypothetical protein   |
| SAG1152 | 340 | branched-chain amino acid aminotransferase                                   |
| SAG1153 | 819 | DNA topoisomerase IV, A subunit  |
| SAG1154 | 653 | DNA topoisomerase IV, B subunit  |
| SAG1155 | 212 | membrane protein, putative   |
| SAG1156 | 217 | uracil-DNA glycosylase   |
| SAG1157 | 161 | conserved hypothetical protein   |
| SAG1158 | 413 | CMP- <i>N</i> -acetylneuraminic acid synthetase NeuA                         |
| SAG1159 | 209 | neuD protein   |
| SAG1160 | 384 | UDP- <i>N</i> -acetylglucosamine-2-epimerase NeuC                            |
| SAG1161 | 341 | <i>N</i> -acetyl neuramic acid synthetase NeuB                               |
| SAG1162 | 466 | polysaccharide biosynthesis protein CpsL                                     |
| SAG1163 | 318 | polysaccharide biosynthesis protein CpsK(V)                                  |
| SAG1164 | 321 | glycosyl transferase CpsJ(V)   |
| SAG1165 | 327 | glycosyl transferase CpsO(V)   |
| SAG1166 | 295 | glycosyl transferase CpsN(V)   |
| SAG1167 | 241 | polysaccharide biosynthesis protein CpsM(V)                                  |
| SAG1168 | 364 | polysaccharide biosynthesis protein cpsH(V)                                  |
| SAG1169 | 163 | glycosyl transferase CpsG(V)   |
| SAG1170 | 149 | polysaccharide biosynthesis protein CpsF                                     |
| SAG1171 | 462 | glycosyl transferase CpsE  |
| SAG1172 | 229 | cpsD protein   |



|         |      |   |
|---------|------|---|
| SAG1173 | 230  | cpsC protein  |
| SAG1174 | 243  | capsular polysaccharide biosynthesis protein CpsB                               |
| SAG1175 | 485  | capsular polysaccharide biosynthesis protein CpsA                               |
| SAG1176 | 290  | transcriptional regulator, LysR family, putative                                |
| SAG1177 | 255  | conserved hypothetical protein  |
| SAG1178 | 236  | purine nucleoside phosphorylase   |
| SAG1179 | 418  | voltage-gated chloride channel family protein, putative                         |
| SAG1180 | 269  | purine nucleoside phosphorylase   |
| SAG1181 | 135  | arsenate reductase  |
| SAG1182 | 403  | phosphopentomutase  |
| SAG1183 | 223  | ribose 5-phosphate isomerase  |
| SAG1184 | 236  | conserved hypothetical protein  |
| SAG1185 | 262  | tributyryl esterase   |
| SAG1186 | 553  | metallo-beta-lactamase superfamily protein                                      |
| SAG1187 | 253  | ABC transporter, ATP-binding protein  |
| SAG1188 | 287  | ABC transporter, permease protein   |
| SAG1189 | 334  | conserved hypothetical protein  |
| SAG1190 | 551  | adherence and virulence protein A   |
| SAG1191 | 239  | alpha-acetolactate decarboxylase  |
| SAG1192 | 560  | acetolactate synthase, catabolic  |
| SAG1193 | 408  | TPR domain protein  |
| SAG1194 | 396  | membrane protein, putative  |
| SAG1195 | 153  | MutT/nudix family protein   |
| SAG1196 | 160  | mutator MutT protein  |
| SAG1197 | 1072 | hyaluronidase   |
| SAG1198 | 348  | dTDP-glucose 4,6-dehydratase  |
| SAG1199 | 197  | dTDP-4-dehydrorhamnose 3,5-epimerase  |
| SAG1200 | 289  | glucose-1-phosphate thymidyltransferase   |
| SAG1201 | 367  | iminodiacetate oxidase, putative  |
| SAG1202 | 262  | conserved hypothetical protein TIGR00486  |
| SAG1203 | 227  | conserved hypothetical protein  |
| SAG1204 | 226  | DNA replication protein DnaD, putative  |
| SAG1205 | 172  | adenine phosphoribosyltransferase   |
| SAG1206 | 854  | conserved domain protein  |
| SAG1207 | 32   | hypothetical protein  |
| SAG1208 | 732  | single-stranded-DNA-specific exonuclease RecJ                                   |
| SAG1209 | 253  | oxidoreductase, short chain dehydrogenase/reductase family                      |
| SAG1210 | 309  | metallo-beta-lactamase superfamily protein                                      |
| SAG1211 | 215  | conserved hypothetical protein  |
| SAG1212 | 412  | GTP-binding protein HflX  |
| SAG1213 | 296  | tRNA delta(2)-isopentenylpyrophosphate transferase                              |
| SAG1214 | 58   | hypothetical protein  |
| SAG1215 | 305  | exfoliative toxin A, putative   |
| SAG1216 | 1252 | pullulanase, putative   |
| SAG1217 | NA   | conserved hypothetical protein, authentic frameshift                            |
| SAG1218 | 194  | conserved hypothetical protein  |
| SAG1219 | 468  | peptidase, M20/M25/M40 family   |
| SAG1220 | 200  | nitroreductase family protein   |
| SAG1221 | NA   | glycerophosphoryl diester phosphodiesterase, putative, authentic point mutation |

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|---------|-----|--|
| SAG1222 | 593 | excinuclease ABC, C subunit                        |
| SAG1223 | 255 | conserved hypothetical protein                     |
| SAG1224 | 446 | MATE efflux family protein                         |
| SAG1225 | 136 | conserved hypothetical protein                     |
| SAG1226 | 165 | conserved hypothetical protein                     |
| SAG1227 | 198 | protein of unknown function                        |
| SAG1228 | 96  | ISSdy1, transposase OrfA                           |
| SAG1229 | 259 | ISSdy1, transposase OrfB                           |
| SAG1230 | 96  | conserved hypothetical protein                     |
| SAG1231 | NA  | transposase OrfB, IS3 family, degenerate           |
| SAG1232 | 77  | transposase OrfB, IS3 family, truncation           |
| SAG1233 | 822 | streptococcal histidine triad family protein       |
| SAG1234 | 306 | laminin-binding surface protein                    |
| SAG1235 | 425 | GBSi1, group II intron, maturase                   |
| SAG1236 | NA  | C5a peptidase, authentic frameshift                |
| SAG1237 | 444 | hypothetical protein                               |
| SAG1238 | 202 | hypothetical protein                               |
| SAG1239 | 76  | conserved hypothetical protein                     |
| SAG1240 | 125 | conserved hypothetical protein, truncation         |
| SAG1241 | 91  | transposase OrfA, IS3 family                       |
| SAG1242 | 67  | transposase OrfB, IS3 family, truncation           |
| SAG1243 | 96  | ISSdy1, transposase OrfA                           |
| SAG1244 | 259 | ISSdy1, transposase OrfB                           |
| SAG1245 | 38  | hypothetical protein                               |
| SAG1246 | 389 | hypothetical protein                               |
| SAG1247 | 399 | site-specific recombinase, phage integrase family  |
| SAG1248 | 75  | conserved hypothetical protein                     |
| SAG1249 | 74  | transcriptional regulator, Cro/CI family           |
| SAG1250 | 621 | Tn5252, relaxase                                   |
| SAG1251 | 121 | Tn5252, Orf 9 protein                              |
| SAG1252 | 120 | Tn5252, Orf 10 protein                             |
| SAG1253 | 435 | transposase, ISL3 family                           |
| SAG1254 | 546 | mercuric reductase                                 |
| SAG1255 | 130 | mercuric resistance operon regulatory protein MerR |
| SAG1256 | 142 | IS861, transposase OrfB, truncation                |
| SAG1257 | 709 | cation-transporting ATPase, E1-E2 family           |
| SAG1258 | 122 | cadmium efflux system accessory protein            |
| SAG1259 | 99  | conserved hypothetical protein                     |
| SAG1260 | 262 | hypothetical protein                               |
| SAG1261 | 198 | conserved hypothetical protein                     |
| SAG1262 | 695 | cation-transporting ATPase, E1-E2 family           |
| SAG1263 | NA  | conserved domain protein, authentic frameshift     |
| SAG1264 | 148 | transcriptional repressor CopY, putative           |
| SAG1265 | 206 | cadmium resistance transporter, putative           |
| SAG1266 | 152 | hypothetical protein                               |
| SAG1267 | 108 | hypothetical protein                               |
| SAG1268 | 230 | repressor protein, putative                        |
| SAG1269 | 44  | hypothetical protein                               |
| SAG1270 | 471 | ImpB/MucB/SamB family protein                      |
| SAG1271 | 116 | conserved hypothetical protein                     |

