

Annex 1: Potential donors for every RNA-free atypical region in 22 species (position of atypical region, distance donor/atypical region, P=plasmid, M=mitochondrion, A= rRNA)

Aeropyrum pernix

2250-8750	67250-70250	262250-263250
180 <i>Salmo salar</i> -M	207 <i>Neurospora crassa</i>	275* <i>Aeropyrum pernix</i>
184 <i>Oncorhynchus mykiss</i> -M	213 <i>Aspergillus fumigatus</i>	284750-293750
184 <i>Salvelinus alpinus</i> -M	218 <i>Chlamydia suis</i>	155 <i>Pyrococcus abyssi</i>
185 <i>Engraulis japonicus</i> -M	219 <i>Candidatus Kuenenia</i>	158 <i>Hyaloraphidium curvatum</i>
188 <i>Dromaius novaehollandiae</i> -M	<i>stuttgartiensis</i> -A	158 <i>Hyaloraphidium curvatum</i> -M
16250-21250	221 <i>Giardia lamblia</i> ATCC 50803	181 <i>Pyrococcus horikoshii</i>
184 <i>Balanoglossus carnosus</i> -M	190250-193250	194 <i>Salmo salar</i> -M
207 <i>Rhea americana</i> -M	205 <i>Salmo salar</i> -M	298250-301750
209 <i>Pyrococcus abyssi</i>	206 <i>Engraulis japonicus</i> -M	256* <i>Pyrodictium occultum</i>
210 <i>Pterocnemia pennata</i> -M	208 <i>Salvelinus alpinus</i> -M	312750-313750
210 <i>Enterococcus dispar</i>	208 <i>Sardinops melanostictus</i> -M	231 <i>Pyrodictium occultum</i>
31250-31750	208 <i>Arctoscopus japonicus</i> -M	247* <i>Aeropyrum pernix</i>
324* <i>Thermococcus hydrothermalis</i>	198750-206250	322250-322750
32250-32750	184 <i>Salmo salar</i> -M	384* <i>Pyrodictium occultum</i>
344* <i>Giardia lamblia</i> ATCC 50803	185 <i>Eudromia elegans</i> -M	327250-328250
33750-35250	186 <i>Hyaloraphidium curvatum</i>	251* <i>Diplophos taenia</i> -M
250* <i>Aeropyrum pernix</i>	186 <i>Hyaloraphidium curvatum</i> -M	371250-373750
35750-36250	188 <i>Struthio camelus</i>	258* <i>Aeropyrum pernix</i>
363* <i>Ehrlichia ovina</i> -A	209250-209750	377250-393250
36750-39750	346* <i>Rhea americana</i> -M	286* <i>Pyrodictium occultum</i>
238* <i>Desulfurococcus mucosus</i>	211250-212250	404250-406250
57750-63750	240* <i>Salmo salar</i> -M	260* <i>Aeropyrum pernix</i>
193 <i>Balanoglossus carnosus</i> -M	215750-222750	416250-425750
203 <i>Salmo salar</i> -M	176 <i>Salmo salar</i> -M	270* <i>Aeropyrum pernix</i>
206 <i>Candidatus Kuenenia</i>	179 <i>Struthio camelus</i>	433750-434250
<i>stuttgartiensis</i> -A	179 <i>Hyaloraphidium curvatum</i>	330* <i>Aeropyrum pernix</i>
206 <i>Arctoscopus japonicus</i> -M	179 <i>Hyaloraphidium curvatum</i> -M	441750-446750
207 <i>Nothoprocta ornata</i> -A	183 <i>Oncorhynchus mykiss</i> -M	222 <i>Aeropyrum pernix</i>

223 *Pyrodictium occultum*
256* *Desulfurococcus mobilis*
523250-524250
284* *Podospora anserina*
526250-527750
242* *Desulfurococcus mucosus*
546250-549250
192 *Hyaloraphidium curvatum*
192 *Hyaloraphidium curvatum-M*
194 *Struthio camelus*
199 *Ehrlichia* sp HGE agent
203 *Salmo salar-M*
552750-553250
377* *Aeropyrum pernix*
554750-563750
226 *Pyrodictium occultum*
243* *Aeropyrum pernix*
569750-576750
190 *Giardia lamblia* ATCC 50803
200 *Archaeoglobus fulgidus*
205 *Neurospora crassa*
206 *Avian sarcoma virus*
206 *Emericella nidulans*
649250-660250
267* *Pyrodictium occultum*
660750-669250
272* *Aeropyrum pernix*
675750-726750
225 *Pyrodictium occultum*
237* *Aeropyrum pernix*
729250-748750
138 *Sulfolobus acidocaldarius*
152 *Sulfolobus solfataricus*
154 *Lumbricus terrestris-M*

162 *Sulfolobus* NOB8H2 plpNOB8-P
754250-756250
268* *Caldococcus noboribetus*
759750-762250
200 *Rhea americana-M*
206 *Pterocnemia pennata-M*
212 *Balanoglossus carnosus-M*
214 *Oncorhynchus mykiss-M*
216 *Salmo salar-M*
765250-770750
291* *Pyrodictium occultum*
779250-779750
346* *Ehrlichia* sp HGE agent
780250-782250
237* *Aeropyrum pernix*
784250-789750
293* *Plecoglossus altivelis-M*
791750-793250
237* *Aeropyrum pernix*
794250-794750
421* *Aeropyrum pernix*
795250-796250
283* *Pyrodictium occultum*
800750-803750
254* *Pyrodictium occultum*
841750-842250
340* *Pyrodictium abyssii*
843250-848750
226 *Pyrodictium occultum*
242* *Aeropyrum pernix*
980250-980750
315* *Pyrodictium occultum*
983250-985750
180 *Sulfolobus solfataricus*

189 *Sulfolobus* NOB8H2 plpNOB8-P
192 *Lumbricus terrestris-M*
193 *Sulfolobus acidocaldarius*
1087250-1088750
220 *Sardinops melanostictus-M*
220 *Balanoglossus carnosus-M*
225 *Pterocnemia pennata-M*
227 *Plecoglossus altivelis-M*
228 *Rhea americana-M*
1120750-1122250
229 *Aeropyrum pernix*
254* *Desulfurococcus mucosus*
1264250-1264750
338* *Aeropyrum pernix*
1350250-1350750
322* *Aeropyrum pernix*
1351750-1352750
263* *Coregonus lavaretus-M*
1356250-1356750
354* *Aeropyrum pernix*
1408250-1408750
383* *Aeropyrum pernix*
1410250-1415250
258* *Pyrodictium occultum*
1418750-1420250
226 *Balanoglossus carnosus-M*
233 *Pyrococcus abyssii*
238* *Sardinops melanostictus-M*
1446750-1447750
284* *Aeropyrum pernix*
1503250-1508250
289* *Aeropyrum pernix*
1631250-1632750
251* *Cochliobolus homomorphus*

