

Salama et al. Supplemental Table 1					
Transposon Insertions Data for all Genes					
Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
1	HP0001	JHP0001	nusB	TRANSCRIPTION TERMINATION	DNA/RNA Synthesis and Processing
3	HP0002	JHP0002	ribE	riboflavin synthase beta chain	Biosynthesis and Metabolism
2	HP0003	JHP0003	kdsA	3-deoxy-d-manno-octulosonic acid 8-phosphate synthetase , 3-deoxy-D-manno-octulosonic acid 8-phosphate synthase	Cell Envelope
5	HP0004	JHP0004	icfA	carbonic anhydrase	Biosynthesis and Metabolism
3	HP0005	JHP0005	pyrF	orotidine 5'-phosphate decarboxylase	Biosynthesis and Metabolism
0	HP0006	JHP0006	panC	pantoate-beta-alanine ligase , PANTOATE--BETA-ALANINE LIGASE	Biosynthesis and Metabolism
0	HP0007	N/A			Unknown Hypothetical
1	HP0008	N/A			Unknown Hypothetical
6	HP0009	JHP0007		putative Outer membrane protein	Outer Membrane Protein
7	HP0010	JHP0008	groEL	chaperone and heat shock protein , 60kDa chaperone	Chaperones
1	HP0011	JHP0009	groES	co-chaperone , 10kDa chaperone	Chaperones
1	HP0012	JHP0010	dnaG	DNA primase	DNA/RNA Synthesis and Processing
4	HP0013	JHP0011			Unknown Hypothetical
3	HP0014	JHP0012			Unknown Hypothetical
5	HP0015	JHP0013			Unknown Hypothetical
1	HP0016	JHP0014			Unknown Hypothetical
8	HP0017	JHP0015	virB4, virB4_1	virB4 homolog , DNA transfer protein	Other
5	HP0018	JHP0016			Unknown Hypothetical
1	HP0019	JHP0017	cheV, cheV_1	chemotaxis protein , putative chemotaxis protein	Motility
10	HP0020	JHP0018	nspC	carboxynorspermidine decarboxylase , putative carboxynorspermidine decarboxylase	Biosynthesis and Metabolism
4	HP0021	JHP0019			Unknown Hypothetical
5	HP0022	JHP0020		conserved hypothetical integral membrane protein	Conserve Hypothetical
1	HP0023	N/A			Unknown Hypothetical
0	HP0024	N/A			Unknown Hypothetical
2	HP0025	JHP0021	omp2	outer membrane protein , putative Outer membrane protein	Outer Membrane Protein
2	HP0026	JHP0022	gltA	citrate synthase	Biosynthesis and Metabolism

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
7	HP0027	JHP0023	icd	isocitrate dehydrogenase	Biosynthesis and Metabolism
0	HP0028	JHP0024		conserved hypothetical secreted protein	Conserve Hypothetical
2	HP0029	JHP0025	bioD	dethiobiotin synthetase	Biosynthesis and Metabolism
6	HP0030	JHP0026			Unknown Hypothetical
5	HP0031	JHP0027			Unknown Hypothetical
1	HP0032	JHP0028		conserved hypothetical protein	Conserve Hypothetical
7	HP0033	JHP0029	clpA	ATP-dependent C1p protease , ATP-DEPENDENT PROTEASE,ATP-BINDING SUBUNIT	Protein Synthesis and Processing
0	HP0034	JHP0030	panD	aspartate 1-decarboxylase	Biosynthesis and Metabolism
0	HP0035	JHP0031		conserved hypothetical protein	Conserve Hypothetical
1	HP0036	JHP0032			Unknown Hypothetical
3	HP0037	JHP0033		NADH-ubiquinone oxidoreductase subunit	Biosynthesis and Metabolism
4	HP0038	JHP0034	comB1	DNA transformation competency	Competence
6	HP0039	JHP0035	comB2	DNA transformation competency	Competence
9	HP0040	JHP0035	comB2	DNA transformation competency	Competence
1	HP0041	JHP0036	comB3	DNA transformation competency	Competence
1	HP0042	JHP0036	comB3	trbI protein, DNA transformation competency	Competence
5	HP0043	JHP0037	pmi, algA, manC	mannose-6-phosphate isomerase , phosphomannose isomerase/GDP-mannose pyrophosphorylase	Biosynthesis and Metabolism
7	HP0044	JHP0038	rfbD, gmd	GDP-D-mannose dehydratase	Cell Envelope
7	HP0045	JHP0039	nolK	nodulation protein , putative SUGAR NUCLEOTIDE BIOSYNTHESIS	Biosynthesis and Metabolism
6	HP0047	JHP0040	hypE	hydrogenase expression/formation protein	Biosynthesis and Metabolism
10	HP0048	JHP0041	hypF	transcriptional regulator , putative TRANSCRIPTIONAL REGULATOR	DNA/RNA Synthesis and Processing
6	HP0049	JHP0042			Competence
7	HP0050	JHP0043	dpnA	adenine specific DNA methyltransferase , putative TYPE II DNA MODIFICATION ENZYME (METHYLTRANSFERASE)	Restiction Modification
7	HP0051	N/A	DDEM	cytosine specific DNA methyltransferase	Restiction Modification
2	HP0052	N/A			Unknown Hypothetical
6	HP0053	N/A			Unknown Hypothetical
17	HP0054	N/A		adenine/cytosine DNA methyltransferase	Restiction Modification
7	HP0055	JHP0047	putP	proline permease , sodium/proline symporter	Transporters