|         |      |  |
|---------|------|--|
| SAG1272 | 102  | conserved hypothetical protein                       |
| SAG1273 | 118  | conserved hypothetical protein                       |
| SAG1274 | 129  | conserved hypothetical protein                       |
| SAG1275 | 75   | hypothetical protein                                 |
| SAG1276 | 358  | conserved hypothetical protein                       |
| SAG1277 | 163  | hypothetical protein                                 |
| SAG1278 | 96   | hypothetical protein                                 |
| SAG1279 | 99   | conserved domain protein                             |
| SAG1280 | 2274 | SNF2 family protein                                  |
| SAG1281 | 183  | hypothetical protein                                 |
| SAG1282 | 63   | calcium-binding protein, putative                    |
| SAG1283 | 1631 | agglutinin receptor                                  |
| SAG1284 | 196  | abortive infection protein AbiGI                     |
| SAG1285 | 281  | abortive infection protein AbiGII                    |
| SAG1286 | 933  | Tn5252, Orf28  |
| SAG1287 | 776  | Tn5252, Orf26  |
| SAG1288 | NA   | Tn5252, Orf25, degenerate                            |
| SAG1289 | 284  | Tn5252, Orf23  |
| SAG1290 | 80   | hypothetical protein                                 |
| SAG1291 | 605  | Tn5252, Orf 21 protein, internal deletion            |
| SAG1292 | 162  | hypothetical protein                                 |
| SAG1293 | 194  | protease, putative                                   |
| SAG1294 | 77   | conserved hypothetical protein                       |
| SAG1295 | 127  | conserved hypothetical protein                       |
| SAG1296 | 142  | conserved hypothetical protein                       |
| SAG1297 | 451  | C-5 cytosine-specific DNA methylase                  |
| SAG1298 | 31   | hypothetical protein                                 |
| SAG1299 | 272  | conserved hypothetical protein                       |
| SAG1300 | 57   | conserved hypothetical protein                       |
| SAG1301 | 121  | ribosomal protein L7/L12                             |
| SAG1302 | 166  | ribosomal protein L10                                |
| SAG1303 | 702  | ATP-dependent Clp protease, ATP-binding subunit      |
| SAG1304 | 32   | hypothetical protein                                 |
| SAG1305 | 314  | homocysteine S-methyltransferase MmuM, putative      |
| SAG1306 | 458  | amino acid permease                                  |
| SAG1307 | 216  | hypothetical protein                                 |
| SAG1308 | 167  | hypothetical protein                                 |
| SAG1309 | 30   | hypothetical protein                                 |
| SAG1310 | 182  | transcriptional regulator, TetR family               |
| SAG1311 | 198  | GTP-binding protein                                  |
| SAG1312 | 408  | ATP-dependent Clp protease, ATP-binding subunit ClpX |
| SAG1313 | 56   | conserved hypothetical protein                       |
| SAG1314 | 164  | dihydrofolate reductase                              |
| SAG1315 | 279  | thymidylate synthase                                 |
| SAG1316 | 390  | HMG-CoA synthase                                     |
| SAG1317 | 427  | 3-hydroxy-3-methylglutaryl-CoA reductase             |
| SAG1318 | 149  | conserved hypothetical protein                       |
| SAG1319 | 214  | hemolysin III, putative                              |
| SAG1320 | 304  | conserved hypothetical protein TIGR00147             |
| SAG1321 | 284  | glutathione S-transferase family protein, putative   |

|         |     |  |
|---------|-----|--|
| SAG1322 | 72  | conserved domain protein                                       |
| SAG1323 | 331 | isopentenyl-diphosphate delta-isomerase                        |
| SAG1324 | 330 | phosphomevalonate kinase                                       |
| SAG1325 | 314 | diphosphomevalonate decarboxylase                              |
| SAG1326 | 292 | mevalonate kinase, putative                                    |
| SAG1327 | 409 | sensor histidine kinase  |
| SAG1328 | 228 | DNA-binding response regulator                                 |
| SAG1329 | 208 | GTP pyrophosphokinase family protein                           |
| SAG1330 | 68  | hypothetical protein   |
| SAG1331 | 979 | R5 protein   |
| SAG1332 | 146 | transcriptional regulator, MarR family, putative               |
| SAG1333 | 690 | 5'-nucleotidase family protein                                 |
| SAG1334 | 136 | polypeptide deformylase, putative                              |
| SAG1335 | 449 | NADP-specific glutamate dehydrogenase                          |
| SAG1336 | 169 | membrane protein, putative                                     |
| SAG1337 | 589 | ABC transporter, ATP-binding/permease protein                  |
| SAG1338 | 579 | ABC transporter, ATP-binding/permease protein                  |
| SAG1339 | 157 | acetyltransferase, GNAT family                                 |
| SAG1340 | 622 | ABC transporter, ATP-binding protein                           |
| SAG1341 | 402 | polyA polymerase family protein                                |
| SAG1342 | 282 | DegV family protein  |
| SAG1343 | 126 | protein of unknown function                                    |
| SAG1344 | 177 | hypothetical protein   |
| SAG1345 | 164 | conserved hypothetical protein                                 |
| SAG1346 | 654 | PTS system, fructose specific IIABC components                 |
| SAG1347 | 303 | 1-phosphofructokinase  |
| SAG1348 | 247 | lactose phosphotransferase system repressor                    |
| SAG1349 | 411 | beta-lactam resistance factor                                  |
| SAG1350 | 544 | surface antigen-related protein                                |
| SAG1351 | 307 | 2-dehydropantoate 2-reductase, putative                        |
| SAG1352 | 356 | regulatory protein, putative                                   |
| SAG1353 | 330 | pyridine nucleotide-disulphide oxidoreductase family protein   |
| SAG1354 | 251 | tRNA (guanine-N1)-methyltransferase                            |
| SAG1355 | 172 | 16S rRNA processing protein RimM                               |
| SAG1356 | 503 | transcriptional regulator, RofA family                         |
| SAG1357 | 80  | KH domain protein  |
| SAG1358 | 90  | ribosomal protein S16  |
| SAG1359 | 415 | permease, putative   |
| SAG1360 | 236 | ABC transporter, ATP-binding protein                           |
| SAG1361 | 414 | conserved hypothetical protein                                 |
| SAG1362 | 532 | carbamoyl-phosphate synthase, large subunit, putative          |
| SAG1363 | 356 | carbamoyl-phosphate synthase, small subunit                    |
| SAG1364 | 173 | pyrimidine operon regulatory protein                           |
| SAG1365 | 296 | ribosomal large subunit pseudouridine synthase, RluD subfamily |
| SAG1366 | 154 | lipoprotein signal peptidase                                   |
| SAG1367 | 301 | transcriptional regulator, LysR family                         |
| SAG1368 | 94  | ribosomal protein L27  |
| SAG1369 | 112 | conserved hypothetical protein                                 |
| SAG1370 | 104 | ribosomal protein L21  |
| SAG1371 | 392 | conserved hypothetical protein                                 |

|         |     |   |
|---------|-----|---|
| SAG1372 | 404 | thiamine biosynthesis protein ThiI  |
| SAG1373 | 381 | cysteine desulphurase   |
| SAG1374 | 150 | conserved hypothetical protein  |
| SAG1375 | 449 | glutathione reductase   |
| SAG1376 | 111 | conserved hypothetical protein  |
| SAG1377 | 388 | chorismate synthase   |
| SAG1378 | 355 | 3-dehydroquinate synthase   |
| SAG1379 | 225 | 3-dehydroquinate dehydratase  |
| SAG1380 | 385 | conserved hypothetical protein  |
| SAG1381 | 714 | sulfatase   |
| SAG1382 | 119 | ribosomal protein L20   |
| SAG1383 | 66  | ribosomal protein L35   |
| SAG1384 | 176 | translation initiation factor IF-3  |
| SAG1385 | 227 | cytidylate kinase   |
| SAG1386 | 174 | conserved hypothetical protein  |
| SAG1387 | 65  | ferredoxin, 4Fe-4S  |
| SAG1388 | 163 | conserved hypothetical protein  |
| SAG1389 | 406 | peptidase T   |
| SAG1390 | 544 | polysaccharide biosynthesis protein, putative                                 |
| SAG1391 | 484 | UDP- <i>N</i> -acetylmuramoylalanyl-D-glutamate-2,6-diaminopimelate<br>ligase |
| SAG1392 | 264 | iron compound ABC transporter, ATP-binding protein                            |
| SAG1393 | 310 | iron compound ABC transporter, substrate-binding protein                      |
| SAG1394 | 341 | iron compound ABC transporter, permease protein                               |
| SAG1395 | 333 | iron compound ABC transporter, permease protein                               |
| SAG1396 | 217 | conserved hypothetical protein  |
| SAG1397 | 311 | inorganic pyrophosphatase, manganese-dependent                                |
| SAG1398 | 262 | pyruvate formate-lyase-activating enzyme                                      |
| SAG1399 | 444 | CBS domain protein  |
| SAG1400 | 188 | conserved hypothetical protein  |
| SAG1401 | 311 | conserved hypothetical protein TIGR01212                                      |
| SAG1402 | 213 | PAP2 family protein   |
| SAG1403 | 194 | membrane protein, putative  |
| SAG1404 | 308 | cell wall surface anchor family protein                                       |
| SAG1405 | 294 | sortase family protein  |
| SAG1406 | 293 | sortase family protein  |
| SAG1407 | 705 | cell wall surface anchor family protein                                       |
| SAG1408 | 901 | cell wall surface anchor family protein                                       |
| SAG1409 | NA  | rogB protein, authentic frameshift  |
| SAG1410 | 379 | glycosyl transferase, group 1 family protein                                  |
| SAG1411 | 282 | glycosyl transferase, group 2 family protein                                  |
| SAG1412 | 474 | polysaccharide biosynthesis protein   |
| SAG1413 | 454 | membrane protein, putative  |
| SAG1414 | 308 | glycosyl transferase, group 2 family protein                                  |
| SAG1415 | 311 | glycosyl transferase, group 2 family protein                                  |
| SAG1416 | 352 | nucleotide sugar dehydratase, putative  |
| SAG1417 | 240 | nucleotidyl transferase, putative   |
| SAG1418 | 274 | polysaccharide biosynthesis protein, putative                                 |
| SAG1419 | 577 | lipoprotein, putative   |
| SAG1420 | 117 | conserved hypothetical protein  |