1666250-1667250

Aquifex aeolicus

31250-31750

329* *Aquifex aeolicus* pece1-P

218750-223250

192 *Aquifex aeolicus* pece1-P

240* *Marinococcus halophilus*

247750-248250

323* *Aquifex aeolicus*

249750-264250

194 *Pneumocystis carinii*

201 *Leptospira interrogans*

205 *Lactobacillus lactis* pl-P

205 *Lactococcus lactis* pK214-P

209 *Bacillus anthracis* pXO2-P

268250-269750

245* *Aquifex aeolicus*

341250-354750

202 *Bacillus mycoides* pBMY1-P

205 *T thermohydrosulfuricus*

206 *Leptospira interrogans*

207 *Nephroselmis olivacea*-M

207 *Lactococcus lactis* pK214-P

398750-399250

376* *Aquifex aeolicus*

428250-431750

271* *Aquifex aeolicus* pece1-P

440250-445250

208 *Leptospira interrogans*

209 *Aquifex aeolicus* pece1-P

235* *Marinococcus halophilus*

697250-697750

259* *Sulfolobus metallicus*

379* *Aquifex aeolicus*

714250-719750

189 *Arbacia lixula*-M

194 *Acidianus ambivalens*

199 *Asterina pectinifera*-M

202 *Sulfolobus shibatae*

205 *Pylaiella littoralis*-M

722750-724250

214 *Thermococcus litoralis*

218 *Chlamydomphila pneumoniae*

220 *Beta vulgaris*-M

228 *Pyrococcus horikoshii*

228 *Pyrococcus furiosus*

725750-728750

193 *T thermohydrosulfuricus*

196 *Bacillus anthracis* pXO2-P

199 *Bacillus anthracis* pPX01-P

200 *Lactobacillus lactis* pl-P

200 *Lactococcus lactis* pK214-P

746750-752250

201 *Clostridium histolyticum*

207 *Clostridium acetobutylicum*

210 *T thermohydrosulfuricus*

216 *Lactococcus lactis* pSRQ900-P

217 *Bacillus anthracis* pPX01-P

762750-768250

187 *Bacillus anthracis* pXO2-P

188 *Listeria ivanovii*

194 *Porphyra purpurea*-M

198 *Bacillus anthracis* pPX01-P

199 *Lactococcus lactis* pSRQ700-P

834250-837750

224 *Aquifex aeolicus* pece1-P

241* *Aquifex aeolicus*

932750-933250

300* *Aquifex pyrophilus*

933750-935750

246* *Hydrogenobacter thermophilus*

980250-980750

340* *Wheat yellow mosaic virus-A*

981750-982250

370* *Aquifex aeolicus*

1020750-1022750

235* *Bacteroides fragilis*

1065750-1067250

239* *Aquifex aeolicus*

1067750-1069750

228 *Aquifex aeolicus* pece1-P

270* *Aquifex aeolicus*

1310250-1313750

188 *Chlamydomphila caviae*

199 *Asterina pectinifera*-M

201 *Chlamydia psittaci* phage chp1

203 *Acidianus ambivalens* pDL10-P

204 *Holospira obtusa*

1445250-1449250

238* *Aquifex aeolicus* pece1-P

1538250-1542750

208 *Aquifex aeolicus*

212 *Strongylocentrotus purpuratus*

213 *Fusobacterium nucleatum*

214 *Chlamydomorpha abortus*

217 *Sarcocystis capracanis-A*

Archaeoglobus fulgidus

2250-5250

314* Apple stem grooving virus

40250-54750

162 *Chlamydia trachomatis*

171 *C pneumoniae* J138

171 *Chlamydomorpha pneumoniae* AR39

171 *Chlamydia pneumoniae* TW-183

176 *Chlamydia muridarum*

64750-71750

140 *Streptococcus pneumoniae*

141 *Streptococcus pneumoniae* R6

147 *Streptococcus mitis*

148 *Streptococcus gordonii*

148 *Thermococcus litoralis*

92250-96750

154 *Aedes aegypti*

160 *Staphylococcus capitis*

160 *Chlamydia muridarum*

162 *Phlebotomus papatasi*

162 *Enterococcus faecium*

167750-168750

271* *Sorghum bicolor*

268250-290750

126 *Chlamydia muridarum*

127 *Chlamydia pneumoniae* J138

127 *Chlamydomorpha pneumoniae* AR39

127 *Chlamydia pneumoniae* TW-183

136 *Chlamydia trachomatis*

397250-403250

282* Apple stem grooving virus

426250-426750

310* Bacteriophage H-19B

479750-483250

181 *Marchantia polymorpha-M*

193 Bacteriophage phi-105

195 *Ipomoea purpurea*

200 *Treponema denticola*

200 *Oryza sativa*

536750-557750

143 *Chlamydia muridarum*

150 *Chlamydia pneumoniae* J138

150 *Chlamydomorpha pneumoniae* AR39

150 *Chlamydia pneumoniae* TW-183

153 *Chlamydomorpha caviae*

678250-682750

152 Turnip vein-clearing virus

160 *Branchiostoma floridae*

160 *Uromyces aemulus*

163 *Physcomitrella patens*

163 Crucifer tobamovirus

688250-692250

166 *Chlamydia muridarum*

167 *Bacillus megaterium*

169 *Coxiella burnetii* pQpH1-P

170 *Chlamydomorpha pneumoniae* AR39

170 *Chlamydia pneumoniae* TW-183

799750-804250

143 *Chlamydia muridarum*

145 *Linum usitatissimum*

146 *Beta vulgaris*

147 *Chlamydomorpha pneumoniae* AR39

147 *Chlamydia pneumoniae* TW-183

844750-848750

180 Ribgrass mosaic virus

182 *Echinococcus granulosus*

185 Crucifer tobamovirus

186 Chinese wheat mosaic virus-A

187 Turnip vein-clearing virus

867750-868750

247* *Cochliobolus kusanoi*

908250-908750

376* *Pyrococcus abyssi*

909750-911750

174 *Chlamydia muridarum*

177 *Chlamydia pneumoniae* J138

177 *Chlamydomorpha pneumoniae* AR39

178 *Chlamydia pneumoniae* TW-183

179 *Chlamydia trachomatis*

935750-939750

256* *Archaeoglobus fulgidus*

975750-983250

202 *Chlamydia muridarum*

204 *Chlamydia* phage 2

206 *Chlamydia pneumoniae* J138

206 *Chlamydomorpha pneumoniae* AR39

206 *Chlamydia pneumoniae* TW-183

1173750-1179250

147 *Lotus japonicus* Chr3

150 *Nicotiana tabacum*

151 *Lotus japonicus* Chr1

154 *Lotus japonicus* Chr6
 154 *Nicotiana sylvestris*
 1256250-1260750
 197 *Thermococcus litoralis*
 200 *Chlamydia muridarum*
 201 *Methanosarcina barkeri*
 201 *Chlamydia trachomatis*
 206 *Chlamydophila pneumoniae* AR39
 1269750-1271750
 215 *Echinococcus granulosus*
 215 Garlic virus B
 216 *Physcomitrella patens*
 220 *Lentinula edodes*
 223 *Mesostoma lingua*
 1334750-1339250
 173 *Thermococcus litoralis*
 191 *Archaeoglobus fulgidus*
 195 *Methanosarcina barkeri*
 209 *Pyrococcus furiosus*
 211 *Chlamydophila pneumoniae* AR39
 1401250-1404750
 278* *Archaeoglobus fulgidus*
 1409750-1415750
 154 *Chlamydophila abortus*
 164 *Trypanosoma brucei*
 167 *Aedes aegypti*
 167 *Trypanosoma brucei*
 168 *Sorghum bicolor*
 1421750-1423750

Bacillus subtilis

118250-121750
 207 *Streptococcus bovis*

181 *Methanosarcina barkeri*
 199 *Eubacterium acidaminophilum*
 201 *Chlamydophila pneumoniae* AR39
 202 *Streptococcus gordonii*
 206 *Chlamydia trachomatis*
 1460750-1464250
 145 *Thermococcus litoralis*
 157 *Pyrococcus furiosus*
 162 *Chlamydophila pneumoniae* AR39
 176 *Chlamydia trachomatis*
 178 *Chlamydia muridarum*
 1508250-1509250
 230 *Fusobacterium equinum*
 239* *Toxoplasma gondii*
 1530750-1536250
 193 *Thermococcus litoralis*
 195 *Pyrococcus furiosus*
 201 *Chlamydia muridarum*
 202 *Chlamydophila pneumoniae* AR39
 202 *Chlamydia pneumoniae* TW-183
 1638750-1641750
 203 *Cochliobolus kusanoi*
 205 *Stagonospora arenaria*
 207 *Pyrenopeziza brassicae*
 207 *Gracilaria gracilis*
 211 *Trichoderma aggressivum*
 1671750-1682750
 153 *Chlamydophila pneumoniae* AR39
 153 *Chlamydia pneumoniae* TW-183

213 *Bacillus megaterium*
 214 *Streptococcus dysgalactiae*

153 *Chlamydia pneumoniae* J138
 154 *Chlamydia muridarum*
 154 *Thermococcus litoralis*
 1689250-1695250
 303* *Archaeoglobus fulgidus*
 1748750-1750250
 236* *Mesotaenium caldariorum*
 1878250-1881250
 219 Artichoke mottled crinkle virus
 220 Cryphonectria hypovirus 3
 222 *Archaeoglobus fulgidus*
 224 Beet chlorosis virus
 224 Potato leaf curl virus
 1910250-1910750
 318* *Fusobacterium nucleatum*
 1919750-1920750
 263* *Bacillus macroides*
 1977250-1980250
 175 *Microcystis aeruginosa*
 176 *Chlamydia muridarum*
 178 *Bacillus megaterium*
 181 *Linum usitatissimum*
 183 *Cucurbita pepo*
 2087750-2106250
 173 *Thermococcus litoralis*
 175 *Chlamydia pneumoniae* J138
 177 *Chlamydia trachomatis*
 180 *Chlamydophila pneumoniae* AR39
 180 *Chlamydia pneumoniae* TW-183

217 *Streptococcus equisimilis*
 227 *Lactococcus lactis* pH003-P

123750-144750	86 <i>Schizosaccharomyces pombe</i>	148 Turkey adenovirus 3
150 <i>Enterococcus asini</i>	90 <i>Listeria innocua</i> pLI100-P	1144750-1145750
154 <i>Bacillus</i> sp. C-125-A	97 Bacteriophage PSA	349* <i>Pantoea citrea</i> pUCD5000-P
154 <i>Vibrio harveyi</i>	100 Bacteriophage SPBc2	1262250-1270250
158 <i>Bacillus pseudofirmus</i>	104 Bacteriophage bIL285	97 Bacteriophage SPBc2
166 <i>Streptococcus bovis</i>	652250-664250	99 <i>Schizosaccharomyces pombe</i>
203250-207750	94 <i>Listeria innocua</i> pLI100-P	99 <i>Listeria innocua</i> pLI100-P
136 <i>Enterococcus faecium</i>	104 <i>Streptococcus thermophilus</i>	106 <i>Onchocerca volvulus</i>
140 <i>Bacillus mojavensis</i>	104 <i>Bacillus anthracis</i>	107 Bacteriophage PSA
143 <i>Vibrio adaptatus</i>	104 Bacteriophage SPBc2	1277750-1278750
148 <i>Legionella longbeachae</i>	106 <i>Schizosaccharomyces pombe</i>	212 <i>Bacillus pumilus</i> pPL10-P
149 <i>Streptococcus uberis</i>	738750-747250	228 <i>Arabidopsis thaliana</i>
209250-209750	112 Bacteriophage SPBc2	231 <i>Brassica napus</i>
297* <i>Clostridium cellulolyticum</i>	121 <i>Streptococcus agalactiae</i>	232 <i>Arabidopsis lyrata</i>
211250-218750	121 <i>Bacillus anthracis</i> pXO2-P	233 <i>Schizosaccharomyces pombe</i>
105 <i>Enterococcus faecium</i>	122 <i>S aureus</i> prophage phiPV83	1280250-1280750
116 <i>Saccharomyces pastorianus</i>	124 <i>Listeria innocua</i> pLI100-P	344* <i>Fagopyrum esculentum</i>
118 <i>Streptococcus suis</i>	769750-777250	1441750-1447250
119 <i>Saccharomyces cerevisiae</i>	175 <i>Bacillus licheniformis</i>	119 <i>Bacillus megaterium</i>
narnavirus	176 <i>Chlorobium limicola</i> pCL1-P	124 <i>Bacillus cereus</i>
124 <i>Legionella pneumophila</i>	180 <i>Bacillus circulans</i>	125 <i>Bacillus mojavensis</i>
379750-387750	188 <i>Bacillus thermoleovorans</i>	128 <i>Staphylococcus intermedius</i>
188 <i>Bacillus licheniformis</i>	189 <i>S typhimurium</i> pSC101-P	129 <i>Schizosaccharomyces pombe</i>
197 <i>Brevibacillus brevis</i>	818250-822250	1478250-1483250
198 <i>Paenibacillus abekawaensis</i>	146 <i>Bacillus anthracis</i> pPX01-P	117 Bacteriophage SPBc2
202 Bacteriophage HK97	154 <i>Cyanidium caldarium</i> chloroplast	117 <i>Bacillus cereus</i>
204 <i>Bacillus</i> sp. BP23	160 <i>Nephroselmis olivacea</i> -M	119 <i>Bacillus mojavensis</i>
392750-398750	160 <i>Prochlorococcus marinus</i>	121 <i>Bacillus anthracis</i>
167 <i>Bacillus licheniformis</i>	160 <i>Bacillus anthracis</i> pXO2-P	124 <i>Schizosaccharomyces pombe</i>
191 <i>Bacillus circulans</i>	1125750-1129250	1529750-1530250
196 <i>Paenibacillus abekawaensis</i>	138 Bacteriophage SPBc2	332* <i>Tetragenococcus halophilus</i>
204 <i>Brevibacillus brevis</i>	140 <i>Schizosaccharomyces pombe</i>	1878750-1893250
207 <i>Heliobacillus mobilis</i> -A	144 <i>Bacillus cereus</i>	93 Bacteriophage SPBc2
528750-567750	144 <i>S aureus</i> phage phi 12	106 <i>Listeria innocua</i> pLI100-P

