

Table S1. Whole SNP candidates among tested *B. anthracis* strains

Ames 0581 <sup>a</sup>		strains												Gene	Synonym	Product					
Target	Position	Ames0581	Ames	Stern	Tsankovskii <sup>b</sup>	A0174	A0183	A0389	A0442	A0465	A0488	A0105	A0212	Australasia4	CNEVA90066	Kruger_B	Volum	USA6153	BA103	BA104	
Chromosome	72	T	T	T	T	T	T	G	G	T	G	T	T	G	G	T	T	T	T	T	
Chromosome	187	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	C
Chromosome	1854	C	C	C	C	T	T	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Chromosome	1972	A	A	A	A	A	A	A	A	A	G	A	A	A	A	A	A	A	A	A	dnan-1
Chromosome	1993	T	T	T	T	T	T	T	T	T	C	T	T	T	T	T	T	T	T	T	GBAA0002
Chromosome	2096	C	C	C	C	C	C	T	C	C	C	C	C	C	C	C	C	C	C	C	GBAA0002
Chromosome	2753	T	T	T	T	T	T	C	T	T	T	T	T	T	C	T	T	T	T	T	dnan-1
Chromosome	4190	G	G	G	G	G	G	G	G	G	G	T	G	G	G	G	G	G	G	G	recF
Chromosome	4429	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	recF
Chromosome	15196	A	A	A	A	A	A	G	G	A	A	A	G	G	A	A	A	A	A	A	GBAA0004
Chromosome	15268	C	C	C	C	C	C	C	T	C	C	C	C	C	C	C	T	C	C	C	guAB
Chromosome	15498	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	GBAA0008
Chromosome	18989	A	A	A	A	A	A	A	A	A	A	G	A	A	A	A	A	A	A	A	-
Chromosome	23173	A	A	A	A	A	A	A	G	G	A	A	A	G	G	A	A	A	A	A	GBAA0011
Chromosome	24149	G	G	G	G	G	G	G	G	G	T	G	G	G	G	G	G	G	G	G	deoxyribonuclease kinase family protein
Chromosome	27093	A	A	A	A	A	A	A	A	A	C	A	A	A	A	A	A	A	A	A	GBAA0016
Chromosome	27910	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	isochorismatase family protein
Chromosome	35039	G	G	G	G	G	G	G	A	A	G	A	G	G	A	G	G	G	G	G	cad-1
Chromosome	37026	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	holB
Chromosome	39396	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	-
Chromosome	40930	C	C	C	T	T	C	C	C	C	C	C	C	C	C	C	T	C	C	C	abrB
Chromosome	41872	A	A	A	A	A	A	A	A	A	G	A	A	A	A	G	A	A	A	A	metG
Chromosome	43813	C	C	C	C	C	C	C	C	C	T	C	C	C	C	C	C	C	C	C	-
Chromosome	45527	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	ksgA
Chromosome	48627	T	T	C	C	C	T	C	C	C	C	T	C	C	C	C	C	T	C	T	ispE
Chromosome	49002	T	T	T	T	T	T	T	C	T	T	T	T	T	T	C	T	T	T	T	-
Chromosome	52920	C	C	C	C	C	C	C	T	C	T	C	T	C	T	C	C	C	C	C	prs
Chromosome	55501	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	mfd
Chromosome	56775	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	GBAA0052
Chromosome	58628	G	G	G	G	G	G	G	A	G	G	G	G	G	G	G	G	G	G	G	spoVT
Chromosome	59062	A	A	A	G	A	A	A	A	A	A	A	A	A	A	A	G	A	A	A	-
Chromosome	59588	G	G	G	G	G	G	A	G	G	G	G	G	G	G	G	G	G	G	G	-
Chromosome	59763	G	G	G	G	G	G	T	G	G	G	G	G	T	G	G	G	G	G	G	-
Chromosome	61899	A	A	A	A	A	A	A	G	A	A	A	A	A	A	G	A	A	A	A	-
Chromosome	63100	T	T	T	T	T	T	C	T	T	T	T	T	T	C	T	T	T	T	T	-
Chromosome	64841	A	A	A	A	A	A	A	G	A	A	A	A	A	A	A	G	A	A	A	-
Chromosome	67135	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	spolE
Chromosome	67744	A	A	A	A	A	A	A	A	A	G	A	A	A	A	A	A	A	A	A	-
Chromosome	68849	C	C	C	C	C	C	C	C	C	T	C	C	C	C	C	C	C	C	C	-
Chromosome	69952	T	T	T	T	T	T	T	C	T	T	T	T	T	T	T	T	T	T	T	ftsH
Chromosome	70057	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	ftsH
Chromosome	70343	T	T	T	T	T	T	T	T	T	C	T	T	T	T	T	T	T	T	T	ftsH
Chromosome	73192	C	C	C	C	C	C	C	T	C	T	C	T	C	T	C	C	C	C	C	hslQ
Chromosome	74252	A	A	A	A	A	A	A	G	A	G	A	A	G	A	A	G	A	A	A	cysK-1
Chromosome	76281	T	T	T	T	T	T	T	T	T	G	T	T	T	T	T	T	T	T	T	paba-1
Chromosome	78982	T	T	T	T	T	T	C	C	T	C	T	T	C	C	T	T	T	T	T	-
Chromosome	80366	A	A	A	A	A	A	A	A	A	G	A	A	A	A	A	A	A	A	A	GBAA0075
Chromosome	87761	C	C	C	C	C	C	C	C	C	T	C	C	C	C	C	C	C	C	C	ctsR
Chromosome	87851	T	T	T	T	T	T	T	T	C	T	T	T	T	T	T	T	T	T	T	-
Chromosome	88730	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	-
Chromosome	92149	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	-
Chromosome	93584	A	A	A	A	A	A	A	G	A	G	A	A	G	A	A	A	A	A	A	radA
Chromosome	93736	C	C	C	T	T	C	T	T	T	C	T	T	T	T	T	C	T	T	T	GBAA0082
Chromosome	94105	C	C	C	C	C	C	C	C	C	T	C	C	C	C	C	C	C	C	C	GBAA0082
Chromosome	97289	T	T	T	T	T	T	T	C	T	C	T	T	C	G	T	T	T	T	T	-
Chromosome	97542	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	gltX
Chromosome	97988	A	A	A	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	gltX
Chromosome	99187	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	-
Chromosome	100129	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	cysS
Chromosome	100669	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	cysS
Chromosome	107960	A	A	A	A	A	A	A	G	A	A	A	A	A	A	A	A	A	A	A	-
Chromosome	108179	T	T	T	T	T	T	T	C	T	C	T	T	T	T	T	C	T	T	T	-
Chromosome	109756	G	G	G	G	G	G	G	G	G	T	G	G	G	G	G	G	G	G	G	rpoB
Chromosome	111199	A	A	A	A	A	A	A	A	G	A	A	A	A	G	A	A	A	A	A	GBAA0102
Chromosome	111697	A	A	A	A	A	A	A	A	A	G	A	A	A	A	A	A	A	A	A	GBAA0102
Chromosome	113528	T	T	T	T	T	T	T	C	T	T	C	T	T	T	T	T	T	T	T	rpoC
Chromosome	113875	C	C	C	C	C	C	C	C	C	T	C	C	C	C	C	C	C	C	C	GBAA0103
Chromosome	114018	A	A	A	A	A	A	A	A	A	G	A	A	A	A	A	A	A	A	A	GBAA0103
Chromosome	114215	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	GBAA0103
Chromosome	114373	T	T	T	T	T	T	T	T	T	G	T	T	T	T	T	T	T	T	T	rpoC
Chromosome	114706	A	A	A	A	A	A	A	G	A	A	A	A	A	A	A	A	A	A	A	GBAA0103
Chromosome	155676	T	T	T	T	T	T	T	T	T	C	T	T	T	T	T	T	T	T	T	-
Chromosome	155939	G	G	G	G	G	G	G	G	G	T	G	G	G	G	G	G	G	G	G	GBAA0156
Chromosome	157516	A	A	A	A	A	A	A	G	A	A	A	G	G	A	A	A	A	A	A	-
Chromosome	157707	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	GBAA0158
Chromosome	157847	C	C	C	C	C	C	C	C	C	T	C	C	C	C	C	C	C	C	C	GBAA0158
Chromosome	158647	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	glmS
Chromosome	159055	C	C	C	C	C	C	T	C	C	C	C	C	C	C	C	C	C	C	C	glmS
Chromosome	160374	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	GBAA0160
Chromosome	160584	C	C	C	C	C	C	C	T	C	T	C	C	T	T	C	C	C	C	C	gntR
Chromosome	161506	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	GBAA0161
Chromosome	166700	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	-
Chromosome	170344	T	T	T	T	T	T	T	T	T	G	T	T	T	T	T					

Chromosome	226778	G G G G G G G T G G G G G G G T G G G G G G	-	GBAA0244	major facilitator family transporter
Chromosome	230611	C C C C C C C T C C C C C C C T C C C C C	-	GBAA0244	major facilitator family transporter
Chromosome	231058	A A A A A A A A A A A A G G A A A A A A G G A A A A	-	GBAA0244	major facilitator family transporter
Chromosome	232823	A A A A A A A A A A A A A G G A A A A A A G G A A A A	murF	GBAA0246	UDP-N-acetylglucosaminyl-D-glutamyl-2,6-diaminopimelate-D-alanyl I-D-alanyl ligase
Chromosome	236286	A A A A A A A A A A A A A G G A A A A A A G G A A A A	-	GBAA0247	DEAD-box ATP dependent DNA helicase
Chromosome	236311	T T	-	GBAA0247	DEAD-box ATP dependent DNA helicase
Chromosome	236522	C C C C C C C C C C C C C T C C C C C C C C C	uvsE	GBAA0248	putative UV damage endonuclease
Chromosome	237471	T T T T G G T T T T T T T T T T T T T G T T T	-	GBAA0249	rhomboid family protein
Chromosome	237521	C C C C C C C C T C T C C T C C T C C C C C	-	GBAA0249	rhomboid family protein
Chromosome	240050	T T C T T T T T T T T T T T T T T T T T T T	dal-1	GBAA0252	alanine racemase
Chromosome	241548	T T T T T T T T T T C T T T T T T T T T T T T	-	GBAA0254	PemR family transcriptional regulator
Chromosome	243353	G G G G G G G G G G G G G A G G G G G G G G G G G	-	GBAA0255	s1 RNA-binding domain-containing protein
Chromosome	243867	C C T T T T T T T T T C T T T T T T T T T T	-	GBAA0255	s1 RNA-binding domain-containing protein
Chromosome	244369	A A A A A A A A A A A A G G A A A A A A G G A A A A	-	GBAA0256	O-sialoglycoprotein endopeptidase
Chromosome	250369	C C C C C C C C C C T C C C C C C C T C C C C C	gcP	GBAA0261	ABC transporter ATP-binding protein
Chromosome	254568	C C C C C C C C C T C C C C C C C C C C C C	-	GBAA0262	redox-sensing transcriptional repressor Rex
Chromosome	256572	C C C C C C C G T T C C C C C C C T C C C C	-	GBAA0263	redox-sensing transcriptional repressor Rex
Chromosome	257099	A A A A A A A A A A A A G A A A A A A A G A A A A A	-	GBAA0263	chaperonin GroEL
Chromosome	259542	C C C C C T C C C C C C C C C C C C C C C C	groEL	GBAA0267	chaperonin GroEL
Chromosome	259567	A A A A A A A A A A A A G A A A A A A A G A A A A A	groEL	GBAA0267	chaperonin GroEL
Chromosome	259569	T T T T A T T T T T T T T T T T T T T T T T	groEL	GBAA0267	chaperonin GroEL
Chromosome	332628	C C C C C C C C C T C C C C C C C C C C C C	gabT	GBAA0285	4-aminobutyrate aminotransferase
Chromosome	332804	T T T T T T T T T T T T C T T T T T T T T T T	gabT	GBAA0325	4-aminobutyrate aminotransferase
Chromosome	335353	A A A A A G A A A A A A A A A A A A A A A A A A	gabT	GBAA0325	4-aminobutyrate aminotransferase
Chromosome	337241	T T C C C C C C C C C C T C C C C C C C C C	amps	GBAA0329	aminopeptidase AmpS
Chromosome	346846	C C C C C C C C C C C G C C C C C C C C C C	-	GBAA0337	hypothetical protein
Chromosome	346847	G G	-	GBAA0337	hypothetical protein
Chromosome	350432	C C C C C T C C C C C C C C C C C C C C C C	-	GBAA0340	transcriptional regulator domain-containing protein
Chromosome	351960	T T T T T T T T T T C T T T T T T T T T T T	nhaC-1	GBAA0341	NarV/Hv+ antipporter NhaC
Chromosome	352432	A A A A A A A A A A A A G G A A A A A A G G A A A A	-	GBAA0348	L-fucose phosphate aldolase
Chromosome	356626	T T	-	GBAA0349	iron compound ABC transporter, permease protein
Chromosome	359536	G G A A A A A A A A A A A A G A A A A A A A A A A A	-	GBAA0351	iron compound ABC transporter, iron compound-binding protein
Chromosome	360092	A A A A A A A A A A A A A G A A A A A A A A A A A	-	GBAA0352	pyridine nucleotide-disulfide oxidoreductase family protein
Chromosome	362375	C C C C T T C C C C C C C C C C C C C C C C	-	GBAA0352	-
Chromosome	364023	C C	-	GBAA0352	-
Chromosome	364527	T T T G G G T G G G G T G G G G T G G G G T T	-	GBAA0358	hypothetical protein
Chromosome	365204	A G	-	GBAA0360	hypothetical protein
Chromosome	365960	C C C C C C C C C C T C T C C T C C T C C C C	-	GBAA0360	hypothetical protein
Chromosome	367738	T T T T T T T T T T C T T T T T T C T T T T T T	-	GBAA0360	hypothetical protein
Chromosome	368154	T T T T T T T T G T T T T T T T T G T T T T T T	-	GBAA0360	hypothetical protein
Chromosome	369804	T T T T T T T T T T T C T T T T T T T T T T T T	-	GBAA0360	hypothetical protein
Chromosome	369853	C C	-	GBAA0360	hypothetical protein
Chromosome	369896	T T T T T T T T T T T T T A T T T T T T T T T T	-	GBAA0360	hypothetical protein
Chromosome	369898	A A	-	GBAA0360	hypothetical protein
Chromosome	370061	A A A A A A A A A A A A G A A A A A A A A A A A	-	GBAA0360	hypothetical protein
Chromosome	370325	A A A A A A A A A A A A G A A A A A A A A A A A	-	GBAA0361	hypothetical protein
Chromosome	371765	A A A A A A A A A A A A T A A A A A A A A A A A	-	GBAA0362	hypothetical protein
Chromosome	376628	A A A A A A A G G A A A A A G G A A A A A A A A	-	GBAA0362	hypothetical protein
Chromosome	381587	G G	-	GBAA0369	methyl-accepting chemotaxis protein
Chromosome	382874	G G	-	GBAA0370	methyl-accepting chemotaxis protein
Chromosome	387637	G G A A A A A A A A A A A A G A A A A A A A A A A	-	GBAA0373	endonuclease/exonuclease/phosphatase family protein
Chromosome	389243	C C	-	GBAA0374	hypothetical protein
Chromosome	389904	A A A A A A A A A A A A A G A A A A A A A A A A A	-	GBAA0374	hypothetical protein
Chromosome	390263	A A A A A A A A A A A A A G A A A A A A A A A A A	-	GBAA0374	hypothetical protein
Chromosome	391001	G G	-	GBAA0374	hypothetical protein
Chromosome	391858	T T T T T T T T T T T T G T T T T T T T T T T T T	topB-1	GBAA0375	DNA topoisomerase III
Chromosome	393116	A A A A A A A A A A A G G A A A A A A G G A A A A A	A	GBAA0375	DNA topoisomerase III
Chromosome	394707	A G	thIM	GBAA0376	hydroxyethylthiazole kinase
Chromosome	394789	G G	thIM	GBAA0376	hydroxyethylthiazole kinase
Chromosome	395296	T T T T T T T T T T T T C T T T T T T T T T T T T	thIE	GBAA0377	thiamine-phosphate pyrophosphorylase
Chromosome	397924	T T T T T T T T T T T T C T T T T T T T T T T T T	-	GBAA0379	methyl-accepting chemotaxis protein
Chromosome	399186	G G G T G	-	GBAA0379	methyl-accepting chemotaxis protein
Chromosome	401315	A G A	-	GBAA0382	ABC transporter substrate-binding protein
Chromosome	403104	T C	-	GBAA0384	ABC transporter ATP-binding protein
Chromosome	404443	G G G C C C G C C C C C C G C C C C C C C C C	-	GBAA0385	chitinase B
Chromosome	404486	T T T T T T T T T T C T T T T T T T T T T T T	-	GBAA0385	chitinase B
Chromosome	404778	C C	-	GBAA0385	chitinase B
Chromosome	405765	T T	-	GBAA0385	-
Chromosome	406142	C C C C C C C C C T C C C C C C C T C T C C C C	-	GBAA0408	hypothetical protein
Chromosome	413634	C C C C C T T C C C C C C C C C C C C C C C C	-	GBAA0408	hypothetical protein
Chromosome	413724	C C	-	GBAA0408	hypothetical protein
Chromosome	415544	T T T T T T T T T T T T T A T T T T T T T T T T	proS-1	GBAA0396	polyI-tRNA synthetase
Chromosome	417981	T T T T T T T T T T T T C T T T T T T T T T T T T	-	GBAA0399	telurite resistance protein, putative
Chromosome	421809	T T T T T T T T T T T T C T T T T T T T T T T T T	-	GBAA0403	hypothetical protein
Chromosome	422826	G G G A A A A G A A A A A G A A A A A A A A A A	-	GBAA0404	telurite resistance protein, putative
Chromosome	426177	A A A A A A A A A A A A G A A A A A A A A A A A	-	GBAA0408	hypothetical protein
Chromosome	427702	T T T T T T T T T T T T G T T T T T T T T T T T T	-	GBAA0408	hypothetical protein
Chromosome	430967	T T T T T T T T C T T T T T T C T T T T T T T T T	-	GBAA0408	hypothetical protein
Chromosome	432277	G G T T T T T T T T T T T T G T T T T T T T T T T	-	GBAA0408	hypothetical protein
Chromosome	439686	G G	cax	GBAA0419	calcium/proton exchanger
Chromosome	441647	G G G G C C C G C C C C G G G G G G G G G G G	-	GBAA0421	hypothetical protein
Chromosome	446565	T T T T T T T T G T G T G T G T T T T T T T T T T	-	GBAA0431	hypothetical protein
Chromosome	446969	G G	-	GBAA0433	prophage LambdaBa04, DNA-binding protein
Chromosome	451584	C C	-	GBAA0438	prophage LambdaBa04, DnaD replication protein, putative
Chromosome	451544	T T	-	GBAA0439	DNA-binding protein
Chromosome	451791	T T T T T T T T T T T T C T T T T T T T T T T T T	-	GBAA0443	hypothetical protein
Chromosome	452180	T T T T T T T T T T T T C T T T T T T T T T T T T	-	GBAA0443	hypothetical protein
Chromosome	452286	G G G A A A A G A A A A A G A A A A A A A A A A	-	GBAA0443	hypothetical protein
Chromosome	452617	A A A A A A A A A A A A G A A A A A A A A A A A	-	GBAA0443	hypothetical protein
Chromosome	452702	T T T T T T T T T T T T G T T T T T T T T T T T T	-	GBAA0443	hypothetical protein
Chromosome	453277	G G T T T T T T T T T T T T G T T T T T T T T T T	-	GBAA0443	hypothetical protein
Chromosome	453844	T T T T T T T T T T T T C T T T T T T T T T T T T	-	GBAA0443	hypothetical protein
Chromosome	454349	G G G G G G G A A G A G A G G A G A G G G G G G	-	GBAA0443	hypothetical protein
Chromosome	450342	C C C C C C C C A C C C C C C C C C C C C C C	-	GBAA0443	hypothetical protein
Chromosome	450734	G G G G A G G G G G G G G G G G G G G G G G G	-	GBAA0443	hypothetical protein
Chromosome	450762	C C C T C C C C C C C C C C C C C C C C C C C	-	GBAA0451	diacylglycerol glucosyltransferase
Chromosome	510394	T T T T T T T T T T T T C T T T T T T T T T T T T	-	GBAA0514	chlorohydrolase family protein
Chromosome	511175	T T T T T T T T C T T T T T T T T T T T T T T T T	-	GBAA0515	cell division inhibitor-like protein
Chromosome	511396	G G	-	GBAA0515	cell division inhibitor-like protein
Chromosome	510502	C C T C	-	GBAA0515	cell division inhibitor-like protein
Chromosome	515111	G G A A A A A G A A A A G A A A A A A A A A A A	mutY	GBAA0511	A/G-specific adenine glycosylase
Chromosome	515690	G G	mutY	GBAA0522	A/G-specific adenine glycosylase
Chromosome	515711	A A	mutY	GBAA0522	A/G-specific adenine glycosylase
Chromosome	516630	A A A A A G G A A A A A A A A A A A A A A A A A	mutY	GBAA0524	A/G-specific adenine glycosylase
Chromosome	517509	A A	mutY	GBAA0527	small acid-soluble spore protein, gamma-type
Chromosome	517633	A A A A A A A A A C A C A C A C A C A C A A A A	mutY	GBAA0527	hypothetical protein
Chromosome	517904	A A	mutY	GBAA0527	hypothetical protein
Chromosome	519020	G G	mutY	GBAA0528	ABC transporter permease/ATP-binding protein
Chromosome	520655	G G	mutY	GBAA0529	putative lipoprotein
Chromosome	521963	A A G G A	-	GBAA0530	glutamate synthase, large subunit, putative
Chromosome	528347	T T T T T T T A A T A T A T A T A T T T T T T T	-	GBAA0533	ABC transporter permease
Chromosome	529282	G G	-	GBAA0534	ABC transporter permease
Chromosome	530479	G G	bcdP	GBAA0536	bacteriorhelin conigratory protein
Chromosome	531610	T T T T T T T T T T C T T T T T T T T T T T T T	-	GBAA0545	iron-sulfur cluster-binding protein, putative
Chromosome	543535	T T T T T T T T T T C T T T T T T T T T T T T T	-	GBAA0545	iron-sulfur cluster-binding protein, putative
Chromosome	543941	C C	-	GBAA0545	iron-sulfur cluster-binding protein, putative
Chromosome	544550	T T T T T T T T T T T T A T T T T T T T T T T T T	-	GBAA0546	hypothetical protein
Chromosome	544551	G G	-	GBAA0546	hypothetical protein