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|---------|-----|--|
| SAG1421 | 243 | glycosyl transferase, group 2 family protein                               |
| SAG1422 | 313 | glycosyl transferase, group 2 family protein                               |
| SAG1423 | 384 | glycosyl transferase, putative   |
| SAG1424 | 284 | dTDP-4-dehydrorhamnose reductase   |
| SAG1425 | 113 | conserved hypothetical protein   |
| SAG1426 | 369 | RNA polymerase sigma-70 factor   |
| SAG1427 | 602 | DNA primase  |
| SAG1428 | 125 | large conductance mechanosensitive channel protein                         |
| SAG1429 | 58  | ribosomal protein S21  |
| SAG1430 | 167 | conserved hypothetical protein   |
| SAG1431 | 268 | amino acid ABC transporter, amino acid-binding protein                     |
| SAG1432 | 347 | ammonium transporter family protein  |
| SAG1433 | 375 | conserved hypothetical protein   |
| SAG1434 | 328 | rhodanese family protein   |
| SAG1435 | 101 | conserved hypothetical protein   |
| SAG1436 | 457 | glycerol-3-phosphate transporter, putative                                 |
| SAG1437 | 55  | hypothetical protein   |
| SAG1438 | 754 | glycogen phosphorylase   |
| SAG1439 | 498 | 4-alpha-glucanotransferase   |
| SAG1440 | 342 | maltose operon repressor MalR, putative                                    |
| SAG1441 | 415 | maltose/maltodextrin ABC transporter, maltose/maltodextrin-binding protein |
| SAG1442 | 456 | maltose ABC transporter, permease protein                                  |
| SAG1443 | 278 | maltose ABC transporter, permease protein                                  |
| SAG1444 | 490 | proton/peptide symporter family protein                                    |
| SAG1445 | NA  | MutT/nudix family protein, authentic frameshift                            |
| SAG1446 | 62  | hypothetical protein   |
| SAG1447 | 441 | conserved hypothetical protein   |
| SAG1448 | 502 | glycosyl transferase, group 1 family protein                               |
| SAG1449 | 795 | preprotein translocase SecA subunit, putative                              |
| SAG1450 | 330 | conserved domain protein   |
| SAG1451 | 494 | conserved hypothetical protein   |
| SAG1452 | 514 | conserved hypothetical protein   |
| SAG1453 | 409 | preprotein translocase SecY family protein                                 |
| SAG1454 | 398 | glycosyl transferase, putative   |
| SAG1455 | 295 | glycosyl transferase, group 2 family protein                               |
| SAG1456 | NA  | glycosyl transferase, family 8, degenerate                                 |
| SAG1457 | 129 | IS1381, transposase OrfB   |
| SAG1458 | 127 | IS1381, transposase OrfA   |
| SAG1459 | 413 | glycosyl transferase family 8  |
| SAG1460 | 401 | glycosyl transferase, family 8   |
| SAG1461 | 335 | conserved hypothetical protein   |
| SAG1462 | 970 | cell wall surface anchor family protein                                    |
| SAG1463 | NA  | transcriptional regulator, RofA family, authentic point mutation           |
| SAG1464 | 663 | excinuclease ABC, B subunit  |
| SAG1465 | 306 | protease, putative   |
| SAG1466 | 727 | glutamine ABC transporter, glutamine-binding protein/permease protein      |
| SAG1467 | 246 | glutamine ABC transporter, ATP-binding protein, GlnQ putative              |
| SAG1468 | 116 | conserved hypothetical protein   |

|         |     |   |
|---------|-----|---|
| SAG1469 | 52  | conserved hypothetical protein  |
| SAG1470 | 437 | GTP-binding protein, GTP1/Obg family                                      |
| SAG1471 | 42  | conserved hypothetical protein  |
| SAG1472 | 413 | aminopeptidase PepS   |
| SAG1473 | 192 | cell wall surface anchor family protein                                   |
| SAG1474 | 680 | amidase family protein  |
| SAG1475 | 240 | ribosomal small subunit pseudouridine synthase A                          |
| SAG1476 | 280 | oxidoreductase, aldo/keto reductase family                                |
| SAG1477 | 224 | nitroreductase family protein   |
| SAG1478 | 130 | lactoylglutathione lyase  |
| SAG1479 | 308 | glycosyl transferase, group 2 family protein                              |
| SAG1480 | 462 | amino acid permease   |
| SAG1481 | 155 | SsrA-binding protein  |
| SAG1482 | 801 | exoribonuclease, VacB/Rnb family  |
| SAG1483 | 78  | preprotein translocase, SecG subunit                                      |
| SAG1484 | 48  | ribosomal protein L33   |
| SAG1485 | 389 | multi-drug resistance protein   |
| SAG1486 | 548 | membrane protein, putative  |
| SAG1487 | 233 | ABC transporter, ATP binding protein                                      |
| SAG1488 | 195 | dephospho-CoA kinase  |
| SAG1489 | 273 | formamidopyrimidine-DNA glycosylase                                       |
| SAG1490 | 282 | transcriptional regulator, MutR family                                    |
| SAG1491 | 530 | hypothetical protein  |
| SAG1492 | 58  | hypothetical protein  |
| SAG1493 | 66  | hypothetical protein  |
| SAG1494 | 32  | hypothetical protein  |
| SAG1495 | 81  | CAAX amino terminal protease family protein                               |
| SAG1496 | 110 | hypothetical protein  |
| SAG1497 | 37  | hypothetical protein  |
| SAG1498 | 133 | hypothetical protein  |
| SAG1499 | 299 | GTP-binding protein Era   |
| SAG1500 | 132 | diacylglycerol kinase   |
| SAG1501 | 161 | conserved hypothetical protein TIGR00043                                  |
| SAG1502 | 268 | tetracenomycin polyketide synthesis O-methyltransferase TcmP,<br>putative |
| SAG1503 | 39  | hypothetical protein  |
| SAG1504 | 38  | hypothetical protein  |
| SAG1505 | 158 | MutT/nudix family protein   |
| SAG1506 | 267 | hypothetical protein  |
| SAG1507 | 345 | PhoH family protein   |
| SAG1508 | 590 | 67 kDa Myosin-crossreactive streptococcal antigen                         |
| SAG1509 | 71  | conserved hypothetical protein  |
| SAG1510 | 169 | peptide methionine sulfoxide reductase                                    |
| SAG1511 | 284 | conserved hypothetical protein  |
| SAG1512 | 185 | ribosome recycling factor   |
| SAG1513 | 242 | uridylate kinase  |
| SAG1514 | 226 | peptide ABC transporter, ATP-binding protein                              |
| SAG1515 | 262 | peptide ABC transporter, ATP-binding protein                              |
| SAG1516 | 255 | peptide ABC transporter, permease protein                                 |
| SAG1517 | 314 | peptide ABC transporter, permease protein                                 |