110 *Bacillus cereus*
110 *Bacillus anthracis*
111 *Legionella longbeachae*
1897750-1905250
133 *Listeria innocua* pLI100-P
135 *Schizosaccharomyces pombe*
136 *Bacillus mojavensis*
141 African swine fever virus
142 Bacteriophage PSA
1923250-1924250
193 *Bacillus subtilis* pTA1060-P
206 *Bacillus subtilis* pTA1040-P
209 *Bacillus subtilis* p1414-P
210 *Bacillus pumilus* pPL10-P
217 *Coxiella burnetii* pQpH1-P
1939250-1939750
314* *Ciona intestinalis*
1977750-1978250
358* *Paenibacillus macerans*
2029250-2029750
331* Commelina yellow mottle virus
2033750-2034750
211 *A actinomycetemcomitans*
pVT745-P
215 *A actinomycetemcomitans*
218 *Enterococcus faecalis*
218 *Bacillus subtilis* pTA1060-P
219 *Bacillus pumilus* pPL10-P
2036250-2042250
121 *Enterococcus faecium*
138 *S cerevisiae* narnavirus
138 *Enterococcus faecalis*
144 *Saccharomyces pastorianus*
144 *Bacillus megaterium*

2047250-2075250
75 Bacteriophage SPBc2
79 *Listeria innocua* pLI100-P
97 *Schizosaccharomyces pombe*
98 *Bacillus anthracis*
101 *Streptococcus agalactiae*
2097250-2097750
360* Bacteriophage phi-105
2150750-2285750
2 Bacteriophage SPBc2
94 *Schizosaccharomyces pombe*
98 *Streptococcus thermophilus*
101 *Listeria innocua* pLI100-P
102 *S aureus* phage phi 12
2552750-2553750
235* *Bacillus subtilis*
2585250-2586250
240* *Bacteroides fragilis*
2653750-2667250
94 *Schizosaccharomyces pombe*
98 *Bacillus megaterium*
99 Bacteriophage SPBc2
102 *Bacillus mojavensis*
104 *Listeria innocua* pLI100-P
2675250-2676250
234 *Bacillus pseudofirmus*
236* *Methanosarcina barkeri*
2683750-2693750
124 *S cerevisiae* narnavirus
126 *Enterococcus faecium*
136 *Enterococcus hirae*
139 *Bacillus megaterium*
139 Streptococcaceae Streptococcus
2696250-2701250

138 *Bacillus megaterium*
141 *Schizosaccharomyces pombe*
145 *Streptococcus mutans*
146 *Bacillus pumilus* pPL10-P
147 *Enterococcus faecium*
2705750-2740250
96 *Listeria innocua* pLI100-P
99 *Schizosaccharomyces pombe*
103 Bacteriophage SPBc2
104 *Bacillus mojavensis*
110 *Legionella longbeachae*
2742250-2746750
124 *Enterococcus faecium*
145 *Bacteroides fragilis*
149 *Streptococcus suis*
149 *Butyrivibrio fibrisolvens*
150 *Legionella pneumophila*
2765750-2768250
170 *A actinomycetemcomitans*
177 *Coxiella burnetii*
177 *Haemophilus influenzae*
180 *A actinomycetemcomitans*
pVT745-P
181 *Legionella pneumophila*
3252750-3257250
123 *Bacillus anthracis*
134 *Listeria innocua* pLI100-P
136 *Bacillus anthracis* pXO2-P
140 Bacteriophage SPBc2
140 *Bacillus anthracis* pPX01-P
3281250-3285750
194 *Paenibacillus abekawaensis*
199 Bacteriophage HK97
202 *C glutamicum* pCG4-P

203 Bacteriophage HK022
205 *Bacillus* sp. BP23
3337250-3337750
346* *Erwinia amylovora* pEA29-P
3462250-3467250
143 *Bacillus anthracis* pPX01-P
148 *Lactococcus lactis* pNZ4000-P
151 *Cucumis sativus*
152 *Anthonomus grandis*
153 *Carnobacterium alterfunditum*
3658750-3661750
161 *Streptococcus intermedius*
169 Bacteriophage Tuc2009
171 *Gardnerella vaginalis*
172 *Tetragenococcus halophilus*
175 *Enterococcus faecium*
3663750-3683750

Borrelia burgdorferi

299750-301750
255* *Chlamydia muridarum* pMoPn-P
398750-404250
161 Bacteriophage SPBc2
174 *Euplotes octocarinatus*
176 *Borrelia hermsii*

Campylobacter jejuni

275250-276250
374* *Campylobacter jejuni* pCJ01-P
276750-277250
450* *Dictyostelium discoideum*
378250-378750

103 *Lactococcus lactis* pNZ4000-P
109 *Lactobacillus lactis* pl-P
109 *Lactococcus lactis* pK214-P
115 *Lactococcus lactis* pAH82-P
116 *Bacillus anthracis* pXO2-P
3712250-3716750
189 *Bacillus subtilis* pTA1060-P
191 *Bacillus pumilus* pPL10-P
196 *Bacillus subtilis* pTA1040-P
204 Plasmid pUB110-P
204 *Staphylococcus aureus* pUB110-P
4019750-4020250
316* *Bacillus* sp. RC607
4122750-4134250
96 *Bacillus anthracis* pPX01-P
115 *Bacillus anthracis* pXO2-P
116 *Bacillus anthracis*

176 *Stylonychia lemnae*
180 *Streptococcus mutans*
445750-446250
300* *Hepatozoon catesbiana*-A
498250-498750
308* Rice tungro bacilliform virus

275* *Campylobacter jejuni*
499250-499750
374* African swine fever virus
808250-808750
311* *Campylobacter jejuni*

127 Bacteriophage bIL312
128 *Cucumis sativus*
4171250-4176750
117 *Bacillus anthracis* pPX01-P
122 *C acetobutylicum* pSOL1-P
128 *Staphylococcus hominis*
133 *Porphyra purpurea*-M
133 *Brochothrix campestris*
4183750-4189250
122 *Listeria innocua* pLI100-P
134 *S cerevisiae* narnavirus
134 *Streptococcus thermophilus*
135 *Schizosaccharomyces pombe*
137 Bacteriophage SPBc2

666750-667250
296* *Mycoplasma incognitus*
668750-669750
284* *Guillardia theta*
907250-907750
337* *Borrelia burgdorferi* plp36-P

906750-908750
201 *Clostridium acetobutylicum*
205 *C acetobutylicum* pSOL1-P
213 *Staphylococcus aureus* pJ3358-P
214 *Cyanidium caldarium* chloroplast

218 *S aureus* phage phi 12
1072750-1073750
245* *Borrelia burgdorferi* plp25-P
1074250-1075750
245* Lumpy skin disease virus
1268250-1270250

250* *Mycoplasma synoviae*
1365750-1366250
328* *Buchnera* sp APS pTrp-P
1373250-1379750
158 *Borrelia burgdorferi* plp38-P
166 *Borrelia burgdorferi* plp28-3-P

168 *Plasmodium yoelii*
169 *Plasmodium chabaudi*
172 *Borrelia burgdorferi* pcp26-P
1617750-1618250
351* *Mycoplasma agalactiae*

***Chlamydomydia pneumoniae* AR39**

12750-13250
320* *Chlamydia trachomatis*
57750-59750
204 *Chlamydia pneumoniae* TW-183
206 *Chlamydia pneumoniae* J138
206 *Chlamydomydia pneumoniae* AR39
206 *Chlamydia muridarum*
208 *Chlamydia trachomatis*
207250-207750
313* *Sulfolobus islandicus* pHEN7-P
289750-292250
154 *Nicotiana tabacum*
157 *Bacillus thuringiensis*
161 *Clostridium butyricum*

161 *Daucus carota*
164 *Petunia axillaris*
394750-395250
309* *Hyaloraphidium curvatum*-M
491750-494750
153 *Chlamydia pneumoniae* J138
194 *Ehrlichia* sp HGE agent
195 *Chlamydomydia abortus*
201 *Pyrococcus woesei*
203 *Thermococcus litoralis*
497250-497750
291* *Beta vulgaris*-M
515750-516750
214 *Chlamydia pneumoniae* TW-183

228 *Chlamydia psittaci*
233 *Chlamydia pneumoniae* J138
233 *Chlamydomydia pneumoniae* AR39
233 *Chlamydia muridarum*
546750-547250
346* Australian bat lyssavirus
623250-624250
262* *Gallus gallus*
899750-900250
363* *Rana catesbeiana*
901750-902250
329* Sendai virus
916250-916750
296* *Malonomonas rubra*

Chlamydia trachomatis

55750-57250
248* Bovine immunodeficiency virus
167250-167750
381* *Brassica montana*
194750-195750
241* *Lactococcus lactis* pAH82-P
196250-198250
210 *Chlamydia muridarum* pMoPn-P

219 *Chlamydia trachomatis* pl-P
220 *Lactococcus lactis* pSRQ700-P
221 *Chlamydia trachomatis* pCHL1-P
222 Bovine adenovirus 4
253750-254250
318* *Dendrobium greg*
352250-353750
231 *Streptococcus mitis*

232 *Pichia pastoris*
232 *Sesamum indicum*
235* *Blumeria graminis*
476750-477250
381* *Encephalitozoon cuniculi*
479750-483250
216 *Chlamydomydia pneumoniae* AR39
238* *Chlamydia trachomatis*

531250-532250
334* *Physcomitrella patens*
533250-533750
328* *Encephalitozoon cuniculi*

Clostridium acetobutylicum

605250-608250
138 *Bartonella henselae*
150 *A calcoaceticus*
161 *Enterococcus faecium*
161 *Pasteurella multocida*
162 *Acinetobacter* sp. ADP1
824750-825250
317* *Acidianus ambivalens*
1043250-1051750
187 *Acetivibrio cellulolyticus*
190 *Clostridium cellulovorans*
212 *Clostridium josui*
218 *Clostridium cellulolyticum*
222 *Clostridium paraputrificum*
1056750-1057250
310* *Clostridium tyrobutyricum*
1058250-1062750
163 *Clostridium cellulovorans*
182 *Clostridium cellulolyticum*
185 *T thermosulfurigenes*
185 *Clostridium paraputrificum*
186 *Suncus murinus*-A
1231750-1239250
285* *Spizellomyces punctatus*
1309250-1317250
154 *Clostridium perfringens* pCP13-P
159 *Borrelia burgdorferi* plp38-P

649750-653250
215 *Chlamydia muridarum*
221 *Fischerella* sp. Cohn
224 *Streptococcus sanguinis*

160 *Reclinomonas americana*-M
161 *Borrelia burgdorferi* plp28-3-P
165 *Ochromonas danica*-M
1821750-1822250
288* *Clostridium sticklandii*
1914250-1914750
309* *Buchnera* sp APS pLeu-P
2032250-2036250
200 Bacteriophage A118
202 Bovine adenovirus 4
208 *Streptococcus dysgalactiae*
209 *M thermolithotrophicus*
209 Turkey adenovirus 3
2138750-2140250
221 *Neurospora crassa* plHarbin3-P
227 *Staphylococcus aureus* pETB-P
231 *Gracilaria robusta* pGro4970-P
235* *S haemolyticus* pNVH97A-P
2142250-2142750
317* *Clostridium perfringens* pCP13-P
2606750-2607750
250* *Clostridium sticklandii*
2779250-2780250
376* *Gyatrix hermaphroditus*-A
2817750-2818750
223 *Loligo bleekeri*-M
241* *Prototheca wickerhamii*-M