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
7	HP0056	JHP0048	putA	delta-1-pyrroline-5-carboxylate dehydrogenase, Proline/pyrroline-5-carboxylate dehydrogenase	Biosynthesis and Metabolism
3	HP0057	JHP0049			Unknown Hypothetical
2	HP0058	JHP0050 JHP0051			Unknown Hypothetical
9	HP0059	JHP0052			Unknown Hypothetical
6	HP0060	JHP0053 JHP0054 JHP0055			Unknown Hypothetical
0	HP0061	JHP0056			Unknown Hypothetical
7	HP0062	JHP0057			Unknown Hypothetical
10	HP0063	JHP0058			Unknown Hypothetical
3	HP0064	JHP0059			Unknown Hypothetical
0	HP0065	JHP0060			Unknown Hypothetical
9	HP0066	JHP0061		conserved hypothetical ATP-binding protein	Conserve Hypothetical
5	HP0067	JHP0062	ureH	urease accessory protein	Biosynthesis and Metabolism
4	HP0068	JHP0063	ureG	urease accessory protein	Biosynthesis and Metabolism
1	HP0069	JHP0064	ureF	urease accessory protein	Biosynthesis and Metabolism
2	HP0070	JHP0065	ureE	urease accessory protein	Biosynthesis and Metabolism
3	HP0071	JHP0066	ureI	urease accessory protein , urea transporter	Biosynthesis and Metabolism
6	HP0072	JHP0067	ureB	urease beta subunit (urea amidohydrolase) , UREASE BETA SUBUNIT	Biosynthesis and Metabolism
7	HP0073	JHP0068	ureA	urease alpha subunit (urea amidohydrolase), UREASE ALPHA SUBUNIT	Biosynthesis and Metabolism
8	HP0074	JHP0069	lspA	lipoprotein signal peptidase	Protein Synthesis and Processing
0	HP0075	JHP0070	ureC, glmM	urease protein , phosphoglucosamine mutase	Biosynthesis and Metabolism
0	HP0076	JHP0071	rps20, rpsT	ribosomal protein S20 , 30S RIBOSOMAL PROTEIN S20	Protein Synthesis and Processing
8	HP0077	JHP0072	prfA	peptide chain release factor RF-1 , PEPTIDE CHAIN RELEASE FACTOR 1	Protein Synthesis and Processing
1	HP0078	JHP0073		putative Outer membrane protein	Unknown Hypothetical
2	HP0079	JHP0073	omp3	outer membrane protein	Outer Membrane Protein
5	HP0080	JHP0074			Unknown Hypothetical
13	HP0082	JHP0075	tlpC	methyl-accepting chemotaxis transducer , methyl-accepting chemotaxis protein (MCP)	Signaling
3	HP0083	JHP0076	rps9, rpsI	ribosomal protein S9 , 30S RIBOSOMAL PROTEIN S9	Protein Synthesis and Processing
0	HP0084	JHP0077	rpl13, rplM	ribosomal protein L13 , 50S RIBOSOMAL PROTEIN L13	Protein Synthesis and Processing
2	HP0085	JHP0078			Unknown Hypothetical

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
8	HP0086	JHP0079		conserved hypothetical protein	Conserve Hypothetical
5	HP0087	JHP0080			Unknown Hypothetical
5	HP0088	JHP0081	rpoD	RNA polymerase sigma-70 factor , RNA POLYMERASE SIGMA FACTOR (SIGMA-70)	DNA/RNA Synthesis and Processing
4	HP0089	JHP0082	pfs	pfs protein	Other
3	HP0090	JHP0083	fabD	malonyl coenzyme A-acyl carrier protein transacylase , MALONYL COA-ACYL CARRIER PROTEIN TRANSACYLASE	Biosynthesis and Metabolism
1	HP0091	JHP0084	hsdR	type II restriction enzyme R protein	Restiction Modification
0	HP0092	JHP0085	hsdM	type II restriction enzyme M protein , TYPE II DNA MODIFICATION ENZYME (METHYLTRANSFERASE)	Restiction Modification
1	HP0093	JHP0086		putative ALPHA(1,2)FUCOSYLTRANSFERASE	Cell Envelope
2	HP0094	JHP0086		conserved hypothetical protein	Conserve Hypothetical
0	HP0095	JHP0087			Unknown Hypothetical
6	HP0096	JHP0088		phosphoglycerate dehydrogenase, putative keto-acid dehydrogenase	Biosynthesis and Metabolism
2	HP0097	JHP0089			Unknown Hypothetical
1	HP0098	JHP0090	thrC	threonine synthase	Biosynthesis and Metabolism
3	HP0099	JHP0091	tlpA	methyl-accepting chemotaxis protein , methyl-accepting chemotaxis protein (MCP)	Signaling
5	HP0100	JHP0092		conserved hypothetical protein	Conserve Hypothetical
7	HP0101	JHP0093			Unknown Hypothetical
4	HP0102	JHP0094		conserved hypothetical protein	Conserve Hypothetical
5	HP0103	JHP0095	tlpB	methyl-accepting chemotaxis protein , methyl-accepting chemotaxis protein (MCP)	Signaling
3	HP0104	JHP0096	cpdB	2',3'-cyclic-nucleotide 2'-phosphodiesterase	Biosynthesis and Metabolism
1	HP0105	JHP0097		conserved hypothetical protein	Conserve Hypothetical
7	HP0106	JHP0098	metB	cystathionine gamma-synthase , putative CYSTATHIONINE GAMMA-SYNTHASE	Biosynthesis and Metabolism
2	HP0107	JHP0099	cysK	cysteine synthetase , CYSTEINE SYNTHASE	Biosynthesis and Metabolism
0	HP0109	JHP0101	dnaK	chaperone and heat shock protein 70 , 70kDa chaperone	Chaperones
0	HP0110	JHP0102	grpE	co-chaperone and heat shock protein , 24kDa chaperone	Chaperones
1	HP0111	JHP0103			Unknown Hypothetical
2	HP0112	JHP0104			Unknown Hypothetical
2	HP0113	JHP0105			Unknown Hypothetical
4	HP0114	JHP0106			Unknown Hypothetical
6	HP0115	JHP0107	flaB	flagellin B	Motility