Chromosome	545558	C C C C C C C C T C C C C C T C C C C C C C	GBAA0547	RNA methyltransferase	
Chromosome	551400	T T T C C C T C C C C C C T C C C C C C T C	GBAA0551	hypothetical protein	
Chromosome	559844	C C C C C C C C T C C C C C C C T C C C C C	GBAA0553	acetyltransferase	
Chromosome	556967	C C C C C C C C C C C C A C C C C C C C C C	GBAA0554	glycine betaine transporter	
Chromosome	556729	C C C C C C C C C C C A C C C C C C C C C	GBAA0554	glycine betaine transporter	
Chromosome	563478	A A A A A A A A G G A G A A G G A A A A A A	GBAA0551	SPFH domain-containing protein/band 7 family protein	
Chromosome	569295	C C C C C C C C C C C C C C T C C C C C C C	GBAA0561	citrate transporter	
Chromosome	569631	T T T T T T T T T T G T T T T T T T T T T	GBAA0561	citrate transporter	
Chromosome	571123	C C C C T T C T T T T T T C T T T T T T T T			
Chromosome	571199	G G A G G G G G G G G G G G G G G G G G		ankyrin repeat-containing protein	
Chromosome	571656	T T T T T T T T T T G T T T T T T T T T T	GBAA0564	ankyrin repeat-containing protein	
Chromosome	571862	G G G G G G G G A A A G A G G A A A G G G G	GBAA0564	glycerol-3-phosphate ABC transporter, permease protein, putative	
Chromosome	575542	A A A A A A A A A G G A A A A G G G A A A A A	GBAA0568	serine/threonine phosphatase, putative	
Chromosome	577876	A A A A A A A A A A C A A A A A A A A A A A	GBAA0570	sensor histidine kinase	
Chromosome	580182	T T T C C C C T C C C C C T C C C C C C T C	GBAA0572	hypothetical protein	
Chromosome	582172	A A A A A A A A A A A A T A A A A A A A A A A	GBAA0574	putative lipoprotein	
Chromosome	590433	T T T T T T T A A T T T T T A T T T T T T T	GBAA0580	eama family protein	
Chromosome	591239	C C	GBAA0581		
Chromosome	591580	G G			
Chromosome	592895	A A A A A A A A A G G A A A A A A A G G A A A A	GBAA0582	GntR family transcriptional regulator	
Chromosome	601418	T T T T T T T T T T G T T T T T T T T T T	GBAA0589	mylopydopatein oxidoreductase family protein	
Chromosome	603408	G G G G G G G G G G G G G C G G G G G G G G	GBAA0591	glycerophosphoryl diester phosphodiesterase family protein	
Chromosome	604294	A A A A A A A A A G G A G A A G G A A A A A A			
Chromosome	604903	T T T T T T T T T T G T T T T T T T T T T			
Chromosome	607232	C C			
Chromosome	610254	G G A A A A A G A A A A A G A A A A A A A A A	GBAA0596	nicotinate phosphoribosyltransferase	
Chromosome	611230	A A A A A A A A A G G A A A A A A A G G A A A A	GBAA0597	transcriptional regulator	
Chromosome	612524	G G	GBAA0597	transcriptional regulator	
Chromosome	612526	G G	GBAA0597	transcriptional regulator	
Chromosome	612588	G G	GBAA0597	transcriptional regulator	
Chromosome	613237	C C C C C C C C T C T C T C C C T C T C C C	GBAA0597	transcriptional regulator	
Chromosome	615982	C C C C C C C C T C C C C C C C C T C C C C			
Chromosome	616040	A A A A A A A A A A A A A A A G G A A A A A A A			
Chromosome	616129	A A A A A A A A A A A A A A A G G A A A A A A A			
Chromosome	617943	T T T T T T T C C T C T C C T C C T T T T T	GBAA0604	hypothetical protein	
Chromosome	631843	G G G G G G G T G G G G G G G G T G G G G	GBAA0617	iron compound ABC transporter, permease protein	
Chromosome	633345	C C	GBAA0619	hypothetical protein	
Chromosome	635653	C C T C C C C C C C C C C C C C C C C C	GBAA0621	hypothetical protein	
Chromosome	635993	C C	GBAA0621	hypothetical protein	
Chromosome	636296	T T T T T T T C C T C T C T C T C T T T T T	GBAA0621	hypothetical protein	
Chromosome	636762	G G	GBAA0622	mutTnun family protein	
Chromosome	638021	G G G G G G G G A G G G G G G G G A G G G	GBAA0623	hypothetical protein	
Chromosome	640966	T T T T T T T C C T C T T T C C C T T T T T	cls	GBAA0625	cardiolipin synthetase
Chromosome	642455	C C C C T T T C C C C C C C C C C C C C C	GBAA0628	sensory box/GGDEF family protein	
Chromosome	642756	T T T T T T T T T T C T C T T T T T T T T	GBAA0628	sensory box/GGDEF family protein	
Chromosome	650715	C C	gerKC	GBAA0633	spore germination protein GerKC
Chromosome	655636	A A A A A A A A A G G A A A A A A G G A A A A			
Chromosome	658847	G G G G T T G G G G G G G G G G G G G G			
Chromosome	660206	G G G G G G G G G G G G G G G G G G G G			
Chromosome	660222	C C C C C C C C C C C A C C C C C C C C C			
Chromosome	663675	T A			
Chromosome	664114	C C C C C C C C T C T C C C C C C C C C C	GBAA0647	hypothetical protein	
Chromosome	669747	C C	GBAA0657	oligopeptide ABC transporter, permease protein	
Chromosome	674870	C C C C C T C T C C C C C C C C C C C C C			
Chromosome	679988	C C C C C C C C T C T C C C T C T C C C C			
Chromosome	683307	G G G G G G G A G G G G G G G G G G G G			
Chromosome	685478	C C C C C C C C C T C T C C C T C C C C C			
Chromosome	686753	G G G G G G G A G G G G G G G G G G G G	GBAA0667	ribonuclease	
Chromosome	692623	C T C T C T T T T T T T T T T T T T T T	GBAA0667	ribose ABC transporter ATP-binding protein	
Chromosome	692932	C T C T T T T T T T T T T T T T T T T T T	GBAA0668	riboABC transporter permease	
Chromosome	696688	A A A A A A A A A A A A A A A T A A A A A A A	GBAA0674	multidrug resistance protein, putative	
Chromosome	696788	C C	GBAA0678	multidrug resistance protein, putative	
Chromosome	696789	A A A A A A A A A A A A A A A C A A A A A A A	GBAA0678	spingomyelinase C	
Chromosome	699098	A A	GBAA0680	spingomyelinase C	
Chromosome	700029	G G G G G G G G G G G G G G G G G G G G	GBAA0681	oxidoreductase, FAD-binding	
Chromosome	701044	T T T T T T T C C C C C T C C T C T T T T T	GBAA0682	hypothetical protein	
Chromosome	703403	G G	GBAA0685	hypothetical protein	
Chromosome	703796	C C C C T C C C C C C C C C C C C C C C C	GBAA0685	hypothetical protein	
Chromosome	710255	T T T T T T T T T T C T C T T T T T T T T T	GBAA0691	hypothetical protein	
Chromosome	710303	A A A A A A A A A A A A A A A C A A A A A A A	GBAA0691	hypothetical protein	
Chromosome	712137	A A A A A A A A A A A A A A A G A A A A A A A	GBAA0692	hypothetical protein	
Chromosome	712582	A A A A A A A A A A A A A A A C A A A A A A A			
Chromosome	714229	C C C C C C C C T C C C C C C C C T C C C C C			
Chromosome	716858	C C C C C C C C C C C T C C C C C C C C C C			
Chromosome	718609	C C C C T C C C C C C C C C C C C C C C C			
Chromosome	719485	G G G G A A A A G A A A A A G G A A A A A G	qoxD	ribokinase	
Chromosome	720360	T T T T A A T T T T T T T T T T T T T T T	qoxB	ribose ABC transporter ATP-binding protein	
Chromosome	722769	C C C C C C C C C C C T C C C C C C C C C	qoxA	riboABC transporter permease	
Chromosome	723240	T T T T T T T T A T T T T T T T T T T T T			
Chromosome	723241	C C C C C C C C A C C C C C C C A C C C C C			
Chromosome	725535	G G G G G G G G G G G G G G G G G G G G	GBAA0697	quino oxidase, subunit IV	
Chromosome	732173	A T	GBAA0702	quino oxidase, subunit I	
Chromosome	732528	G G	GBAA0703	quino oxidase, subunit II	
Chromosome	733749	G G G G G G G A A G A G A G G A G A G G G G			
Chromosome	737037	C C C C C C C C C T C C C C C C C C C C C			
Chromosome	738680	A A A T A A A A A A A A A A A A A A A A A	GBAA0717	phosphate ABC transporter permease	
Chromosome	740102	G G G G G G G T G T G T G T G T G G G G G	GBAA0719	AcB/AcD/AcrF family transporter	
Chromosome	740724	C C	GBAA0719	AcB/AcD/AcrF family transporter	
Chromosome	748585	T T T T T T G T T T T T T T T T T T T T T	GBAA0720	AcB/AcD/AcrF family transporter	
Chromosome	751425	T T	GBAA0724	CBS domain-containing protein	
Chromosome	751542	G G G G G G G G G G A G A G G G A G A G G G G	GBAA0724	M2337 family peptidase	
Chromosome	752178	T T			
Chromosome	753717	T T	GBAA0726	ABC transporter ATP-binding protein	
Chromosome	755049	T T	GBAA0728	ABC transporter substrate-binding protein	
Chromosome	756710	C C C C C C C C T C C C C C C C C C C C C	gboxP	glycine oxidase	
Chromosome	764171	A A A A A A A A A A A A A A A G G A A G A A A	GBAA0740	potassium-translocating ATPase subunit B	
Chromosome	765499	A A C C C C C C C C C C C C C C C C C C C	GBAA0740	potassium-translocating ATPase subunit B	
Chromosome	766050	C C	kdpC	potassium-translocating ATPase, C subunit	
Chromosome	768651	T T	GBAA0745	phospholipase, putative	
Chromosome	770057	T T	GBAA0745	phospholipase, putative	
Chromosome	773045	T T	GBAA0745	phospholipase, putative	
Chromosome	774013	G G G G G G G G G G G G G G G G G G G G	GBAA0751	hypothetical protein	
Chromosome	774573	C C C C C C C C C C C C C C C C C C C C	scrK	fructokinase	
Chromosome	777756	C C C C C C C C C C C C G C C C C C C C C	scrA	PTS system, sucrose-specific IIBC component	
Chromosome	778052	G G G G G G G A G G G G G G G G G G G G	GBAA0754	GerYA	
Chromosome	778065	T T T T T T T T C T T T T T C T C T T T T T	GBAA0755	spore germination protein GerYA	
Chromosome	778110	G G G T T T G T T T G G T T T T G G T T T	-	spore germination protein GerYA	
Chromosome	778753	T T T T T T T T T T T T C T C T T T T T T T	scrR	GBAA0755	
Chromosome	780143	A A A A A A A A A G G A G A G A G A G A A	GBAA0758	putative disulfide oxidoreductase	
Chromosome	781732	A A A A A A A A A A A A A A A C A A A A A A A	-		
Chromosome	784502	C C C C C C C C G C G C G C C C C C C C C	gerYA	spore germination protein GerYA	
Chromosome	784937	G G G G G G G A G A G A G A G A G A G G G G	gerYA	spore germination protein GerYA	
Chromosome	786291	G G G G G G G G C G G G G G G G G G G G	GBAA0766	nitroreductase family protein	
Chromosome	787278	G G G G G G G G G G G G G G G G G G G G	spoVR	stage V sporulation protein R	
Chromosome	789298	G G A	GBAA0768	alkaline ceramidase-domain-containing protein	
Chromosome	791840	G G G C C C C C C C C C C C C C C C C C C	GBAA0774	pyridine nucleotide-disulfide oxidoreductase, class I	
Chromosome	792162	G G G G G G G G G A G G G G G G G G G G G	GBAA0774	pyridine nucleotide-disulfide oxidoreductase, class I	
Chromosome	793589	C C C C C C C C A A C C C C C C C C C C C	GBAA0776	rhodanese domain-containing protein	
Chromosome	794323	A A A A A A A A A A A A A G G A A A A A A A A	GBAA0776	rhodanese domain-containing protein	
Chromosome	794594	G G G G G G G G T G G G G G G G G G G G G G			
Chromosome	794603	A A A A A A A A G A A A A A A A A A A A A A A			







Chromosome	1449933	T	T	T	C	C	C	T	C	C	C	C	T	T	ubiE	GBAA1534	ubiquinone/menaquinone biosynthesis methyltransferase	
Chromosome	1451348	G	G	G	A	A	G	G	G	G	G	G	A	G	ndk	GBAA1536	nucleoside diphosphate kinase	
Chromosome	1451452	A	A	A	A	A	A	G	A	A	A	A	G	A	A	ndk	GBAA1536	nucleoside diphosphate kinase
Chromosome	1455386	T	T	T	T	T	T	T	G	T	T	T	T	T	-	GBAA1541	TPR domain-containing protein	
Chromosome	1455402	A	A	A	A	A	A	G	A	A	A	A	G	A	A	GBAA1541	TPR domain-containing protein	
Chromosome	1456721	A	A	A	A	A	A	A	A	A	A	A	A	A	-	GBAA1541	TPR domain-containing protein	
Chromosome	1457461	T	T	T	T	T	C	T	T	T	T	T	C	T	T	GBAA1541	TPR domain-containing protein	
Chromosome	1458558	C	C	C	C	C	C	T	C	C	C	C	T	C	C	qcrA	GBAA1544	menaquinol-cytochrome c reductase, iron-sulfur subunit
Chromosome	1459195	C	C	C	C	C	C	C	T	C	C	C	T	C	C	qcrB	GBAA1545	cytochrome b6
Chromosome	1460221	A	A	A	A	A	A	A	G	A	A	A	A	A	A	-	GBAA1551	hypothetical protein
Chromosome	1463290	A	A	A	A	A	A	A	A	C	A	A	A	A	A	-	GBAA1551	hypothetical protein
Chromosome	1464242	T	T	T	T	T	T	T	C	T	T	T	T	T	T	GBAA1553	hypothetical protein	
Chromosome	1465199	A	A	A	G	G	G	G	G	A	A	G	G	G	A	-	GBAA1556	bifunctional ATP-dependent DNA helicase/DNA polymerase III subunit epsilon
Chromosome	1468522	T	T	T	T	C	T	T	T	T	T	T	T	C	T	-	GBAA1558	glycosyl transferase group 1 family protein
Chromosome	1469479	C	C	C	C	C	C	T	C	C	C	C	C	C	C	pncB	GBAA1559	tRNA CCA-pyrophosphorylase
Chromosome	1470049	C	C	C	T	T	C	C	C	C	C	C	C	T	C	birA	GBAA1560	bifunctional biotin operon repressor/biotin-[acetyl-CoA-carboxylase] synthetase
Chromosome	1475348	C	C	C	C	C	T	T	C	T	C	T	T	C	C	-	GBAA1565	bifunctional ATP-dependent DNA helicase/DNA polymerase III subunit epsilon
Chromosome	1476031	C	C	C	C	C	T	T	C	C	C	T	T	C	C	-	GBAA1565	bifunctional ATP-dependent DNA helicase/DNA polymerase III subunit epsilon
Chromosome	1478381	C	C	C	C	C	T	C	C	C	T	C	C	C	C	aspB	GBAA1568	aspartate aminotransferase
Chromosome	1480006	A	A	A	A	A	A	A	A	A	T	A	A	A	A	nth	GBAA1570	endonuclease III
Chromosome	1486496	A	A	A	A	A	A	A	A	A	A	A	A	A	G	-	GBAA1578	hypothetical protein
Chromosome	1487792	C	C	C	C	C	C	T	C	C	C	C	T	C	C	-	GBAA1581	spore coat protein D, putative
Chromosome	1488216	G	G	G	G	G	G	G	A	G	G	G	G	G	G	-	GBAA1582	hypothetical protein
Chromosome	1488469	A	A	A	A	A	A	A	A	T	A	A	A	A	A	-	GBAA1582	hypothetical protein
Chromosome	1490276	A	A	A	A	A	G	A	A	A	A	A	A	A	A	-	GBAA1584	hypothetical protein
Chromosome	1492272	A	A	A	A	A	A	A	A	G	A	A	A	A	A	-	GBAA1586	hypothetical protein
Chromosome	1492907	T	T	T	C	T	T	T	T	T	T	T	T	T	T	-	GBAA1586	hypothetical protein
Chromosome	1493280	C	C	C	T	T	C	T	T	C	T	T	T	T	C	-	GBAA1587	thermostable carboxypeptidase 1
Chromosome	1494392	G	G	G	G	G	A	G	G	G	G	A	G	G	G	-	GBAA1587	acetyltransferase
Chromosome	1494899	A	A	A	A	A	A	A	A	G	A	A	A	A	A	-	GBAA1588	hypothetical protein
Chromosome	1496946	G	G	G	G	G	G	G	A	G	G	G	G	G	G	maP-2	GBAA1590	methionine aminopeptidase
Chromosome	1500082	A	A	A	A	A	G	A	A	A	A	A	A	A	A	-	GBAA1593	hypothetical protein
Chromosome	1504430	A	A	A	A	A	A	A	G	A	A	A	A	G	A	-	GBAA1595	hypothetical protein
Chromosome	1504528	C	C	C	C	C	C	C	C	C	C	C	C	C	T	-	GBAA1597	hypothetical protein
Chromosome	1505636	A	A	A	A	A	A	A	C	A	C	A	A	A	A	-	GBAA1597	acetyltransferase
Chromosome	1507487	G	G	G	G	G	A	G	G	G	G	G	A	G	G	-	GBAA1602	hypothetical protein
Chromosome	1508742	T	T	T	T	T	T	T	C	T	T	T	T	T	T	-	GBAA1612	capsular polysaccharide biosynthesis glycosyltransferase, putative
Chromosome	1509471	G	G	G	G	G	G	G	A	G	G	G	G	G	G	-	GBAA1612	capsular polysaccharide biosynthesis glycosyltransferase, putative
Chromosome	1516269	A	A	A	A	A	A	G	A	A	A	A	A	A	A	-	GBAA1618	hypothetical protein
Chromosome	1516358	T	T	T	T	T	T	T	T	T	G	T	T	T	T	-	GBAA1618	hypothetical protein
Chromosome	1531733	G	G	A	A	A	A	A	A	A	G	A	A	A	A	-	GBAA1618	hypothetical protein
Chromosome	1537103	C	C	C	C	C	C	C	C	A	C	C	C	C	C	-	GBAA1618	hypothetical protein
Chromosome	1537310	A	A	A	A	A	A	A	A	T	A	A	A	A	T	-	GBAA1624	lacX protein, putative
Chromosome	1541665	C	C	C	C	C	C	T	C	C	C	C	C	C	C	-	GBAA1631	hypothetical protein
Chromosome	1545829	C	C	C	C	C	C	C	C	C	C	C	C	C	C	-	GBAA1636	aminotransferase
Chromosome	1550746	A	A	A	G	G	G	G	G	A	G	G	G	G	A	-	GBAA1643	MATE efflux family protein, putative
Chromosome	1556649	C	C	C	C	C	C	T	C	C	C	C	C	C	C	-	GBAA1642	hypothetical protein
Chromosome	1557337	T	T	T	T	T	T	T	C	T	T	T	T	T	T	-	GBAA1643	thiU/thiP family protein
Chromosome	1560380	A	A	A	A	A	A	G	G	A	A	A	G	A	A	-	GBAA1648	hypothetical protein
Chromosome	1560779	T	T	T	C	C	T	C	C	C	T	C	C	C	T	-	GBAA1649	hypothetical protein
Chromosome	1562404	C	C	C	A	C	C	C	C	C	C	C	C	C	C	-	GBAA1650	hypothetical protein
Chromosome	1562507	C	C	C	C	C	C	C	T	C	C	C	C	C	C	-	GBAA1650	hypothetical protein
Chromosome	1562666	C	C	C	C	C	C	C	C	T	C	C	C	C	C	-	GBAA1650	hypothetical protein
Chromosome	1563780	C	C	C	C	C	C	T	C	T	C	T	C	T	C	-	GBAA1652	permease, putative
Chromosome	1564397	A	A	A	A	A	A	A	A	G	A	A	A	A	A	-	GBAA1652	permease, putative
Chromosome	1564569	A	A	A	A	A	A	G	G	A	A	A	G	A	A	-	GBAA1652	permease, putative
Chromosome	1565818	A	A	A	A	A	A	A	A	T	A	A	A	A	A	-	GBAA1655	hypothetical protein
Chromosome	1567241	C	C	C	C	C	C	T	C	C	C	C	C	C	C	-	GBAA1658	flagellar motor protein MotP
Chromosome	1567921	G	G	G	G	G	G	T	T	G	G	G	T	T	G	-	GBAA1658	flagellar motor protein MotP
Chromosome	1568138	T	T	T	T	T	C	T	C	T	T	C	T	T	T	-	GBAA1659	flagellar motor protein MotS
Chromosome	1568279	T	T	T	T	T	T	T	T	C	T	T	T	T	T	-	GBAA1659	flagellar motor protein MotS
Chromosome	1568476	A	A	A	A	A	A	A	A	C	A	A	A	A	A	-	GBAA1659	flagellar motor protein MotS
Chromosome	1570190	G	G	G	A	A	A	G	A	A	G	G	A	A	G	-	GBAA1663	hypothetical protein
Chromosome	1570595	A	A	A	G	A	A	A	A	A	A	A	A	A	A	-	GBAA1663	hypothetical protein
Chromosome	1571108	G	G	G	A	G	G	G	G	G	G	G	G	G	G	-	GBAA1663	hypothetical protein
Chromosome	1572965	T	T	C	C	C	C	C	C	T	C	C	C	C	C	-	GBAA1663	hypothetical protein
Chromosome	1573642	A	A	A	A	A	A	A	A	G	A	A	A	A	A	-	GBAA1663	hypothetical protein
Chromosome	1574662	T	C	T	C	C	C	C	C	C	C	C	C	C	C	-	GBAA1664	hypothetical protein
Chromosome	1578174	T	T	T	T	T	T	T	T	G	T	T	T	T	T	-	GBAA1669	flagellar hook-associated protein FlgK
Chromosome	1579875	G	G	G	G	G	G	G	G	A	G	G	G	G	G	fld	GBAA1671	flagellar capping protein
Chromosome	1582843	G	G	G	A	A	G	G	G	G	G	G	G	G	G	fIgC	GBAA1675	flagellar basal body rod protein FlgC
Chromosome	1585101	A	A	A	A	A	A	A	A	G	A	A	A	A	A	fIg	GBAA1679	flagellar motor switch protein G
Chromosome	1585353	C	C	C	C	C	C	C	C	C	C	C	C	C	C	fIg	GBAA1679	flagellar motor switch protein G
Chromosome	1589496	T	T	T	T	T	T	T	C	T	T	T	T	T	T	-	GBAA1684	hypothetical protein
Chromosome	1589560	C	C	C	C	C	C	C	C	T	C	T	C	C	C	-	GBAA1684	hypothetical protein
Chromosome	1592398	C	A	C	C	C	C	C	C	C	C	C	C	C	C	-	GBAA1688	hypothetical protein
Chromosome	1592626	A	A	A	A	A	A	G	A	A	A	A	G	A	A	-	GBAA1688	hypothetical protein
Chromosome	1592798	T	T	T	C	T	T	T	T	T	T	T	T	T	T	-	GBAA1689	hypothetical protein
Chromosome	1593162	C	C	C	C	C	C	C	C	C	C	C	C	C	C	-	GBAA1689	hypothetical protein
Chromosome	1593219	G	G	G	G	G	G	G	G	A	G	G	G	G	G	-	GBAA1694	hypothetical protein
Chromosome	1593594	C	C	C	C	C	C	C	C	T	C	T	C	T	C	-	GBAA1694	hypothetical protein
Chromosome	1602648	T	T	T	T	T	T	T	T	A	T	T	T	T	T	-	GBAA1701	hypothetical protein
Chromosome	1603766	A	A	A	A	A	A	G	A	A	A	A	A	A	A	-	GBAA1706	flagellin
Chromosome	1607937	T	T	T	T	T	T	T	T	G	T	T	T	T	T	-	GBAA1706	flagellin
Chromosome	1607978	G	G	G	G	G	G	G	G	T	G	G	G	G	G	-	GBAA1706	flagellin
Chromosome	1610520	C	C	C	C	C	C	C	C	C	C	C	C	C	C	-	GBAA1710	flagellar motor switch protein
Chromosome	1610738	T	T	T	T	T	T	T	C	T	T	T	T	T	T	-	GBAA1711	hypothetical protein
Chromosome	1611584	A	A	A	A	A	G	A	G	A	A	G	A	A	A	fIIP	GBAA1712	flagellar biosynthesis protein fIIP
Chromosome	1612053	G	G	G	T	G	G	G	G	G	G	G	G	T	G	fIIR	GBAA1714	flagellar biosynthesis protein fIIR
Chromosome	1613095	C	C	C	C	C	C	C	C	C	C	C	C	C	C	fIIB	GBAA1715	flagellar biosynthesis protein fIIB
Chromosome	1614332	G	G	G	G	G	G	G	G	A	G	G	G	G	G	fIIA	GBAA1716	flagellar biosynthesis protein fIIA
Chromosome	1614410	G	G	G	G	G	G	G	G	G	G	G	G	G	G	fIIA	GBAA1716	flagellar biosynthesis protein fIIA
Chromosome	1614908	C	C	C	C	C	C	T	C	C	C	C	C	C	T	fIIA	GBAA1716	flagellar biosynthesis protein fIIA
Chromosome	1616204	A	A	A	A	A	G	A	A	A	A	G	A	A	A	-	GBAA1717	hypothetical protein
Chromosome	1616631	C	C	C	C	C	C	T	C	C	C	C	C	C	C	fIIF	GBAA1718	flagellar biosynthesis regulator fIIF
Chromosome	1621512	C	C	C	C	C	C	C	C	C	C	C	C	C	C	-	GBAA1725	TirR family transcriptional regulator
Chromosome	1624863	C	C	C	C	C	C	T	C	C	C	C	C	C	C	-	GBAA1730	DNA-binding protein
Chromosome	1625789	C	C	C	C	C	C	C	C	T	C	C	C	C	C	-	GBAA1731	permease, putative
Chromosome	1627523	T	T	T	C	C	T	C	C	T	C	C	C	C	T	-	GBAA1733	LysR family transcriptional regulator
Chromosome	1629694	A	A	A	A	G	A	A	A	A	A	A	A	A	A	-	GBAA1735	ABC transporter substrate-binding protein