225 Bovine adenovirus 2
225 Ovine adenovirus A
722250-723750
259* *Marinococcus halophilus*

2863250-2863750
308* *Mycoplasma virus* P1
3076250-3077250
347* *Calonitophyllum medium*
3270250-3271250
307* Beet curly top virus
3276750-3280250
193 *Clostridium sticklandii*
193 *Clostridium pasteurianum*
209 *Stylonychia lemnae*
209 Rice tungro bacilliform virus
212 *Lilium henryi*
3306250-3308750
186 *Clostridium sticklandii*
200 *Acidianus ambivalens*
207 *Clostridium pasteurianum*
209 Feline foamy virus
213 *Sulfolobus shibatae*
3422250-3427750
191 *Rickettsia helvetica*
203 *Rickettsia rhipicephali*
205 *Porphyra purpurea*
208 *Rickettsia sibirica*
208 *Rickettsia felis*
3436250-3437750
296* *Acholeplasma* phage L2
3477250-3480750

339* *Sarcophyton glaucum*
3569250-3571250
229 *Clostridium cellulovorans*
239* *Acetivibrio cellulolyticus*

3774250-3774750
324* *Clostridium pasteurianum*
3910750-3916750
119 *Streptococcus salivarius*

120 *Streptococcus pneumoniae*
121 *Streptococcus pneumoniae* R6
126 *Streptococcus thermophilus*
128 *Streptococcus pyogenes*

Deinococcus radiodurans

139750-146750
164 *C striatum* pTP10-P
172 *Deinococcus radiodurans* plCP1-P
172 *Pseudomonas aureofaciens*
175 *Gaeumannomyces graminis*
176 *Mycobacterium leprae*
217750-222250
178 plasmid Bin 19-P
184 *C striatum* pTP10-P
193 *Arcanobacterium pyogenes*
194 *Paecilomyces tenuipes*
196 *Pseudomonas alcaligenes*
309750-313750
178 *Desulfovibrio vulgaris*
188 *Hydrogenophaga pseudoflava*
197 *Burkholderia* sp. PS12
197 *Bifidobacterium animalis*
199 *Streptomyces abikoensis*
316250-316750
297* *Azospirillum brasilense*
450750-452250
274* *Streptomyces ambofaciens*
518250-538750
329* *Deinococcus radiodurans*
544750-546750
171 *Deinococcus radiodurans* plMP1-P

173 *Pseudomonas* sp
176 *Pseudomonas putida* pWW0-P
176 *Pseudomonas putida*
178 *Arthrobacter nicotinovorans*
549750-553750
169 *Pseudomonas putida*
172 *Aeromonas hydrophila*
175 *Pseudomonas aureofaciens*
177 *Pseudomonas alcaligenes*
178 *Pseudomonas synxantha*
671250-678750
158 plasmid Bin 19-P
158 *Enterobacter aerogenes*
158 *Deinococcus radiodurans* plCP1-P
164 *Pseudomonas azelaica*
164 *Sphingomonas adhaesiva*
691750-695250
263* *Actinomyces viscosus*
921250-924750
210 *Thauera selenatis*
213 *Thauera aromatica*
224 *Burkholderia* sp. PS12
225 *S meliloti* phage PBC5
225 *Burkholderia pyrrocinia*
995250-995750
310* *Beroe ovata*
1206750-1207250

340* *Blastocladiella emersonii*
1230750-1231250
369* *Deinococcus radiodurans*
1239250-1240750
208 plasmid Bin 19-P
209 *Pseudomonas syringae glycinea*
214 *Alcaligenes faecalis*
217 *Erwinia chrysanthemi*
219 *Pseudomonas syringae*
1387250-1391250
187 *D radiodurans* plMP1-P
192 *Deinococcus radiodurans* plCP1-P
196 *Arthrobacter nicotinovorans*
197 *Pseudomonas* sp
199 *Pseudomonas alcaligenes* pRA2-P
1465250-1474750
260* *Actinosynnema pretiosum*
1588750-1590750
200 *Pseudomonas aureofaciens*
204 Bacteriophage phi CTX
204 Bacteriophage phi CTX
207 *Pseudomonas fluorescens*
208 *Pseudomonas resinovorans*
1610250-1613250
189 *Deinococcus radiodurans* plCP1-P
209 *Halomonas alimentaria*
210 *Burkholderia* sp. RASC

211 *Alicyclobacillus acidoterrestris*
217 *Afipia felis*-A
1674250-1677750
199 *Pseudomonas* sp U2 pWWU2-P
199 *Halomonas elongata*
199 *Burkholderia* sp. RASC
201 *Pseudomonas* sp
203 *Pseudomonas putida* pWW0-P
1745250-1748250
189 plasmid Bin 19-P
196 *Agrobacterium agile*
199 *Desulfitobacterium hafniense*
200 *Pseudomonas oleovorans*
204 *Magnaporthe grisea*
1832250-1832750
319* *Deinococcus radiodurans*
1834750-1836250
187 *Deinococcus radiodurans* plCP1-P
189 *D radiodurans* plMP1-P
190 *Deinococcus radiodurans*
200 *Desulfovibrio vulgaris*
205 *Ralstonia eutropha* H850
1952750-1953250
339* *Thauera selenatis*
1974250-1975250

231 *D radiodurans* plMP1-P
239* *Deinococcus radiodurans*
2060750-2063250
218 *Desulfovibrio vulgaris*
232 *Hydrogenophaga pseudoflava*
238* *Streptomyces abikoensis*
2113250-2116750
175 *Pseudomonas* sp
189 *Acidovorax avenae*
190 *Halomonas elongata*
191 *Pseudomonas chlororaphis*
195 *Pseudomonas putida* pWW0-P
2244250-2249250
142 *Halomonas alimentaria*
144 *Deinococcus radiodurans* plCP1-P
156 *Centroscyllium fabricii*
158 *Acetobacter aceti*
159 *Gremmeniella abietina* mit RNA
virus S1
2347750-2348250
350* *Deinococcus radiodurans*
2508750-2511250
290* *Pseudomonas brassicacearum*
2580750-2589250
139 *Halomonas elongata*

146 *Arthrobacter* sp. TM1
147 *Pseudomonas* sp
148 *C glutamicum* pAG1-P
148 *C glutamicum* pAG4-P
2612250-2613250
321* *Deinococcus radiodurans*
2648250-2652250
154 *Pseudomonas syringae*
164 *Pseudomonas syringae glycinea*
168 *Pseudomonas putida* pWW0-P
169 *Pseudomonas aureofaciens*
172 *Pseudomonas putida*
2682250-2697750
120 *C glutamicum* pCG4-P
126 *Eremothecium gossypii*
127 *Aspergillus terreus*
136 *Aeromonas allosaccharophila*
136 *Brevibacterium flavum*
2791250-2792750
229 Bacteriophage phi CTX
229 Bacteriophage phi CTX
233 *Herbaspirillum seropedicae*
234 *Pseudomonas chlororaphis*
237* *Pseudomonas fluorescens*

***Escherichia coli* MG1655**

124250-127750
227 *Enterobacter aerogenes*
238* *Enterobacter cloacae*
150250-156250
127 *Photobacterium luminescens*
129 *Yersinia pseudotuberculosis*

131 *Yersinia enterocolitica* pYVe22-P
131 *Y enterocolitica* pYVe8081-P
132 *Yersinia pestis* pCD1-P
235750-239250
135 *Citrobacter rodentium*
143 *Escherichia coli* pR721-P

153 *Yersinia pseudotuberculosis*
153 *Shigella sonnei*
157 *Yersinia enterocolitica*
264750-265750
258* *Pantoea citrea*
280750-288750

157 <i>D radiodurans</i> pIMP1-P	192 <i>Yersinia ruckeri</i>	872750-874750
166 <i>Ralstonia solanacearum</i> pJTSP1-P	197 <i>Yersinia pestis</i>	221 <i>Xenorhabdus nematophilus</i>
167 <i>Pseudomonas</i> sp. ADP pADP-1-P	200 <i>Kluyvera cryocrescens</i>	230 <i>Yersinia enterocolitica</i>
169 <i>Burkholderia gladioli</i>	202 <i>Erwinia carotovora</i>	234 <i>Photorhabdus luminescens</i>
169 <i>Pseudomonas stutzeri</i>	204 <i>Salmonella enterica</i>	240* <i>Yersinia pseudotuberculosis</i>
291250-295750	566750-572250	976250-977750
146 <i>Microscilla</i> sp pSD15-P	109 <i>Citrobacter rodentium</i>	296* <i>Klebsiella aerogenes</i>
148 <i>Citrobacter rodentium</i>	112 <i>Shigella sonnei</i>	998750-999250
149 <i>Escherichia coli</i> pR721-P	127 <i>Yersinia pseudotuberculosis</i>	299* <i>Yersinia ruckeri</i>
154 <i>Salmonella typhi</i> pR27-P	138 <i>Plesiomonas shigelloides</i>	1065250-1065750
157 <i>Y enterocolitica</i> pYVe8081-P	142 <i>Bacillus firmus</i>	339* <i>E. coli</i> O157-H7 phage L1
310250-320250	575750-585750	1089250-1095250
92 <i>Xenorhabdus nematophilus</i>	107 <i>Citrobacter rodentium</i>	114 <i>Yersinia enterocolitica</i>
104 <i>Shigella boydii</i>	110 <i>Shigella sonnei</i>	114 <i>Shigella boydii</i>
111 <i>Photorhabdus luminescens</i>	111 <i>Escherichia coli</i> pR721-P	124 <i>Xenorhabdus nematophilus</i>
113 <i>Yersinia enterocolitica</i>	119 <i>Yersinia pseudotuberculosis</i>	125 <i>Yersinia enterocolitica</i> pYVe22-P
118 <i>Shigella flexneri</i> pvir-P	129 <i>Plesiomonas shigelloides</i>	127 <i>Photorhabdus luminescens</i>
333250-333750	620750-622250	1101750-1104750
337* <i>Salmonella enterica</i>	229 <i>Pectobacterium atrosepticum</i>	151 <i>Citrobacter rodentium</i>
338250-339250	236* <i>Serratia marcescens</i>	160 <i>Proteus vulgaris</i>
310* <i>Bordetella avium</i>	635750-636750	164 <i>Escherichia coli</i> pR721-P
390750-392250	247* <i>Wolbachia pipientis</i>	169 <i>Yersinia pseudotuberculosis</i>
220 <i>Salmonella enterica</i> pvir-P	676250-677750	169 <i>Shigella sonnei</i>
229 Bacteriophage Mu	205 <i>Salmonella enterica</i>	1194750-1201250
230 <i>Salmonella typhimurium</i> pSLT-P	206 <i>Shigella dysenteriae</i>	119 <i>Citrobacter rodentium</i>
232 <i>Erwinia amylovora</i> pEA29-P	207 <i>Salmonella enteritidis</i>	127 <i>Escherichia coli</i> pR721-P
233 <i>Erwinia herbicola</i>	207 <i>Citrobacter freundii</i>	134 <i>Salmonella typhi</i> pR27-P
521250-528750	208 <i>Escherichia coli</i> O157-H7	135 <i>Shigella sonnei</i>
145 <i>Salmonella typhimurium</i> pSLT-P	728750-738250	137 <i>Y enterocolitica</i> pYVe8081-P
147 <i>Serratia entomophila</i> pADAP-P	133 <i>Salmonella enterica</i> pvir-P	1208250-1221750
150 <i>Salmonella enterica</i> pvir-P	135 <i>Salmonella typhimurium</i> pSLT-P	92 <i>Citrobacter rodentium</i>
160 <i>Salmonella dublin</i>	142 Bacteriophage P4	97 <i>Shigella sonnei</i>
167 <i>Escherichia coli</i> pCloDF13-P	144 Bacteriophage 933W	97 <i>Yersinia pseudotuberculosis</i>
559250-561250	145 <i>Escherichia coli</i> pO157-P	120 <i>Yersinia enterocolitica</i>