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|---------|-----|--|
| SAG1518 | 538 | peptide ABC transporter, peptide-binding protein                       |
| SAG1519 | 229 | ribosomal protein L1   |
| SAG1520 | 141 | ribosomal protein L11  |
| SAG1521 | 388 | transposase, IS30 family, putative                                     |
| SAG1522 | 460 | transporter, major facilitator family                                  |
| SAG1523 | 404 | peptidase, M20/M25/M40 family  |
| SAG1524 | 294 | transcriptional regulator, LysR family                                 |
| SAG1525 | 117 | conserved hypothetical protein   |
| SAG1526 | 178 | IS861, transposase OrfA  |
| SAG1527 | 277 | IS861, transposase OrfB  |
| SAG1528 | 571 | chorismate binding enzyme  |
| SAG1529 | 816 | FtsK/SpoIIIE family protein  |
| SAG1530 | 267 | peptidyl-prolyl cis-trans isomerase, cyclophilin-type                  |
| SAG1531 | 277 | manganese ABC transporter, permease protein                            |
| SAG1532 | 238 | manganese ABC transporter, ATP-binding protein                         |
| SAG1533 | 308 | manganese ABC transporter, manganese-binding adhesion liprotein        |
| SAG1534 | 215 | iron-dependent transcriptional regulator                               |
| SAG1535 | 229 | 5-methylthioadenosine nucleosidase/S-adenosylhomocysteine nucleosidase |
| SAG1536 | 89  | conserved hypothetical protein   |
| SAG1537 | 184 | MutT/nudix family protein  |
| SAG1538 | 459 | UDP- <i>N</i> -acetylglucosamine pyrophosphorylase                     |
| SAG1539 | 31  | hypothetical protein   |
| SAG1540 | 137 | conserved hypothetical protein   |
| SAG1541 | 125 | glyoxalase family protein  |
| SAG1542 | 318 | oxidoreductase, Gfo/Idh/MocA family                                    |
| SAG1543 | NA  | conserved hypothetical protein, authentic frameshift                   |
| SAG1544 | 232 | gluconate 5-dehydrogenase, putative                                    |
| SAG1545 | 78  | conserved hypothetical protein   |
| SAG1546 | 82  | conserved hypothetical protein   |
| SAG1547 | 166 | acetyltransferase, GNAT family   |
| SAG1548 | 422 | glycosyl transferase, group 2 family protein                           |
| SAG1549 | 127 | IS1381, transposase OrfA   |
| SAG1550 | 129 | IS1381, transposase OrfB   |
| SAG1551 | 67  | hypothetical protein   |
| SAG1552 | 719 | conserved hypothetical protein   |
| SAG1553 | 477 | hypothetical protein   |
| SAG1554 | 225 | hypothetical protein   |
| SAG1555 | 231 | hypothetical protein   |
| SAG1556 | 445 | branched-chain amino acid transport system II carrier protein          |
| SAG1557 | 665 | methionyl-tRNA synthetase  |
| SAG1558 | 291 | tellurite resistance protein TehB                                      |
| SAG1559 | 231 | membrane protein, putative   |
| SAG1560 | 40  | hypothetical protein   |
| SAG1561 | 405 | PTS system, IIC component, putative                                    |
| SAG1562 | 280 | conserved hypothetical protein   |
| SAG1563 | 275 | exodeoxyribonuclease   |
| SAG1564 | 118 | conserved hypothetical protein   |
| SAG1565 | 158 | methylated-DNA--protein-cysteine S-methyltransferase                   |



|         |     |   |
|---------|-----|---|
| SAG1566 | 393 | D-isomer specific 2-hydroxyacid dehydrogenase family protein          |
| SAG1567 | 182 | acetyltransferase, GNAT family  |
| SAG1568 | NA  | phosphoserine aminotransferase, authentic frameshift                  |
| SAG1569 | 211 | copper homeostasis protein CutC, putative                             |
| SAG1570 | 34  | conserved hypothetical protein  |
| SAG1571 | 53  | hypothetical protein  |
| SAG1572 | 287 | tetrapyrrole methylase family protein                                 |
| SAG1573 | 108 | conserved hypothetical protein  |
| SAG1574 | 287 | DNA polymerase III, delta prime subunit, putative                     |
| SAG1575 | 211 | thymidylate kinase  |
| SAG1576 | 267 | transposase, IS30 family, putative, truncation                        |
| SAG1577 | 219 | AcuB family protein   |
| SAG1578 | 236 | branched-chain amino acid ABC transporter, ATP-binding protein        |
| SAG1579 | 254 | branched-chain amino acid ABC transporter, ATP-binding protein        |
| SAG1580 | 317 | branched-chain amino acid ABC transporter, permease protein           |
| SAG1581 | 289 | branched-chain amino acid ABC transporter, permease protein           |
| SAG1582 | 388 | branched-chain amino acid ABC transporter, amino acid-binding protein |
| SAG1583 | 81  | conserved hypothetical protein  |
| SAG1584 | 377 | IS1548, transposase   |
| SAG1585 | 196 | ATP-dependent Clp protease, proteolytic subunit ClpP                  |
| SAG1586 | 209 | uracil phosphoribosyltransferase                                      |
| SAG1587 | 389 | aminotransferase, class I   |
| SAG1588 | 182 | RNA methyltransferase, TrmH family, group 2                           |
| SAG1589 | 450 | amino acid permease, putative   |
| SAG1590 | 449 | potassium uptake protein, Trk family                                  |
| SAG1591 | 475 | cation uptake protein, Trk family                                     |
| SAG1592 | 83  | conserved hypothetical protein TIGR00278                              |
| SAG1593 | 240 | ribosomal large subunit pseudouridine synthase B                      |
| SAG1594 | 194 | conserved hypothetical protein TIGR00281                              |
| SAG1595 | 235 | conserved hypothetical protein  |
| SAG1596 | 246 | integrase/recombinase, phage integrase family                         |
| SAG1597 | 157 | CBS domain protein  |
| SAG1598 | 173 | conserved hypothetical protein  |
| SAG1599 | 324 | HAM1 protein  |
| SAG1600 | 264 | glutamate racemase  |
| SAG1601 | 79  | conserved hypothetical protein  |
| SAG1602 | 180 | membrane protein, putative  |
| SAG1603 | 173 | transcriptional regulator, biotin repressor family                    |
| SAG1604 | 229 | membrane protein, putative  |
| SAG1605 | 167 | conserved hypothetical protein  |
| SAG1606 | 247 | RNA methyltransferase, TrmH family                                    |
| SAG1607 | 92  | acylphosphatase   |
| SAG1608 | 310 | lipoprotein, putative   |
| SAG1609 | 221 | amino acid ABC transporter, permease protein                          |
| SAG1610 | 285 | amino acid ABC transporter, substrate-binding protein                 |
| SAG1611 | 486 | amidase family protein  |
| SAG1612 | 160 | transcription elongation factor GreA                                  |
| SAG1613 | 600 | conserved hypothetical protein  |
| SAG1614 | 167 | acetyltransferase, GNAT family  |

|         |      |   |
|---------|------|---|
| SAG1615 | 443  | UDP- <i>N</i> -acetylmuramate--alanine ligase                 |
| SAG1616 | 205  | conserved hypothetical protein                                |
| SAG1617 | 32   | hypothetical protein  |
| SAG1618 | 1032 | Snf2 family protein   |
| SAG1619 | 377  | IS1548, transposase   |
| SAG1620 | 436  | phosphoglycerate dehydrogenase-related protein                |
| SAG1621 | 300  | primosomal protein DnaI                                       |
| SAG1622 | 391  | conserved hypothetical protein                                |
| SAG1623 | 159  | conserved hypothetical protein TIGR00244                      |
| SAG1624 | 501  | sensor histidine kinase CsrS                                  |
| SAG1625 | 229  | DNA-binding response regulator CsrR                           |
| SAG1626 | 177  | conserved hypothetical protein                                |
| SAG1627 | 296  | heat shock protein HtpX                                       |
| SAG1628 | 184  | lemA protein  |
| SAG1629 | 237  | glucose-inhibited division protein B                          |
| SAG1630 | 459  | sodium transport family protein                               |
| SAG1631 | 223  | potassium uptake protein, Trk family, putative                |
| SAG1632 | 276  | cobalt transport family protein                               |
| SAG1633 | 558  | ABC transporter, ATP-binding protein                          |
| SAG1634 | 212  | conserved hypothetical protein                                |
| SAG1635 | 402  | sodium:dicarboxylate symporter family protein                 |
| SAG1636 | 455  | branched-chain amino acid transport system II carrier protein |
| SAG1637 | 351  | alcohol dehydrogenase, zinc-containing                        |
| SAG1638 | 230  | ABC transporter, permease protein                             |
| SAG1639 | 356  | ABC transporter, ATP-binding protein                          |
| SAG1640 | 458  | peptidase, M20/M25/M40 family                                 |
| SAG1641 | 274  | YaeC family protein   |
| SAG1642 | 277  | ABC transporter, substrate-binding protein                    |
| SAG1643 | 229  | glutamine amidotransferase, class I                           |
| SAG1644 | 37   | hypothetical protein  |
| SAG1645 | 238  | conserved hypothetical protein TIGR01033                      |
| SAG1646 | 32   | hypothetical protein  |
| SAG1647 | 328  | dihydroxyacetone kinase family protein                        |
| SAG1648 | 178  | transcriptional regulator, TetR family, putative              |
| SAG1649 | 37   | hypothetical protein  |
| SAG1650 | 329  | dihydroxyacetone kinase family protein                        |
| SAG1651 | 192  | dihydroxyacetone kinase family protein                        |
| SAG1652 | 124  | conserved hypothetical protein                                |
| SAG1653 | 237  | glycerol uptake facilitator protein                           |
| SAG1654 | 134  | conserved hypothetical protein                                |
| SAG1655 | 237  | transcriptional regulator, MerR family                        |
| SAG1656 | 369  | conserved hypothetical protein                                |
| SAG1657 | 83   | hypothetical protein  |
| SAG1658 | 244  | conserved hypothetical protein                                |
| SAG1659 | 118  | iojap-related protein   |
| SAG1660 | 173  | isochorismatase family protein                                |
| SAG1661 | 195  | conserved hypothetical protein TIGR00488                      |
| SAG1662 | 210  | conserved hypothetical protein TIGR00482                      |
| SAG1663 | 105  | conserved hypothetical protein TIGR00253                      |
| SAG1664 | 372  | GTP-binding protein   |