Chromosome	1656674	A A A A A A A A A A G A A A A A A A	fumC	GBAA1767	fumarate hydratase
Chromosome	1657073	A A A A A A A A A A A A A A A A A A	-	GBAA1768	hypothetical protein
Chromosome	1662402	T T T T T T T T T T A T T T T T T T	-	GBAA1776	hypothetical protein
Chromosome	1663262	T T T T T T T T T T T T T T T T T T	-	-	-
Chromosome	1664782	G G G G G G G G G G G G G G G G G G	-	GBAA1780	prolipoprotein diacylglycerol transferase family protein
Chromosome	1669436	C C C T C C C C C C C C C C C C C C	-	GBAA1793	ABC transporter ATP-binding protein
Chromosome	1676291	C C C C C C C C C C C C C C C C C C	-	GBAA1793	ABC transporter ATP-binding protein
Chromosome	1676446	C C C C C C C C C C C C C C C C C C	-	GBAA1793	ABC transporter ATP-binding protein
Chromosome	1684726	A A A A A A A A A A A A A A A A A A	ykWA	GBAA1801	malate dehydrogenase
Chromosome	1684826	C C C C C C C C C C C C C C C C C C	-	GBAA1801	malate dehydrogenase
Chromosome	1685824	A A A G A A A A A A A A A A A A A A	ykWA	GBAA1801	malate dehydrogenase
Chromosome	1686097	G G G G G G G A G A G A G A G G G G	-	GBAA1802	sensor histidine kinase
Chromosome	1686232	C C C C C C C C C C C C C C C C C C	-	GBAA1802	sensor histidine kinase
Chromosome	1686374	C C C C C C C C C C C C C C C C C C	-	GBAA1802	sensor histidine kinase
Chromosome	1695935	T T T T T T C C T T C T C C T C T T	dapG-1	GBAA1811	aspartate kinase
Chromosome	1697411	A A A A A A A A A A A A A A A A A A	-	GBAA1815	hypothetical protein
Chromosome	1699297	T T T T T T T T T T T T T T T T T G T	-	GBAA1815	hypothetical protein
Chromosome	1699684	C C C C C C C C T C T C C T C C C C C	-	GBAA1815	hypothetical protein
Chromosome	1700020	A A A A A A A A A A A A A A A A A A	-	GBAA1815	hypothetical protein
Chromosome	1700271	A A A A A A A A A A A A A A A A A A	-	GBAA1815	hypothetical protein
Chromosome	1703235	A A A A A G A A A A A A A A A A A A	-	GBAA1818	N-acetylumuramoyl-L-alanine amidase
Chromosome	1703260	T T T G T T T T T T T T T T T T T T	-	GBAA1818	N-acetylumuramoyl-L-alanine amidase
Chromosome	1703271	A A A A G A A A A A A A A A A A A A	-	GBAA1818	N-acetylumuramoyl-L-alanine amidase
Chromosome	1703287	T T T G T T T T T T T T T T T T T T	-	GBAA1818	N-acetylumuramoyl-L-alanine amidase
Chromosome	1704850	T T T T T T T T T T C T T T T T T T T	-	GBAA1819	transporter, putative
Chromosome	1705263	C C C C C C C C A C C C C C C C C C	-	GBAA1819	transporter, putative
Chromosome	1708442	A A A A A A A A A A A A A A A A A A	-	GBAA1823	hypothetical protein
Chromosome	1708828	A A A A A A A A A A A A A A A A A A	-	GBAA1824	hypothetical protein
Chromosome	1717874	T T C C C T C C C C C C C C C T C	-	GBAA1832	acetyltransferase
Chromosome	1723833	A A A A A A A A A A A A A A A A A A	-	-	-
Chromosome	1725817	A A A A A A A A A A A A A A A A A A	-	GBAA1840	fibronectin-binding protein, putative
Chromosome	1726129	C C T C C C C C C C C C C C C C C	-	-	-
Chromosome	1728049	G G A A A A A A A A A A A G A A A A A	-	GBAA1843	hypothetical protein
Chromosome	1736198	A A A A A G A A A A A A A A A A A A	IVD	GBAA1853	dihydroxy-acid dehydratase
Chromosome	1738425	A A A A A A A A G G A G A G A G A A A	-	GBAA1857	acetyltransferase
Chromosome	1740091	A A A A A A A A A G A G A A A G A A A A	-	GBAA1858	major facilitator family transporter
Chromosome	1742016	G G G G G G G G G G G G G G G G G G	-	GBAA1858	major facilitator family transporter
Chromosome	1742067	G G G G G G G G G G G G G G G G G G	-	GBAA1858	major facilitator family transporter
Chromosome	1742068	A A A A A A A A A A A A A A A A A A	-	GBAA1858	major facilitator family transporter
Chromosome	1742700	C C C C C C C A C C C C C A C C C C	-	GBAA1858	major facilitator family transporter
Chromosome	1743195	C C C C C C C C C C C C C C C C C C	-	GBAA1859	oxidoreductase
Chromosome	1744839	G G G G G G G G G G G G G G G G G G	-	GBAA1862	acetyl-CoA hydrolase/transferase family protein
Chromosome	1746328	C C C C C C C C C C C C C C C C C C	-	GBAA1862	acetyl-CoA hydrolase/transferase family protein
Chromosome	1747193	A A G A A A A A A A A A A A A A A A A	-	GBAA1862	acetyl-CoA hydrolase/transferase family protein
Chromosome	1747219	T T T T T T T T T T C T T T T T T T T	-	GBAA1865	chlorohydrolase
Chromosome	1748415	A A A A A A A A A A A A A A A A A A	-	GBAA1865	chlorohydrolase
Chromosome	1748642	A A A A T T A A A A A A A A A A A A	-	GBAA1866	hypothetical protein
Chromosome	1749441	C C C A A C C C C C C C C C C C C C	-	GBAA1866	hypothetical protein
Chromosome	1750262	G G G T T G G G G G G G G G G G G	-	GBAA1866	hypothetical protein
Chromosome	1750865	C C C C C C C C C C C C C C C C C C	-	GBAA1866	hypothetical protein
Chromosome	1757215	T T T T T T T T T T T T T T T T T T	-	GBAA1874	hypothetical protein
Chromosome	1757252	A A A A A A A A A A A A A A A A A A	-	GBAA1874	hypothetical protein
Chromosome	1757781	C C C C C C C C C C C C C C C C C C	-	GBAA1875	coenzyme PQQ synthesis protein, putative
Chromosome	1763512	C C C C C C C C C C C C C C C C C A	-	GBAA1880	manganese transport protein MtnH
Chromosome	1763788	T T T T T T T T T T G T T T G T T T T	-	GBAA1882	hypothetical protein
Chromosome	1766049	G G G G G G G G G G G G G G G G G G	-	GBAA1884	2-dehydropanoate 2-reductase
Chromosome	1767595	C C C C C T C C C C C C C C C C C C	-	-	-
Chromosome	1768378	G G G G G G G G G G G G G C G C G G	-	-	-
Chromosome	1769797	T T T T T T T T G T G T G T G T G T T T	-	GBAA1887	enterotoxin
Chromosome	1771740	T T T T T T T T T T T T T T T T T T T T	-	GBAA1888	enterotoxin
Chromosome	1772355	A A A A A A A A A A G A A A A A G A A A A A A	-	GBAA1900	BNR repeat-containing protein
Chromosome	1783219	G G G G G G G G G G G G G G G G G G	-	GBAA1900	BNR repeat-containing protein
Chromosome	1783965	A A A A A A A A A C C A C A C A C A A A A A A	-	GBAA1900	BNR repeat-containing protein
Chromosome	1785277	T T T T T T T T T T T A T T T T T T T T T T	-	GBAA1901	xaa-pro aminopeptidase, putative
Chromosome	1786649	C C C C C T C C C C C C C C C C C C C C	-	GBAA1902	multicopper oxidase family protein
Chromosome	1793488	A A	-	GBAA1906	hypothetical protein
Chromosome	1793942	G G	-	GBAA1906	hypothetical protein
Chromosome	1794826	T T T T T T T T T T T T C T T T T T T T T T T	-	GBAA1907	sodium/bile acid symporter family protein
Chromosome	1798709	A G A	-	-	-
Chromosome	1798769	G T T T T T T T T T T T G T T T T T T T T T T	-	-	-
Chromosome	1798826	C C	-	GBAA1912	hypothetical protein
Chromosome	1799640	C C C C T C C C C C C C C C C C C C C C C C	-	GBAA1913	hypothetical protein
Chromosome	1801214	C C	-	GBAA1913	hypothetical protein
Chromosome	1801219	G G	-	GBAA1914	hypothetical protein
Chromosome	1801676	C C C C C C C C C C C C C C C T C C C C C C C	-	GBAA1914	hypothetical protein
Chromosome	1801677	T T	-	GBAA1914	hypothetical protein
Chromosome	1802966	C C	-	GBAA1915	emsa family protein
Chromosome	1803310	C C C C C C C T C C C C C C C C C C C C C C	-	GBAA1915	emsa family protein
Chromosome	1803570	C C C C C C C C C C C C C T C C C C C C C C C C	-	GBAA1916	LysR family transcriptional regulator
Chromosome	1803952	G G	-	GBAA1916	LysR family transcriptional regulator
Chromosome	1804423	T T T T T T T C T T T T T T T T T T T T T T T T	-	-	-
Chromosome	1804442	T T T T T T T T T T T T G T T T T T T T T T T	-	GBAA1918	2-hydroxychromene-2-carboxylate isomerase family protein
Chromosome	1805450	A A	-	GBAA1921	amidase
Chromosome	1806779	A A	-	-	-
Chromosome	1808293	A A A A A A A A A G G A G A G G A A A A A A A A	-	-	-
Chromosome	1814541	C C T T T C T C T T T T C T T T T T T T T T T T	-	-	-
Chromosome	1814566	A A A A G G A A A A A A A A A A A A A A A A A A	-	-	-
Chromosome	1817080	T T T T T T T T T T G T T T T T T T T T T T T T T	-	GBAA1929	maoC family protein
Chromosome	1820229	C C C C C C C C C C C C C T C C C C C C C C C C	-	GBAA1933	branched chain amino acid ABC transporter ATP-binding protein
Chromosome	1821513	G G C	-	GBAA1937	tRNA family transcriptional regulator
Chromosome	1824707	A A A A G G A A A A A A A A A A A A A A A A A A	-	GBAA1939	hypothetical protein
Chromosome	1824833	G G G T T G G G G G G G G G G G G G G G G G G	-	GBAA1939	hypothetical protein
Chromosome	1824965	C C	-	GBAA1940	carboxymuconolactone decarboxylase family protein
Chromosome	1826878	T T T T T T T T T T T T C T T T T T T T T T T T T	-	GBAA1942	luciferase family protein
Chromosome	1828921	T C T C T	-	GBAA1943	cytochrome d ubiquinol oxidase, subunit I
Chromosome	1830750	G G	-	GBAA1945	transport ATP-binding protein CytC
Chromosome	1831386	G G	-	GBAA1945	transport ATP-binding protein CytC
Chromosome	1832651	C C	-	GBAA1946	transport ATP-binding protein CytD
Chromosome	1832719	T T T C C C T C C C C C C C C C C C C C C C C	-	GBAA1946	transport ATP-binding protein CytD
Chromosome	1833130	G G G T T G G T T T G T T T G G T T T T G G T T G	-	GBAA1946	transport ATP-binding protein CytD
Chromosome	1835115	G G A A A G A A A A A A A A A A A A A A A A A A	-	GBAA1949	microcin immunity protein McfF
Chromosome	1835917	A A A A A A G A A A A A A A A A A A A A A A A A	-	GBAA1950	D-alanyl-D-alanine carboxypeptidase family protein
Chromosome	1837754	G G T G	-	-	-
Chromosome	1837790	C C	-	-	-
Chromosome	1838150	A A A A A A A A A A G G A G A G G A A A A A A A	-	-	-
Chromosome	1840029	G G	-	GBAA1953	alpha/beta fold family hydrolase
Chromosome	1840320	C C	-	GBAA1953	alpha/beta fold family hydrolase
Chromosome	1840462	A A	-	-	-
Chromosome	1841554	G G T G	-	-	-
Chromosome	1841835	T T C C C C T C C C C C T C C C C C C C C C C	-	GBAA1957	hypothetical protein
Chromosome	1844762	T T T I I T C I I T I T C I I T I T I T I -	-	-	-
Chromosome	1844946	A A	-	-	-
Chromosome	1845882	C C C C C C C C T C C C C C C C C C C C C C C	-	GBAA1964	mutT/nudix family protein
Chromosome	1848953	C C C C C C C C T C C C C C C C C C C C C C C	-	GBAA1964	mutT/nudix family protein
Chromosome	1849037	T C	-	GBAA1964	homoserine dehydrogenase
Chromosome	1851766	A A A A A A A A A A A G A A A A A A A A A A A A	hom-1	GBAA1968	homoserine dehydrogenase
Chromosome	1853717	A A	thrB	GBAA1970	homoserine kinase
Chromosome	1854481	C C	-	GBAA1972	putative lipoprotein
Chromosome	1854944	A A A A A A A A A A G G A A A A G G A A A A A A	-	GBAA1972	putative lipoprotein
Chromosome	1855756	A A A A A A A A A A G G A A A A A A A A A A A A	-	GBAA1972	putative lipoprotein
Chromosome	1864427	G G	-	GBAA1980	hypothetical protein
Chromosome	1870380	C C C C C C C C C C C C C A C C C C C C C C C C	-	GBAA1985	hypothetical protein