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
3	HP0116	JHP0108	topA, topA_1	DNA topoisomerase I	DNA/RNA Synthesis and Processing
6	HP0117	JHP0109		conserved hypothetical protein	Conserve Hypothetical
5	HP0118	JHP0110			Unknown Hypothetical
7	HP0119	N/A			Unknown Hypothetical
2	HP0120	N/A			Unknown Hypothetical
1	HP0121	JHP0111	ppsA	phosphoenolpyruvate synthase	Biosynthesis and Metabolism
0	HP0122	JHP0112			Unknown Hypothetical
0	HP0123	JHP0113	thrS	threonyl-tRNA synthetase	Protein Synthesis and Processing
0	HP0124	JHP0114	infC	translation initiation factor IF-3	Protein Synthesis and Processing
0	HP0125	JHP0115	rpl35, rpml	ribosomal protein L35 , 50S RIBOSOMAL PROTEIN L35	Protein Synthesis and Processing
0	HP0126	JHP0116	rpl20, rplT	ribosomal protein L20 , 50S RIBOSOMAL PROTEIN L20	Protein Synthesis and Processing
4	HP0127	JHP0117	omp4	outer membrane protein , putative Outer membrane protein	Outer Membrane Protein
1	HP0128	N/A			Unknown Hypothetical
2	HP0129	JHP0118			Unknown Hypothetical
3	HP0130	JHP0119			Unknown Hypothetical
4	HP0131	N/A			Unknown Hypothetical
7	HP0132	JHP0120	sdaA, sdaB	L-serine deaminase , L-SERINE/L-THREONINEDEAMINASE	Biosynthesis and Metabolism
5	HP0133	JHP0121	sdaC	serine transporter , L-serine transporter, similar to E. coli nhaB	Transporters
2	HP0134	JHP0122	dhs1, aroF	3-deoxy-D-arabino-heptulosonate 7-phosphate synthase , PHOSPHO-2-DEHYDRO-3-DEOXYHEPTONATE ALDOLASE	Biosynthesis and Metabolism
1	HP0135	JHP0123			Unknown Hypothetical
3	HP0136	JHP0124	bcp	bacterioferritin comigratory protein	Unknown Hypothetical
4	HP0137	JHP0125			Unknown Hypothetical
1	HP0138	JHP0126		conserved hypothetical iron-sulfur protein	Conserve Hypothetical
2	HP0139	JHP0127		conserved hypothetical secreted protein	Conserve Hypothetical
14	HP0140	JHP0128	lctP, lldP_1	L-lactate permease	Transporters
4	HP0141	JHP0129	lctP, lldP_2	L-lactate permease	Transporters
2	HP0142	JHP0130	mutY	A/G-specific adenine glycosylase	DNA/RNA Synthesis and Processing
3	HP0143	JHP0131			Transporters
5	HP0144	JHP0132	fixN	cytochrome c oxidase, heme b and copper-binding subunit, membrane-bound , Cytochrome oxidase (CBB3-TYPE)	Biosynthesis and Metabolism