|         |     |   |
|---------|-----|---|
| SAG1665 | 177 | hydrolase, haloacid dehalogenase-like family      |
| SAG1666 | 304 | membrane protein, putative                        |
| SAG1667 | 480 | glutamyl-tRNA(Gln) amidotransferase, B subunit    |
| SAG1668 | 488 | glutamyl-tRNA(Gln) amidotransferase, A subunit    |
| SAG1669 | 100 | glutamyl-tRNA(Gln) amidotransferase, C subunit    |
| SAG1670 | 881 | pyruvate phosphate dikinase                       |
| SAG1671 | 276 | protein of unknown function                       |
| SAG1672 | 170 | CBS domain protein                                |
| SAG1673 | 321 | 3-hydroxyacyl-CoA dehydrogenase family protein    |
| SAG1674 | 182 | isochorismatase family protein                    |
| SAG1675 | 261 | transcriptional regulator CodY, putative          |
| SAG1676 | 403 | aminotransferase, class I                         |
| SAG1677 | 150 | conserved hypothetical protein                    |
| SAG1678 | 460 | hydrolase, haloacid dehalogenase-like family      |
| SAG1679 | 320 | asparaginase family protein                       |
| SAG1680 | 292 | shikimate 5-dehydrogenase                         |
| SAG1681 | 304 | oxidoreductase, aldo/keto reductase family        |
| SAG1682 | 671 | ATP-dependent DNA helicase RecG                   |
| SAG1683 | 512 | immunogenic secreted protein, putative            |
| SAG1684 | 366 | alanine racemase                                  |
| SAG1685 | 119 | holo-(acyl-carrier-protein) synthase              |
| SAG1686 | 335 | phospho-2-dehydro-3-deoxyheptonate aldolase       |
| SAG1687 | 842 | preprotein translocase, SecA subunit              |
| SAG1688 | 315 | mannose-6-phosphate isomerase, class I            |
| SAG1689 | 293 | fructokinase                                      |
| SAG1690 | 639 | PTS system, IIABC components                      |
| SAG1691 | 479 | sucrose-6-phosphate hydrolase                     |
| SAG1692 | 320 | sucrose operon repressor ScrR                     |
| SAG1693 | 144 | N utilization substance protein B                 |
| SAG1694 | 129 | conserved hypothetical protein                    |
| SAG1695 | 186 | translation elongation factor P                   |
| SAG1696 | 38  | hypothetical protein                              |
| SAG1697 | 48  | hypothetical protein                              |
| SAG1698 | 99  | conserved hypothetical protein                    |
| SAG1699 | 30  | hypothetical protein                              |
| SAG1700 | 76  | hypothetical protein                              |
| SAG1701 | 56  | hypothetical protein                              |
| SAG1702 | 41  | hypothetical protein                              |
| SAG1703 | 54  | hypothetical protein                              |
| SAG1704 | 150 | cytidine/deoxycytidylate deaminase family protein |
| SAG1705 | NA  | peptidase, M24 family, authentic point mutation   |
| SAG1706 | 238 | conserved hypothetical protein                    |
| SAG1707 | 499 | drug resistance transporter, EmrB/QacA family     |
| SAG1708 | 38  | hypothetical protein                              |
| SAG1709 | 942 | excinuclease ABC, A subunit                       |
| SAG1710 | 223 | conserved hypothetical protein                    |
| SAG1711 | 314 | magnesium transporter, CorA family                |
| SAG1712 | 79  | ribosomal protein S18                             |
| SAG1713 | 163 | single-strand binding protein                     |
| SAG1714 | 95  | ribosomal protein S6                              |

|         |     |  |
|---------|-----|--|
| SAG1715 | 374 | A/G-specific adenine glycosylase                             |
| SAG1716 | 197 | transcriptional regulator, Cro/CI family                     |
| SAG1717 | 104 | thioredoxin  |
| SAG1718 | 166 | PAP2 family protein  |
| SAG1719 | 779 | MutS2 family protein   |
| SAG1720 | 180 | conserved hypothetical protein                               |
| SAG1721 | 103 | conserved hypothetical protein                               |
| SAG1722 | 297 | ribonuclease HIII  |
| SAG1723 | 197 | signal peptidase I   |
| SAG1724 | 806 | helicase, putative   |
| SAG1725 | 160 | conserved hypothetical protein                               |
| SAG1726 | 364 | DNA-damage-inducible protein P                               |
| SAG1727 | 770 | formate acetyltransferase                                    |
| SAG1728 | 124 | FMN-binding protein  |
| SAG1729 | 309 | conserved hypothetical protein                               |
| SAG1730 | 251 | conserved hypothetical protein                               |
| SAG1731 | 298 | membrane protein, putative                                   |
| SAG1732 | 282 | glycerol uptake facilitator protein, putative                |
| SAG1733 | 150 | universal stress protein family                              |
| SAG1734 | 400 | transporter, putative  |
| SAG1735 | 219 | transcriptional regulator, Crp/Fnr family                    |
| SAG1736 | 761 | X-pro dipeptidyl-peptidase                                   |
| SAG1737 | 119 | hypothetical protein   |
| SAG1738 | 326 | polyprenyl synthetase family protein                         |
| SAG1739 | 582 | ABC transporter, ATP-binding protein CydC                    |
| SAG1740 | 572 | ABC transporter, ATP-binding protein CydD                    |
| SAG1741 | 339 | cytochrome d ubiquinol oxidase, subunit II                   |
| SAG1742 | 475 | cytochrome d oxidase, subunit I                              |
| SAG1743 | 402 | pyridine nucleotide-disulphide oxidoreductase family protein |
| SAG1744 | 299 | prenyltransferase, UbiA family                               |
| SAG1745 | 148 | hypothetical protein   |
| SAG1746 | 35  | hypothetical protein   |
| SAG1747 | 99  | conserved hypothetical protein TIGR00103                     |
| SAG1748 | 396 | cyclopropane-fatty-acyl-phospholipid synthase                |
| SAG1749 | 241 | transcriptional regulator, merR family                       |
| SAG1750 | 195 | exonuclease  |
| SAG1751 | 178 | conserved hypothetical protein                               |
| SAG1752 | 390 | conserved hypothetical protein TIGR00275                     |
| SAG1753 | 260 | conserved hypothetical protein                               |
| SAG1754 | 89  | ribosomal protein S14  |
| SAG1755 | 38  | hypothetical protein   |
| SAG1756 | 341 | conserved hypothetical protein                               |
| SAG1757 | 336 | O-sialoglycoprotein endopeptidase family protein             |
| SAG1758 | 135 | ribosomal-protein-alanine acetyltransferase, putative        |
| SAG1759 | 230 | protein of unknown function                                  |
| SAG1760 | 76  | conserved hypothetical protein                               |
| SAG1761 | 559 | metallo-beta-lactamase superfamily protein                   |
| SAG1762 | 169 | conserved hypothetical protein                               |
| SAG1763 | 448 | glutamine synthetase, type I                                 |
| SAG1764 | 123 | transcriptional regulator GlnR                               |