120 *Plesiomonas shigelloides*
1227250-1228250
220 *E. coli* O157-H7 bacteriophage L1
222 *E. coli* O157-H7 EDL9333
232 *Salmonella Typhi* CT18-P
233 *Salmonella dublin*
1411750-1418250
120 *Salmonella enterica* pHCM1-P
120 *Salmonella typhi* CT18 pHCM1-P
122 *Shigella boydii*
122 Bacteriophage H-19B
125 *Escherichia coli* pB171-P
1421750-1424250
166 *Citrobacter rodentium*
171 *Yersinia pseudotuberculosis*
177 *Y. enterocolitica* pYVe8081-P
180 *Shigella sonnei*
181 *Yersinia enterocolitica* pYVe22-P
1430750-1434250
132 *Escherichia coli* pR721-P
157 *Xenorhabdus nematophilus*
157 *Citrobacter rodentium*
158 Bacteriophage If1
159 *Shigella sonnei*
1474250-1475750
204 *Xenorhabdus nematophilus*
204 *Photorhabdus luminescens*
207 *Yersinia pestis* pCD1-P
207 *Y. enterocolitica* pYVe8081-P
1525750-1531250
117 *Shigella flexneri* pvir-P
118 *Shigella flexneri* pCP301-P
121 *Shigella boydii*
121 *Escherichia coli* pB171-P

132 *Escherichia coli* pO157-P
1541750-1544750
168 *Proteus mirabilis*
191 *Shewanella hanedai*
192 *Shigella sonnei*
193 *Manduca sexta*
193 *Vibrio fischeri*
1574750-1588750
100 *Yersinia enterocolitica*
103 *Yersinia enterocolitica* pYVe22-P
103 *Photorhabdus luminescens*
104 *Y. enterocolitica* pYVe8081-P
108 *Yersinia pestis* pCD1-P
1593750-1594750
241* *Erwinia pyrifoliae*
1629250-1641250
90 *Escherichia coli* pR721-P
112 *Salmonella typhi* pR27-P
116 *Xenorhabdus nematophilus*
117 *Shigella boydii*
118 Bacteriophage If1
1644250-1646750
147 *Escherichia coli* pR721-P
164 *Y. enterocolitica* pYVe8081-P
164 *Salmonella typhi* pR27-P
169 *Yersinia enterocolitica* pYVe22-P
169 *Bacillus subtilis*
1770250-1770750
296* *Bacteroides fragilis*
1800250-1803750
160 *Yersinia pseudotuberculosis*
161 *Escherichia coli* pR721-P
166 *Plesiomonas shigelloides*
166 *Citrobacter rodentium*

169 *Yersinia enterocolitica*
1853250-1854750
182 *Salmonella enteritidis*
189 *Salmonella enterica*
196 *Escherichia coli* O157-H7
197 *Citrobacter freundii*
198 *Erwinia carotovora*
1868750-1870750
164 *Yersinia enterocolitica*
172 *Shigella boydii*
178 *Yersinia enterocolitica* pYVe22-P
180 *Plesiomonas shigelloides*
181 *Yersinia pestis* pCD1-P
2033250-2035750
146 *Yersinia enterocolitica*
157 *Yersinia enterocolitica* pYVe22-P
159 *Y. enterocolitica* pYVe8081-P
160 *Yersinia pestis* pCD1-P
2036750-2042250
125 *Shigella boydii*
129 *Y. enterocolitica* pYVe8081-P
130 *Yersinia enterocolitica* pYVe22-P
131 *Yersinia enterocolitica*
131 *Escherichia coli* pR721-P
2052250-2058250
128 *Yersinia enterocolitica*
128 *Salmonella enterica*
128 *Shigella boydii*
129 *Yersinia pestis* pCD1-P
2067250-2074750
153 *Salmonella typhimurium* pSLT-P
172 *Salmonella enterica* pvir-P
176 *Serratia entomophila* pADAP-P
181 *Shigella sonnei* pCollb-P9-P

189 *Morganella morganii*
2099250-2110750
93 *Shigella sonnei*
104 *Citrobacter rodentium*
120 *Vibrio anguillarum*
122 *Legionella pneumophila*
128 *Enterococcus faecium*
2185750-2190750
151 *Yersinia pseudotuberculosis*
163 *Yersinia enterocolitica*
164 *Photothabdus luminescens*
174 *Plesiomonas shigelloides*
177 *Citrobacter rodentium*
2380750-2386250
122 *Yersinia enterocolitica*
124 *Yersinia pseudotuberculosis*
127 *Citrobacter rodentium*
131 *Photothabdus luminescens*
137 *Xenorhabdus nematophilus*
2460250-2463750
151 *Shigella boydii*
152 *Salmonella typhi* pR27-P
152 *Yersinia enterocolitica*
153 Bacteriophage APSE-1
154 *Y enterocolitica* pYVe8081-P
2464750-2469750
126 *Shigella sonnei*
133 *Bacteroides fragilis*
134 *Citrobacter rodentium*
141 *Paenibacillus popilliae*
143 *Yersinia pseudotuberculosis*
2478750-2492750
97 *Yersinia enterocolitica*
100 *Yersinia pseudotuberculosis*

114 *Photothabdus luminescens*
115 *Y enterocolitica* pYVe8081-P
116 *Yersinia enterocolitica* pYVe22-P
2565750-2566250
418* *Serratia marcescens*
2753750-2765250
110 *Yersinia pestis* pCD1-P
112 *Salmonella typhi* pR27-P
113 *Yersinia enterocolitica* pYVe22-P
115 *Y enterocolitica* pYVe8081-P
2770250-2774250
141 *Plesiomonas shigelloides*
141 *Yersinia enterocolitica*
146 *Shigella sonnei*
147 *Citrobacter rodentium*
147 *Yersinia pseudotuberculosis*
2779250-2786250
116 *Shigella sonnei*
126 *Vibrio fischeri*
127 *Citrobacter rodentium*
127 *Proteus mirabilis*
132 *Shewanella hanedai*
2789250-2790250
273* *Pectobacterium chrysanthemi*
2878750-2883750
138 *Salmonella typhi* pR27-P
141 *Yersinia enterocolitica* pYVe22-P
142 *Y enterocolitica* pYVe8081-P
143 *Yersinia pestis* pCD1-P
2899750-2903750
163 *Yersinia enterocolitica*
164 *Yersinia ruckeri*
170 *Yersinia pseudotuberculosis*
172 *Salmonella enterica*

173 *Photothabdus luminescens*
2983250-2995750
115 *Shigella sonnei*
115 *Vibrio fischeri*
124 *Proteus mirabilis*
127 *Staphylococcus carnosus*
128 *Xenorhabdus nematophilus*
3184250-3190750
102 *Yersinia pseudotuberculosis*
111 *Yersinia enterocolitica*
113 *Photothabdus luminescens*
122 *Y enterocolitica* pYVe8081-P
124 *Yersinia enterocolitica* pYVe22-P
3262250-3267750
133 *A actinomycetemcomitans*
144 *Coxiella burnetii*
145 *Coxiella burnetii* pQpRS-P
146 *Coxiella burnetii* pQpDV-P
146 *Citrobacter rodentium*
3286750-3287250
368* *Erwinia carotovora*
3359750-3361250
202 *Shigella boydii*
207 *Salmonella typhi* pR27-P
214 *Yersinia pestis* pCD1-P
216 *Escherichia coli* pR721-P
3447250-3448750
220 *Vibrio proteolyticus*
237* *Salmonella enterica* pHCM2-P
3468750-3470250
278* *Pelobacter acidigallici*
3578250-3582250
123 *Shigella sonnei*
129 *Citrobacter rodentium*

145 *Proteus mirabilis*
 146 *Yersinia pseudotuberculosis*
 155 *Bombyx mori*
 3614250-3620750
 178 *Pantoea agglomerans*
 189 *Pectobacterium chrysanthemi*
 196 *Morganella morganii*
 198 *Erwinia chrysanthemi*
 203 *Klebsiella aerogenes*
 3628750-3633250
 149 *Proteus mirabilis*
 157 *Shigella sonnei*
 165 *Citrobacter rodentium*
 168 *Shewanella hanedai*
 168 *Vibrio fischeri*
 3648750-3655750
 100 *Yersinia pseudotuberculosis*
 103 *Yersinia enterocolitica*
 114 *Citrobacter rodentium*
 115 *Photorhabdus luminescens*
 119 *Shigella sonnei*
 3663250-3664750
 185 *E coli O157-H7 EDL9333*
 186 *E coli O157-H7 0509952*
 194 *Salmonella dublin*
 196 *Citrobacter freundii*
 3759250-3768250
 142 *Escherichia coli* pO157-P
 146 *Shigella flexneri*
 148 Bacteriophage P4
 149 Bacteriophage 933W
 153 *Erwinia amylovora* pEA29-P

3792250-3804750
 118 *Shigella sonnei*
 120 *Proteus mirabilis*
 130 *A actinomycetemcomitans*
 138 *Citrobacter rodentium*
 140 *Staphylococcus aureus* pJ3356-P
 3835250-3835750
 318* Bacteriophage HK620
 4041750-4042250
 301* *Lactobacillus plantarum*
 4059250-4061250
 193 Bacteriophage APSE-1
 193 *Yersinia enterocolitica*
 195 *Photorhabdus luminescens*
 199 *Yersinia pseudotuberculosis*
 201 *Yersinia ruckeri*
 4178250-4185750
 207 *Salmonella enterica* pHCM2-P
 207 *Salmonella typhi* CT18 pHCM2-P
 214 *Yersinia pestis* pMT1-P
 214 *Yersinia pestis* pCD1-P
 226 *Vibrio proteolyticus*
 4218250-4219250
 230 *Shigella sonnei*
 238* *Citrobacter rodentium*
 4312750-4321250
 126 *Klebsiella aerogenes*
 147 *Pectobacterium chrysanthemi*
 164 *Serratia marcescens*
 177 *Xanthomonas campestris*
 178 *Xanthomonas oryzae*
 4356250-4358250