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
4	HP0145	JHP0133	fixO	cytochrome c oxidase, monoheme subunit, membrane-bound , Cytochrome oxidase (CBB3-TYPE)	Biosynthesis and Metabolism
0	HP0146	JHP0134	CcoQ, fixQ	cbb3-type cytochrome c oxidase subunit Q , putative Cytochrome oxidase (CBB3-TYPE)	Biosynthesis and Metabolism
0	HP0147	JHP0135	fixP	cytochrome c oxidase, diheme subunit, membrane-bound , Cytochrome oxidase (CBB3-TYPE)	Biosynthesis and Metabolism
0	HP0148	JHP0136			Unknown Hypothetical
2	HP0149	JHP0137			Unknown Hypothetical
2	HP0150	JHP0138			Unknown Hypothetical
16	HP0151	JHP0139		conserved hypothetical membrane protein	Conserve Hypothetical
1	HP0152	JHP0140			Unknown Hypothetical
0	HP0153	JHP0141	recA	recombinase , RECA PROTEIN.	DNA/RNA Synthesis and Processing
1	HP0154	JHP0142	eno	enolase	Biosynthesis and Metabolism
4	HP0155	JHP0143			Unknown Hypothetical
5	HP0156	JHP0144			Unknown Hypothetical
0	HP0157	JHP0145	aroK	shikimic acid kinase I , SHIKIMATE KINASE I	Biosynthesis and Metabolism
2	HP0158	JHP0146			Unknown Hypothetical
7	HP0159	JHP0147	rfaJ	lipopolysaccharide 1,2-glucosyltransferase , putative lipopolysaccharide biosynthesis protein	Cell Envelope
8	HP0160	JHP0148		conserved hypothetical secreted protein	Conserve Hypothetical
15	HP0161	N/A			Unknown Hypothetical
12	HP0162	JHP0149		conserved hypothetical protein	Conserve Hypothetical
6	HP0163	JHP0150	hemB	delta-aminolevulinic acid dehydratase	Biosynthesis and Metabolism
0	HP0164	JHP0151		signal-transducing protein, histidine kinase	Regulation
1	HP0165	JHP0151		putative histidine kinase sensor protein	Unknown Hypothetical
3	HP0166	JHP0152	ompR	response regulator , putative TRANSCRIPTIONAL REGULATOR	DNA/RNA Synthesis and Processing
4	HP0167	JHP0153			Unknown Hypothetical
1	HP0168	JHP0154			Unknown Hypothetical
5	HP0169	JHP0155	prtC	collagenase , putative PROTEASE	Protein Synthesis and Processing
8	HP0170	JHP0156			Unknown Hypothetical
4	HP0171	JHP0157	prfB	peptide chain release factor RF-2 , PEPTIDE CHAIN RELEASE FACTOR 2 (RF-2)	Protein Synthesis and Processing
6	HP0172	JHP0158	moeA	molybdopterin biosynthesis protein	Biosynthesis and Metabolism
2	HP0173	JHP0159	fliR	flagellar biosynthetic protein , FLAGELLAR BIOSYNTHESIS PROTEIN	Motility
7	HP0174	JHP0160			Unknown Hypothetical

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
0	HP0175	JHP0161		cell binding factor 2, putative PEPTIDYL-PROLYL CIS-TRANS ISOMERASE	Outer Membrane Protein
1	HP0176	JHP0162	tsr, fba	fructose-bisphosphate aldolase	Biosynthesis and Metabolism
2	HP0177	JHP0163	efp	translation elongation factor EF-P , ELONGATION FACTOR P (EF-P)	Protein Synthesis and Processing
4	HP0178	JHP0166	neuB	spore coat polysaccharide biosynthesis protein E, sialic acid synthase	Cell Envelope
3	HP0179	JHP0167		ABC transporter, ATP-binding protein	Transporters
1	HP0180	JHP0168	cute, lnt	apolipoprotein N-acyltransferase	Outer Membrane Protein
12	HP0181	JHP0169			Unknown Hypothetical
0	HP0182	JHP0170	lysS	lysyl-tRNA synthetase	Protein Synthesis and Processing
1	HP0183	JHP0171	glyA	serine hydroxymethyltransferase	Biosynthesis and Metabolism
9	HP0184	JHP0172			Unknown Hypothetical
1	HP0185	JHP0173			Unknown Hypothetical
4	HP0186	JHP0174			Unknown Hypothetical
3	HP0187	JHP0174			Unknown Hypothetical
0	HP0188	JHP0174			Unknown Hypothetical
2	HP0189	JHP0175		conserved hypothetical integral membrane protein	Conserve Hypothetical
0	HP0190	JHP0176		conserved hypothetical secreted protein, putative cardiolipin synthase	Conserve Hypothetical
1	HP0191	JHP0177	frdB	fumarate reductase, iron-sulfur subunit , Fumarate reductase	Biosynthesis and Metabolism
5	HP0192	JHP0178	frdA	fumarate reductase, flavoprotein subunit , Fumarate reductase	Biosynthesis and Metabolism
8	HP0193	JHP0179	frdC	fumarate reductase, cytochrome b subunit , Fumarate reductase	Biosynthesis and Metabolism
2	HP0194	JHP0180	tpi	triosephosphate isomerase , TRIOSE PHOPHATE ISOMERASE	Biosynthesis and Metabolism
7	HP0195	JHP0181	fabI	enoyl-(acyl-carrier-protein) reductase (NADH) , ENOYL-ACYL CARRIER PROTEIN REDUCTASE	Biosynthesis and Metabolism
0	HP0196	JHP0182	lpxD	UDP-3-O-(3-hydroxymyristoyl) glucosamine N-acyltransferase , UDP-3-O-[3-hydroxymyristoyl	Cell Envelope
0	HP0197	JHP0183	metX, metK	S-adenosylmethionine synthetase 2 , S-adenosylmethionine synthetase	Biosynthesis and Metabolism
1	HP0198	JHP0184	ndk	nucleoside diphosphate kinase	Biosynthesis and Metabolism
4	HP0199	JHP0185			Unknown Hypothetical
0	HP0200	JHP0186	rpl32, rpmF	ribosomal protein L32 , 50S RIBOSOMAL PROTEIN L32	Protein Synthesis and Processing
0	HP0201	JHP0187	plsX	fatty acid/phospholipid synthesis protein , putative FATTY ACID/PHOSPHOLIPID SYNTHESIS PROTEIN	Biosynthesis and Metabolism