Chromosome	1872723	T T T T T T T T T G C T T T T T T T T	-	GBAA1989	lysE/yyggA family protein
Chromosome	1873861	C C C C C C C C T T C C C C C T T C C C	-	GBAA1989	lysE/yyggA family protein
Chromosome	1873985	G G G G G G G G G G G G G G G G G G	-	GBAA1992	phospholipase, putative
Chromosome	1874408	T T T T C C C T T T T T T T T T C C T	-	GBAA2001	intracellular serine protease
Chromosome	1875342	T T T T T T C C C T T T T T C C C C C	-	GBAA2004	multidrug resistance protein, putative
Chromosome	1883276	C C C C C C C C C C T C C C C C C C	-	GBAA2007	hypothetical protein
Chromosome	1885583	A A A A A A A A A A G A A A A A G A A	-	GBAA1992	lysE/yyggA family protein
Chromosome	1887932	C C C C C C C C C C C T C C C C C C C	-	GBAA2014	hypothetical protein
Chromosome	1889305	A A A A A A A A A A A G A A A A A A A	-	GBAA2016	luciferase family protein
Chromosome	1889357	G G G G G G G G G G G G G G G G G G	-	GBAA2035	adhesion lipoprotein
Chromosome	1894674	C C C C C C C C C C C C T C C C C C C	-	GBAA2038	NADPH dehydrogenase Nama
Chromosome	1896163	T T T G T T T T T T T T T T T T T T	-	GBAA2038	NADPH dehydrogenase Nama
Chromosome	1897574	T T T T T T T T C C T C T C C T T T T	-	GBAA2047	mutT/mutK family protein
Chromosome	1904640	T T T T T T T T C C T C T C C T T T T	-	GBAA2049	polysaccharide biosynthesis family protein
Chromosome	1908866	A A A A A A A A A G G A A A A A G G A	-	GBAA2051	hypothetical protein
Chromosome	1908937	G G G G G G G G G G G G G G G G G G	-	GBAA2054	cardiolipin synthetase domain-containing protein
Chromosome	1910274	C C C C C C C C C C C T C C C C C C	-	GBAA2054	cardiolipin synthetase domain-containing protein
Chromosome	1912544	T T T T T T T T T C C T T T C T T T T	-	GBAA2058	hypothetical protein
Chromosome	1912652	A A A A A A A A C A C A C A A C A A	-	GBAA2061	CBS domain-containing protein
Chromosome	1914878	C C C T T T C T T T C T C C T T T C C	-	GBAA2072	amidase
Chromosome	1914918	T T T T T T T T T T C T T T T T T T T	-	GBAA2075	SPEF1 domain-containing protein/band 7 family protein
Chromosome	1919350	A A A A A A A A A A T T A T A A T T A	-cotH	GBAA2046	spore coat protein H
Chromosome	1919553	T T T T T T T T T T T T T T T T T T	-cotH	GBAA2046	spore coat protein H
Chromosome	1920612	T T T T T T T T T T C T T T T T T T T	-	GBAA2047	mutT/mutK family protein
Chromosome	1922803	G G G G G G G G G G G G G G G G G G	-	GBAA2049	polysaccharide biosynthesis family protein
Chromosome	1923165	T T T T T T T T T T C T T T T T T T T	-	GBAA2051	hypothetical protein
Chromosome	1924850	A A A A A A A A A A A G A A A A A A A	-	GBAA2054	cardiolipin synthetase domain-containing protein
Chromosome	1927623	C C C C C C C C A C C C C C C C A C	-	GBAA2054	cardiolipin synthetase domain-containing protein
Chromosome	1927717	C C C C C C C C T C C C C C C C T C C	-	GBAA2058	hypothetical protein
Chromosome	1930093	C C C C C C C C A C C C C C C A C C C	-	GBAA2061	CBS domain-containing protein
Chromosome	1933466	C C C C C C C C T C T C C C C T T T C C	-	GBAA2072	alanine racemase
Chromosome	1933749	T T T T T T T T T T C T C T T T T T T T	-	GBAA2075	hypothetical protein
Chromosome	1940336	G G G G G G G G G G G G G G G G G G	-	GBAA2080	hypothetical protein
Chromosome	1941024	C C C C C C C C C C C C C C C C C C	-	GBAA2080	hypothetical protein
Chromosome	1944420	A A A A A A A A A A A A A A A A A A	-	GBAA2080	hypothetical protein
Chromosome	1944850	C C C C C C C C C T C C C C C C C C	-dal-2	GBAA2079	hypothetical protein
Chromosome	1947353	C C C C C C C C C C C C C C C C C C	-	GBAA2080	hypothetical protein
Chromosome	1948662	G G G A A A G A A A A A G A A A A A A	-	GBAA2081	hypothetical protein
Chromosome	1949099	A A A A G G G A G G G G G A A G G G G	-	GBAA2081	hypothetical protein
Chromosome	1949431	T T T T T T C T T T T T T T T T T T T	-	GBAA2081	hypothetical protein
Chromosome	1949966	T T T T T T T T T T C T T T T T T T T	-	GBAA2082	hypothetical protein
Chromosome	1950257	T T T C C C C T C C C C C C C C C C	-	GBAA2082	hypothetical protein
Chromosome	1951903	A A A A A A A A A A G A A A A A A A A	-	GBAA2083	glycosyl transferase family protein
Chromosome	1954568	G G G T T T T G T T T T G T T T T G T	-	GBAA2085	GntR family transcriptional regulator
Chromosome	1955480	T T T T T T T T T T C T C T T T T T T T	-	GBAA2102	hypothetical protein
Chromosome	1957220	G G G G G G G G G G G G G G G G G G	-	GBAA2106	hypothetical protein
Chromosome	1962975	G G G G G G G G G G G G G G G G G G	-	GBAA2120	hypothetical protein
Chromosome	1964353	G G G G G G G G A G G G G G G G G G	-	GBAA2120	hypothetical protein
Chromosome	1967431	C C C C C C C T C C C C C C C C C C	-	GBAA2121	hypothetical protein
Chromosome	1970562	T T T T T T T T T T T T T T T T T T T G	-qor-1	GBAA2113	quinone oxidoreductase
Chromosome	1971191	C C C C C C C C C C C C C C C C C T	-	GBAA2114	RNA polymerase sigma factor
Chromosome	1971932	G G G G G G G G G G G G G G G G G G	-	GBAA2114	RNA polymerase sigma factor
Chromosome	1972210	T T T T G T T T T T T T T T T T T T T	-	GBAA2120	membrane-bound protease, putative
Chromosome	1977484	A A A A A A A A A A A A A A A A A A	-	GBAA2120	membrane-bound protease, putative
Chromosome	1977849	C T C C C C C C C C C C C C C C C C	-	GBAA2121	hypothetical protein
Chromosome	1978017	T T T T T T T T T T C T T T T T T T T	-	GBAA2121	hypothetical protein
Chromosome	1982219	T T T T T T T T A A T T T T A A T T T T	-narG	GBAA2125	respiratory nitrate reductase, alpha subunit
Chromosome	1982448	G G G G G G G G G G G G G G G G G G	-	GBAA2125	respiratory nitrate reductase, alpha subunit
Chromosome	1982730	G G G C C C G C C C G G G G G G G G	-	GBAA2125	respiratory nitrate reductase, alpha subunit
Chromosome	1982805	G G G G G G G G C G G G G G G G G G	-	GBAA2125	respiratory nitrate reductase, alpha subunit
Chromosome	1982941	A A A A A A A A A A A A A A A A A A	-	GBAA2125	respiratory nitrate reductase, alpha subunit
Chromosome	1982986	C T C C C C C C C C C C C C C C C C	-	GBAA2125	respiratory nitrate reductase, alpha subunit
Chromosome	1983240	C C C C C C C C T C C C C C C C C C	-	GBAA2125	respiratory nitrate reductase, alpha subunit
Chromosome	1985199	C C C C C C C C C C C C C C C C C C	-	GBAA2125	respiratory nitrate reductase, alpha subunit
Chromosome	1986172	G G G G G G G G G G G G G G G G G G	-	GBAA2126	respiratory nitrate reductase, beta subunit
Chromosome	1986721	C C C C C C C C T C C C C C C C C C	-	GBAA2126	respiratory nitrate reductase, beta subunit
Chromosome	1987848	C C C C C C C C C C C C C C C C C C	-	GBAA2126	respiratory nitrate reductase, gamma subunit
Chromosome	1989080	G G G G G G G G G G G G G G G G G G	-	GBAA2130	ABC transporter ATP-binding protein
Chromosome	1996130	T T T T T T T T T T T T T T T T T T T	-	GBAA2138	nitrate transporter
Chromosome	1996201	T T T T T T T T T T T T T T T T T T T	-	GBAA2138	nitrate transporter
Chromosome	1998035	T T T T T T T T T T T T T T T T T T T	-	GBAA2139	hypothetical protein
Chromosome	2001415	G G G G G G G G G G G G G G G G G G	-	GBAA2144	bifunctional uroporphyrinogen-III methyltransferase/uroporphyrinogen-III synthase
Chromosome	2002467	T T T T T T T C T C T C T T C C T T T	-	GBAA2146	nitrite reductase [NAD(p)h], large subunit
Chromosome	2003501	A A A A A A A A A A A A A A A A A A	-	GBAA2146	nitrite reductase [NAD(p)h], large subunit
Chromosome	2007637	T T T C T C T T T T T T T T T T C T T	-	GBAA2146	nitrite reductase [NAD(p)h], large subunit
Chromosome	2007653	A A A A A A A A A A G A A A A A A A A	-	GBAA2146	nitrite reductase [NAD(p)h], large subunit
Chromosome	2010423	G G G G G G G G A A G G G G G G G G	-	GBAA2153	hypothetical protein
Chromosome	2010450	T T T T T T T A T T T T T T T T T T T	-	GBAA2153	hypothetical protein
Chromosome	2011146	G G G G G G G G A G G G G G G G G G	-	GBAA2153	hypothetical protein
Chromosome	2012644	G G G G G G G G A G G G G G G G G G	-	GBAA2155	hypothetical protein
Chromosome	2014888	C C C C C C C C T T T C T C C T T C C C	-	GBAA2162	hypothetical protein
Chromosome	2015221	A A A A A A A A A A A A A A A A A A	-	GBAA2163	HD domain-containing protein
Chromosome	2015398	G G G G G G G G G G G G G G G G G G	-	GBAA2163	HD domain-containing protein
Chromosome	2016757	C C C C C C C C C C C C C C C C C T	-	GBAA2164	ABC transporter ATP-binding protein
Chromosome	2022958	G G G G G T G G G G G G G G G G G G	-	GBAA2172	hypothetical protein
Chromosome	2022966	T T T T G T T T T T T T T T T T T T T	-	GBAA2172	hypothetical protein
Chromosome	2022987	A A A A A G G A A A A A A A A A A A	-	GBAA2172	hypothetical protein
Chromosome	2023006	T T T T G T T T T T T T T T T T T T T	-	GBAA2172	hypothetical protein
Chromosome	2023007	G G G G G A G G G G G G G G G G G G	-	GBAA2172	hypothetical protein
Chromosome	2023030	T T T T T T T C C T C T T C C T T T T	-	GBAA2172	hypothetical protein
Chromosome	2023075	A A A A A T A A A A A A A A A A A A	-	GBAA2172	hypothetical protein
Chromosome	2023082	T T T T T G T T T T T T T T T T T T T	-	GBAA2172	hypothetical protein
Chromosome	2025174	G G G G G G G G G G G G G G G G G G	-argS	GBAA2175	arginyl-tRNA synthetase
Chromosome	2026100	G G G G G G G G G G G G G G G G G G	-argS	GBAA2175	arginyl-tRNA synthetase
Chromosome	2026733	T T C C C C C C C C C C T C C C C C C	-	GBAA2176	hypothetical protein
Chromosome	2026857	T T T T T T T A T T T T T T T A T T T	-	GBAA2177	hypothetical protein
Chromosome	2026901	T T T T T T T T T C T T T T T T T T T	-	GBAA2177	hypothetical protein
Chromosome	2028797	C C C C C C C C C C C C C C C C C C	-	GBAA2179	hypothetical protein
Chromosome	2033691	G G G G G G G G A A G G G G G G G G	-ileS	GBAA2181	isoleucyl-tRNA synthetase
Chromosome	2034060	G G G G G G G G A A G G G G G G G G	-ileS	GBAA2181	isoleucyl-tRNA synthetase
Chromosome	2036983	A A A A A A A A G G A A G G A A G G A	-	GBAA2183	neutral metalloprotease, putative
Chromosome	2037092	C C C C C C C C C C C C C C C C C C	-	GBAA2183	neutral metalloprotease, putative
Chromosome	2037385	C C C C C C C C C C C C C C C C C C	-	GBAA2183	neutral metalloprotease, putative
Chromosome	2039483	G G G G G G G G G G G G G G G G G G	-	GBAA2183	neutral metalloprotease, putative
Chromosome	2039646	T T T T T T T C T T T T T C T T T T T	-aspC	GBAA2186	aspartyl-tRNA synthetase
Chromosome	2043172	T T T T T T T T T T T C T T T T T T T	-	GBAA2190	FtsK/SpoIIIE family protein
Chromosome	2043301	G G G G G G G G G G G G G G G G G G	-	GBAA2190	FtsK/SpoIIIE family protein
Chromosome	2044094	C C C C C C C C T C C C C C C C C C	-	GBAA2190	FtsK/SpoIIIE family protein
Chromosome	2044607	C C C C T C C C C C C C C C C C C	-	GBAA2190	FtsK/SpoIIIE family protein
Chromosome	2045104	G G G G G G G G G G G G G G G G G G	-	GBAA2190	FtsK/SpoIIIE family protein
Chromosome	2045407	T T T G T T T T T T T T T T T T T T	-	GBAA2190	FtsK/SpoIIIE family protein
Chromosome	2045712	A A C C C C C C C C C A C C C C C C	-	GBAA2190	FtsK/SpoIIIE family protein
Chromosome	2047098	T T T T T T T T T T T C T T T T T T T	-	GBAA2191	hypothetical protein
Chromosome	2047486	C C C C C C C C C C C T C C C C C C	-	GBAA2192	hypothetical protein
Chromosome	2048090	T T T T T T T T T T T A T T T T T T T	-	GBAA2192	hypothetical protein
Chromosome	2048525	T T T T T T T T T T C T T T T T T T T	-	GBAA2192	hypothetical protein
Chromosome	2048920	A A A A C C A A A A A A A A A A A A	-	GBAA2192	hypothetical protein
Chromosome	2051141	A A A A G G A A A A A A A A A A A A	-	GBAA2195	hypothetical protein
Chromosome	2052092	G G G G G G G G G G G G G G G G G G	-	GBAA2196	hypothetical protein
Chromosome	2063668	A A A A A A A A G G A A G G A A G G A	-	GBAA2210	hypothetical protein
Chromosome	2063575	A A A A A A A A A A A A A A A A A A	-	GBAA2210	hypothetical protein
Chromosome	2067078	T T T T T G G T G T G G T T G G T T	-	GBAA2213	sensor histidine kinase





Chromosome	2584570	C C C C T T C C C C C C C C C C C C C C	-			
Chromosome	2586652	G G G G G G G G A G G G G G G G G G G G	-	GBAA2779	hypothetical protein	
Chromosome	2585807	G G G G G G G G A A G A G A G G G G G G G	-	GBAA2779	hypothetical protein	
Chromosome	2585986	C C C C C T C C C C C C C C C C C C C C	-			
Chromosome	2587605	G G G G G G G G A G G G G G G G G G G G	-	GBAA2783	hypothetical protein	
Chromosome	2589468	A A A A A A A A A A A A A A A A A A A A	-	GBAA2785	glycine betaine/L-proline ABC transporter, permease protein	
Chromosome	2589474	A A A A A G G G A A A A A A A A A A A A	-	GBAA2786	glycine betaine/L-proline ABC transporter, ATP-binding protein	
Chromosome	2594074	G G G G G G G G A A G A G G G G G G G G	-	GBAA2788	ribose-5-phosphate isomerase A	
Chromosome	2597027	G G G G G G G G G G G G G G G G G G G G	-	GBAA2791	topology modulation protein	
Chromosome	2597986	A A A A A A A A A A A A A A A A A A A A	-	GBAA2794	hypothetical protein	
Chromosome	2598400	C C C C C C C T C T C C T C C T C C C C	-	GBAA2795	hypothetical protein	
Chromosome	2599735	G G G G G G G G G G G G G G G G G G G G	-	GBAA2797	hypothetical protein	
Chromosome	2600271	G G G G G G G G G G G G G G G G G G G G	-	GBAA2800	hypothetical protein	
Chromosome	2600998	A A A A A A A A A G G A G A G A G A G A	-	GBAA2801	hypothetical protein	
Chromosome	2601475	C C C C C C C C C C C C C C C C C C C C	-	GBAA2803	S-layer protein, putative	
Chromosome	2605829	T T T T T T T T T T T T T T T T T T T T	-			
Chromosome	2606039	C C C C C C C T T T C C C C C C C C C C	-	GBAA2811	hypothetical protein	
Chromosome	2606242	T T T T T T T T T T T C T T T T T T T T	-	GBAA2811	hypothetical protein	
Chromosome	2608168	A A A A C A A A A A A A A A A A A A A A	-	GBAA2814	uvrD/Rep helicase family protein	
Chromosome	2609990	T T T T T T T T T T T C T T T T T T T T	-			
Chromosome	2609991	C C C C C C C C C C C C C C C C C C C C	-			
Chromosome	2611560	C C C C T T T C T T T T C T T T T T T T	-	GBAA2816	N-methyl-transferase-related protein	
Chromosome	2612196	T T T T T T T T C T T T T T T C T T T T	-	GBAA2817	btR family protein	
Chromosome	2614351	A A A G G G A G G G G G G G G G G G G	-	GBAA2818	ATP-dependent DNA helicase RecQ	
Chromosome	2616140	A A A A A A A A A A A A A A A A A A A A	-	GBAA2820	hypothetical protein	
Chromosome	2617061	A A A A A A A A A A A A A A A A A A A A	-	GBAA2821	hypothetical protein	
Chromosome	2618497	T T T T T T T T T T T C T T T T T T T T	-	GBAA2822	hypothetical protein	
Chromosome	2619247	T T T T T T T G G T T T T T G G T T T A	-	GBAA2823	hypothetical protein	
Chromosome	2623895	G G G G A A A G G G G G G G G G G G G	-	GBAA2828	acetyltransferase	
Chromosome	2624892	C C C C C C C C C C C C C C C C C C C	-	GBAA2829	carboxymuconolactone decarboxylase	
Chromosome	2624928	A A A A A A A A A A A A A A A A A A A A	-	GBAA2830	sodium/alanine symporter family protein	
Chromosome	2631298	G G G A G G G G G G G G G G G G G G G	-	GBAA2835	glycine oxidase, putative	
Chromosome	2631526	T T T T T T T T T T C T T T T T T T T	-	GBAA2835	glycine oxidase, putative	
Chromosome	2634964	A A A A A A A A G G A G A G A G A G A A	-			
Chromosome	2636655	G G G G G G G G G G G G G G G G G G G	-			
Chromosome	2636703	C C C C C C C C C C C C C C C C C C C	-			
Chromosome	2637448	T T T T C C C T T T T T T T T T C T T T	-	GBAA2841	hypothetical protein	
Chromosome	2638715	T T T T T T T T T T T C T T T T T T T T	-	GBAA2844	hypothetical protein	
Chromosome	2643036	T T T T T T T T T T T C T T T T T T T T	-	GBAA2849	NLP/P60 family protein	
Chromosome	2643451	A A A A A A A A A A A A A G A G A A A A	-	GBAA2849	NLP/P60 family protein	
Chromosome	2643606	G G G G G A G G G G G G G G G G G G G	-	GBAA2849	NLP/P60 family protein	
Chromosome	2644428	T T T T T T T T T T C T T T T T T T T T	-	GBAA2850	mandelate racemase/muconate lactonizing enzyme family protein	
Chromosome	2644836	A A A A A A A A A A A A A A A A A A A A	-	GBAA2850	mandelate racemase/muconate lactonizing enzyme family protein	
Chromosome	2651523	A A A A A A A A A A A A A A A A A A A A	-	GBAA2858	hypothetical protein	
Chromosome	2653705	T T T T T T T T T T T G T T T T T T T T	-	GBAA2860	x-prolyl-dipeptidyl aminopeptidase	
Chromosome	2656049	C C C C C C C C C C C C C C C C C C C	-			
Chromosome	2656190	G G G G G G G G G G G G G G G G G G G	-			
Chromosome	2658531	G G G G G G G G G G G G G G G G G G G	-			
Chromosome	2660129	T T T T T T T A A T A T A T A T A T T T	-	GBAA2865	hypothetical protein	
Chromosome	2660574	A A A A A A A A G G A A A A A A G G A A	-	GBAA2866	bifunctional 5'-methylthioadenosine/S-adenosylhomocysteine nucleosidase/phosphatase	
Chromosome	2664598	G G G G G G G G G G G G G G G G G G G	-	GBAA2867	hypothetical protein	
Chromosome	2668966	C C T T T T T T T T T C T T T T T T T T	-	GBAA2869	peptidase, putative	
Chromosome	2669321	G G G G G G G G G G G G G G G G G G G	-	GBAA2870	hypothetical protein	
Chromosome	2669770	T T T T T T T C T T T T T T T C T T T T	-	GBAA2877	EmrB/QacA family drug resistance transporter	
Chromosome	2670425	T T T T T T T T C T T T T T T T C T T T T	-	GBAA2881	solute-binding family 5 protein	
Chromosome	2670535	A A A A A A A A A A A A A A A A A A A A	-	GBAA2881	solute-binding family 5 protein	
Chromosome	2671719	A A A A A A A A A A A A A G A A A A A A A A	-	GBAA2882	solute-binding family 5 protein	
Chromosome	2672362	C C C C C C C C A C C C C C C C C A C C C	-	GBAA2882	major facilitator family transporter	
Chromosome	2674870	C C C C C C C C C C C C C T C C C C C C	-	GBAA2883	major facilitator family transporter	
Chromosome	2676505	G G G G G G G G C G C G C G C G C G G G	-	GBAA2884	putative lipoprotein	
Chromosome	26769052	T T T T T T T C T T T T T T T C T T T T T T	-	GBAA2891	hypothetical protein	
Chromosome	2678265	A A A A A A A A A A A A A A A A A A A A	-	GBAA2896	transporter, putative	
Chromosome	2680151	C C C C C C C C C T C C C C C C C C C C	-	GBAA2896	transporter, putative	
Chromosome	2682587	C C C C C C C G T T C C C C C C C T C C	-	GBAA2898	putative lipoprotein	
Chromosome	2685140	G G G G G G G G G G G G G G G G G G G	-	GBAA2901	panthothenate kinase	
Chromosome	2685593	T T T T T T T C T C T C T C T C T C T T T T	-	GBAA2904	hypothetical protein	
Chromosome	2689766	A A A A A A A A A A A A A A A A A A A A	-	GBAA2906	ABC transporter ATP-binding protein	
Chromosome	2689776	A A A A A A A A A A A A A A A A A A A A	-	GBAA2917	hypothetical protein	
Chromosome	2690488	G G G G G G G G A A G A G A G A G A G G G	-	GBAA2917	hypothetical protein	
Chromosome	2693464	G G G G G G G G G A G G G G G G G G G G	-	GBAA2921	sulfonate ABC transporter, sulfonate-binding protein, putative	
Chromosome	2695371	C C C C T T T C T T T C T C T C T T T C C	-	GBAA2923	hypothetical protein	
Chromosome	2696380	C C C C C C C C C A C C C C C C C C A C C C	-			
Chromosome	2697062	T T T T T T T C T T T T T T T C T T T T T T	-	GBAA2927	hypothetical protein	
Chromosome	2698185	T T T T T T T C T T T T T T T C T T T T T T	-	GBAA2927	hypothetical protein	
Chromosome	2698633	T T T T C C C T C C C C C T T C C C C C C T	-	GBAA2927	hypothetical protein	
Chromosome	2701404	G G G G G G G G G G G G G G G G G G G G	-			
Chromosome	2704355	A A A A A A A A A A A A A A A A A A A A	-	GBAA2936	hypothetical protein	
Chromosome	2704730	G G G G G G G G A A G G G G G G G G G G	-	GBAA2936	hypothetical protein	
Chromosome	2706197	C C C C A A A C A A A A A C A A A A A A A A	-	GBAA2939	acetyltransferase	
Chromosome	2706276	C C C C A A A C A A A A A C A A A A A A A A	-	GBAA2939	acetyltransferase	
Chromosome	2706300	A A	-	GBAA2939	acetyltransferase	
Chromosome	2706637	G G G G G G G G A A G G G G G G G G G G G G	-	GBAA2940	hypothetical protein	
Chromosome	2707051	T T T T T T T T G T T T T T T T T T T T T T	-	GBAA2940	hypothetical protein	
Chromosome	2707289	G G G G G G G G T G G G G G G G G T G G G G	-	GBAA2941	hypothetical protein	
Chromosome	2714653	G G	-	GBAA2948	ABC transporter ATP-binding protein	
Chromosome	2717579	A A	-			
Chromosome	2718148	A A	-			
Chromosome	2718339	C C	-			
Chromosome	2720236	T T T T T T T T T T T T C T T T T T T T T T T	-			
Chromosome	2721530	G G	-	GBAA2952	acetyltransferase	
Chromosome	2722072	A A A A A A A A A A A A C A C A C A C A C A A	-	GBAA2952	acetyltransferase	
Chromosome	2722621	T T T T T T T C T C T C T C T C T C T C T C T	-	GBAA2953	3-phosphoshikimate 1-carboxyvinyltransferase	
Chromosome	2723483	C C C C C C C C C T C T C T C T C T C T C T C	-	GBAA2953	3-phosphoshikimate 1-carboxyvinyltransferase	
Chromosome	2724165	T T T T T T T C T C T T T C T C T C T C T C T	-	GBAA2954	prephenate dehydrogenase	
Chromosome	2730518	G G	-	GBAA2959	hypothetical protein	
Chromosome	2730745	T T T T T T T C T C T T T C T T C T C T C T C T	-	GBAA2959	hypothetical protein	
Chromosome	2731858	C C	-	GBAA2959	hypothetical protein	
Chromosome	2732086	T T T T T T T T T T C T C T T T C T C T C T C T	-	GBAA2960	hypothetical protein	
Chromosome	2734589	T T T T T T T C T C T T T C T T T C T C T C T T	-	GBAA2964	acetyltransferase	
Chromosome	2738081	A A	-	GBAA2969	hypothetical protein	
Chromosome	2738084	T T T T T T T C T T T T T T T T T T T T T T C	-	GBAA2969	hypothetical protein	
Chromosome	2738352	T C	-	GBAA2970	RNA polymerase sigma factor	
Chromosome	2738799	C C C C C C C C C T T C C C C C C C C C C C	-	GBAA2970	RNA polymerase sigma factor	
Chromosome	2738925	T T T T T T T T C T T T T T T T T C T T T T T	-	GBAA2972	hypothetical protein	
Chromosome	2739600	C C	-	GBAA2972	hypothetical protein	
Chromosome	2739790	T T T T T T T T T T G T T T T T T T T T T T T	-	GBAA2972	hypothetical protein	
Chromosome	2740541	G G G G G G G G A G G G G G G G G G G G G G	-	GBAA2973	hypothetical protein	
Chromosome	2741152	C C	-			
Chromosome	2741508	A A A G G G A A A A A A A A A A A A A A A A	-	GBAA2974	malate:quinone oxidoreductase	
Chromosome	2743932	C C C C C C C C C C A C C C C C C C C C C C	-	GBAA2975	sugar ABC transporter, sugar-binding protein, putative	
Chromosome	2744036	G G	-	GBAA2975	sugar ABC transporter, sugar-binding protein, putative	
Chromosome	2744044	C C	-	GBAA2976	ribose ABC transporter permease	
Chromosome	2744665	G G G G G G G G C G C G G G G G G G G G G G	-	GBAA2976	ribose ABC transporter permease	
Chromosome	2748334	A A A A A A A A G G A A A A A A A A A A A A	-	GBAA2979	transcriptional regulator, putative	
Chromosome	2748541	G G G G G G G G A G G G G G G G G G G G G G	-	GBAA2979	transcriptional regulator, putative	
Chromosome	2748754	T T T T T T T T T T G T T T T T T T T T T T T	-			
Chromosome	2749444	C C	-			
Chromosome	2749671	A A G	-			
Chromosome	2753350	C C C C C C C C T C T C T C T C T C T C C C	-	GBAA2986	putative lipoprotein	