188 *Photorhabdus luminescens*
 192 *Yersinia pseudotuberculosis*
 192 *Yersinia enterocolitica*
 199 *Xenorhabdus nematophilus*
 201 *Yersinia ruckeri*
 4471250-4476250
 149 *Yersinia enterocolitica*
 154 *Citrobacter rodentium*
 155 *Yersinia pseudotuberculosis*
 156 *Salmonella typhi* pR27-P
 159 *Y enterocolitica* pYVe8081-P
 4498750-4505250
 109 *Escherichia coli* pR721-P
 116 *Y enterocolitica* pYVe8081-P
 116 *Yersinia enterocolitica* pYVe22-P
 121 *Shigella flexneri* pvir-P
 4510750-4511750
 261* *Pseudomonas syringae*
 4532750-4541750
 104 *Yersinia pseudotuberculosis*
 113 *Yersinia enterocolitica*
 116 *Photorhabdus luminescens*
 117 *Citrobacter rodentium*
 118 *Xenorhabdus nematophilus*
 4573750-4577250
 120 *Yersinia pseudotuberculosis*
 131 *Citrobacter rodentium*
 133 *Yersinia enterocolitica*
 134 *Shigella sonnei*
 135 *Xenorhabdus nematophilus*

haemophilus influenzae

51750-52750
185 *Prochlorococcus marinus*
206 *Borrelia burgdorferi*
208 *Borrelia burgdorferi* cp32-1-P
209 *Borrelia burgdorferi* cp32-8-P
211 *Borrelia burgdorferi* pcp32-3-P
120250-121250
244* *Mesostigma viride* chloroplast
285750-287250
202 *Staphylococcus hominis*
207 *Odontella sinensis*
210 *Staphylococcus haemolyticus*
212 *Guillardia theta* chloroplast
219 *Staphylococcus aureus* pVRSAP-P
532250-533250
275* *Listeria grayi*

***Helicobacter pylori* J99**

128250-131250
317* *Helicobacter pylori* pHPM8-P
300250-302750
235* *Alteromonas* phage PM2
458750-459750
255* *Helicobacter pylori* pHPM186-P
461250-463750
178 *Helicobacter pylori* pHPM8-P
199 *Helicobacter pylori* pHPM186-P
212 *Carnobacterium alterfunditum*
215 *Borrelia burgdorferi* plp28-2-P
217 *Lactococcus lactis* pCI305-P
466250-466750
320* *Helicobacter pylori* 26695

534750-535250
333* *Pediococcus pentosaceus*
597750-599250
260* *Desulfosporosinus orientis*
839750-841250
216 *Colwellia maris*
243* *Moritella marina*
919250-925250
144 *Staphylococcus aureus* pETB-P
155 *Methanococcus aeolicus*
159 *Staphylococcus aureus* pN315B-P
159 *Mesostigma viride* chloroplast
163 *Staphylococcus aureus* 21kb pl-P
1302250-1303250
338* *Photobacterium profundum*
1561750-1564250

473750-478750
198 *Helicobacter pylori* pHPM8-P
204 *Francisella tularensis* pnovicid-P
204 *Francisella tularensis* pFNL10-P
208 *Helicobacter pylori* pHPM186-P
212 *Borrelia burgdorferi* plp28-2-P
554750-569750
180 *Helicobacter pylori* pHPM186-P
182 *Lactococcus lactis* pSH72-P
194 *Lactococcus lactis* pAH82-P
195 *Helicobacter pylori* pHPM8-P
201 *Bacillus subtilis* pTA1040-P
649750-650250
336* Bacteriophage APSE-1

242* *M haemolytica* pMHSCS1-P
1571250-1589750
159 *Vibrio cholerae* Chr2
160 *Shewanella affinis*
167 *Vibrio vulnificus*
168 *Vibrio cholerae* Chr1
168 Bacteriophage K139
1766750-1769250
198 *Cyanophora paradoxa*
210 *Borrelia burgdorferi*
212 *Cyanidioschyzon merolae*-M
213 *Tribolium castaneum*-M
216 *Mesostigma viride* chloroplast
1806250-1807250
292* *Colwellia maris*

746750-749250
231 *Acinetobacter* sp
231 *Bartonella quintana*
234 *Streptococcus gordonii*
236* *Bacillus pumilus*
967250-968250
340* *Shewanella* sp
981250-984750
236* *Helicobacter pylori* J99
1052250-1060250
200 *Francisella tularensis* pnovicid-P
200 *Francisella tularensis* pFNL10-P
206 *Helicobacter pylori* pHPM8-P
220 *Borrelia burgdorferi* cp32-1-P

221 Plasmid pCD4-P
1064750-1067750
229 *Campylobacter jejuni*
244* *Rhodomonas salina*-M
1068750-1069750
271* *Helicobacter pylori* pHPM8-P

1204750-1205250
395* *Chlorella vulgaris*
1221250-1222750
285* *Alteromonas* phage PM2
1270750-1272250
264* Bacteriophage APSE-1

1594250-1599250
223 *Campylobacter jejuni*
225 *Mycoplasma pulmonis*
230 *Rhodomonas salina*-M
236* *Mycoplasma hyopneumoniae*

Methanobacterium thermoautotrophicum

39250-61250
153 Walleye dermal sarcoma virus
160 Ovine pulmonary adenocarcinoma
virus
163 Ovine enzootic nasal tumour virus
163 Equine foamy virus
164 *Oryza sativa*
256750-264250
182 *Chlamydophila pneumoniae* AR39
182 *Chlamydia pneumoniae* J138
182 *Chlamydia pneumoniae* TW-183
182 *Chlamydia muridarum*
185 *Oenothera elata* chloroplast
267750-277250
142 *Ricinus communis*
153 *Lotus japonicus* Chr3
154 *Glycine max*
155 *Lotus japonicus* Chr6
157 *Lotus japonicus* Chr1
437250-445250

191 *Methanobacterium aarhusense*
231 *Methanobacterium formicicum*
237* *Methanothermobacter wolfeii*
513250-513750
337* *Fusobacterium necrophorum*
580250-581750
222 *Ricinus communis*
236* *Staphylococcus intermedius*
636750-650750
158 Walleye dermal sarcoma virus
161 Mouse adenovirus 2 strain K87
161 Murine hepatitis virus
173 *Perina nuda* picorna-like virus-A
173 Human papillomavirus type 63
831750-841750
100 *Methanobacterium aarhusense*
151 *Methanobacterium formicicum*
173 *Saccharum* sp
177 *Microscilla* sp pSD15-P
180 *Methanothermobacter wolfeii*

978750-994250
285* *Oikopleura longicauda*
1000750-1006750
170 *Methanobacterium aarhusense*
191 *Methanothermobacter wolfeii*
191 *M wolfeii* psiM100-P
197 Northern cereal mosaic virus-A
200 Australian bat lyssavirus
1198250-1198750
340* *Thermoplasma acidophilum*
1471250-1476750
327* *Oikopleura longicauda*
1516750-1517250
330* *Chaetoceros ressum*
1736250-1737750
223 *Mustelus manazo*-M
228 *Sulfolobus acidocaldarius*
228 *Scyliorhinus canicula*-M
229 *Mertensiella luschani*-M
233 Simian foamy virus

Methanococcus jannaschi

207250-209250

271* Hepatitis A virus

769750-776250

187 *Clarkia epilobioides*

196 Tupaia paramyxovirus

197 Human papillomavirus type 65

197 Human papillomavirus type 4

198 Feline syncytial virus

973250-974250

270* *Pyrococcus furiosus*

1001750-1002250

375* *W brevipalpis* pWb1-P

1131250-1136250

165 *Glycine max*

172 *Clarkia epilobioides*

172 *Prochlorococcus marinus*

175 *Mesembryanthemum crystallinum*

176 Lake Victoria marburgvirus

1158750-1159250

338* *Riemerella anatipestifer* pCFC1-P

1344250-1344750

321* Variola major virus

Mycobacterium tuberculosis

332250-340750

430* *Frankia* sp. CpI1 pFQ12-P

360250-364250

299* *Frankia* sp. CpI1 pFQ12-P

366750-374750

362* *Mycobacterium marinum*

424250-434250

409* *Aeromonas* sp. 10S-24

483250-485750

196 *Mycobacterium leprae*

204 *M methylotropha*

205 *Agrobacterium agile*

207 *Arcanobacterium pyogenes*

207 *A tumefaciens* pTi-SAKURA-P

621750-626250

274* *Streptomyces noursei*

670750-676750

364* *Frankia* sp. CpI1 pFQ12-P

744250-747750

232 *Frankia* sp. CpI1 pFQ12-P

252* *Actinosynnema pretiosum*

834750-842250

336* *Frankia* sp. CpI1 pFQ12-P

924250-931250

365* *Frankia* sp. CpI1 pFQ12-P

966750-967750

236* *Mycobacterium tuberculosis*

1089250-1094750

298* *Streptomyces noursei*

1102750-1105750

183 *Xylella fastidiosa*

194 *Alcanivorax borkumensis*

195 *Alcaligenes faecalis*

196 *Corynebacterium diphtheriae*

197 *Thiobacillus aquaesulis*

1186750-1192250

439* *Frankia* sp. CpI1 pFQ12-P

1210250-1220250

331* *Streptomyces ambofaciens*

1385750-1386250

517* *Frankia* sp. CpI1 pFQ12-P

1487250-1490750

303* *Streptomyces ambofaciens*

1572250-1575250

323* *Frankia* sp. CpI1 pFQ12-P

1618250-1620750

412* *Frankia* sp. CpI1 pFQ12-P

1629250-1638750

341* *Frankia* sp. CpI1 pFQ12-P

1691250-1697250

112 *A tumefaciens* pTi-SAKURA-P

118 *Agrobacterium tumefaciens* pTi-P

120 *Oligotropha carboxidovorans*

123 *Burkholderia* sp. RP007

124 *Agrobacterium agile*

1862250-1866750

333* *Rhodocista pekingensis*

1988750-1993250

357* *Frankia* sp. CpI1 pFQ12-P

2043750-2044750

226 *Mycobacterium tuberculosis*

226 *M tuberculosis* H37RV

232 *Methylobacter bovis*

244* *Mycobacterium avium*
2059750-2062250
329* *Streptomyces ambofaciens*
2163750-2168750
298* *Mycobacterium leprae*
2321750-2322250
320* *Amycolatopsis mediterranei*
2358750-2359250
329* *Bordetella pertussis*
2419250-2425750
217 *Frankia* sp. CpI1 pFQ12-P
225 *Streptomyces ambofaciens*
234 *Streptomyces noursei*
251* *Streptomyces fradiae*
2614750-2615250
316* *Sphingomonas* sp