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
1	HP0202	JHP0188	fabH	beta-ketoacyl-acyl carrier protein synthase III , BETA-KETOACYL-ACP SYNTHASE III	Biosynthesis and Metabolism
1	HP0203	JHP0189			Unknown Hypothetical
6	HP0204	JHP0190			Unknown Hypothetical
7	HP0205	JHP0191			Unknown Hypothetical
1	HP0206	JHP0192			Unknown Hypothetical
3	HP0207	JHP0193	mpr	ATP-binding protein	Unknown Hypothetical
1	HP0208	JHP0194		putative lipopolysaccharide biosynthesis protein	Cell Envelope
1	HP0209	JHP0195		putative Outer membrane protein	Unknown Hypothetical
7	HP0210	JHP0196	htpG	chaperone and heat shock protein C62.5 , 90kDa chaperone	Chaperones
3	HP0211	JHP0197		conserved hypothetical secreted protein	Conserve Hypothetical
6	HP0212	JHP0198	dapE	succinyl-diaminopimelate desuccinylase	Biosynthesis and Metabolism
4	HP0213	JHP0199	gidA	glucose inhibited division protein , GLUCOSE INHIBITED DIVISION PROTEIN A	DNA/RNA Synthesis and Processing
4	HP0214	JHP0200	huNaD C-1	sodium-dependent transporter , putative transporter	Transporters
3	HP0215	JHP0201	cdsA	CDP-diglyceride synthetase , CDP-DIACYLGLYCEROL SYNTHASE	Biosynthesis and Metabolism
4	HP0216	JHP0202		conserved hypothetical protein	Conserve Hypothetical
0	HP0218	JHP0204			Unknown Hypothetical
2	HP0219	JHP0205			Unknown Hypothetical
2	HP0220	JHP0206	nifS	synthesis of [Fe-S] cluster , putative AMINOTRANSFERASE	Biosynthesis and Metabolism
0	HP0221	JHP0207		nifU-like protein	Unknown Hypothetical
0	HP0222	JHP0208			Unknown Hypothetical
5	HP0223	JHP0209	sms, radA	ATP-dependent protease , DNA REPAIR PROTEIN	Protein Synthesis and Processing
4	HP0224	JHP0210	msrA	peptide methionine sulfoxide reductase , putative PEPTIDE METHIONINE SULFOXIDE REDUCTASE	Regulation
2	HP0225	N/A			Unknown Hypothetical
0	HP0226	JHP0211		conserved hypothetical integral membrane protein	Conserve Hypothetical
11	HP0227	JHP0212	omp5	outer membrane protein , putative Outer membrane protein	Outer Membrane Protein
10	HP0228	JHP0213		conserved hypothetical integral membrane protein	Conserve Hypothetical
6	HP0229	JHP0214	omp6, hopA	outer membrane protein , Outer membrane protein/porin	Outer Membrane Protein
5	HP0230	JHP0215	kdsB	CTP:CMP-3-deoxy-D-manno-octulosonate-cytidyl-transferase , 3-DEOXY-MANNO-OCTULOSONATE CYTIDYLTRANSFERASE	Cell Envelope
1	HP0231	JHP0216			Unknown Hypothetical

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
3	HP0232	JHP0217		secreted protein involved in flagellar motility, motility protein	Motility
3	HP0233	JHP0218		conserved hypothetical protein	Conserve Hypothetical
4	HP0234	JHP0219		conserved hypothetical integral membrane protein	Conserve Hypothetical
7	HP0235	JHP0220		conserved hypothetical secreted protein	Conserve Hypothetical
1	HP0236	JHP0221			Unknown Hypothetical
0	HP0237	JHP0222	hemC	porphobilinogen deaminase	Biosynthesis and Metabolism
10	HP0238	JHP0223	proS	prolyl-tRNA synthetase	Protein Synthesis and Processing
2	HP0239	JHP0224	hemA	glutamyl-tRNA reductase , GLUTAMYL TRNA REDUCTASE	Biosynthesis and Metabolism
0	HP0240	JHP0225	ispB	octaprenyl-diphosphate synthase , putative OCTAPRENYL-DIPHOSPHATE SYNTHASE	Biosynthesis and Metabolism
1	HP0241	JHP0226			Unknown Hypothetical
0	HP0242	JHP0227			Unknown Hypothetical
2	HP0243	JHP0228	napA	neutrophil activating protein (bacterioferritin), NEUTROPHIL-ACTIVATING PROTEIN A	Detoxification
12	HP0244	JHP0229	atoS	signal-transducing protein, histidine kinase , putative histidine kinase sensor protein	Regulation
2	HP0245	JHP0230			Unknown Hypothetical
2	HP0246	JHP0231	flgl	flagellar basal-body P-ring protein , FLAGELLAR P-RING PROTEIN	Motility
8	HP0247	JHP0232	deaD	ATP-dependent RNA helicase, DEAD-box family , ATP-DEPENDENT RNA HELICASE DEAD	Protein Synthesis and Processing
1	HP0248	JHP0233		conserved hypothetical protein	Conserve Hypothetical
3	HP0249	JHP0234			Unknown Hypothetical
6	HP0250	JHP0235	oppD	oligopeptide ABC transporter, ATP-binding protein , ABC transporter, ATP-binding protein	Transporters
5	HP0251	JHP0236	oppC	oligopeptide ABC transporter, permease protein , ABC transporter, permease	Transporters
3	HP0253	JHP0238		putative Outer membrane protein	Unknown Hypothetical
15	HP0254	JHP0238	omp8	outer membrane protein	Outer Membrane Protein
13	HP0255	JHP0239	purA	adenylosuccinate synthetase	Biosynthesis and Metabolism
2	HP0256	JHP0240			Unknown Hypothetical
5	HP0257	JHP0241		conserved hypothetical secreted protein	Conserve Hypothetical
15	HP0258	JHP0242		conserved hypothetical integral membrane protein	Conserve Hypothetical
2	HP0259	JHP0243	xseA	exonuclease VII, large subunit , EXODEOXYRIBONUCLEASE LARGE SUBUNIT	DNA/RNA Synthesis and Processing