|         |     |   |
|---------|-----|---|
| SAG1765 | 179 | conserved hypothetical protein                            |
| SAG1766 | 398 | phosphoglycerate kinase                                   |
| SAG1767 | 289 | acid phosphatase  |
| SAG1768 | 336 | glyceraldehyde 3-phosphate dehydrogenase                  |
| SAG1769 | 692 | translation elongation factor G                           |
| SAG1770 | 156 | ribosomal protein S7                                      |
| SAG1771 | 137 | ribosomal protein S12                                     |
| SAG1772 | 270 | pur operon repressor                                      |
| SAG1773 | 313 | HD domain protein   |
| SAG1774 | 424 | conserved hypothetical protein                            |
| SAG1775 | 210 | conserved hypothetical protein                            |
| SAG1776 | 220 | ribulose-phosphate 3-epimerase                            |
| SAG1777 | 290 | conserved hypothetical protein TIGR00157                  |
| SAG1778 | 283 | rRNA (guanine-N1-)-methyltransferase, putative            |
| SAG1779 | 290 | dimethyladenosine transferase                             |
| SAG1780 | 163 | hypothetical protein                                      |
| SAG1781 | 186 | primase-related protein                                   |
| SAG1782 | 260 | deoxyribonuclease, TatD family                            |
| SAG1783 | 90  | hypothetical protein                                      |
| SAG1784 | 130 | hypothetical protein                                      |
| SAG1785 | 430 | hypothetical protein                                      |
| SAG1786 | 130 | protein of unknown function                               |
| SAG1787 | 420 | dltD protein  |
| SAG1788 | 79  | D-alanyl carrier protein                                  |
| SAG1789 | 421 | dltB protein  |
| SAG1790 | 511 | D-alanine-activating enzyme                               |
| SAG1791 | 395 | sensor histidine kinase                                   |
| SAG1792 | 224 | DNA-binding response regulator                            |
| SAG1793 | 44  | ribosomal protein L34                                     |
| SAG1794 | 451 | membrane protein, putative                                |
| SAG1795 | 388 | transposase, IS30 family, putative                        |
| SAG1796 | 575 | amino acid ABC transporter, permease protein              |
| SAG1797 | 407 | amino acid ABC transporter, ATP-binding protein           |
| SAG1798 | 39  | hypothetical protein                                      |
| SAG1799 | 792 | xylulose-5-phosphate/fructose-6-phosphate phosphoketolase |
| SAG1800 | 363 | conserved hypothetical protein                            |
| SAG1801 | 559 | transcriptional antiterminator, BglG family               |
| SAG1802 | 253 | conserved hypothetical protein                            |
| SAG1803 | 505 | carbohydrate kinase, FGGY family                          |
| SAG1804 | 329 | hypothetical protein                                      |
| SAG1805 | 483 | PTS system, IIC component, putative                       |
| SAG1806 | 318 | glyoxylate reductase, NADH-dependent                      |
| SAG1807 | 339 | hypothetical protein                                      |
| SAG1808 | 327 | sugar binding transcriptional regulator, LacI family      |
| SAG1809 | 215 | transaldolase family protein                              |
| SAG1810 | 238 | carbohydrate isomerase, AraD/FucA family                  |
| SAG1811 | 287 | hexulose-6-phosphate isomerase, putative                  |
| SAG1812 | 221 | hexulose-6-phosphate synthase, putative                   |
| SAG1813 | 161 | PTS system, IIA component                                 |
| SAG1814 | 92  | PTS system, IIB component                                 |

|         |      |   |
|---------|------|---|
| SAG1815 | 479  | transport protein SgaT, putative                                      |
| SAG1816 | 205  | hypothetical protein  |
| SAG1817 | 157  | hypothetical protein  |
| SAG1818 | 430  | adenylosuccinate synthetase   |
| SAG1819 | 340  | perfringolysin O regulator protein                                    |
| SAG1820 | 224  | conserved hypothetical protein  |
| SAG1821 | 750  | glutamate--cysteine ligase/amino acid ligase, putative                |
| SAG1822 | 272  | protein of unknown function   |
| SAG1823 | 418  | protein of unknown function   |
| SAG1824 | 291  | chaperonin, 33 kDa  |
| SAG1825 | 325  | NifR3/Smm1 family protein   |
| SAG1826 | 213  | deoxynucleoside kinase family protein                                 |
| SAG1827 | 163  | phosphinothricin <i>N</i> -acetyltransferase                          |
| SAG1828 | 815  | ATP-dependent Clp protease, ATP-binding subunit                       |
| SAG1829 | 154  | transcriptional regulator CtsR  |
| SAG1830 | 153  | conserved hypothetical protein  |
| SAG1831 | 346  | translation elongation factor Ts                                      |
| SAG1832 | 256  | ribosomal protein S2  |
| SAG1833 | 186  | alkyl hydroperoxide reductase, subunit C                              |
| SAG1834 | 510  | alkyl hydroperoxide reductase, subunit F                              |
| SAG1835 | 134  | conserved hypothetical protein  |
| SAG1836 | 61   | conserved hypothetical protein  |
| SAG1837 | 468  | prophage LambdaSa2, lysin, putative                                   |
| SAG1838 | 109  | prophage LambdaSa2, holin, putative                                   |
| SAG1839 | 136  | conserved hypothetical protein  |
| SAG1840 | 112  | hypothetical protein  |
| SAG1841 | 76   | conserved domain protein  |
| SAG1842 | 1224 | prophage LambdaSa2, PblB, putative                                    |
| SAG1843 | 240  | conserved hypothetical protein  |
| SAG1844 | 911  | conserved hypothetical protein  |
| SAG1845 | 42   | hypothetical protein  |
| SAG1846 | 158  | hypothetical protein  |
| SAG1847 | 227  | conserved hypothetical protein  |
| SAG1848 | 114  | conserved hypothetical protein  |
| SAG1849 | 115  | hypothetical protein  |
| SAG1850 | 101  | hypothetical protein  |
| SAG1851 | 111  | conserved domain protein  |
| SAG1852 | 420  | conserved domain protein  |
| SAG1853 | 180  | prophage LambdaSa2, protease, putative                                |
| SAG1854 | 380  | conserved hypothetical protein  |
| SAG1855 | 570  | prophage LambdaSa2, terminase large subunit, putative                 |
| SAG1856 | 161  | hypothetical protein  |
| SAG1857 | 119  | prophage LambdaSa2, HNH endonuclease family protein                   |
| SAG1858 | 95   | hypothetical protein  |
| SAG1859 | 180  | prophage LambdaSa2, site-specific recombinase, phage integrase family |
| SAG1860 | 154  | conserved hypothetical protein  |
| SAG1861 | 119  | prophage LambdaSa2, transcriptional regulator, Cro/CI family          |
| SAG1862 | 86   | hypothetical protein  |
| SAG1863 | 138  | prophage LambdaSa2, single-strand binding protein                     |

|         |     |   |
|---------|-----|---|
| SAG1864 | 68  | hypothetical protein  |
| SAG1865 | 74  | conserved hypothetical protein  |
| SAG1866 | 109 | conserved hypothetical protein  |
| SAG1867 | 163 | conserved hypothetical protein  |
| SAG1868 | 134 | hypothetical protein  |
| SAG1869 | 437 | prophage LambdaSa2, type II DNA modification methyltransferase, putative                      |
| SAG1870 | 273 | prophage LambdaSa2, DNA replication protein DnaC, putative                                    |
| SAG1871 | 248 | prophage LambdaSa2, bacteriophage replication protein/hypothetical protein, truncation/fusion |
| SAG1872 | 200 | hypothetical protein  |
| SAG1873 | 443 | prophage LambdaSa2, replicative DNA helicase  |
| SAG1874 | 87  | hypothetical protein  |
| SAG1875 | 94  | conserved hypothetical protein  |
| SAG1876 | 176 | prophage LambdaSa2, HNH endonuclease family protein   |
| SAG1877 | 236 | prophage LambdaSa2, antirepressor protein, putative   |
| SAG1878 | 102 | conserved domain protein  |
| SAG1879 | 156 | hypothetical protein  |
| SAG1880 | 54  | hypothetical protein  |
| SAG1881 | 51  | hypothetical protein  |
| SAG1882 | 120 | prophage LambdaSa2, repressor protein, putative   |
| SAG1883 | 128 | conserved hypothetical protein  |
| SAG1884 | 134 | hypothetical protein  |
| SAG1885 | 356 | prophage LambdaSa2, site-specific recombinase, phage integrase family                         |
| SAG1886 | 32  | hypothetical protein  |
| SAG1887 | 689 | Na <sup>+</sup> /H <sup>+</sup> exchanger family protein                                      |
| SAG1888 | 78  | hypothetical protein  |
| SAG1889 | 317 | microcin immunity protein MccF, putative  |
| SAG1890 | 631 | endopeptidase O   |
| SAG1891 | 327 | oxidoreductase, Gfo/Idh/MocA family   |
| SAG1892 | 358 | membrane protein, putative  |
| SAG1893 | 59  | hypothetical protein  |
| SAG1894 | 214 | cyclic nucleotide-binding domain protein  |
| SAG1895 | 204 | polypeptide deformylase   |
| SAG1896 | 333 | sugar binding transcriptional regulator RegR  |
| SAG1897 | 634 | conserved hypothetical protein  |
| SAG1898 | 271 | PTS system, IID component   |
| SAG1899 | 288 | PTS system, IIC component   |
| SAG1900 | 164 | PTS system, IIB component   |
| SAG1901 | 398 | glucuronyl hydrolase  |
| SAG1902 | 144 | PTS system, IIA component   |
| SAG1903 | 34  | hypothetical protein  |
| SAG1904 | 270 | oxidoreductase, short-chain dehydrogenase/reductase family                                    |
| SAG1905 | 212 | conserved hypothetical protein  |
| SAG1906 | 335 | carbohydrate kinase, PfkB family  |
| SAG1907 | 212 | 2-dehydro-3-deoxyphosphogluconate aldolase/4-hydroxy-2-oxoglutarate aldolase                  |
| SAG1908 | 499 | hypothetical protein  |
| SAG1909 | 204 | nitroreductase family protein   |