Pyrococcus abyssi

1142250-1148750
126 *Nicotiana tabacum*
140 *Nicotiana glauca*
143 *Psilotum nudum*

Pyrococcus furiosus

2250-4750
138 *Clostridium histolyticum*
145 *Sulfolobus tokodaii*
167 *Clostridium acetobutylicum*
167 *Porphyra pulchra* pl Pp6859-P
177 *Clostridium difficile*
26750-30250
385* *Triticum aestivum*

2636250-2637250
212 *Mycobacterium microti*
226 *Mycobacteriophage Bxb1*
234 *Mycobacterium bovis*
237* *Rhodococcus* sp. CIR2
2794250-2798250
305* *Streptomyces noursei*
2800250-2806250
390* *Frankia* sp. CpI1 pFQ12-P
2959750-2962750
367* *Frankia* sp. CpI1 pFQ12-P
3052750-3056750
278* *Rhodocista pekingensis*
3119750-3125750
134 *Mycobacterium canettii*
188 *Mycobacterium microti*

143 *Psilotum nudum* chloroplast
144 *Lotus japonicus*
1616250-1627250
138 *Sulfolobus solfataricus*

203250-203750
329* *Xiphophorus maculatus*
671750-673750
214 *Thermococcus fumicolans*
236* *Pyrococcus abyssi*
695250-699250
346* *Sulfolobus islandicus* pHEN7-P
701250-714250

237* *Cucumaria salma*-A
3478750-3479750
251* *Oligotropha carboxidovorans*
3730250-3752250
340* *Mycobacterium tuberculosis*
3757250-3766250
351* *Mycobacterium tuberculosis*
3777250-3782250
258* *Streptomyces thermoviolaceus*
3800750-3805250
346* *Frankia* sp. CpI1 pFQ12-P
3925250-3951750
539* *Frankia* sp. CpI1 pFQ12-P
4030250-4034250
276* *Streptomyces ambofaciens*

146 *Sulfolobus shibatae*
147 *Psilotum nudum*
147 *Psilotum nudum* chloroplast
160 *Acidianus ambivalens*

163 *Archaeoglobus fulgidus*
170 *Thermococcus fumicolans*
174 *Pyrococcus glycovorans*
185 *Pyrococcus abyssi*
190 *Thermococcus hydrothermalis*
723750-727750
169 *Thermococcus fumicolans*
173 *Thermococcus hydrothermalis*

179 *Pyrococcus abyssi*
197 *Thermococcus zilligii*
204 *Thermococcus kodakaraensis*
775750-783250
135 *Listeria innocua* pLI100-P
135 *Schizosaccharomyces pombe*
141 *Streptococcus thermophilus*
143 *Chlamydia muridarum* pMoPn-P
143 *Arabidopsis thaliana*

787250-789750
203 *Pyrococcus abyssi*
217 *Pyrococcus glycovorans*
232 *Thermococcus acidaminovorans*
257* *Pyrococcus horikoshii*
1152250-1152750
355* *Megaceros aenigmaticus*
1354750-1356250
280* *Struthio camelus*

1699750-1700250
290* *Pyrococcus furiosus*
1899250-1905750
138 *Cryptosporidium parvum*
140 *Lycopersicon esculentum*
144 *Solanum tuberosum*
146 *Bacillus thuringiensis*
146 *Bacillus anthracis*

Pyrococcus horikoshii

347250-348750
259* *Pyrococcus abyssi*
382250-387250
125 *Clostridium beijerinckii*
132 *Bacillus anthracis* pPX01-P
133 *Cryptosporidium parvum*
136 *Porphyra purpurea*
142 *Clostridium acetobutylicum*
390250-392750

177 *Bacillus anthracis*
177 *Bacillus thuringiensis*
184 *Psilotum nudum*
184 *Psilotum nudum* chloroplast
184 *M thermolithotrophicus*
489750-492250
243* *Ehrlichia platys*
493750-499750
205 *Pyrococcus abyssi*

209 *Pyrococcus glycovorans*
228 *Thermococcus acidaminovorans*
253* *Balanoglossus carnosus*-M
933250-938750
423* *Oryza sativa* mit plB1-PM
1068250-1068750
299* *Cyprinodon macularius*

Rickettsia prowazekii

30250-31750
244* *Borrelia burgdorferi* plp38-P
91750-92750
195 *Borrelia burgdorferi* plp56-P
199 *Borrelia burgdorferi* plp36-P
208 *Borrelia burgdorferi* plp38-P
209 *Borrelia burgdorferi* plcp18-2-P
212 *Borrelia burgdorferi* pcp32-3-P
163250-167250
152 *Clostridium saccharobutylicum*

153 *S aureus* phage phi 12
156 *Streptococcus agalactiae*
157 *Porphyra purpurea*
159 *S aureus* phage phiSLT
426750-428750
192 *Prototheca wickerhamii*-M
202 *Clostridium botulinum*
209 *Gracilaria robusta* pGro4970-P
209 *Tetradontophora bielensis*-M
209 *Rhizophyidium* sp.136 mit-M

534250-534750
306* *Rickettsia rickettsii*
556250-559750
256* *Plasmodium reichenowi*-M
815750-816750
258* *F nucleatum* pKH9-P
882250-886250
229 Israeli tick typhus *rickettsia*
232 *Rickettsia japonica*
232 *Astrakhan rickettsia*

232 *Rickettsia africae*
232 *Rickettsia aeschlimannii*

892750-893750
258* *Francisella tularensis*

1005750-1006250
269* *Rickettsia conorii*

***Synechocystis* sp PCC6803**

22250-30750

141 *Lactobacillus gasseri*
144 *Pachysolen tannophilus*
150 *Lactobacillus helveticus* pLH1-P
150 *Debaryomyces occidentalis*
151 *Legionella longbeachae*

102750-107750

136 *Prochlorococcus marinus*
137 *Lactobacillus lactis* pl-P
137 *Lactococcus lactis* pK214-P
139 *Lactococcus lactis* pNZ4000-P
143 *Cyanidium caldarium* chloroplast

250750-255250

150 *Microcystis aeruginosa*
159 *Legionella pneumophila*
160 *Pasteurella aerogenes*
160 *Nostoc punctiforme*
160 *Enterococcus faecalis*

359250-381750

101 *Legionella longbeachae*
110 *Streptococcus thermophilus*
114 *Lactobacillus helveticus* pLH1-P
116 *Legionella pneumophila*
116 *Schizosaccharomyces pombe*

473750-477750

155 *Lactococcus lactis*
156 *Dirofilaria immitis*
160 *Listeria innocua* pLI100-P
161 Bacteriophage bIL285

165 *S thermophilus* pER35-P
497750-499750
222 *Nostoc punctiforme*
222 *Nostoc* sp. pCC7120 pepsilon-P
228 *Nostoc* sp. pCC7120 pbeta-P
228 *Nostoc* sp. PCC 7120
229 *Anabaena* PCC7120

513750-515250

199 *Lactococcus lactis*
200 *Streptococcus mutans*
204 *Legionella longbeachae*
205 *Streptococcus thermophilus*

525250-529750

278* *Coccoltrema pocillarium*

572750-575250

159 *Streptococcus agalactiae*
161 *Cyanidium caldarium* chloroplast
162 *Legionella longbeachae*
166 *Listeria innocua* pLI100-P
167 *Lactococcus* phage BK5-T

588250-592250

270* *Pseudomonas* sp. KFCC10818

650250-650750

346* *Anabaena* sp. strain ATCC29413

660250-664750

151 *Microcystis aeruginosa*
152 *Nostoc punctiforme*
166 *Anabaena* PCC7120
168 *Nostoc* sp. PCC 7120

171 *Nostoc* sp. pCC7120 pbeta-P

716250-719750

173 *Legionella longbeachae*
173 Bacteriophage bIL286
174 *Lactobacillus helveticus* pLH1-P
175 Bacteriophage bIL309
178 *Lactobacillus gasseri*

784250-788750

150 *Legionella longbeachae*
173 *Candida boidinii*
173 *Lactobacillus helveticus* pLH1-P
174 *Methanococcus maripaludis*
175 *P pentosaceus* pMD136-P

855750-858250

212 *Synechocystis* sp
241* *Geosmithia argillacea*-A

895250-897750

186 *Synechocystis* sp PCC6803
226 *Nostoc* sp. PCC 7120
227 *Microcystis aeruginosa*
228 *Anabaena variabilis*
230 *Nostoc punctiforme*

899250-900250

263* *Lactobacillus gasseri*

919250-920750

210 *Lactobacillus gasseri*
217 *Pachysolen tannophilus*
217 *Microcystis aeruginosa*
221 *Enterococcus faecalis*

221 *Legionella pneumophila*
967250-967750
306* *Echinococcus multilocularis*-M
1000250-1003750
197 *Nostoc punctiforme*
200 *Nostoc* sp. PCC 7120
203 *Legionella pneumophila*
204 *Anabaena* PCC7120
204 *Nostoc* sp. pCC7120 pepsilon-P
1111750-1112250
311* *Tupaia paramyxovirus*
1127250-1127750
352* *Synechocystis* sp
1197750-1205250
161 *Lactobacillus gasseri*
162 *Legionella longbeachae*
169 *Francisella tularensis*
170 *Legionella pneumophila*
171 *Lactobacillus helveticus* pLH1-P
1291250-1296750
152 *Microcystis aeruginosa*
154 *Legionella pneumophila*
156 *Prochlorococcus marinus*
157 *Streptococcus thermophilus*
158 *Streptococcus mutans*
1367750-1371250
161 *Microcystis aeruginosa*
162 *Pasteurella haemolytica*
168 *Lactobacillus gasseri*
168 *Dendroctonus jeffreyi*
173 *Lactobacillus helveticus* pLH1-P
1374250-1383250
135 *Lactobacillus helveticus* pLH1-P
135 *Enterococcus faecalis*