Chromosome	3155209	T	T	T	T	T	C	T	T	T	T	T	C	T	T	T	tkt-1	GBAA3432	transketolase
Chromosome	3157345	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	zwf	GBAA3433	glucose-6-phosphate 1-dehydrogenase
Chromosome	3162846	A	A	A	A	A	A	G	A	A	A	A	A	A	A	A	GAA3440	short chain dehydrogenase/reductase family oxidoreductase	
Chromosome	3162871	C	C	C	T	T	C	T	T	T	C	T	T	T	T	C	GAA3440	short chain dehydrogenase/reductase family oxidoreductase	
Chromosome	3166431	A	A	A	A	A	A	T	T	A	A	A	T	A	A	A	GAA3443	enhancer family protein	
Chromosome	3169023	G	G	G	G	G	G	G	G	C	G	G	G	G	G	G	-	GBAA3448	4-oxalocrotonate tautomerase family protein
Chromosome	3175072	G	G	G	G	G	G	G	G	A	G	G	G	G	G	G	-	GBAA3450	glyoxalase family protein
Chromosome	3177938	A	A	A	A	A	A	C	A	A	A	C	C	A	A	A	-	GBAA3452	hypothetical protein
Chromosome	3178284	G	G	G	G	G	G	G	G	A	G	G	G	G	G	G	-	GBAA3458	GntR family transcriptional regulator
Chromosome	3181350	G	G	G	G	G	G	G	G	A	G	G	G	G	G	G	-	GBAA3458	GntR family transcriptional regulator
Chromosome	3181685	A	A	A	A	A	A	A	A	A	A	A	G	A	A	A	-	GBAA3465	meta-beta-lactamase family protein
Chromosome	3181688	A	A	A	A	A	A	C	A	A	A	A	A	C	A	A	-	GBAA3466	hypothetical protein
Chromosome	3182039	G	G	G	G	G	G	G	G	A	G	G	G	G	G	G	-	GBAA3466	hypothetical protein
Chromosome	3182245	A	A	A	A	A	A	G	G	A	G	A	G	G	A	A	-	GBAA3468	hypothetical protein
Chromosome	3187421	G	G	G	G	G	G	G	G	A	G	G	G	G	G	G	-	GBAA3470	hypothetical protein
Chromosome	3188248	G	G	G	G	G	G	G	G	A	G	G	G	G	G	G	-	GBAA3470	hypothetical protein
Chromosome	3188654	C	C	C	C	C	C	C	C	T	C	C	C	C	T	C	-	GBAA3470	hypothetical protein
Chromosome	3189667	A	A	A	A	A	A	A	A	A	G	A	A	A	A	A	-	GBAA3470	hypothetical protein
Chromosome	3189885	A	A	A	A	A	A	A	A	A	G	A	A	A	A	A	-	GBAA3470	hypothetical protein
Chromosome	3193073	C	C	C	C	C	C	C	C	T	C	C	C	C	C	C	-	GBAA3470	hypothetical protein
Chromosome	3196691	C	C	C	C	C	C	C	T	C	C	C	C	C	T	C	-	GBAA3470	hypothetical protein
Chromosome	3197166	A	A	A	G	A	A	A	A	A	A	A	A	A	A	A	-	GBAA3470	hypothetical protein
Chromosome	3198903	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	-	GBAA3480	glycosyl transferase, group 2 family protein/polysaccharide deacetylase family protein
Chromosome	3199714	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	-	GBAA3490	DeoR family transcriptional regulator
Chromosome	3209707	G	G	G	G	G	G	G	G	A	G	G	G	G	G	G	-	GBAA3494	hypothetical protein
Chromosome	3213054	A	A	A	A	A	A	G	G	A	G	A	G	G	A	A	-	GBAA3495	hypothetical protein
Chromosome	3213664	A	A	A	A	A	A	C	C	A	A	A	C	C	A	A	-	GBAA3495	hypothetical protein
Chromosome	3213784	C	C	C	C	C	C	C	C	T	C	C	C	C	C	C	-	GBAA3497	hydroxylamine reductase
Chromosome	3215077	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	-	GBAA3498	hypothetical protein
Chromosome	3215548	A	A	A	G	G	G	A	G	G	G	G	G	G	G	G	-	GBAA3501	lysosome, putative
Chromosome	3218493	C	C	C	C	C	C	C	C	T	C	C	C	C	C	C	-	GBAA3519	hypothetical protein
Chromosome	3219340	A	A	A	A	A	A	C	C	A	C	A	C	C	A	A	-	GBAA3527	hypothetical protein
Chromosome	3219298	A	A	A	A	A	A	A	A	G	A	A	A	G	G	A	-	GBAA3531	iron compound ABC transporter, iron compound-binding protein, putative
Chromosome	3219986	A	A	A	A	A	A	A	A	G	A	A	A	A	A	A	-	GBAA3536	PhnZ family phenazine biosynthesis protein
Chromosome	3220853	G	G	G	G	G	G	A	G	G	G	G	A	G	G	G	-	GBAA3536	hypothetical protein
Chromosome	3224646	T	T	T	T	T	T	C	T	T	T	T	C	T	T	T	-	GBAA3512	hypothetical protein
Chromosome	3227122	A	A	A	G	G	G	A	G	G	G	G	G	G	G	A	-	GBAA3519	hypothetical protein
Chromosome	3231414	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	-	GBAA3527	hypothetical protein
Chromosome	3236875	G	G	G	G	G	G	G	G	G	T	G	G	G	G	G	-	GBAA3531	iron compound ABC transporter, iron compound-binding protein, putative
Chromosome	3240209	T	T	T	T	T	T	T	C	T	T	T	T	T	C	T	-	GBAA3536	PhnZ family phenazine biosynthesis protein
Chromosome	3243357	G	G	G	G	G	G	A	G	A	G	G	A	G	G	G	-	GBAA3536	hypothetical protein
Chromosome	3244553	T	T	T	T	T	T	G	T	T	T	T	T	T	T	T	-	GBAA3537	hypothetical protein
Chromosome	3245669	T	T	T	T	T	T	T	T	C	T	T	T	T	T	T	-	GBAA3537	hypothetical protein
Chromosome	3248540	A	A	A	G	G	A	G	G	G	A	G	A	G	G	A	-	GBAA3545	phosphoglycerate mutase, putative
Chromosome	3250909	A	A	A	A	A	A	G	A	A	A	A	A	G	A	A	-	GBAA3545	phosphoglycerate mutase, putative
Chromosome	3251202	C	C	C	C	C	C	C	C	T	C	C	C	C	C	C	-	GBAA3547	MutS family protein, putative
Chromosome	3252973	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	-	GBAA3547	MutS family protein, putative
Chromosome	3253921	A	A	A	A	A	A	A	A	A	C	A	A	A	A	A	-	GBAA3547	cytoplasmic alpha-amylase
Chromosome	3255672	T	T	T	T	T	T	C	T	T	T	C	T	T	T	T	-	GBAA3551	cytoplasmic alpha-amylase
Chromosome	3256477	A	A	A	A	A	A	G	G	A	A	A	G	G	A	A	-	GBAA3551	cytoplasmic alpha-amylase
Chromosome	3256688	T	T	T	C	C	T	C	C	C	T	C	C	C	C	T	-	GBAA3551	cytoplasmic alpha-amylase
Chromosome	3256720	G	G	G	G	G	G	A	G	G	G	G	A	G	G	G	-	GBAA3551	cytoplasmic alpha-amylase
Chromosome	3256870	T	T	T	C	C	T	C	C	T	T	C	C	C	C	T	-	GBAA3551	cytoplasmic alpha-amylase
Chromosome	3257937	A	A	A	A	A	A	A	A	G	A	A	A	A	A	A	-	GBAA3551	cytoplasmic alpha-amylase
Chromosome	3257981	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	-	GBAA3551	cytoplasmic alpha-amylase
Chromosome	3259199	T	T	T	T	T	T	T	T	C	T	T	T	T	T	T	-	GBAA3552	oligoendopeptidase F
Chromosome	3259585	C	C	C	C	C	C	A	A	C	A	C	A	C	C	C	-	GBAA3552	oligoendopeptidase F
Chromosome	3260131	A	A	A	A	A	A	A	A	A	A	A	G	A	A	A	-	GBAA3554	penicillin-binding protein, putative
Chromosome	3261725	G	G	G	G	G	G	A	G	A	A	G	A	A	G	A	-	GBAA3556	major facilitator family transporter
Chromosome	3262870	T	T	T	T	T	T	G	T	T	T	G	T	T	T	T	-	GBAA3556	major facilitator family transporter
Chromosome	3264610	A	A	A	A	A	A	G	G	A	G	A	G	A	G	A	-	GBAA3559	hypothetical protein
Chromosome	3264678	T	T	T	T	T	T	C	T	T	T	C	T	T	T	T	-	GBAA3559	hypothetical protein
Chromosome	3270956	A	A	A	A	A	A	G	G	A	A	G	A	G	A	A	-	GBAA3565	ArsF family transcriptional regulator
Chromosome	3271305	A	A	A	A	A	A	A	A	C	A	A	A	A	A	A	-	GBAA3566	alcohol dehydrogenase, zinc-containing
Chromosome	3275914	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	-	GBAA3571	protease synapse and sporulation negative regulatory protein PAI 2
Chromosome	3277854	G	G	G	G	G	G	A	G	G	G	G	G	G	G	G	-	GBAA3574	bile acid transporter family protein
Chromosome	3279398	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	-	GBAA3575	glycolate oxidase, subunit GldC, putative
Chromosome	3279991	A	A	A	A	A	A	A	A	G	A	G	A	A	A	A	-	GBAA3581	degJ/dmJ/cjyJ/sfrJ family protein
Chromosome	3285490	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	-	GBAA3582	glycosyl transferase, group 2 family protein
Chromosome	3288865	C	C	C	C	C	C	C	C	T	C	C	C	C	C	C	-	GBAA3584	collagenase, putative
Chromosome	3291655	T	T	T	T	T	T	T	T	G	T	T	T	T	T	T	-	GBAA3586	acetyltransferase
Chromosome	3293046	A	A	A	A	A	A	A	A	G	A	A	A	A	A	A	-	GBAA3587	glyoxalase family protein
Chromosome	3294750	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	-	GBAA3588	putative lipoprotein
Chromosome	3295143	G	G	G	G	G	G	A	G	G	G	G	G	A	G	G	-	GBAA3588	putative lipoprotein
Chromosome	3295225	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	-	GBAA3591	hypothetical protein
Chromosome	3297853	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	-	GBAA3592	hypothetical protein
Chromosome	3298258	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	-	GBAA3592	hypothetical protein
Chromosome	3303342	C	C	C	C	C	C	C	C	T	C	C	C	C	C	C	-	GBAA3600	acetyltransferase
Chromosome	3304199	A	A	A	A	A	A	G	A	A	A	A	A	G	A	A	-	GBAA3601	hypothetical protein
Chromosome	3304424	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	-	GBAA3601	hypothetical protein
Chromosome	3306232	A	A	A	A	A	A	A	A	G	A	A	A	A	A	A	-	GBAA3601	hypothetical protein
Chromosome	3310574	G	G	G	G	G	G	A	G	G	G	G	G	G	A	A	-	GBAA3601	hypothetical protein
Chromosome	3310645	A	A	A	A	A	A	A	A	G	A	A	A	A	A	A	-	GBAA3601	hypothetical protein
Chromosome	3310809	C	C	C	C	C	C	T	C	T	C	T	C	T	C	C	-	GBAA3611	hypothetical protein
Chromosome	3311851	G	G	G	T	G	G	G	G	G	G	G	G	G	T	G	-	GBAA3603	acetyltransferase
Chromosome	3312017	A	A	A	A	A	A	A	A	G	A	A	A	G	A	A	-	GBAA3603	acetyltransferase
Chromosome	3319061	C	C	C	C	C	C	C	C	A	C	C	C	C	C	C	-	GBAA3604	argininosuccinate lyase
Chromosome	3313113	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	-	GBAA3604	argininosuccinate lyase
Chromosome	3313282	T	T	T	T	T	T	T	T	T	C	T	T	T	T	T	-	GBAA3604	argininosuccinate lyase
Chromosome	3313339	A	A	A	A	A	A	A	A	T	A	A	A	A	A	A	-	GBAA3604	argininosuccinate lyase
Chromosome	3314718	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	-	GBAA3605	hypothetical protein
Chromosome	3315017	G	G	G	G	G	G	A	G	G	G	G	G	G	G	G	-	GBAA3605	hypothetical protein
Chromosome	3320108	G	G	G	G	G	G	A	G	A	G	G	A	G	G	G	-	GBAA3610	3-ketoacyl-(acyl-carrier-protein) reductase
Chromosome	3320794	T	T	T	T	T	T	C	T	T	T	C	T	T	T	T	-	GBAA3611	hypothetical protein
Chromosome	3323739	C	C	C	C	C	C	C	A	C	C	C	C	C	A	C	-	GBAA3629	hypothetical protein
Chromosome	3336905	T	T	T	T	T	T	T	T	T	A	T	T	T	T	T	-	GBAA3633	spore germination protein

Chromosome	3380414	G G G A A A A G A A A A A G A A A A A G A A A A A G A A G A	acnA	GBAA3677	aconitate hydratase
Chromosome	3381448	C C	acnA	GBAA3677	aconitate hydratase
Chromosome	3382079	C T T T T T T T T T T T C T T T T T T T T T T T T	acnA	GBAA3677	aconitate hydratase
Chromosome	3386925	A A A A A A A A G G G G G A A G G G G G A A A A A A	-	GBAA3684	alanyl-tRNA synthetase family protein
Chromosome	3394083	C C	-	GBAA3692	hypothetical protein
Chromosome	3398818	G G A A A A G A A A A A G A A A A A G A A A A A A G A	-	GBAA3698	N-acetylumamoyl-L-alanine amidase, putative
Chromosome	3398820	A A A C C C A C C C C C C C C C C C C C C C C C C C	-	GBAA3698	N-acetylumamoyl-L-alanine amidase, putative
Chromosome	3399189	G G	-	GBAA3698	hypothetical protein
Chromosome	3403457	C C	-	GBAA3703	phospholipase/carboxylesterase family protein
Chromosome	3404208	G G G G G G G G A G G G G G G G G G G G G G G G G G	-	GBAA3704	glyoxylase family protein
Chromosome	3404212	C C C C C C C C T T C C C C C C C C C C C C C C C C	-	GBAA3704	glyoxylase family protein
Chromosome	3406379	C C C C C C C C T C C C C C C C C C C C C C C C C C	-	GBAA3704	glyoxylase family protein
Chromosome	3408616	C C C C C C C C T T C T C C T C C T C C T C C C C C C	-	GBAA3707	Cys family NADH-dependent flavin oxidoreductase
Chromosome	3410686	G G	hutG	GBAA3709	formimidoylglutamate
Chromosome	3413516	T T T T T T T T T T T T C T T T T T T C T T T T T T	hutU	GBAA3711	urocanate hydratase
Chromosome	3413590	A A A A A A A A G A A A A A A A A A A A A A A A A A	-	GBAA3711	urocanate hydratase
Chromosome	3415469	G G	hutH	GBAA3712	histidine ammonia-lyase
Chromosome	3415743	G G G G G G G G A G G G G G G G G G G G G G G G G G	hutH	GBAA3712	histidine ammonia-lyase
Chromosome	3428581	A A A A A A A A G A A A A A A A A A A A A A A A A A	-	GBAA3725	hypothetical protein
Chromosome	3429305	A A	-	GBAA3726	hypothetical protein
Chromosome	3432443	A A	-	GBAA3730	holin-like protein
Chromosome	3433941	T T	-	GBAA3734	hypothetical protein
Chromosome	3434133	C C	-	GBAA3746	hypothetical protein
Chromosome	3435168	A A A A A A A G A A A A A A A A A A A A A A A A A A	-	GBAA3747	phosphonate ABC transporter permease
Chromosome	3437380	T T T T T T T T T T T T G T T T T T T T T T T T T T	-	GBAA3755	hypothetical protein
Chromosome	3437423	C C	-	GBAA3756	hypothetical protein
Chromosome	3447643	C C	-	GBAA3756	hypothetical protein
Chromosome	3448034	G G	-	GBAA3760	prophage LambdaBa01 TPR domain-containing protein
Chromosome	3452699	A A	-	GBAA3770	hypothetical protein
Chromosome	3455152	A A A G G G A G G G G G G G G G G G G G G G G G G G	-	GBAA3771	prophage LambdaBa01, minor structural protein
Chromosome	3455737	A A	-	GBAA3771	prophage LambdaBa01, minor structural protein
Chromosome	3455806	G G	-	GBAA3791	hypothetical protein
Chromosome	3457241	C C C C C C C C T C T C T C T C T C T C C C C C C C C	-	GBAA3791	hypothetical protein
Chromosome	3464157	A A	-	GBAA3770	hypothetical protein
Chromosome	3464708	A A A A A A A A A A A A G G A G G A G G A G G A A A A	-	GBAA3771	prophage LambdaBa01, minor structural protein
Chromosome	3466032	C C	-	GBAA3771	prophage LambdaBa01, minor structural protein
Chromosome	3481363	C C	-	GBAA3791	hypothetical protein
Chromosome	3481380	C C	-	GBAA3791	hypothetical protein
Chromosome	3483542	C C	-	GBAA3805	prophage LambdaBa01, acyltransferase, putative
Chromosome	3489116	A A	-	GBAA3807	hypothetical protein
Chromosome	3492609	C C T C G C G C G C G C G C G C G C G C G C G C G	-	GBAA3813	prophage LambdaBa01, thymidylate synthase-complementing protein
Chromosome	3494352	C C	-	GBAA3814	prophage LambdaBa01, C-5 cytosine-specific DNA methylase family protein
Chromosome	3495050	C C	-	GBAA3816	hypothetical protein
Chromosome	3496615	C C	-	GBAA3818	hypothetical protein
Chromosome	3497378	G G	-	GBAA3819	hypothetical protein
Chromosome	3499219	A A	-	GBAA3822	hypothetical protein
Chromosome	3499843	T T T T T T T T T T G T G T G T G T G T T T T T T T	-	GBAA3805	prophage LambdaBa01, acyltransferase, putative
Chromosome	3500942	G G	-	GBAA3807	hypothetical protein
Chromosome	3501030	A A A A A A A A A A C C A C A A A A A C C C A A A A	-	GBAA3813	prophage LambdaBa01, thymidylate synthase-complementing protein
Chromosome	3502201	T T T T T T T T T T T T C T T T T T T T T T T T T T	-	GBAA3814	prophage LambdaBa01, C-5 cytosine-specific DNA methylase family protein
Chromosome	3502481	G G	-	GBAA3816	hypothetical protein
Chromosome	3504722	T T T T T T T T T T T T C T T T T T T T T T T T T T	-	GBAA3818	hypothetical protein
Chromosome	3504726	A A	-	GBAA3819	hypothetical protein
Chromosome	3506063	G G	-	GBAA3822	hypothetical protein
Chromosome	3512415	A A	-	GBAA3850	prophage LambdaBa01, acyltransferase, putative
Chromosome	3512494	C C	-	GBAA3852	hypothetical protein
Chromosome	3513042	T T T T T T T T T T T T C T T T T T T C T T T T T T T	-	GBAA3853	GABA permease
Chromosome	3513362	C C	-	GBAA3853	GABA permease
Chromosome	3513289	T T	-	GBAA3857	formate transporter, putative
Chromosome	3513290	G G	-	GBAA3861	hypothetical protein
Chromosome	3512413	A A A A A A A A A A C A C A A A A A A A A A A A A A	-	GBAA3863	hypothetical protein
Chromosome	3512468	G G	-	GBAA3865	hypothetical protein
Chromosome	3525350	A A	-	GBAA3865	hypothetical protein
Chromosome	3525894	G G	-	GBAA3872	peptidase T
Chromosome	3526239	G G	-	GBAA3872	peptidase T
Chromosome	3529845	G G	-	GBAA3873	hypothetical protein
Chromosome	3534034	G G	-	GBAA3876	phosphoglycerate mutase family protein, putative
Chromosome	3534210	A A	-	GBAA3877	alpha/beta fold family hydrolase
Chromosome	3535236	T T T T T T T T T T C T C T C T C T C T C T C T T T T	-	GBAA3883	hypothetical protein
Chromosome	3535633	A A A G A	-	GBAA3883	hypothetical protein
Chromosome	3535889	T T T T T T T T C T T C T T C T C T C T C T C T T T T	-	GBAA3889	stage V sporulation protein K
Chromosome	3538131	A A A A A A A A A A A A G G A G G A A G G A A A A A A	-	GBAA3890	stage V sporulation protein K
Chromosome	3543653	A A	-	GBAA3891	iron compound ABC transporter, permease protein
Chromosome	3543698	G G	-	GBAA3891	iron compound ABC transporter, permease protein
Chromosome	3544691	G G	-	GBAA3891	iron compound ABC transporter, permease protein
Chromosome	3546095	G G	-	GBAA3896	hypothetical protein
Chromosome	3546877	C C	-	GBAA3897	hypothetical protein
Chromosome	3547964	C C	-	GBAA3899	hypothetical protein
Chromosome	3548054	A A	-	GBAA3900	hypothetical protein
Chromosome	3548188	T T T T T T T T T T T T C T T T T T T T T T T T T T	-	GBAA3901	bacteriocin ABC transporter, permease protein subunit, putative
Chromosome	3548200	G G	-	GBAA3901	bacteriocin ABC transporter, permease protein subunit, putative
Chromosome	3562234	G G	-	GBAA3903	bacteriocin ABC transporter, ATP-binding protein, putative
Chromosome	3562764	T T T T T T T T T T T T C T T T T T T T T T T T T T	-	GBAA3905	DNA mismatch repair protein
Chromosome	357125	G G	-	GBAA3909	lantibiotic biosynthesis sensor histidine kinase, putative
Chromosome	357222	T T T T T T T T T T T T C T T T T T T T T T T T T T	-	GBAA3909	lantibiotic biosynthesis DNA-binding response regulator, putative
Chromosome	3572950	T T T T T T T T T T T T C T T T T T T C T T T T T T T	-	GBAA3901	bacteriocin ABC transporter, permease protein subunit, putative
Chromosome	3572978	T T T T T T T T T T T T G T T T T T T T T T T T T T	-	GBAA3901	bacteriocin ABC transporter, permease protein subunit, putative
Chromosome	3574162	G G	-	GBAA3902	bacteriocin ABC transporter, permease protein subunit, putative
Chromosome	3574866	A A A A A A A A A A C A C A C A C A C A C A A A A	-	GBAA3903	bacteriocin ABC transporter, ATP-binding protein, putative
Chromosome	3578145	T T T T T T T T T T T T C T T T T T T T T T T T T T	-	GBAA3905	DNA mismatch repair protein
Chromosome	3583769	A A A A A A A A A A A A G A A A A A A G A A A A A A	-	GBAA3909	2-oxoglutarate ferredoxin oxidoreductase subunit beta
Chromosome	3585055	G G	-	GBAA3910	pyruvate ferredoxin oxidoreductase, alpha subunit, putative
Chromosome	3585421	C C	-	GBAA3910	pyruvate ferredoxin oxidoreductase, alpha subunit, putative
Chromosome	3587779	C C C C C C C C C T C T C T C T C T C T C C C C C C	-	GBAA3913	phosphotriesterase family protein
Chromosome	3590846	G G	-	GBAA3915	recombinase A
Chromosome	3590885	A A A A G G A	-	GBAA3915	recombinase A
Chromosome	3592346	A A	-	GBAA3916	competence damage-inducible protein A
Chromosome	3592394	C C C C C C C C T T C T C T C T C T C T C C C C C C	-	GBAA3916	competence damage-inducible protein A
Chromosome	3592539	T T T T T T T T T T T T A T T T T T T T T T T T T T	-	GBAA3916	competence damage-inducible protein A
Chromosome	3592541	A A	-	GBAA3916	competence damage-inducible protein A
Chromosome	3593664	T T T C T	-	GBAA3917	CDP-diacylglycerol-glycerol-3-phosphate 3-phosphatidyltransferase
Chromosome	3595765	T T T G T	-	GBAA3920	hypothetical protein
Chromosome	3597160	T T T T T T T T T T A A T A T A T T A T T T T T T T T	-	GBAA3922	zinc protease
Chromosome	3597969	G G	-	GBAA3922	zinc protease
Chromosome	3600057	A A	-	GBAA3923	hypothetical protein
Chromosome	3600786	C C T T T T C T T T T T T C T T T C T T T T T T C C	-	GBAA3923	hypothetical protein
Chromosome	3600923	C C C C C C C C T C C C C C C C C C C C C C C C C C	-	GBAA3923	hypothetical protein
Chromosome	3601031	G G	-	GBAA3928	GntR family transcriptional regulator
Chromosome	3601149	T T T T T T T T G T T T T T T T T T T T T T T T T T	-	GBAA3928	GntR family transcriptional regulator
Chromosome	3604832	G G	-	GBAA3932	hypothetical protein
Chromosome	3605094	A A	-	GBAA3932	hypothetical protein
Chromosome	3608460	G G	-	GBAA3935	dihydrodipicolinate synthase
Chromosome	3612062	C C C C C C C C T T C C C C C T T C C C C C C C C	-	GBAA3935	dihydrodipicolinate synthase
Chromosome	3615726	G G G G G G G G A A G G G G G G G G G G G G G G G G	-	GBAA3939	dipicolinate synthase subunit A
Chromosome	3616488	C C C C C C C C T C C C C C C C C C C C C C C C C C	-	GBAA3939	dipicolinate synthase subunit A
Chromosome	3617617	G G G G G G G G A G G G G G G G G G G G G G G G G G	-	GBAA3942	zinc protease
Chromosome	3618671	G G	-	GBAA3943	polysaccharide deacetylase, putative
Chromosome	3621094	G G	-	GBAA3944	poly nucleotide phosphorylase/polyadenylate
Chromosome	3621380	T T T C C C T C C C C C C C C C C C C C C C C C C C	-	GBAA3944	poly nucleotide phosphorylase/polyadenylate
Chromosome	3621782	G G	-	GBAA3944	poly nucleotide phosphorylase/polyadenylate