|         |      |  |
|---------|------|--|
| SAG1910 | 141  | transcriptional regulator, MarR family                       |
| SAG1911 | 1468 | DNA polymerase III, alpha subunit, Gram-positive type        |
| SAG1912 | 194  | <i>N</i> -acetylmuramoyl-L-alanine amidase, family 4 protein |
| SAG1913 | 617  | prolyl-tRNA synthetase                                       |
| SAG1914 | 419  | membrane-associated zinc metalloprotease, putative           |
| SAG1915 | 264  | phosphatidate cytidyltransferase                             |
| SAG1916 | 250  | undecaprenyl diphosphate synthase                            |
| SAG1917 | 113  | preprotein translocase, YajC subunit                         |
| SAG1918 | 114  | bacteriocin transport accessory protein, putative            |
| SAG1919 | 387  | malate oxidoreductase  |
| SAG1920 | 445  | citrate carrier protein, CCS family                          |
| SAG1921 | 508  | sensor histidine kinase                                      |
| SAG1922 | 229  | response regulator   |
| SAG1923 | 331  | UDP-glucose 4-epimerase                                      |
| SAG1924 | 535  | glucan 1,6- $\alpha$ -glucosidase                            |
| SAG1925 | 377  | sugar ABC transporter, ATP-binding protein                   |
| SAG1926 | 283  | helix-turn-helix domain protein, fis-type                    |
| SAG1927 | 298  | lacX protein   |
| SAG1928 | 325  | tagatose 1,6-diphosphate aldolase                            |
| SAG1929 | 310  | tagatose-6-phosphate kinase                                  |
| SAG1930 | 171  | galactose-6-phosphate isomerase, LacB subunit                |
| SAG1931 | 141  | galactose-6-phosphate isomerase, LacA subunit                |
| SAG1932 | 816  | neuraminidase-related protein                                |
| SAG1933 | 482  | PTS system, IIC component, putative                          |
| SAG1934 | 101  | PTS system, IIB component, putative                          |
| SAG1935 | 157  | PTS system, IIA component, putative                          |
| SAG1936 | 258  | lactose phosphotransferase system repressor                  |
| SAG1937 | NA   | streptococcal histidine triad family protein, degenerate     |
| SAG1938 | 307  | adhesion lipoprotein   |
| SAG1939 | 147  | protein of unknown function TIGR00256                        |
| SAG1940 | 738  | GTP pyrophosphokinase family protein                         |
| SAG1941 | 800  | 2',3'-cyclic-nucleotide 2'-phosphodiesterase                 |
| SAG1942 | 151  | nrdI protein   |
| SAG1943 | 345  | conserved hypothetical protein                               |
| SAG1944 | 165  | conserved hypothetical protein                               |
| SAG1945 | 345  | iron ABC transporter, iron-binding protein                   |
| SAG1946 | 257  | DNA-binding response regulator                               |
| SAG1947 | 549  | conserved hypothetical protein                               |
| SAG1948 | 275  | PTS system, IID component                                    |
| SAG1949 | 269  | PTS system, IIC component                                    |
| SAG1950 | 163  | PTS system, IIB component                                    |
| SAG1951 | 141  | PTS system, IIA component, putative                          |
| SAG1952 | 353  | membrane protein, putative                                   |
| SAG1953 | 60   | hypothetical protein   |
| SAG1954 | 384  | membrane protein, putative                                   |
| SAG1955 | 282  | ABC transporter, ATP-binding protein                         |
| SAG1956 | 96   | conserved hypothetical protein, truncation                   |
| SAG1957 | 250  | response regulator   |
| SAG1958 | 276  | conserved hypothetical protein                               |
| SAG1959 | 727  | PTS system, IIABC components                                 |



|         |     |  |
|---------|-----|--|
| SAG1960 | 551 | sensor histidine kinase                                      |
| SAG1961 | 225 | phosphate regulon response regulator PhoB                    |
| SAG1962 | 218 | phosphate transport system regulatory protein PhoU, putative |
| SAG1963 | 253 | phosphate ABC transporter, ATP-binding protein               |
| SAG1964 | 292 | phosphate ABC transporter, permease protein                  |
| SAG1965 | 281 | phosphate ABC transporter, permease protein                  |
| SAG1966 | 293 | hemolysin precursor, putative                                |
| SAG1967 | 195 | hypothetical protein   |
| SAG1968 | 246 | conserved hypothetical protein TIGR00046                     |
| SAG1969 | 317 | ribosomal protein L11 methyltransferase                      |
| SAG1970 | 102 | conserved hypothetical protein                               |
| SAG1971 | 41  | hypothetical protein   |
| SAG1972 | 238 | transcriptional regulator, MerR family                       |
| SAG1973 | 156 | acetyltransferase, GNAT family                               |
| SAG1974 | 152 | MutT/nudix family protein                                    |
| SAG1975 | 47  | hypothetical protein   |
| SAG1976 | 156 | conserved hypothetical protein                               |
| SAG1977 | 163 | acetyltransferase, GNAT family                               |
| SAG1978 | 422 | ATPase, AAA family   |
| SAG1979 | 253 | membrane protein, putative                                   |
| SAG1980 | 300 | ABC transporter, ATP-binding protein                         |
| SAG1981 | 68  | hypothetical protein   |
| SAG1982 | 359 | transcriptional regulator, Cro/CI family                     |
| SAG1983 | 105 | conserved hypothetical protein                               |
| SAG1984 | 188 | conserved hypothetical protein TIGR00730                     |
| SAG1985 | 51  | hypothetical protein   |
| SAG1986 | 375 | site-specific recombinase, phage integrase family            |
| SAG1987 | 61  | conserved hypothetical protein                               |
| SAG1988 | 342 | conserved hypothetical protein                               |
| SAG1989 | 139 | hypothetical protein   |
| SAG1990 | 127 | hypothetical protein   |
| SAG1991 | 204 | transcriptional regulator, Cro/CI family                     |
| SAG1992 | 518 | protein of unknown function                                  |
| SAG1993 | 373 | site-specific recombinase, phage integrase family            |
| SAG1994 | 108 | conserved hypothetical protein                               |
| SAG1995 | 210 | hypothetical protein   |
| SAG1996 | 263 | cell wall surface anchor family protein, putative            |
| SAG1997 | 182 | hypothetical protein   |
| SAG1998 | 457 | hypothetical protein   |
| SAG1999 | 47  | hypothetical protein   |
| SAG2000 | 666 | membrane protein, putative                                   |
| SAG2001 | 756 | conjugal transfer protein, interruption-C                    |
| SAG2002 | 129 | IS1381, transposase OrfB                                     |
| SAG2003 | 127 | IS1381, transposase OrfA                                     |
| SAG2004 | 67  | conjugal transfer protein, interruption-N                    |
| SAG2005 | 136 | conserved hypothetical protein                               |
| SAG2006 | 88  | conserved hypothetical protein                               |
| SAG2007 | 317 | conserved hypothetical protein                               |
| SAG2008 | 84  | conserved hypothetical protein                               |
| SAG2009 | 88  | conserved hypothetical protein                               |

|         |      |   |
|---------|------|---|
| SAG2010 | 157  | hypothetical protein  |
| SAG2011 | 160  | conserved hypothetical protein  |
| SAG2012 | 90   | hypothetical protein  |
| SAG2013 | 189  | hypothetical protein  |
| SAG2014 | 449  | hypothetical protein  |
| SAG2015 | 99   | transcriptional regulator, Cro/CI family                              |
| SAG2016 | 125  | hypothetical protein  |
| SAG2017 | 429  | transcriptional regulator, Cro/CI family                              |
| SAG2018 | 553  | FtsK/SpoIIIE family protein   |
| SAG2019 | 153  | hypothetical protein  |
| SAG2020 | 98   | hypothetical protein  |
| SAG2021 | 826  | cell wall surface anchor family protein                               |
| SAG2022 | 417  | transposase, ISL3 family  |
| SAG2023 | 546  | mercuric reductase  |
| SAG2024 | 130  | mercuric resistance operon regulatory protein MerR                    |
| SAG2025 | 522  | Mn <sup>2+</sup> /Fe <sup>2+</sup> transporter, NRAMP family          |
| SAG2026 | 240  | membrane protein, putative  |
| SAG2027 | 205  | ABC transporter, ATP-binding protein                                  |
| SAG2028 | 36   | conserved hypothetical protein  |
| SAG2029 | 284  | streptomycin resistance protein                                       |
| SAG2030 | 130  | hypothetical protein  |
| SAG2031 | 202  | hypothetical protein  |
| SAG2032 | 111  | conserved hypothetical protein  |
| SAG2033 | 162  | acetyltransferase, GNAT family  |
| SAG2034 | 247  | membrane protein, putative  |
| SAG2035 | 300  | ABC transporter, ATP-binding protein                                  |
| SAG2036 | 68   | hypothetical protein  |
| SAG2037 | 358  | transcriptional regulator, Cro/CI family                              |
| SAG2038 | 204  | PAP2 family protein   |
| SAG2039 | 98   | conserved hypothetical protein  |
| SAG2040 | 186  | conserved hypothetical protein TIGR00730                              |
| SAG2041 | 287  | protease, putative  |
| SAG2042 | 100  | rhodanese family protein  |
| SAG2043 | 255  | cAMP factor   |
| SAG2044 | 62   | hypothetical protein  |
| SAG2045 | 179  | DNA topology modulation protein FlaR, putative                        |
| SAG2046 | 361  | glycerol dehydrogenase, putative                                      |
| SAG2047 | 235  | conserved hypothetical protein  |
| SAG2048 | 614  | 5-methyltetrahydrofolate--homocysteine methyltransferase, putative    |
| SAG2049 | 745  | 5-methyltetrahydropteroyltriglutamate--homocysteine methyltransferase |
| SAG2050 | 107  | conserved hypothetical protein  |
| SAG2051 | 230  | branched-chain amino acid transport protein AzlC, putative            |
| SAG2052 | 41   | hypothetical protein  |
| SAG2053 | 1570 | serine protease, subtilase family, putative                           |
| SAG2054 | 228  | DNA-binding response regulator  |
| SAG2055 | 462  | sensor histidine kinase   |
| SAG2056 | 202  | chromosome assembly-related protein                                   |
| SAG2057 | 833  | leucyl-tRNA synthetase  |