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
3	HP0260	JHP0244	mod	adenine specific DNA methyltransferase , TYPE II DNA MODIFICATION ENZYME (METHYLTRANSFERASE)	Restiction Modification
3	HP0261	JHP0245			Unknown Hypothetical
3	HP0262	JHP0246 JHP0247			Unknown Hypothetical
5	HP0263	JHP0248	hpaim	adenine specific DNA methyltransferase , TYPE II DNA MODIFICATION ENZYME (METHYLTRANSFERASE)	Restiction Modification
4	HP0264	JHP0249	clpB	ATP-dependent protease binding subunit , HEAT SHOCK PROTEIN	Protein Synthesis and Processing
0	HP0265	JHP0250	ccdA	cytochrome c biogenesis protein , putative CYTOCHROME C-TYPE BIOGENESIS PROTEIN	Biosynthesis and Metabolism
2	HP0266	JHP0251	pyrC, pyrC_1	dihydroorotase	Biosynthesis and Metabolism
3	HP0267	JHP0252	orf1	chlorohydrolase	Detoxification
0	HP0268	JHP0253			Unknown Hypothetical
0	HP0269	JHP0254		conserved hypothetical ATP-binding protein	Conserve Hypothetical
5	HP0270	JHP0255			Unknown Hypothetical
1	HP0271	JHP0256			Unknown Hypothetical
0	HP0272	JHP0257			Unknown Hypothetical
14	HP0273	JHP0258			Unknown Hypothetical
2	HP0274	JHP0259		conserved hypothetical protein	Conserve Hypothetical
0	HP0275	JHP0260	addB	ATP-dependent nuclease	DNA/RNA Synthesis and Processing
0	HP0276	JHP0261			Unknown Hypothetical
0	HP0277	JHP0262		ferredoxin	Biosynthesis and Metabolism
6	HP0278	JHP0263	gppA	guanosine pentaphosphate phosphohydrolase , GUANOSINE-5'-TRIPHOSPHATE,3'-DIPHOSPHATE PYROPHOSPHATASE	Regulation
0	HP0279	JHP0264	rfaC, waaC	lipopolysaccharide heptosyltransferase-1	Cell Envelope
2	HP0280	JHP0265	ibpB, waaM	heat shock protein B , putative LIPID A BIOSYNTHESIS ACYLTRANSFERASE	Other
5	HP0281	JHP0266	tgt	tRNA-guanine transglycosylase , QUEUINE TRNA-RIBOSYLTRANSFERASE	Protein Synthesis and Processing
4	HP0282	JHP0267			Unknown Hypothetical
5	HP0283	JHP0268	aroB	3-dehydroquinate synthase	Biosynthesis and Metabolism
4	HP0284	JHP0269		conserved hypothetical integral membrane protein	Conserve Hypothetical
2	HP0285	JHP0270		conserved hypothetical protein	Conserve Hypothetical
3	HP0286	JHP0271	ftsH, ftsH_1	cell division protein , ATP-DEPENDENT ZINC METALLOPEPTIDASE	Cell Division
1	HP0287	JHP0272			Unknown Hypothetical

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
0	HP0288	JHP0273			Unknown Hypothetical
0	HP0289	JHP0274		toxin-like outer membrane protein, putative vacuolating cytotoxin (VacA) paralog	Outer Membrane Protein
0	HP0290	JHP0275	lysA	diaminopimelate decarboxylase (dap decarboxylase) , DIAMINOPIMELATE DECARBOXYLASE	Biosynthesis and Metabolism
1	HP0291	JHP0276			Unknown Hypothetical
11	HP0292	JHP0277			Unknown Hypothetical
9	HP0293	JHP0278	pabB	para-aminobenzoate synthetase , P-AMINO BENZOATE SYNTHETASE	Biosynthesis and Metabolism
4	HP0294	JHP0279	aimE, amiE	aliphatic amidase	Biosynthesis and Metabolism
7	HP0295	JHP0280	fla, flgL	flagellin B homolog , putative FLAGELLAR-HOOK ASSOCIATED PROTEIN 3 (HAP3)	Motility
2	HP0296	JHP0281	rpl21, rplU	ribosomal protein L21 , 50S RIBOSOMAL PROTEIN L21	Protein Synthesis and Processing
0	HP0297	JHP0282	rpl27, rpmA	ribosomal protein L27 , 50S RIBOSOMAL PROTEIN L27	Protein Synthesis and Processing
0	HP0298	JHP0283	dppA	dipeptide ABC transporter, periplasmic dipeptide-binding protein , PERIPLASMIC DIPEPTIDE TRANSPORT SUBSTRATE-BINDING PROTEIN	Transporters
1	HP0299	JHP0284	dppB	dipeptide ABC transporter, permease protein , DIPEPTIDE TRANSPORT SYSTEM PERMEASE PROTEIN	Transporters
0	HP0300	JHP0285	dppC	dipeptide ABC transporter, permease protein	Transporters
0	HP0301	JHP0286	dppD	dipeptide ABC transporter, ATP-binding protein , DIPEPTIDE TRANSPORT SYSTEM DIPEPTIDE TRANSPORT SYSTEM ATP-BINDING PROTEIN	Transporters
1	HP0302	JHP0287	dppF	dipeptide ABC transporter, ATP-binding protein , DIPEPTIDE TRANSPORT SYSTEM ATP-BINDING PROTEIN	Transporters
3	HP0303	JHP0288	obg	GTP-binding protein	Unknown Hypothetical
2	HP0304	JHP0289			Unknown Hypothetical
1	HP0305	JHP0290			Unknown Hypothetical
8	HP0306	JHP0291	hemL	glutamate-1-semialdehyde 2,1-aminomutase	Biosynthesis and Metabolism
1	HP0307	JHP0292			Unknown Hypothetical
11	HP0308	JHP0293			Unknown Hypothetical
2	HP0309	JHP0294		conserved hypothetical protein	Conserve Hypothetical
3	HP0310	JHP0295		conserved hypothetical protein	Conserve Hypothetical
1	HP0311	JHP0296			Unknown Hypothetical
6	HP0312	JHP0297		conserved hypothetical ATP-binding protein	Conserve Hypothetical
9	HP0313	JHP0298	narK	nitrite extrusion protein	Transporters