Chromosome	3813449	C C C C C C C C C C T C C C C C C C C C -	GBAA4158	cell cycle protein FtsW	
Chromosome	3804984	C C C C C C C C C C A C C C C C C C C C -	GBAA4160	hypothetical protein	
Chromosome	3815560	T T T T T T T T C T T T T T T T T T T T -	GBAA4161	PhoH family protein	
Chromosome	3818343	A A A A A A A A G G A A A A A G G A A A A A typA	GBAA4162	GTP-binding protein TypA	
Chromosome	3818577	A typA	GBAA4166	GTP-binding protein TypA	
Chromosome	3818754	A typA	GBAA4166	GTP-binding protein TypA	
Chromosome	3820465	G G G G G G G G G G A G G G G G G G G G G G -	GBAA4167	hypothetical protein	
Chromosome	3822659	T T T T T T T C T T T T T T C T T T T T T T -	GBAA4171	hypothetical protein	
Chromosome	3823766	G G G G G G G G G G T G G G G G G G G G G G -	GBAA4172	lysine decarboxylase	
Chromosome	3826817	G G G G G G G G G A G G G G G G G G G G G G -	GBAA4178	hypothetical protein	
Chromosome	3832446	G G G G G G G G G A G G G G G G G G G G G G -	GBAA4193	M20/M25/M40 family peptidase	
Chromosome	3839224	C C C C C C C C C A C C C C C C C C C C C C -	GBAA4195	LysT family transcriptional regulator	
Chromosome	3841418	C C C C C C C C C C C A C C C C C C C C C C C -	GBAA4195	LysT family transcriptional regulator	
Chromosome	3841655	T T T T T T T C C T C T C T C C C C C C C C C -	GBAA4195	LysT family transcriptional regulator	
Chromosome	3841916	G G A G -	GBAA4198	hypothetical protein	
Chromosome	3842864	G G G G G G G G A A G A G G A A G A G G G G G G -	GBAA4198	hypothetical protein	
Chromosome	3843141	A A A A A A A A A A G A A A A A A A A A A A A -	GBAA4200	hypothetical protein	
Chromosome	3844039	G A -	GBAA4200	hypothetical protein	
Chromosome	3845179	C C C C C C C C C C C A C C C C C C C C C C C -	GBAA4229	maltosaccharide ABC transporter, maltosaccharide-binding protein, putative	
Chromosome	3851310	G G G G G G G G G G A G G G G G G G G G G G G -	GBAA4229	maltosaccharide ABC transporter, maltosaccharide-binding protein, putative	
Chromosome	3851344	C C C T T T C T T T C T C T T T T T T C T C T -	metE	5-methyltetrahydropteroyltriglutamate--homocysteine methyltransferase	
Chromosome	3860483	A A A A A A A A A A G A A A A A A A A A A A A -	GBAA4218	competence-specific nuclelease	
Chromosome	3862452	G G G A G G G G G G G G G G G G G G G G G G G -	GBAA4220	sporulation kinase B	
Chromosome	3863942	T -	kinB-3	aminotransferase A	
Chromosome	3865911	T T T T T T T T T T T C T T T T T T T T T T T -	GBAA4225	aminotransferase A	
Chromosome	3866041	A A A A G A A A A A A A A A A A A A A A A A A -	GBAA4225	aminotransferase A	
Chromosome	3866158	C C C C C C C C T C C C C C C C C T C C C C C -	GBAA4225	aminotransferase A	
Chromosome	3871474	T T T T T T T T T T T C T T C T T T T T T T T T -	GBAA4229	maltosaccharide ABC transporter, maltosaccharide-binding protein, putative	
Chromosome	3871818	T T T T T T T T T T T T A T T T T T T T T T T T -	GBAA4229	maltosaccharide ABC transporter, maltosaccharide-binding protein, putative	
Chromosome	3871847	A A A A A A A A A A A A G A A A A A A A A A A A -	GBAA4229	maltosaccharide ABC transporter, maltosaccharide-binding protein, putative	
Chromosome	3871854	C C G C -	GBAA4230	alpha-amylase	
Chromosome	3872842	G G G G G G G G A G G G G G G G G G G G G G G -	GBAA4233	hypothetical protein	
Chromosome	3877119	G G G G G G G G T T T G T G T G T G T G G G G G -	GBAA4233	hypothetical protein	
Chromosome	3877258	T T T T T T T T T T T C T T T T T T T T T T T -	-	5-methylthio-3-oxo-1-penten-1,2-diol dioxygenase, putative	
Chromosome	3882658	T T T T T C T T T T T T T T T T T T T T T T T -	GBAA4241	mutT/mutX family protein	
Chromosome	3882726	G G G G G G G G G G G G A G G G G G G G G G G G -	GBAA4242	hypothetical protein	
Chromosome	3883542	C -	GBAA4242	hypothetical protein	
Chromosome	3887221	G G G G G G A A A G A G G A G G A G G G G G G -	GBAA4258	hypothetical protein	
Chromosome	3895794	A -	GBAA4258	hypothetical protein	
Chromosome	3897696	T T T T T T T T T T T C T T C T T T T T T T T T -	-	GBAA4258	hypothetical protein
Chromosome	3898356	G G G G G G G G G G G A G G G G G G G G G G G -	GBAA4262	hypothetical protein	
Chromosome	3898412	C -	GBAA4262	hypothetical protein	
Chromosome	3902202	A A A A A A A A A A A A G A A A A A A A A A A A -	ptsI	phosphoenolpyruvate-protein phosphotransferase	
Chromosome	3902391	A -	ptsI	phosphoenolpyruvate-protein phosphotransferase	
Chromosome	3902808	A A A A A A A A G A G A G A G A A G A A A A A A -	ptsI	phosphoenolpyruvate-protein phosphotransferase	
Chromosome	3903186	T T T T T T T T T T T A T T T T T T T T T T T -	ptsI	phosphoenolpyruvate-protein phosphotransferase	
Chromosome	3903553	G G G G G G G G T T T G T G T G T G T G G G G G -	ptsI	phosphoenolpyruvate-protein phosphotransferase	
Chromosome	3906097	T T T T T T T T T T T C T C T T T T T T T T T T -	ptsG	PTS system, glucose-specific IIBC component	
Chromosome	3906099	A -	ptsG	PTS system, glucose-specific IIBC component	
Chromosome	3906109	G G G A A A A G A A A A A G G A A A A A A A A A G -	GBAA4269	HAD superfamily hydrolase	
Chromosome	3906152	A -	GBAA4267	GntR family transcriptional regulator	
Chromosome	3906166	A -	GBAA4267	N-acetylglucosamine-6-phosphate deacetylase	
Chromosome	3906822	A A A A A A A A C A A A A A A A A C A C A A A A A -	GBAA4274	N-acetylglucosamine-6-phosphate deacetylase	
Chromosome	3906900	G G G G G G G G G G A G G G G G G G G G G G G G -	GBAA4274	N-acetylglucosamine-6-phosphate deacetylase	
Chromosome	3907337	A A A A A A A A A G G A A A A A G G A A A A A A A A -	GBAA4274	N-acetylglucosamine-6-phosphate deacetylase	
Chromosome	3907341	C C C C C C C C T C T C T C C T C C C C C C C C C -	-	GBAA4271	HAD superfamily hydrolase
Chromosome	3908012	A A A A A A A A A A A A G G A A A A A G G A A A A A A -	GBAA4272	GntR family transcriptional regulator	
Chromosome	3908943	G G G G G G G A G G G G G G G G G G G G G G G G -	GBAA4272	N-acetylglucosamine-6-phosphate deacetylase	
Chromosome	3909949	A -	GBAA4274	N-acetylglucosamine-6-phosphate deacetylase	
Chromosome	3909907	C C C C C C C C C C T C C C C C C C C T C C C C C -	GBAA4274	N-acetylglucosamine-6-phosphate deacetylase	
Chromosome	3910193	A -	GBAA4274	N-acetylglucosamine-6-phosphate deacetylase	
Chromosome	3911006	G G G G G G G G G G G A G G G G G G G G G G G G -	GBAA4276	segregation and condensation protein B	
Chromosome	3912289	A -	scpB	segregation and condensation protein B	
Chromosome	3912415	G G G G G G G G G G G A G G G G G G G G G G G G -	GBAA4276	segregation and condensation protein B	
Chromosome	3913298	C -	GBAA4276	segregation and condensation protein B	
Chromosome	3915970	T T T T C T T T T T T T T T T T T T T T T T T T -	-	GBAA4285	HAD family hydrolase
Chromosome	3916951	A A A G G G A G G G G G G G G G G G G G G G G A G -	GBAA4285	HAD family hydrolase	
Chromosome	3927596	A -	GBAA4306	magnesium/cobalt transporter CorA	
Chromosome	3931302	C C C C C C C C C T C T C T C C T C T C C C C C C C -	deoB	phosphopentomutase	
Chromosome	3933945	T -	deoB	phosphopentomutase	
Chromosome	3937001	C -	GBAA4309	corA	
Chromosome	3937612	C -	GBAA4309	corA	
Chromosome	3937999	T T T T T T T C C T T T T T T T C C T T T T T T T T -	GBAA4314	stage II sporulation protein M	
Chromosome	3940117	T T T T T T T T C C T C T C T C T C T C T T T T T T -	GBAA4320	hypothetical protein	
Chromosome	3945078	A -	-	GBAA4325	hypothetical protein
Chromosome	3945468	C -	GBAA4325	hypothetical protein	
Chromosome	3949692	A -	GBAA4325	hypothetical protein	
Chromosome	3950566	C -	GBAA4325	hypothetical protein	
Chromosome	3950649	A -	GBAA4325	hypothetical protein	
Chromosome	3952181	T -	GBAA4327	acetyltransferase	
Chromosome	3953674	T T T T T T T T C T T T T T T T T T T T T T T T T -	GBAA4330	hypothetical protein	
Chromosome	3957782	T T T C C T -	ribD	ribD	
Chromosome	3959473	C -	GBAA4331	riboflavin biosynthesis protein RibD	
Chromosome	3961669	T -	GBAA4332	riboflavin synthase subunit alpha	
Chromosome	3962609	A -	GBAA4332	riboflavin synthase subunit alpha	
Chromosome	3962782	C -	GBAA4332	riboflavin synthase subunit alpha	
Chromosome	3964568	A -	GBAA4332	riboflavin synthase subunit beta	
Chromosome	3966728	T -	GBAA4342	biotin synthesis protein BioC, putative	
Chromosome	3969094	C -	GBAA4342	dithiobiotin synthetase	
Chromosome	3969439	G G G G G G G G G G A G A G G G G G G G G G G G -	GBAA4342	dithiobiotin synthetase	
Chromosome	3970948	T -	GBAA4349	hypothetical protein	
Chromosome	3971375	A -	GBAA4350	hypothetical protein	
Chromosome	3972140	T -	argF	ornithine carbamoyltransferase	
Chromosome	3973911	A A A G G G A G G G G G G G G G G G G G G G G A G -	argB	arginyl transferase	
Chromosome	3974404	T -	argB	arginyl transferase	
Chromosome	3977004	A A A A A A A G A A A A A A A A A A A A A A A A A -	GBAA4353	hypothetical protein	
Chromosome	3977050	C C C C C C C C T C C C C C C C C C C C C C C C C -	GBAA4353	hypothetical protein	
Chromosome	39799851	C -	GBAA4353	hypothetical protein	
Chromosome	3980086	G G G G G G G G G G A G G G G G G G G G G G G G -	GBAA4353	hypothetical protein	
Chromosome	3980884	T -	sdhA-2	pyrrole-5-carboxylate reductase	
Chromosome	3981229	T -	sdhB-2	pyrrole-5-carboxylate reductase	
Chromosome	3982376	T -	GBAA4361	L-serine dehydratase, iron-sulfur-dependent, alpha subunit	
Chromosome	3983490	T T T C C T -	GBAA4361	I-serine dehydratase, iron-sulfur-dependent, beta subunit	
Chromosome	3983531	A -	-	GBAA4369	hypothetical protein
Chromosome	3987434	A A A G G G A G G G G G G G G G G G G G G G G G -	GBAA4369	hypothetical protein	
Chromosome	3998739	C -	GBAA4369	hypothetical protein	
Chromosome	4000426	A -	GBAA4369	hypothetical protein	
Chromosome	4003487	C -	GBAA4369	hypothetical protein	
Chromosome	4004903	C -	GBAA4369	sensory box sigma-54 dependent DNA-binding response regulator	
Chromosome	4005648	G G G A A A A G A A A A A G G A A A A A A A A A A -	GBAA4369	sensory box sigma-54 dependent DNA-binding response regulator	
Chromosome	4005752	T -	spoIVB	hypothetical protein	
Chromosome	4005820	A A A A A A A A A A A A A C A C A A A A A A A A A -	spoIVB	hypothetical protein	
Chromosome	4006153	T T T T T T T C C T T T T C T C T C T C T T T T T T -	spoIVB	hypothetical protein	
Chromosome	4007472	C -	spoIVB	hypothetical protein	
Chromosome	4010511	T T T T T T C T T T T T T T T T T T T T T T T T T -	spoIVB	hypothetical protein	
Chromosome	4010942	A A A A A A A C A C A A A C A C A A A C A C A A A -	recN	DNA repair protein RecN	
Chromosome	4011965	A A A A A A A A A A A A A G A A A A A A A A A A A -	GBAA4397	DNA repair protein RecN	
Chromosome	4012078	C C C C C C C C T C T C C C C C C C C C C C C C C -	GBAA4397	DNA repair protein RecN	
Chromosome	4017716	C C C C C C C T C C C C C C C C C C C C C C C C C -	ispA	geranyltransferase	

Chromosome	4018494	C C C C C C C C C C T C C C C C C C C	xseA	GBAA4404	exoendoxonuclease VII large subunit
Chromosome	4019097	T T T T T T T T T T C T T T T T T T T	xseA	GBAA4404	exoendoxonuclease VII large subunit
Chromosome	4021265	T T T T T T T T T T G G T T T T T T T T	spolIIAF	GBAA4412	stage III sporulation protein AF
Chromosome	4025791	T T T T C T T T T T T T T T T T T T T	spolIIB	GBAA4412	stage IIII sporulation protein AE
Chromosome	4026096	A A A A A A A A A A A A T A A A A A A A	spolIIAC	GBAA4413	stage IIII sporulation protein AC
Chromosome	4027511	A A A A A A A A A A A C A A A A A A C A	spolIIAD	GBAA4415	stage IIII sporulation protein AA
Chromosome	4028004	A A A A A A A A A G A A A A A A G A A A	spolIIAB	GBAA4416	stage IIII sporulation protein SpoAB
Chromosome	4028537	A A A A A A A A A G G A G A G A G G A A	spolIIAA	GBAA4417	stage IIII sporulation protein AA
Chromosome	4028881	T T T T T T T T T T T T C T T T T T T T	elfP	GBAA4421	elongation factor P
Chromosome	4031219	T T T T T T T T C T T T T T T C T T T T	-	GBAA4426	hypothetical protein
Chromosome	4035203	T T C T T T T T T T T T T T T T T T T	-	GBAA4427	HAD superfamily hydrolase
Chromosome	4035440	G G G G G G G G G G G G G G G G G G G	splB	GBAA4429	spore photoproduct lyase
Chromosome	4037072	G G G G G G G G G G G G G G G G G G G	splB	GBAA4429	spore photoproduct lyase
Chromosome	4037455	A A A G G G G A G G G G A A G G G G G	-	GBAA4430	hypothetical protein
Chromosome	4037597	C C C C C C C C C C C C C C C C C C	-	GBAA4430	hypothetical protein
Chromosome	4038251	C C C C C C C C C C C C C C C C C C	-	GBAA4435	sugE protein
Chromosome	4040113	C C C C C C C C C C C C C C C C C C	-	GBAA4436	sugE protein
Chromosome	4042203	A A A A A A A A A A A A G A A A A A A A	sugE-1	GBAA4435	sugE protein
Chromosome	4042504	A A A A A A A A A A A G G G G G G G G	sugE-2	GBAA4436	sugE protein
Chromosome	4042912	C C C T T T C T T T C T T C T T T T T	-	GBAA4437	hypothetical protein
Chromosome	4044613	A A A A A A A A A A A G A A A A A A A A	-	GBAA4440	hypothetical protein
Chromosome	4045620	G G G G G G G G G G G G G G G G G G G	-	GBAA4442	hypothetical protein
Chromosome	4048716	T T T T T T T T T T T G T T T T T T T T	yghK	GBAA4447	glycine dehydrogenase subunit 2
Chromosome	4051076	G G G G G G G G G G G G G G G G G G G	govT	GBAA4449	glycine cleavage system aminomethyltransferase T
Chromosome	4055609	A A A A A A A A A G A A A A A A A A G	-	GBAA4451	comG operon protein 6, putative
Chromosome	4058588	T T T T T T T C T T T T T T C T T T T T	-	GBAA4461	comG operon protein 3
Chromosome	4059092	C C C C C C C T T C T C C T T C C C C	comGC	GBAA4464	comG operon protein 3
Chromosome	4059334	A A A A A A A A A C A A A A A A A C A A	comGC	GBAA4464	comG operon protein 3
Chromosome	4066166	T T T T T T T C T C T C T C T C T T T T	-	GBAA4473	hypothetical protein
Chromosome	4066901	G G G G G G G G G G G G G G G G G G G	-	GBAA4475	hypothetical protein
Chromosome	4071450	A A A G A A A A A A A A A A A A A A A A	metH	GBAA4478	5-methyltetrahydrofolate--homocysteine methyltransferase
Chromosome	4071698	T T T T T T C T C T C T C T C T T T T T	metH	GBAA4478	5-methyltetrahydrofolate--homocysteine methyltransferase
Chromosome	4074082	A A A A A A A A A A A A G A A A A A A A A	-	GBAA4491	nucleotidyl transferase family protein
Chromosome	4076953	C C C C C C C A A C C C C C C A A C C C	-	GBAA4491	nucleotidyl transferase family protein
Chromosome	4076987	A A A A A A A A A A A G G A A A A A G G A	-	GBAA4491	nucleotidyl transferase family protein
Chromosome	4077012	G G G G G G G G G G G G G G G G G G G	-	GBAA4493	ArsR family transcriptional regulator
Chromosome	4077881	G G G G G G G G G G G G G G G G G G G	-	GBAA4497	glucokinase
Chromosome	4081152	C C C C C C C T C C C C C C C T C C C C	glcK	GBAA4497	glucokinase
Chromosome	4081826	G G G G G G G A A G A G A G G A A G G G G	-	GBAA4491	nucleotidyl transferase family protein
Chromosome	4083192	A A A A A A A A A A A A G A A A A A A A A	-	GBAA4491	nucleotidyl transferase family protein
Chromosome	4083207	A A A A A A A A A A A A G A A A A A A A A	-	GBAA4491	nucleotidyl transferase family protein
Chromosome	4083223	T T T T T T T C C T C T C T C C T T T T T	-	GBAA4491	nucleotidyl transferase family protein
Chromosome	4083574	G G G G G G G G G G G G G G G G G G G	-	GBAA4491	nucleotidyl transferase family protein
Chromosome	4084809	G G G G G G G A G G G G G G G G G G G	-	GBAA4491	nucleotidyl transferase family protein
Chromosome	4085275	G G G G G G G G G A G G G G G G G G G G	-	GBAA4491	nucleotidyl transferase family protein
Chromosome	4085704	T T T T T T T T T T T C T T T T T T T T T	-	GBAA4492	phosphate transporter PhoU
Chromosome	4099975	T T T T T T T T G G T G T G T G T T T T T	-	GBAA4506	hypothetical protein
Chromosome	4102223	G G G G G G G A G G G G G G G G G G G G	-	GBAA4509	DEAD-box ATP dependent DNA helicase
Chromosome	4102299	T T T T T T G T T T T T T T T T T T T T T	-	GBAA4509	DEAD-box ATP dependent DNA helicase
Chromosome	4102345	T T T T T T T C T T T T T T T T T T T T T	-	GBAA4509	DEAD-box ATP dependent DNA helicase
Chromosome	4102628	A A A A A A A G A A A A A A A A A A A A	-	GBAA4509	DEAD-box ATP dependent DNA helicase
Chromosome	4108987	C C C C C C C C C C C C C C C C C C C C	sigA	GBAA4515	RNA polymerase sigma factor RpoD
Chromosome	4111675	A A A A A A A A A A A G A A A A A A A A	-	GBAA4518	hypothetical protein
Chromosome	4115282	G G G G G G G G G G G G G G G G G G G G	era	GBAA4524	GTP-binding protein Era
Chromosome	4118434	T T	-	GBAA4528	hdg domain-containing protein
Chromosome	4119609	A A A A A A A A A A A G A A A A A A A A	-	GBAA4529	PhoH family protein
Chromosome	4120646	T T T T T T T T T T T C T T T T T T T T T	-	GBAA4530	sporulation protein
Chromosome	4121986	A A A A A A A A A A A G A A A A A G A A A	-	GBAA4532	hypothetical protein
Chromosome	4122553	G G G G G G G G G G G G G G G G G G G	-	GBAA4533	gtb/gye domain-containing protein
Chromosome	4123195	A A A A A A A A A A A G A G A G A G A A A	-	GBAA4535	hypothetical protein
Chromosome	4126060	T C T T T T T T T T T T T C T C T T T T T	-	GBAA4537	ribosomal protein L11 methyltransferase
Chromosome	4128419	T T	-	GBAA4537	molecular chaperone DnaK
Chromosome	4129012	C C T T C C C C C C C C C C C C C C C C	dnaK	GBAA4539	molecular chaperone DnaK
Chromosome	4130849	G G G G G G G G G G G G G G G G G G G	hrcA	GBAA4541	heat-inducible transcription repressor
Chromosome	4130924	A A A A A A A A A G A G A G A G A G A G A	hrcA	GBAA4541	heat-inducible transcription repressor
Chromosome	4134667	T C	lepA	GBAA4544	GTP-binding protein LepA
Chromosome	4135260	A A A G G G G A G G G G G G A G G G G G	-	GBAA4545	hypothetical protein
Chromosome	4136572	G G G G G G G G G G G G G G G G G G G G	rpsT	GBAA4547	30S ribosomal protein S20
Chromosome	4138460	G G G G A A G G G G G G G G G G G G G G	-	GBAA4550	hypothetical protein
Chromosome	4138720	C C C C C C C C C C C C C C C C C C C C	comEC	GBAA4551	DNA internalization-related competence protein ComEC/Rec2
Chromosome	4138928	C C C C C C C C C T C C C C C C C C C C	comEC	GBAA4551	DNA internalization-related competence protein ComEC/Rec2
Chromosome	4139252	C C C C C C C C T C T C C T C C T C C C C	comEC	GBAA4551	DNA internalization-related competence protein ComEC/Rec2
Chromosome	4139558	T T	comEC	GBAA4551	DNA internalization-related competence protein ComEC/Rec2
Chromosome	4140133	T T T T T T T T T C C T T T T T C C T T T	comEC	GBAA4551	DNA internalization-related competence protein ComEC/Rec2
Chromosome	4142045	T T T T T T T T T C T T T T T T T T T T T	comEA	GBAA4553	comC operon protein 1
Chromosome	4142088	T T T T T T T C C T T T T T C C T C T T T	comEA	GBAA4553	comC operon protein 1
Chromosome	4142490	C C C C C C C C C C C C C C C C C C C C	-	GBAA4554	late competence protein ComER
Chromosome	4142821	T T T C T T T T T T T T T C T T T T T T T	-	GBAA4554	late competence protein ComER
Chromosome	4145299	C C T T T T T T T T T T T C T T T T T T T	nadD	GBAA4558	nicotinic acid mononucleotide adenylyltransferase
Chromosome	4145524	T T T T T T T C C T T T T T T C C T T T T	-	GBAA4561	aroE
Chromosome	4146699	T T T T T T T T T T T C T T T T T T T T T	-	GBAA4561	shikimate 5-dehydrogenase
Chromosome	4146712	C C C C C C C C C C C C C C C C C C C C	-	GBAA4562	GTP-binding protein YqeH
Chromosome	4147376	C C T T T T T T T T T T C T T T T T T T T	-	GBAA4562	hypothetical protein
Chromosome	4148983	A A A A A A A A A A A A A A A A A A A A	-	GBAA4564	hypothetical protein
Chromosome	4149609	G G G G G G G G G G G G G G G G G G G	psd	GBAA4565	phosphatidylserine decarboxylase
Chromosome	4149771	T T T C C C T C C C C C T C C C C C C C	-	GBAA4567	alkaline phosphatase
Chromosome	4153551	T T T T T T T T T T T C T T T T T T T T T	-	GBAA4567	acetyltransferase
Chromosome	4154209	G G G G G G G G G G G G G G G G G G G G	-	GBAA4571	nitroreductase family protein
Chromosome	4154337	C C C C C C C C C C C C C C C C C C C C	-	GBAA4574	hypothetical protein
Chromosome	4156738	C C C C C C C C C T C C T C C T C C C C	-	GBAA4576	O-methyltransferase
Chromosome	4157515	A A A A A A A A A A A A A A A A A A A A	-	GBAA4576	O-methyltransferase
Chromosome	4163308	A A A A A A A A A A G A A A A A A A A A	-	GBAA4576	O-methyltransferase
Chromosome	4164324	G G G G G G G G G G G G G G G G G G G G	vpR	GBAA4584	minor extracellular protease VpR
Chromosome	4168478	G G G A A A A G A A A A A G G A A A A G	phnA	GBAA4586	phenylalanine 4-monooxygenase
Chromosome	4170494	G G G G G G G G C C G G G G C G C G G G	-	GBAA4590	DNA-binding protein
Chromosome	4171376	C C C C C C C C C C C C C C C C C C C C	-	GBAA4590	DNA-binding protein
Chromosome	4172696	G G G G G G G G G G G G G G G G G G G G	-	GBAA4599	bifunctional acetaldehyde-CoA/alcohol dehydrogenase
Chromosome	4177451	T T	-	GBAA4599	bifunctional acetaldehyde-CoA/alcohol dehydrogenase
Chromosome	4184314	T T T T T T T T T T T C T C T T T T T T T	-	GBAA4606	penicillin-binding protein
Chromosome	4184338	G G G G G G G G G G G G G G G G G G G G	-	GBAA4606	penicillin-binding protein
Chromosome	4185036	T T T T T T T T T C T T T T T T C T T T T	-	GBAA4606	penicillin-binding protein
Chromosome	4186551	T T	-	GBAA4609	U32 family peptidase
Chromosome	4187722	T T T T T T T T T T T G T G T T T T T T T	-	GBAA4609	U32 family peptidase
Chromosome	4189099	A A A A A A A A A A A A G G A A A A A A A	-	GBAA4610	U32 family peptidase
Chromosome	4189109	C C C C C C C C C T C T C C T C T C C C	-	GBAA4610	U32 family peptidase
Chromosome	4189384	A A A G G G G A G G G G G G G G G G G	-	GBAA4610	U32 family peptidase
Chromosome	4189594	G G G G G G G G A A A G A G G G A A G G G	-	GBAA4611	O-methyltransferase family protein
Chromosome	4190538	A A A A A A A C A C A C A C A C A C A	-	GBAA4612	hypothetical protein
Chromosome	4190842	G G G G G G G G G T G G G G G G T G G G	-	GBAA4612	hypothetical protein
Chromosome	4193204	A A A A A A A A A A A G A G A A A A A A A	-	GBAA4616	alanyl-tRNA synthetase
Chromosome	4195734	T T	-	GBAA4622	helicase, putative
Chromosome	4196039	A A A A A A A A A A A A G A A A A A A A A	-	GBAA4625	tRNA (5'-methylaminomethyl-2-thiouridylate)-methyltransferase
Chromosome	4196050	A A A A A A A A A A A A C A C A C A C A A	-	GBAA4625	tRNA (5'-methylaminomethyl-2-thiouridylate)-methyltransferase
Chromosome	4197343	A A A A G G A A A A A A A A A A A A G A A A	-	GBAA4626	aminotransferase, class V
Chromosome	4198007	A A A G G G G G G G G G G G G G G G G G	-	GBAA4633	histidyl-tRNA synthetase