|         |     |  |
|---------|-----|--|
| SAG2058 | 415 | major facilitator family protein                                   |
| SAG2059 | 281 | protein of unknown function  |
| SAG2060 | 398 | glycosyl transferase, family 8                                     |
| SAG2061 | 401 | glycosyl transferase, family 8                                     |
| SAG2062 | 179 | transcription antitermination protein NusG                         |
| SAG2063 | 630 | pathogenicity protein, putative                                    |
| SAG2064 | 57  | preprotein translocase, SecE subunit, putative                     |
| SAG2065 | 50  | ribosomal protein L33  |
| SAG2066 | 773 | penicillin-binding protein 2A                                      |
| SAG2067 | 294 | ribosomal large subunit pseudouridine synthase, RluD subfamily     |
| SAG2068 | 546 | conserved hypothetical protein                                     |
| SAG2069 | 403 | phosphopentomutase   |
| SAG2070 | 223 | deoxyribose-phosphate aldolase                                     |
| SAG2071 | 400 | Na <sup>+</sup> dependent nucleoside transporter                   |
| SAG2072 | 259 | uridine phosphorylase  |
| SAG2073 | 245 | transcriptional regulator, GntR family                             |
| SAG2074 | 540 | 60 kda chaperonin  |
| SAG2075 | 94  | chaperonin, 10 kDa   |
| SAG2076 | 267 | ABC transporter, ATP-binding protein                               |
| SAG2077 | 298 | ABC transporter, permease protein                                  |
| SAG2078 | 320 | protein of unknown function/lipoprotein, putative                  |
| SAG2079 | 265 | hydrolase, haloacid dehalogenase-like family                       |
| SAG2080 | 286 | glyoxalase family protein  |
| SAG2081 | 243 | conserved hypothetical protein                                     |
| SAG2082 | 205 | anaerobic ribonucleoside-triphosphate reductase activating protein |
| SAG2083 | 163 | acetyltransferase, GNAT family                                     |
| SAG2084 | 310 | virulence factor MviM, putative                                    |
| SAG2085 | 47  | conserved hypothetical protein                                     |
| SAG2086 | 723 | anaerobic ribonucleoside-triphosphate reductase                    |
| SAG2087 | 495 | membrane protein, putative   |
| SAG2088 | 40  | hypothetical protein   |
| SAG2089 | 105 | conserved hypothetical protein                                     |
| SAG2090 | 136 | conserved hypothetical protein TIGR00250                           |
| SAG2091 | 88  | conserved hypothetical protein                                     |
| SAG2092 | 132 | conserved hypothetical protein                                     |
| SAG2093 | 379 | recA protein   |
| SAG2094 | NA  | competence/damage-inducible protein CinA, authentic frameshift     |
| SAG2095 | 183 | DNA-3-methyladenine glycosylase I                                  |
| SAG2096 | 196 | Holliday junction DNA helicase RuvA                                |
| SAG2097 | 418 | transporter, putative  |
| SAG2098 | 659 | DNA mismatch repair protein HexB                                   |
| SAG2099 | 33  | hypothetical protein   |
| SAG2100 | 67  | cold shock protein, CSD family                                     |
| SAG2101 | 858 | DNA mismatch repair protein HexA                                   |
| SAG2102 | 145 | arginine repressor ArgR, putative                                  |
| SAG2103 | 563 | arginyl-tRNA synthetase  |
| SAG2104 | 102 | conserved hypothetical protein                                     |
| SAG2105 | 290 | conserved hypothetical protein                                     |
| SAG2106 | 314 | conserved hypothetical protein                                     |
| SAG2107 | 583 | aspartyl-tRNA synthetase   |

|         |     |   |
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| SAG2108 | 426 | histidyl-tRNA synthetase  |
| SAG2109 | 60  | ribosomal protein L32   |
| SAG2110 | 49  | ribosomal protein L33   |
| SAG2111 | 173 | conserved hypothetical protein  |
| SAG2112 | 494 | site-specific recombinase, phage integrase family                       |
| SAG2113 | 82  | conserved hypothetical protein  |
| SAG2114 | 342 | conserved hypothetical protein  |
| SAG2115 | 143 | hypothetical protein  |
| SAG2116 | 151 | conserved hypothetical protein  |
| SAG2117 | 71  | hypothetical protein  |
| SAG2118 | 306 | transcriptional regulator, Cro/CI family                                |
| SAG2119 | 373 | conserved domain protein  |
| SAG2120 | 269 | hypothetical protein  |
| SAG2121 | 223 | hypothetical protein  |
| SAG2122 | 223 | DNA-binding response regulator  |
| SAG2123 | 454 | sensor histidine kinase   |
| SAG2124 | 517 | membrane protein, putative  |
| SAG2125 | 308 | carbamate kinase  |
| SAG2126 | 332 | ornithine carbamoyltransferase  |
| SAG2127 | 431 | sensor histidine kinase   |
| SAG2128 | 277 | response regulator  |
| SAG2129 | 240 | amino acid ABC transporter, ATP-binding protein                         |
| SAG2130 | 504 | amino acid ABC transporter, amino acid-binding protein/permease protein |
| SAG2131 | 847 | membrane protein, putative  |
| SAG2132 | 247 | conserved hypothetical protein  |
| SAG2133 | 118 | conserved hypothetical protein  |
| SAG2134 | 772 | membrane protein, putative  |
| SAG2135 | 179 | transcriptional regulator, TetR family, putative                        |
| SAG2136 | 98  | conserved hypothetical protein  |
| SAG2137 | 203 | ribosomal protein S4  |
| SAG2138 | 95  | conserved hypothetical protein  |
| SAG2139 | 451 | replicative DNA helicase  |
| SAG2140 | 150 | ribosomal protein L9  |
| SAG2141 | 660 | DHH family protein  |
| SAG2142 | 613 | glucose inhibited division protein A                                    |
| SAG2143 | 203 | membrane protein, putative  |
| SAG2144 | 373 | tRNA (5-methylaminomethyl-2-thiouridylate)-methyltransferase            |
| SAG2145 | 222 | L-serine dehydratase, iron-sulfur-dependent, beta subunit               |
| SAG2146 | 290 | L-serine dehydratase, iron-sulfur-dependent, alpha subunit              |
| SAG2147 | 234 | protein of unknown function/lipoprotein, putative                       |
| SAG2148 | 179 | LysM domain protein   |
| SAG2149 | 264 | cobalt transport family protein   |
| SAG2150 | 280 | ABC transporter, ATP-binding protein                                    |
| SAG2151 | 279 | ABC transporter, ATP-binding protein                                    |
| SAG2152 | 180 | CDP-diacylglycerol--glycerol-3-phosphate 3-phosphatidyltransferase      |
| SAG2153 | 427 | peptidase, M16 family   |
| SAG2154 | 414 | conserved hypothetical protein  |
| SAG2155 | 117 | conserved hypothetical protein  |

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| SAG2156 | 369 | recF protein                                |
| SAG2157 | 278 | transporter, putative                       |
| SAG2158 | 220 | transcriptional regulator, Cro/CI family    |
| SAG2159 | 493 | inosine-5'-monophosphate dehydrogenase      |
| SAG2160 | 161 | transcriptional regulator, ArgR family      |
| SAG2161 | 226 | transcriptional regulator, Crp/Fnr family   |
| SAG2162 | 234 | conserved hypothetical protein              |
| SAG2163 | 410 | arginine deiminase                          |
| SAG2164 | 136 | acetyltransferase, GNAT family              |
| SAG2165 | 337 | ornithine carbamoyltransferase              |
| SAG2166 | 475 | arginine/ornithine antiporter               |
| SAG2167 | 318 | carbamate kinase                            |
| SAG2168 | 341 | tryptophanyl-tRNA synthetase                |
| SAG2169 | 230 | membrane protein, putative                  |
| SAG2170 | 290 | conserved hypothetical protein              |
| SAG2171 | 539 | ABC transporter, ATP-binding protein        |
| SAG2172 | 859 | ABC transporter, permease protein, putative |
| SAG2173 | 159 | conserved hypothetical protein TIGR00246    |
| SAG2174 | 409 | serine protease                             |
| SAG2175 | 257 | partitioning protein, ParB family           |

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