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
0	HP0315	N/A	vapD	virulence associated protein D	Other
5	HP0317	N/A	omp9	outer membrane protein	Outer Membrane Protein
1	HP0318	JHP0301		conserved hypothetical protein	Conserve Hypothetical
11	HP0319	JHP0302	argS	arginyl-tRNA synthetase	Protein Synthesis and Processing
1	HP0320	JHP0303		conserved hypothetical secreted protein	Conserve Hypothetical
0	HP0321	JHP0304	gmk	5'-guanylate kinase , GUANYLATE KINASE	Biosynthesis and Metabolism
2	HP0322	JHP0305		poly E-rich protein	Unknown Hypothetical
0	HP0323	JHP0306	nuc	membrane bound endonuclease , putative ENDONUCLEASE	DNA/RNA Synthesis and Processing
1	HP0324	JHP0307	omp10	outer membrane protein , putative Outer membrane protein	Outer Membrane Protein
0	HP0325	JHP0308	flgH	flagellar basal-body L-ring protein , FLAGELLAR L-RING PROTEIN PRECURSOR (BASAL BODY L-RING PROTEIN)	Motility
3	HP0326	JHP0309	neuA	CMP-N-acetylneuraminic acid synthetase	Cell Envelope
2	HP0327	JHP0310	flaG	flagellar protein G , putative FLAGELLAR BIOSYNTHESIS PROTEIN	Motility
1	HP0328	JHP0311	lpxK	conserved hypothetical protein, putative tetraacyldisaccharide-1-P 4'-kinase	Conserve Hypothetical
2	HP0329	JHP0312	nadE	NH(3)-dependent NAD+ synthetase	Biosynthesis and Metabolism
9	HP0330	JHP0313	ilvC	ketol-acid reductoisomerase	Biosynthesis and Metabolism
3	HP0331	JHP0314	minD	cell division inhibitor	Cell Division
1	HP0332	JHP0315	minE	cell division topological specificity factor , putative cell division topological specificity factor	Cell Division
0	HP0333	JHP0316	dprA	DNA processing chain A	DNA/RNA Synthesis and Processing
2	HP0334	JHP0317		conserved hypothetical protein	Conserve Hypothetical
0	HP0336	N/A			Unknown Hypothetical
1	HP0337	JHP0319			Unknown Hypothetical
2	HP0338	JHP0320			Unknown Hypothetical
12	HP0339	N/A			Unknown Hypothetical
6	HP0340	N/A			Unknown Hypothetical
7	HP0341	N/A			Unknown Hypothetical
11	HP0342	N/A			Unknown Hypothetical
2	HP0343	N/A			Unknown Hypothetical
1	HP0344	N/A			Unknown Hypothetical
9	HP0345	N/A			Unknown Hypothetical
6	HP0346	N/A			Unknown Hypothetical
3	HP0347	JHP0321		conserved hypothetical protein	Conserve Hypothetical