Chromosome	4210985	C C C C C C C T T C T C C T C C T C C C C	-	relA	GAA4637	GTP pyrophosphokinase
Chromosome	4212643	A A A A G A A A A A A A A A A A A A A A	-	GAA4637	GTP pyrophosphokinase	
Chromosome	4212867	G A G G G G G G G G G G G G G G G G G	-	relA	GAA4637	GTP pyrophosphokinase
Chromosome	4213947	C C C C C C C C C C C C C C C C C C C	-	relA	GAA4637	GTP pyrophosphokinase
Chromosome	4214901	T T T T T T T T T T T T T T T T T T T	-	recJ	GAA4639	single-stranded-DNA-specific exonuclease RecJ
Chromosome	4215649	G G G G G G G A A A G G G G G G G G G G	-	recJ	GAA4639	single-stranded-DNA-specific exonuclease RecJ
Chromosome	4216848	T T T T T T T T C T T T T T T C T T T T	-	recJ	GAA4639	single-stranded-DNA-specific exonuclease RecJ
Chromosome	4216898	A A A A T T A A A A A A A A A A A T A A	-	recJ	GAA4639	single-stranded-DNA-specific exonuclease RecJ
Chromosome	4219598	G G G G G G G A A A G G G G G G G G G G	-	secDF	GAA4641	bifunctional preprotein translocase subunit SecD/SecF
Chromosome	4221185	G G G G G G G G G G G G G G G G G G G G	-	GAA4642	hypothetical protein	
Chromosome	4221186	A A A A A A A A A A A A A A A A A A A A	-	GAA4642	hypothetical protein	
Chromosome	4221322	C C C T T T C T T T T C T C T T T C C	-	GAA4642	hypothetical protein	
Chromosome	4221445	G G A A A A A A A A A A A G A A A A A A	-	spoVb	GAA4643	stage V sporulation protein B
Chromosome	4223910	A A A G A A A A A A A A A A A A A A A A	-	GAA4645	hypothetical protein	
Chromosome	4228722	C C C C C C C C T C C C C C C C C C C	-	rva	GAA4651	Holliday junction DNA helicase motor protein
Chromosome	4230960	T T T T T T C T T T T T T T T T T T T	-	-	-	-
Chromosome	4232753	C T C C C C C C C C C C C C C C C C C	-	-	GAA4658	forespore-specific protein, putative
Chromosome	4234637	A A A A A A A A A A A A A A A A A A A A	-	-	GAA4659	lym domain-containing protein
Chromosome	4238099	C C C T T T C T T T T C T T T T C T C	-	nadB	GAA4662	L-aspartate oxidase
Chromosome	4239260	T T T T T T C T T T T T T C T T T T T T	-	-	GAA4663	cysteine desulfurase
Chromosome	4240885	A A A A A A A A A A A A A A A A A A A A	-	-	-	-
Chromosome	4241491	A A A G G G A G G G G G G G G G G	-	-	GAA4665	hypothetical protein
Chromosome	4242552	T T T T T T T T C T T T T C T C T T T T	-	-	-	-
Chromosome	4243267	G G G G G G G A A A G G G G G G G G G	-	-	GAA4667	ABC transporter permease
Chromosome	4243613	A A A A A A A A G G A G A A G G A A A A	-	-	GAA4667	ABC transporter permease
Chromosome	4243771	C C C C C C C C C C C C C C C C C C	-	-	GAA4667	ABC transporter permease
Chromosome	4249170	C C T C C C C C C C C C C C C C C C C	-	-	-	-
Chromosome	4250505	T T T T T T T T T T T C T T T T T T T T	-	obgE	GAA4672	GTPase ObgE
Chromosome	4250844	T T T T T T T T T T T C T T T C T T T T	-	-	GAA4673	sporulation initiation phosphotransferase, putative
Chromosome	4252802	C C C C C C C T C C C C C C T C C C C	-	-	GAA4677	ribonuclease
Chromosome	4257078	A A A A A A A A A A A G A A A A A A A A	-	mreD	GAA4682	rod shape-determining protein MreD
Chromosome	4261623	T T T C T T T T T T T T T T T T T T	-	-	GAA4688	stage II sporulation protein B, putative
Chromosome	4264176	T T T T T T T T T T T C T T T T T T T T	-	valS	GAA4690	valy-tRNA synthetase
Chromosome	4264233	C C C C C C C A A C C C C C A C C C	-	valS	GAA4690	valy-tRNA synthetase
Chromosome	4264690	G G G G G G G A A A G G G G G G A A G	-	valS	GAA4690	valy-tRNA synthetase
Chromosome	4265770	A A A A A A A A A A A G A A A A A A A A	-	valS	GAA4690	valy-tRNA synthetase
Chromosome	4270682	C C C C C C C T C C C C C C C T C C C C	-	-	GAA4694	delta-aminolevulinic acid dehydratase
Chromosome	4271929	G G G G G G G A A A G G G G G A A G G G	-	-	GAA4696	porphobilinogen deaminase
Chromosome	4272499	T T T T T T T T T T T A T T T T T T T T	-	-	GAA4696	porphobilinogen deaminase
Chromosome	4273667	T T T T T T T T T T T C T T T T T T T C	-	-	GAA4697	hemX protein
Chromosome	4275266	G G G G G G G A A A G G G G G G A A G	-	-	-	-
Chromosome	4275406	C C C C C C C C C C C C C C C C C C	-	-	-	-
Chromosome	4276952	T T C C T T T T T T T T T T C T T T T	-	-	GAA4701	GTPase EngB
Chromosome	4277289	A A A A A A A A G A A A A A A A A A A A	-	IoN	GAA4702	ATP-dependent protease La 1
Chromosome	4277617	A A A A A A A A A A A G A A A A A A A A A	-	IoN	GAA4702	ATP-dependent protease La 1
Chromosome	4277887	A A A A A A A A A A A G A A A A A A A A A	-	IoN	GAA4702	ATP-dependent protease La 1
Chromosome	4283118	C C C C C C C T C C C C C C T C C C C	-	tig	GAA4705	trigger factor
Chromosome	4283200	G G G G G G G G G G G G G G G G G G G G	-	tig	GAA4705	trigger factor
Chromosome	4284789	T T T T T T T T T T T C T C T C T C T T T	-	-	GAA4706	hypothetical protein
Chromosome	4285510	C C C C C C C T C T C T C C T C C C C C	-	-	-	-
Chromosome	4289209	G G G G G G G G G G G G G G G G G G G G	-	rph	GAA4715	ribonuclease PH
Chromosome	4290006	A A A A A A A A G G A G A A G G A A A G	-	gerM	GAA4716	germination protein gerM
Chromosome	4290790	A A A A A A A A G G A G A A G G A A A G	-	gerM	GAA4716	germination protein gerM
Chromosome	4290947	C C C C C C C C C C C C C C C C C C C C	-	-	-	-
Chromosome	4291416	T T T T T C T T T T T T T T T T T T T T	-	racE-2	GAA4717	glutamate racemase
Chromosome	4291606	T T T T T T T T T T T C T T T T T T T T	-	racE-2	GAA4717	glutamate racemase
Chromosome	4293095	A A A A A A A G A A A A A A A A A A A A	-	-	GAA4718	major facilitator family transporter
Chromosome	4293812	T T T G T T T T T T T T T T T T T T T T	-	-	GAA4720	thiJ/prfI family protein
Chromosome	4295429	A A A A A A A A A A A A T A A A A A A A A A	-	-	GAA4722	thiJ/prfI family protein
Chromosome	4296785	G G G G G G G G G G G G G G G G G G G G	-	gerE	GAA4724	germination protein GerE
Chromosome	4297494	A A	-	-	GAA4725	xanthine/uracil permease family protein
Chromosome	4299537	C C C C C C C C C C C C C C C C C C C C	-	-	GAA4727	deaminase
Chromosome	4304753	G G G G G G G G G G G G G G G G G G G G	-	-	GAA4732	oligopeptide ABC transporter, permease protein
Chromosome	4306492	A A A G G G A G G G G G G G G G G G G G	-	-	GAA4733	oligopeptide ABC transporter, ATP-binding protein
Chromosome	4310239	A A A A A A A A A A A G A A A A A A A A A	-	-	GAA4738	hypothetical protein
Chromosome	4311765	G G G G G G G G A A A G G G G G G G G G	-	-	GAA4741	hypothetical protein
Chromosome	4312996	G G G G G G G G G G G G G G G G G G G G	-	-	GAA4742	aquaporin Z
Chromosome	4313037	T T T T T T T T C T T T T T T T T T T T	-	-	GAA4742	aquaporin Z
Chromosome	4313141	T T T T T T T T T T T A T T T T T T T T	-	-	-	-
Chromosome	4313414	G G G G G G G G G G G G G G G G G G G G	-	-	-	-
Chromosome	4315374	A A A A A A A A A A A G A A A A A A A A A	-	-	GAA4745	ABC transporter ATP-binding protein
Chromosome	4315439	A A A A A A A A A A A C A A A A A A A A A	-	-	GAA4745	ABC transporter ATP-binding protein
Chromosome	4318283	T T T T T T T T T C T T T T T T T T T T	-	-	GAA4748	flagellar motor protein Mota
Chromosome	4321055	C C C C C C C C T C C T C C T C C T C C C C	-	sdhB	GAA4753	succinate dehydrogenase iron-sulfur subunit
Chromosome	4322513	C C C C C C C C C T C C C C C C C T C C C C	-	sdhA	GAA4754	succinate dehydrogenase flavoprotein subunit
Chromosome	4324427	G G G G G G G G G G G G G G G G G G G G	-	-	GAA4756	hypothetical protein
Chromosome	4326166	A A	-	uvrC	GAA4757	excinuclease ABC subunit C
Chromosome	4328298	C C C C C C C C C C C C C C C C C C C C	-	eifTb	GAA4760	electron transfer flavoprotein, beta subunit
Chromosome	4329565	C C C C C C C C C T C C T C C T C C C C C C	-	-	GAA4761	enoyl-CoA hydratase
Chromosome	4329796	A A A A A A A A A A A G A A A A A A A A A	-	-	GAA4762	TatF family transcriptional regulator
Chromosome	4336133	G G G G G G G G G G G G G G G G G G G G	-	-	GAA4767	iron-hydroxamate transporter permease subunit
Chromosome	4336688	G G G G G G G G G G G G G G G G G G G G	-	-	GAA4768	hypothetical protein
Chromosome	4343597	C C C C C C C C C C C C C C C C C C C C	-	-	GAA4770	hypothetical protein
Chromosome	4345557	T T A T T T T T T T T T T T T T T T T T T	-	-	GAA4781	sodium/hydrogen exchanger family protein
Chromosome	4345784	C C T T T T T T T T T T C T T T T T T T T	-	-	GAA4781	sodium/hydrogen exchanger family protein
Chromosome	4347623	C C C C C C C C C C C C C C C C C C C C	-	-	GAA4783	hypothetical protein
Chromosome	4347810	A A A A A A T A T A A A A A A A A A A A	-	-	GAA4783	hypothetical protein
Chromosome	4347811	T T T T T T T T T T T A T T T T T T T T	-	-	GAA4783	hypothetical protein
Chromosome	4348916	A A A G G G A G G G G G G G G G G G A	-	-	GAA4785	iron compound ABC transporter, permease protein
Chromosome	4350538	T T T T T T T T T T T C T T T T T T T T	-	-	-	-
Chromosome	4350540	C C C C C C C C C C C C C C C C C C C C	-	-	-	-
Chromosome	4350553	A A A A A A A A A A A A A A A A A A A A	-	-	GAA4794	recombination and DNA strand exchange inhibitor protein
Chromosome	4358572	G G G G G G G G G G G G G G G G G G G G	-	-	GAA4794	recombination and DNA strand exchange inhibitor protein
Chromosome	4359722	C C C C C C C T C C C C C C C C C C C C	-	-	GAA4795	hypothetical protein
Chromosome	4360409	A A A A A A A A A A A A A A A A A A A A	-	-	GAA4795	hypothetical protein
Chromosome	4364798	G G G G G G G A A G G G G G G G G G G G	-	asnC	GAA4802	asparaginyl-tRNA synthetase
Chromosome	4366961	T T T T T T T T T C T T T T T T T T T T	-	pheT	GAA4803	phenylalanyl-tRNA synthetase subunit beta
Chromosome	4367053	T T T T T T T T T T T C T T T T T T T T T	-	-	GAA4805	RNA methyltransferase
Chromosome	4371291	A G A A A A A A A A A A A A A A A A A A	-	-	GAA4806	small acid-soluble spore protein SspI
Chromosome	4376209	C C C C C C C C C C C C C C C C C C C C	-	-	GAA4812	EmrB/OacA family drug resistance transporter
Chromosome	4376210	T T T T T T T T T T C T T T T T T T T T	-	-	GAA4812	EmrB/OacA family drug resistance transporter
Chromosome	4377139	C C C C C C C C T C C C C C C C T C C C C	-	-	-	-
Chromosome	4377657	A A A A A A A A A A A A A A A A A A A A	-	-	GAA4814	TetR family transcriptional regulator
Chromosome	4379492	T T T T T T T T C T C T C T C T C T T T T	-	-	GAA4816	hypothetical protein
Chromosome	4382463	C C C C C C C T C T C T C T C T C C C C	-	thrS	GAA4820	threonyl-tRNA synthetase
Chromosome	4382520	G G G G G G G G G G G G G G G G G G G G	-	thrS	GAA4820	threonyl-tRNA synthetase
Chromosome	4382895	A A A A A A A A A A A A A A A A A A A A	-	thrS	GAA4820	threonyl-tRNA synthetase
Chromosome	4384917	G G G G G G G G A G G G G G G G G G G G	-	-	GAA4820	threonyl-tRNA synthetase
Chromosome	4384929	T T T T T T T T T T T A T T T T T T T T	-	-	-	-
Chromosome	4386819	A A A A A A A A C C C A A A A C C C A A	-	gap-1	GAA4827	glyceraldehyde-3-phosphate dehydrogenase
Chromosome	4390144	T T T T T T T T T T C T C T C T C T T T T	-	-	-	-
Chromosome	4390204	G G G G G G G G G G G G G G G G G G G G	-	-	-	-
Chromosome	4394860	T T T T T T T T T T C T C T T T T C T T T	-	polA	GAA4831	DNA polymerase I
Chromosome	4396547	G G C C G G G G G G G G G G G G G G G G	-	phoR	GAA4832	sensory box histidine kinase PhoR
Chromosome	4397994	C C C C C C C C C C C C C C C C C C C C	-	-	GAA4834	hypothetical protein
Chromosome	4398256	C C C C C C C C T C C T C C T C C T C C C	-	-	-	-
Chromosome	4398273	A A A A A A A A C C C A C A A C C C A A	-	-	-	-
Chromosome	4398276	T T A A A A T A A A A T A A A A A A A T	-	-	GAA4837	malate dehydrogenase
Chromosome	4400019	C C C C C C C C C C C C C C C C C C C C	-	-	GAA4839	methyliclurate synthase
Chromosome	4402638	G G G G G G G G A A G A G G G A A G G G	-	citZ	GAA4841	hypothetical protein
Chromosome	4404593	A A A A A A A A T T A T A A T A T A A A	-	-	GAA4841	hypothetical protein
Chromosome	4404809	G G G G G G G G A G G G G G G G G G G G	-	-	GAA4841	hypothetical protein