140 *Lactococcus lactis*
143 *Legionella longbeachae*
143 Bacteriophage bIL309
1422250-1426750
251* *Aureobasidium pullulans*
1553750-1555250
218 *Psilotum nudum*
218 *Psilotum nudum* chloroplast
223 *Triticum aestivum*
227 *Clostridium sticklandii*
228 *Chlamydia trachomatis* pCHL1-P
1614750-1617250
187 *Psilotum nudum*
187 *Psilotum nudum* chloroplast
193 *Listeria innocua* pLI100-P
193 *Clostridium sticklandii*
196 *Sulfolobus shibatae*
1621750-1633250
109 *Legionella longbeachae*
115 *Listeria innocua* pLI100-P
118 *Lactobacillus helveticus* pLH1-P
119 Bacteriophage bIL285
120 Bacteriophage bIL309
1638250-1640250
169 *Microcystis aeruginosa*
172 *Lactobacillus helveticus* pLH1-P
180 *Streptococcus uberis*
182 *Lactobacillus gasseri*
183 Chlorarachnion CCMP1408
1647750-1651250
142 *Lactococcus lactis*
150 *Streptococcus thermophilus*
150 Bacteriophage bIL285
151 Bacteriophage bIL309

153 *Streptococcus mutans*
1725250-1730750
153 *Legionella longbeachae*
159 Bacteriophage bIL309
160 *Listeria innocua* pLI100-P
161 *Cyanidium caldarium* chloroplast
162 *Lactococcus* phage BK5-T
1801750-1804750
184 *Pasteurella haemolytica*
190 *Legionella pneumophila*
193 *Pasteurella aerogenes*
197 *Microcystis aeruginosa*
199 *Mannheimia haemolytica*
1809750-1813250
187 *Lepidosiren paradoxa*-M
187 *Lactobacillus gasseri*
190 *Microcystis aeruginosa*
198 *Legionella pneumophila*
198 *Debaryomyces occidentalis*
1878750-1880250
194 *Microcystis aeruginosa*
201 *Decumaria barbara*
202 *Delarbrea michieana*
203 *Microcystis aeruginosa*
203 *Eucnide bartonioides*
1899750-1900250
310* *Synechocystis* sp
1923750-1926250
173 *Lactococcus lactis* pNZ4000-P
175 *Carnobacterium alterfunditum*
175 *Prochlorococcus* sp
181 *Lactobacillus lactis* pl-P
181 *Lactococcus lactis* pK214-P
1962250-1965750

156 *Prochlorococcus marinus*
173 *Streptococcus thermophilus*
174 *Streptococcus mutans*
175 *Streptococcus pneumoniae*
176 *Acinetobacter* sp SUN pIRAY-P
1969750-1973750
152 *Nicotiana tabacum*
156 *Nicotiana glauca*
160 *Lotus japonicus* Chr1
161 *Lotus japonicus* Chr2
162 *Cyprinodon macularius*
2050250-2051750
225 *Microcystis aeruginosa*
227 *Smittium mucronatum*-A
231 *Desulfitobacterium dehalogenans*
235* *Micrococcus lylae*
2058250-2061750
174 *Nostoc punctiforme*
174 *Microcystis aeruginosa*
182 *Nostoc* sp. pCC7120 pepsilon-P
183 *Pasteurella aerogenes*
183 *Nostoc* sp. PCC 7120
2081750-2085750
158 *Microcystis aeruginosa*
159 *Nostoc* sp. pCC7120 pgamma-P
161 *Nostoc* sp. pCC7120 pbeta-P
161 *Nostoc punctiforme*
163 *Anabaena* PCC7120
2126250-2126750
336* *Barleria prionitis*
2276750-2277750
272* *Pachysolen tannophilus*
2325750-2328750
145 *Streptococcus thermophilus*

151 Bacteriophage bIL309
153 *Schizosaccharomyces pombe*
154 *Listeria innocua* pLI100-P
155 *Prochlorococcus marinus*
2352250-2364250
321* *Penicillium funiculosum*
2442750-2446750
165 *Nicotiana tabacum*
165 *Triticum aestivum*
165 *Microcystis aeruginosa*
166 *Psilotum nudum*
166 *Psilotum nudum* chloroplast
2520250-2521250
223 *S cerevisiae* narnavirus
225 *Streptococcus suis*
226 *Caenorhabditis vulgare*
227 *Candida albicans*
227 *Candida dubliniensis*
2754250-2759750
143 Bacteriophage Tuc2009
144 Bacteriophage bIL309
145 *Microcystis aeruginosa*
145 *Prochlorococcus marinus*
146 *Streptococcus thermophilus*
2772750-2773250
311* *Dendroctonus jeffreyi*
2784750-2790750
140 *Streptococcus mutans*
142 *Francisella tularensis*
147 *Lactobacillus helveticus* pLH1-P
148 *Legionella longbeachae*
2816750-2817750
250* *Pachysolen tannophilus*
2999250-3000250

263* *Synechocystis* sp
3025250-3027250
209 *Nostoc* sp. PCC 7120
210 *Anabaena* PCC7120
211 *Nostoc* sp. pCC7120 pbeta-P
212 *Anabaena variabilis*
213 *Microcystis aeruginosa*
3032750-3042750
135 *Vibrio cholerae* Chr2
138 *Vibrio cholerae* Chr1
138 Bacteriophage HK620
147 Bacteriophage P22-pbi
147 *Plectonema boryanum*
3073250-3073750
342* Bacteriophage APSE-1
3080750-3083750
159 *Lactobacillus gasseri*
172 *Lactobacillus* phage phi adh
174 *Lactococcus* phage BK5-T
177 Bacteriophage bIL286
177 *Prochlorococcus marinus*
3093750-3104750
134 *Enterococcus faecalis*
136 *Coxiella burnetii*
141 *Coxiella burnetii* pQpRS-P
147 *Coxiella burnetii* pQpDV-P
149 *Coxiella burnetii* pQpH1-P
3108750-3111750
169 *Schizosaccharomyces pombe*
169 *Listeria innocua* pLI100-P
170 Bacteriophage bIL309
171 *Streptococcus thermophilus*
172 Bacteriophage bIL285
3146750-3147750

307* *Synechocystis* sp
3400250-3404250
158 *Microcystis aeruginosa*
163 *Pasteurella aerogenes*
164 *Nostoc punctiforme*
164 *Pasteurella haemolytica*
169 *Coxiella burnetii*
3441750-3450750
136 *Microcystis aeruginosa*

Thermotoga maritima

2250-4250
255* *Thermotoga maritima*
318250-325250
171 Shrimp white spot syndrome virus
172 Shrimp white spot syndrome virus
180 *Chlamydophila pneumoniae*
182 *Thermococcus litoralis*
185 *Chlamydia muridarum*
408250-412250
290* *Solanum berthaultii*
451250-456250
168 *Encephalitozoon cuniculi* Chr2
169 *Botryotinia fuckeliana*
171 *Oculimacula yallundae*
172 *Encephalitozoon cuniculi* Chr9
626250-629750
248* *Thermotoga* sp FjSS3-B.1
634250-634750
323* *Thermotoga* sp FjSS3-B.1
647250-667250
145 *S cerevisiae* narnavirus
155 *Saccharomyces bayanus*

152 *Enterococcus faecalis*
156 *Legionella pneumophila*
160 *Coxiella burnetii*
162 *Coxiella burnetii* pQpRS-P
3483750-3488750
155 *Lactococcus lactis*
158 Bacteriophage bIL309
159 *Lactobacillus gasseri*
163 Bacteriophage bIL285

156 *Caenorhabditis briggsae*
158 *Enterococcus hirae*
159 *Enterococcus faecium*
671250-673750
219 *Thermotoga* sp FjSS3-B.1
222 *Thermotoga neapolitana*
260* *Thermotoga maritima*
779250-783750
193 *Caenorhabditis briggsae*
221 *Caenorhabditis vulgarensis*
231 *Bacillus subtilis* p1414-P
232 *Enterococcus hirae*
233 *S thermophilus* pER35-P
967250-968250
250* *Thermotoga maritima*
971250-976750
154 *Chlamydophila pneumoniae*
161 *Pichia pastoris*
162 *Pichia acaciae*
164 *Chlamydia trachomatis*
167 Shrimp white spot syndrome virus
987750-988750

164 *Oenococcus oeni*
3511250-3514750
154 *Triticum aestivum*
155 *Nicotiana tabacum*
156 *Nicotiana glauca*
161 *Zea mays*
162 *Oryza sativa*

258* *Thermotoga maritima*
1010750-1017750
176 *Streptococcus mitis*
176 *Chlamydia trachomatis*
177 *Kluyveromyces fragilis*
178 Shrimp white spot syndrome virus
178 Shrimp white spot syndrome virus
1078750-1084250
163 *Pichia pastoris*
163 *Pichia acaciae*
164 Shrimp white spot syndrome virus
165 Shrimp white spot syndrome virus
166 Banana streak virus
1194750-1195750
314* *Thermotoga maritima*
1203250-1207250
182 *Chlamydia muridarum* pMoPn-P
190 *Chlamydia trachomatis* pCHL1-P
191 *Fagopyrum esculentum*
194 *Chlamydia trachomatis* pl-P
194 *Cucurbita moschata*
1219250-1219750

336* <i>Fagus sylvatica</i>	1348750-1357250	1722750-1729750
1310250-1313250	200 Strawberry vein banding virus	162 <i>Oryza sativa</i>
200 <i>Caenorhabditis briggsae</i>	201 Shrimp white spot syndrome virus	164 <i>Chlamydia muridarum</i>
210 <i>Caenorhabditis vulgaris</i>	201 <i>Chlamydophila pneumoniae</i> AR39	166 Shrimp white spot syndrome virus
214 <i>Enterococcus hirae</i>	202 <i>Chlamydia pneumoniae</i> J138	167 <i>Zea mays</i>
215 <i>Streptococcus constellatus</i>	202 <i>Chlamydia pneumoniae</i> TW-183	167 Shrimp white spot syndrome virus
216 <i>Enterococcus faecium</i>	1359250-1361250	1764750-1767250
1324250-1338750	242* <i>Thermococcus</i> sp	241* <i>Leptospira biflexa</i>
173 Shrimp white spot syndrome virus	1421250-1427250	1769750-1774250
174 Shrimp white spot syndrome virus	197 <i>Thermotoga maritima</i>	211 <i>Thermotoga maritima</i>
179 <i>Chlamydia trachomatis</i>	222 <i>Leptospira biflexa</i>	262* <i>Thermotoga neapolitana</i>
181 <i>Chlamydophila pneumoniae</i> AR39	228 <i>Caenorhabditis briggsae</i>	1779750-1782250
181 <i>Chlamydia pneumoniae</i> J138	235* <i>Chlamydia trachomatis</i>	256* Shrimp white spot syndrome virus
1340250-1344250	1577250-1579250	1787750-1790250
205 <i>Thermotoga maritima</i>	230 <i>Pichia pastoris</i>	227 <i>Thermotoga maritima</i>
212 Shrimp white spot syndrome virus	234 <i>Botryotinia fuckeliana</i>	267* <i>Thermotoga neapolitana</i>
213 Shrimp white spot syndrome virus	237* <i>Lentinula edodes</i>	
218 <i>Leptospira biflexa</i>	1622250-1626750	
220 Banana streak virus	255* <i>Thermotoga maritima</i>	