Chromosome	4405143	A A A A A A A G G A A A A A A A G G A A A A A	pykA-2	GBAA4843	pyruvate kinase
Chromosome	4407078	A A A A A A A G G A A A A A A A G G A A A A A	pykA-2	GBAA4843	pyruvate kinase
Chromosome	4407851	G G	pykA-2	GBAA4843	pyruvate kinase
Chromosome	4413218	T T T T T T T T T T T C T T T T T T T T T T	-	GBAA4852	DHH subfamily 1 protein
Chromosome	4417856	G G	-	GBAA4852	DHH subfamily 1 protein
Chromosome	4419379	A A	-	GBAA4856	hypothetical protein
Chromosome	4419789	C C	-	GBAA4856	hypothetical protein
Chromosome	4420161	T T T T T T T T T T T C T T T T T T T T T T	-	GBAA4858	thioesterase family protein
Chromosome	4422378	T C	-	GBAA4860	metal-dependent hydrolase
Chromosome	4422904	T T T T T T T A A T A T T A A T T T T T T T	pepQ-2	GBAA4861	proline dipeptidase
Chromosome	4424481	G G	-	GBAA4865	hypothetical protein
Chromosome	4425645	A A A A A A A G G A A A A A G G A A A A A A	-	GBAA4865	hypothetical protein
Chromosome	4425649	A A A A A A A A G G A A A A A G G A A A A A A	-	GBAA4865	hypothetical protein
Chromosome	4425702	A A A A A A A G G A A A A A G G A A A A A A A	-	GBAA4866	acetyltransferase
Chromosome	4426307	A A A A A A A A G G A A A A A G G A A A A A A	-	GBAA4867	hypothetical protein
Chromosome	4426799	T T T A T T T T T T T T T T T T T T T T T T	-	GBAA4868	acetyltransferase
Chromosome	4426930	G G	-	GBAA4868	acetyltransferase
Chromosome	4428497	T T T T T T T T T C T T T T T T T T T T T T	-	GBAA4877	hypothetical protein
Chromosome	4432884	A A	-	GBAA4877	hypothetical protein
Chromosome	4433002	G G G G G G G T T T G G G G G G T T G G G G	argH-2	GBAA4879	argininosuccinate lyase
Chromosome	4434836	C C	-	GBAA4889	hypothetical protein
Chromosome	4436421	T T T T T T T T T T G T T T T T T T T T T T T	-	GBAA4890	thiI peroxidase
Chromosome	4442281	A A	-	GBAA4893	inorganic polyphosphate/ATP-NAD kinase
Chromosome	4443535	T T T T T T T T T T G T T T T T T T T T T T T	-	GBAA4894	hypothetical protein
Chromosome	4445528	G G	pprK	GBAA4900	aminotransferase, class V
Chromosome	4447109	T T T T A A T T T T T T T T T T T T T T T T T	-	GBAA4905	hypothetical protein
Chromosome	4452655	G G G G G G G A G G G G G G G G G G G G G G	-	GBAA4905	hypothetical protein
Chromosome	4457694	A A	-	GBAA4905	hypothetical protein
Chromosome	4457800	G G	-	GBAA4905	hypothetical protein
Chromosome	4457847	G G	-	GBAA4905	hypothetical protein
Chromosome	4460189	T T T T T T T T T C T T T T T T T T T T T T T T	rpsD	GBAA4908	30S ribosomal protein S4
Chromosome	4461897	T T T T T T T C T T T T T T T T T T T T T T T T	tyrS-1	GBAA4911	tyrosyl-tRNA synthetase
Chromosome	4462030	G G G A G G G G G G G G G G G G G G G G G G	tyrS-1	GBAA4911	tyrosyl-tRNA synthetase
Chromosome	4462940	A A A A A A A A G G A A G G A A A G G A A A A	-	GBAA4913	ECF subfamily RNA polymerase sigma factor
Chromosome	4465730	C C	-	GBAA4915	acetyl-CoA synthetase
Chromosome	4465913	T T T T T T T C T T T T T T T T T T T T T T T T	-	GBAA4919	sensor histidine kinase
Chromosome	4469005	C C	-	GBAA4921	sensor histidine kinase
Chromosome	4469004	C C C C C C C A C C C C C C C C C C C C C C	-	GBAA4921	sensor histidine kinase
Chromosome	4470166	C C C C C C C C C C T C C C C C C C C C C C C	-	GBAA4921	sensor histidine kinase
Chromosome	4470608	A A A A G G A A A A A A A A A A A A A A A A	-	GBAA4921	sensor histidine kinase
Chromosome	4471325	A A A A A A A A C C C A A A C C A C C A A A A	-	GBAA4922	ankyrin repeat-containing protein
Chromosome	4472050	A A A A A A A A G G A A A A A A A G G A A A A	-	GBAA4929	catabolite control protein A
Chromosome	4476020	G G	ccpA	GBAA4930	putative lipoprotein
Chromosome	4477017	T T T T T T T T G T G T G T G T G T T T T T T	-	GBAA4930	putative lipoprotein
Chromosome	4477344	C C C C C C C C G C C C C C C C C G C C C C	-	GBAA4930	putative lipoprotein
Chromosome	4483001	A A	-	GBAA4938	UDP-N-acetylmuramate-L-alanine ligase
Chromosome	4484197	C C	-	GBAA4939	nicotinate phosphoribosyltransferase
Chromosome	4488395	G G A	-	GBAA4940	FtsK/SpoIIIE family protein
Chromosome	4499321	C C C A A A A C A A A A A A C A A A A A A A	-	GBAA4954	hypothetical protein
Chromosome	4500094	A A	-	GBAA4954	hypothetical protein
Chromosome	4501001	G G A G G G G G G G G G G G G G G G G G G G	-	GBAA4954	hypothetical protein
Chromosome	4501234	C C C C C C C C A A C A C A C C A A C C C C C	-	GBAA4954	hypothetical protein
Chromosome	4501506	A A A A A A A G A A A A A A A A A A A A A A	-	GBAA4954	hypothetical protein
Chromosome	4511699	A A	glcU	GBAA4969	glucose uptake protein
Chromosome	4519433	C C A	-	GBAA4969	hypothetical protein
Chromosome	4528001	T T T T T T T C C T T T C T C T C T C T T T T	-	GBAA4989	hypothetical protein
Chromosome	4530499	G G	leuS	GBAA4991	leucyl-tRNA synthetase
Chromosome	4532500	A A A A A A A A G G A A A A A G G A A A A A A	-	GBAA4992	permease, putative
Chromosome	4538713	T T T T T T T T C T T T C T T T C T C T T T T T	-	GBAA4998	hypothetical protein
Chromosome	4540050	T T T T T T T T T T T A T T T T T T T T T T T T	-	GBAA5000	hypothetical protein
Chromosome	4544130	T T T T A A T T T T T T T T T T T T A T T T T T	-	GBAA5005	aspartate racemase family protein
Chromosome	4544131	G G G A A G G G G G G G G G G G G G G G G G	-	GBAA5005	aspartate racemase family protein
Chromosome	4546380	A A A A A A A A C A A A A A A A A A A A A A	-	GBAA5008	hypothetical protein
Chromosome	4548086	C C	-	GBAA5010	transferase family protein
Chromosome	4546868	C C C C C C C C C T T C C C C C T C T C C C C	-	GBAA5012	glycosyl transferase, group 1 family protein
Chromosome	4547365	A A A A A A A A G G A G A G G A A G G A A A A	-	GBAA5012	glycosyl transferase, group 1 family protein
Chromosome	4550099	C C C T T C C C C C C C C C C C C C C C C C	-	GBAA5012	glycosyl transferase, group 1 family protein
Chromosome	4550842	A A A G G G A G G G G G G A A G G G G G G G G	-	GBAA5013	molybdopterin-guanine dinucleotide biosynthesis protein A, putative
Chromosome	4552655	G G	metK	GBAA5017	S-adenosylmethionine synthetase
Chromosome	4555030	A A A A A A A A G G A G G A A G G A A A A A A	pckA	GBAA5019	phosphoenolpyruvate carboxykinase
Chromosome	4555710	A A	-	GBAA5024	eama family protein
Chromosome	4556835	G G	-	GBAA5028	sensor histidine kinase, putative
Chromosome	4556974	A A A A A A A A A G G A G A G G A A G G A A A A	-	GBAA5029	sensor histidine kinase
Chromosome	4557311	A A	-	GBAA5029	sensor histidine kinase, putative
Chromosome	4561058	G G A G	-	GBAA5030	alpha/beta fold family hydrolase
Chromosome	4562626	G G	-	GBAA5035	hypothetical protein
Chromosome	4563068	C C	-	GBAA5040	hypothetical protein
Chromosome	4571074	G G	-	GBAA5042	hypothetical protein
Chromosome	4572392	G G	-	GBAA5042	hypothetical protein
Chromosome	4574857	T T T T T T T T T T C T T T T T T T T T T T T	-	GBAA5047	S-ribosylhomocysteine
Chromosome	4575727	A A	luxS	GBAA5047	carboxic anhydrase
Chromosome	4581314	A A	-	GBAA5055	hypothetical protein
Chromosome	4582354	G G G A G G G G G G G G G G G G G G G G G G	-	GBAA5056	hypothetical protein
Chromosome	4585262	A A	-	GBAA5061	hypothetical protein
Chromosome	4589569	C C	-	GBAA5071	hypothetical protein
Chromosome	4594590	G G	-	GBAA5072	hypothetical protein
Chromosome	4595217	G G	-	GBAA5082	dedA family protein
Chromosome	4602594	A A	-	GBAA5086	ArAc family transcriptional regulator
Chromosome	4605457	C C	-	GBAA5096	GntR family transcriptional regulator
Chromosome	4615510	C C	-	GBAA5098	hypothetical protein
Chromosome	4618170	A A A G G G A G G G G G G G G G G G G G G	-	GBAA5099	pyridoxal phosphate-dependent enzyme, putative
Chromosome	4619789	T T	-	GBAA5107	N-acetylmuramate racemase
Chromosome	4621113	G G	-	GBAA5107	N-acetylmuramate racemase
Chromosome	4622654	T T	-	GBAA5109	O-succinylbenzoic acid-CoA ligase
Chromosome	4625570	C C C C C C C C T T C C C C C C C C C C C C	-	GBAA5109	naphthoate synthase
Chromosome	4627533	G G	-	GBAA5110	alpha/beta fold family hydrolase
Chromosome	4629655	A A	-	GBAA5112	menaquinone-specific isochorismate synthase
Chromosome	4630782	G G	-	GBAA5112	menaquinone-specific isochorismate synthase
Chromosome	4631083	A A	-	GBAA5112	menaquinone-specific isochorismate synthase
Chromosome	4633914	A A	-	GBAA5112	menaquinone-specific isochorismate synthase
Chromosome	4634143	G G G A A G G G G G G G G G G G G G G G G G	-	GBAA5112	menaquinone-specific isochorismate synthase
Chromosome	4634695	C C C T T C C C C C C C C C C C C C C C C C	-	GBAA5116	hypothetical protein
Chromosome	4637710	G G	-	GBAA5121	glycogen biosynthesis protein GlgD
Chromosome	4643634	C C	-	GBAA5123	glycogen branching enzyme
Chromosome	4646165	G G G A A G G G G G G G G G G G G G G G G G	-	GBAA5133	hypothetical protein
Chromosome	4662513	C C C C C C C C T C C C C C C C C C C C C C	-	GBAA5133	hypothetical protein
Chromosome	4663123	T T	-	GBAA5135	glutonate 2-dehydrogenase
Chromosome	4663937	A A	-	GBAA5135	glutonate 2-dehydrogenase
Chromosome	4664823	A A	-	GBAA5136	amino transferase, classes I and II
Chromosome	4667047	G G	-	GBAA5138	superoxide dismutase, Cu-Zn
Chromosome	4667854	A A	sodC	GBAA5141	kinase-associated protein B
Chromosome	4668658	T C	-	GBAA5148	comA operon protein, putative
Chromosome	4669651	T T	-	GBAA5149	hypothetical protein
Chromosome	4674509	C C	-	GBAA5153	phosphoglucomutase/phosphomannomutase family protein
Chromosome	4673333	A A	-	GBAA5157	hypothetical protein
Chromosome	4678763	G G	-	GBAA5157	hypothetical protein
Chromosome	4682403	C C C C C C C C T C C C C C C C C C C C C C	-	GBAA5157	hypothetical protein
Chromosome	4683245	G G	-	GBAA5157	hypothetical protein
Chromosome	4684055	A A	-	GBAA5157	hypothetical protein

Chromosome	4685383	C C C T T T C T T T C T T C T T T C T	-		
Chromosome	4686567	C C C C C C C C C C T C C C C C C	-		
Chromosome	4692201	A A A A A A A A G G A G A A G A A A A	-		
Chromosome	4692926	T T T T T T T T T C T T T T T T T T	-		
Chromosome	4698084	T T C T T T T T C C T C T C T C T C	-		
Chromosome	4701906	T T T T T T T C C C T C T C T C T C	-	GAA5175	ABC transporter ATP-binding protein
Chromosome	4701923	A A A A A A A A G A A A A A A A A A	-	GAA5175	ABC transporter ATP-binding protein
Chromosome	4702087	G G G A G G G G G G G G G G G G G G	-	GAA5175	ABC transporter ATP-binding protein
Chromosome	4702523	G G G G G G G G G G G G G G G G G	-	GAA5176	hypothetical protein
Chromosome	4703906	A A A A A A A A G A A A A A A A A A	-		
Chromosome	4704552	A A A A A A A A A C C A A A A A C C	-	GAA5178	hypothetical protein
Chromosome	4706929	A A A G A A A A A A A A A A A A A A	-	GAA5180	hypothetical protein
Chromosome	4707722	T T T T C T T T T T T T T T T T T T	-	GAA5181	hypothetical protein
Chromosome	4710402	T T T T T T T T T T T C T T T T T T T	-	GAA5185	hypothetical protein
Chromosome	4710403	C C C C C C C C C C C C T C C C C C	-	GAA5185	hypothetical protein
Chromosome	4714688	A A A A A A A A A A A A A A A A A A	-	GAA5191	quinone family NAD(P)H dehydrogenase
Chromosome	4718500	G G G A G A G G G G G G G G G G G	-	GAA5196	hypothetical protein
Chromosome	4721085	T T T T T T T T T T T C T T T T T T	-	GAA5200	transcriptional activator tipA, putative
Chromosome	4723486	C C C C C C C C C C C T C C C C C	-	GAA5203	phosphoglycerate mutase family protein, putative
Chromosome	4727094	G G G G G G G G G G G G G G G G G	-	GAA5208	hypothetical protein
Chromosome	4728338	C C C A C C C C C C C C C C C C C	-		
Chromosome	4731407	G G G G G G G G G G G G G G G G G	-	GAA5213	hypothetical protein
Chromosome	4733700	A A G G G G G G G G G G G G G G G	-	GAA5215	aminotransferase, class V
Chromosome	4734190	C C C C C C C C C C T C C C C C C	-	GAA5216	hypothetical protein
Chromosome	4734854	C C C C C C C C T C C C C C C C	-	GAA5216	hypothetical protein
Chromosome	4738507	G G G G G G G A A A G G G G G G A	-	GAA5221	ABC transporter permease
Chromosome	4738574	G G G G G G G G G G G G T G G G G G	-	GAA5221	ABC transporter permease
Chromosome	4741266	G G G G G G G T G T G G T T G G G	-	GAA5226	TOPRIM domain-containing protein
Chromosome	4743589	T T T T T T T T T T T T T T T T T C	-	GAA5232	hypothetical protein
Chromosome	4745816	A A A A A A A A G A A A A A A A A A	-		
Chromosome	4745959	T T T T T T T T T C T C T T T T T T	-	GAA5238	PAP2 family protein
Chromosome	4746348	G G G G G G G G G G G G G G G G G	-	GAA5238	PAP2 family protein
Chromosome	4746902	A A A A A A A A A A A A C A A A A A	-	GAA5239	hypothetical protein
Chromosome	4747435	A A A A A A A A A G A A A A A A A A	-	GAA5239	hypothetical protein
Chromosome	4749519	G G G G G G G G G G G G G G G G G	-	GAA5243	CAAX amino terminal protease family protein
Chromosome	4749579	A A A A A A A A G A A A A A A A A A	-	GAA5243	CAAX amino terminal protease family protein
Chromosome	4752196	C C C C C C C C C C T C C C C C C	-	GAA5246	acyl-CoA dehydrogenase
Chromosome	4756919	A A A A A A A A G A G A G A G A A A	-	GAA5249	3-hydroxyacyl-CoA dehydrogenase/enoyl-CoA hydratase/isomerase family protein
Chromosome	4757018	T T T T T T T T T T C T C T T T T T	-	GAA5249	3-hydroxyacyl-CoA dehydrogenase/enoyl-CoA hydratase/isomerase family protein
Chromosome	4757361	T T T T T T T T T T C T C T T T T T	-	GAA5249	3-hydroxyacyl-CoA dehydrogenase/enoyl-CoA hydratase/isomerase family protein
Chromosome	4757812	C C C C C C C C T C C C C C C T C C C	-	GAA5250	hypothetical protein
Chromosome	4758648	G G G G G G G G G G G G G G G G G	-	GAA5252	D-alanyl-D-alanine carboxypeptidase family protein
Chromosome	4762136	C C C C C C C C C C C T C C C C C C	-	GAA5256	methyl-accepting chemotaxis protein
Chromosome	4770322	C C C C C C C C C C C A C C C C C C	-	GAA5262	hypothetical protein
Chromosome	4771397	T T T T T T T C C T T T C C T T T T	-	GAA5264	hypothetical protein
Chromosome	4772492	A A A A A A A A A A A A A G A A A A A	-	GAA5265	hypothetical protein
Chromosome	4772899	A A A A A A A A A A A A A T A A A A A A	-	GAA5265	hypothetical protein
Chromosome	4774621	T T T T T T T T T T C T C T T T T T	-	GAA5268	cytolysin immunity CylT protein
Chromosome	4780246	T T T T T T T C T T T T T C T T T T T	-	GAA5276	sensor histidine kinase
Chromosome	4781827	A A A A A A A A G G A A A A A G G A A A	-	GAA5277	hypothetical protein
Chromosome	4787604	G G G G G G G A G G G G G G G G G	-	GAA5281	hypothetical protein
Chromosome	4788879	T T T T T T T T T C T T T T T T T T T	nprB	GAA5282	neutral protease B
Chromosome	4790465	A A A A A A A A A A A A A G A A A A A A	-		
Chromosome	4791055	C C C C C C C A C C C C C C C A C C	-	GAA5285	hypothetical protein
Chromosome	4796490	A A A A A A A A A A A A A A C A A A A A	-	GAA5292	hypothetical protein
Chromosome	4796491	C C C C C C C C C C C C A C C C C C C	-	GAA5292	hypothetical protein
Chromosome	4808800	G G G G G G G G G G G G G G G G G	-	GAA5305	hypothetical protein
Chromosome	4817242	G G G G G G G G G G G G G G G G G	-	GAA5313	pyridine nucleotide-disulphide oxidoreductase
Chromosome	4820542	G G G G G G G G G G G G G G G G G	-	GAA5316	set domain-containing protein
Chromosome	4821111	C C C C C C C C C A A C A C C A C A C C C	-	GAA5317	methyl-accepting chemotaxis protein
Chromosome	4822025	C C C C C C C C C C T C C C C C C C C	-	GAA5317	methyl-accepting chemotaxis protein
Chromosome	4822893	A A A A A A A A A A A A A T A A A A A A A	-	GAA5318	endonuclease/exonuclease/phosphatase family protein
Chromosome	4825394	A A A A A A A A A A A A A G A A A A A A A	-		
Chromosome	4825435	T T T T T T T T T T T G T T T T T T T T	-	GAA5328	iron compound ABC transporter, permease protein
Chromosome	4830135	T T T T T T T T T T T C T C T T T T T T	-	GAA5329	iron compound ABC transporter, permease protein
Chromosome	4831046	G G G G G G G G G G G G G G G G G	-		
Chromosome	4840456	T T T T C T C T T T T T T T T T T T T	-		
Chromosome	4840642	A A A A A A A A G A A A A A A A A A A A	-	GAA5352	hypothetical protein
Chromosome	4847882	C C C C C C C T C C T C T C T C T C C	-	GAA5355	hypothetical protein
Chromosome	4849783	T C T T C T C T C T C T C T C T C T C	-		
Chromosome	4852488	A A A A A A A A A A A A A G A A A A A A	-	GAA5358	hypothetical protein
Chromosome	4852644	G G G G G G G G G G G G G G G G G	-	GAA5358	hypothetical protein
Chromosome	4853166	A A A A A A A A A A A A A T A G A T A A A A A	-	GAA5358	hypothetical protein
Chromosome	4853350	T T T T C T T T A T T T T T T T A T T T T	-	GAA5358	hypothetical protein
Chromosome	4860545	C C C C C C C C T C T C T C T C T C C C C	-	GAA5365	phosphoglyceromutase
Chromosome	4861189	G G G G G G G A G A G A G G A A G G G G G	-	GAA5365	phosphoglyceromutase
Chromosome	4865570	T T T T T T T T T T C T C T T T T T T T	-		
Chromosome	4865603	C C C T T T C T T T C T T C T T T C T C T	-		
Chromosome	4865609	A A A A A A A A A A A A A G A A A A A A A	-		
Chromosome	4867375	G G A A A A A A A A A A A A A A A A A A	-	GAA5374	putative lipoprotein
Chromosome	4868278	T T T T T T T C T T T T T C T T T T T T	-	GAA5384	hypothetical protein
Chromosome	4875480	A A A A A G A A A A A A A A A A A A A A	-	GAA5385	mutN/ndnx family protein
Chromosome	4876059	A A A A A A A A A A A A A T A A A A A A A A	-		
Chromosome	4876491	A A A A A A A A A A A A A G A A A A A A A A	-	GAA5386	hypothetical protein
Chromosome	4877009	G G	-		
Chromosome	4877455	A A A A A A A A A A A A A T A T A T A T A A A A	-		
Chromosome	4880766	A A A G G G G A G G G G G G G G G G	-	GAA5390	pyrophosphatase PpaX
Chromosome	4880879	A A A A A A A A A A A A A G G A A G G G G G	-	GAA5390	pyrophosphatase PpaX
Chromosome	4882463	T T T A T T T T T T T T T T T T T T T T	hprK	GAA5392	HPr kinase/phosphorylase
Chromosome	4886797	A A	uvrA	GAA5395	excinuclease ABC subunit A
Chromosome	4888836	C C C T C C C C C C C C C C C C C C C C	uvrB	GAA5396	excinuclease ABC subunit B
Chromosome	4890771	G G G G G G G A A G A G G A A A G G G G G	-		
Chromosome	4893102	A A A A A A A A A A A A A A G A A A A A A A	-		
Chromosome	4894675	T T T T T T T T T T T C T C T T T T T T T	-	GAA5405	hypothetical protein
Chromosome	4895076	G G G G G G G G G G G G G G G G G	-	GAA5405	hypothetical protein
Chromosome	4895441	T T T T T T T C T C T T T C T C T T T T T T	-		
Chromosome	4902344	A A	-	GAA5412	hypothetical protein
Chromosome	4903935	T T T T T T T T T T C T C T T T T T T T T	-	GAA5414	carboxy-terminal protease
Chromosome	4904797	G G	ftsX	GAA5415	cell division ABC transporter, permease protein FtsX
Chromosome	4906434	A G G A A A A A A A A A A A A A A A A A A	-		
Chromosome	4907243	G G G G G G G G A G G G G G G G G G G G	-		
Chromosome	4911170	G G	-		
Chromosome	4913375	A A A A A A A A A A A A A A G A A A A A A A	-	GAA5426	comF operon protein 1
Chromosome	4913852	T T T T T T T T T T C T T T T T T T T T	comFA	GAA5426	comF operon protein 1
Chromosome	4913978	A A A A A A A A A A A A A G A A A A A A A	-	GAA5426	comF operon protein 1
Chromosome	4915797	T T T T T T T T T T T T T T T T T T T T	-	GAA5427	endopeptidase lytE, putative
Chromosome	4916091	T T T T T T T T T T T C T C T T T T T T T T	-		
Chromosome	4916592	G G	-	GAA5428	hypothetical protein
Chromosome	4916511	C C C C C C C C C T T C C C T C C C C C C	-		
Chromosome	4918132	A A A A A A A A A A A A A G A A A A A A A	-	GAA5431	hypothetical protein
Chromosome	4921007	T T T T T T T T T T C T T T T T T T T T T	ugd	GAA5434	UDP-glucose 6-dehydrogenase
Chromosome	4921027	G G	ugd	GAA5434	UDP-glucose 6-dehydrogenase
Chromosome	4921148	C C	ugd	GAA5434	UDP-glucose 6-dehydrogenase
Chromosome	4923716	A A A A A A A A G A A A A A A A A G A A A A	-	GAA5435	glycosyl transferase, group 4 family protein
Chromosome	4924364	G G G G G G G G A G A G A G A G A G A G G G	-	GAA5436	polysaccharide deacetylase, putative
Chromosome	4925027	C C C C A A C C C C C C C C C C C C C C	-	GAA5437	BigG family transcription antiterminator
Chromosome	4925778	C C C C C C C C T C T C C T C T C C T C C C	-	GAA5437	BigG family transcription antiterminator
Chromosome	4929312	T T G G G G G G G G T G T G G G G G G G G	-	GAA5439	chromate ion transporter
Chromosome	4929837	G G G G G G G G G G T G T G G G G G G G G	-	GAA5440	hypothetical protein
Chromosome	4941461	G G G G A A A A G A A A A A G G A A A A A A	-	GAA5453	hypothetical protein
Chromosome	4948489	G G	cyclA-3	GAA5460	cytochrome d ubiquinol oxidase, subunit I
Chromosome	4948658	A A	G cyclA-3	GAA5460	cytochrome d ubiquinol oxidase, subunit I



<sup>a</sup> Reference genome sequence of the *B. anthracis* Ames 0581 (chromosome, NC\_007530; pXO1, NC\_007322; pXO2, NC\_007323)