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
4	HP0348	JHP0322	recJ	single-stranded-DNA-specific exonuclease , putative SINGLE-STRANDED-DNA-SPECIFIC EXONUCLEASE RECJ	DNA/RNA Synthesis and Processing
3	HP0349	JHP0323	pyrG	CTP synthetase , CTP SYNTHASE	Biosynthesis and Metabolism
4	HP0350	JHP0324			Unknown Hypothetical
6	HP0351	JHP0325	fliF	flagellar basal-body M-ring protein , FLAGELLAR M-RING PROTEIN	Motility
0	HP0352	JHP0326	fliG	flagellar motor switch protein	Motility
2	HP0353	JHP0327	fliH	flagellar export protein , putative FLAGELLAR EXPORT APPARATUS	Motility
4	HP0354	JHP0328	dxs	deoxyxylulose-5-phosphate synthase, putative , 1-DEOXYXYLULOSE-5-PHOSPHATE SYNTHASE	Biosynthesis and Metabolism
1	HP0355	JHP0329	lepA	GTP-binding membrane protein , GTP-BINDING PROTEIN	Protein Synthesis and Processing
3	HP0356	JHP0330			Unknown Hypothetical
2	HP0357	JHP1023		short chain alcohol dehydrogenase, putative oxidoreductase	Biosynthesis and Metabolism
13	HP0358	JHP1022		putative Outer membrane protein	Outer Membrane Protein
0	HP0359	JHP1021			Unknown Hypothetical
10	HP0360	JHP1020	galE	UDP-glucose 4-epimerase	Biosynthesis and Metabolism
4	HP0361	JHP1019	hisT, truA	pseudouridylate synthase I	Protein Synthesis and Processing
4	HP0362	JHP1018		conserved hypothetical integral membrane protein	Conserve Hypothetical
0	HP0363	JHP1017	pcm	L-isoaspartyl-protein carboxyl methyltransferase , PROTEIN-L-ISOASPARTATE O-METHYLTRANSFERASE	Protein Synthesis and Processing
1	HP0364	JHP1016	nrdB	ribonucleoside diphosphate reductase, beta subunit , RIBONUCLEOSIDE-DIPHOSPHATE REDUCTASE 1 BETA CHAIN	Biosynthesis and Metabolism
5	HP0365	N/A			Unknown Hypothetical
6	HP0366	JHP1015		spore coat polysaccharide biosynthesis protein C, putative SUGAR NUCLEOTIDE BIOSYNTHESIS	Cell Envelope
4	HP0367	JHP1014			Unknown Hypothetical
4	HP0368	JHP1013			Unknown Hypothetical
1	HP0369	JHP1012		putative TYPE II DNA MODIFICATION ENZYME (METHYLTRANSFERASE)	Restriction Modification
1	HP0370	JHP1011	accC	biotin carboxylase	Biosynthesis and Metabolism
4	HP0371	JHP1010	fabE, accB	biotin carboxyl carrier protein	Biosynthesis and Metabolism

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
6	HP0372	JHP1009	dcd	deoxycytidine triphosphate deaminase	Biosynthesis and Metabolism
1	HP0373	JHP1008		conserved hypothetical protein, putative outer membrane protein	Conserve Hypothetical
2	HP0374	JHP1007		conserved hypothetical protein	Conserve Hypothetical
5	HP0375	JHP1006			Unknown Hypothetical
3	HP0376	JHP1005	hemH	ferrochelatase	Biosynthesis and Metabolism
11	HP0377	JHP1004	dsbC	thiol:disulfide interchange protein	Unknown Hypothetical
0	HP0378	JHP1003	ycf5	cytochrome c biogenesis protein , putative CYTOCHROME C-TYPE BIOGENESIS PROTEIN	Biosynthesis and Metabolism
3	HP0379	JHP1002		fucosyltransferase, ALPHA-(1,3)-FUCOSYLTRANSFERASE	Cell Envelope
8	HP0380	JHP1001	gdhA	glutamate dehydrogenase	Biosynthesis and Metabolism
2	HP0381	JHP1000	hemK, hemG	protoporphyrinogen oxidase	Biosynthesis and Metabolism
1	HP0382	JHP0999	YJR117W	zinc-metallo protease , putative ZINC-METALLO PROTEASE	Protein Synthesis and Processing
3	HP0383	JHP0998			Unknown Hypothetical
12	HP0384	JHP0997			Unknown Hypothetical
1	HP0385	JHP0996			Unknown Hypothetical
0	HP0386	JHP0995			Unknown Hypothetical
2	HP0387	JHP0994	priA	primosomal protein replication factor , PRIMOSOMAL PROTEIN N' (REPLICATION FACTOR Y)	DNA/RNA Synthesis and Processing
0	HP0388	JHP0993		conserved hypothetical protein	Conserve Hypothetical
2	HP0389	JHP0992	sodB, sodF	superoxide dismutase , iron-dependent superoxide dismutase	Detoxification
3	HP0390	JHP0991	tagD, tpx	adhesin-thiol peroxidase , THIOL PEROXIDASE	Unknown Hypothetical
4	HP0391	JHP0990	cheW	purine-binding chemotaxis protein , histidine kinase - MCP coupling protein	Motility
11	HP0392	JHP0989	cheA	histidine kinase	Motility
4	HP0393	JHP0988	cheV, cheV_3	chemotaxis protein , putative chemotaxis protein	Motility
2	HP0394	JHP0987			Unknown Hypothetical
0	HP0395	JHP0986		conserved hypothetical protein	Conserve Hypothetical
2	HP0396	JHP0985		conserved hypothetical protein	Conserve Hypothetical
4	HP0397	JHP0984	serA	phosphoglycerate dehydrogenase , D-3-PHOSPHOGLYCERATE DEHYDROGENASE	Biosynthesis and Metabolism
1	HP0398	JHP0983			Unknown Hypothetical
2	HP0399	JHP0982	rps1, rpsA	ribosomal protein S1 , 30S RIBOSOMAL PROTEIN S1	Protein Synthesis and Processing
1	HP0400	JHP0981	lytB	penicillin tolerance protein , LYSIS TOLERANCE PROTEIN	Regulation

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
4	HP0401	JHP0980	aroA	3-phosphoshikimate 1-carboxyvinyltransferase , 3-PHOSPHOSHIKIMATE 1-CARBOXYVINYL TRANSFERASE	Biosynthesis and Metabolism
1	HP0402	JHP0979	pheT	phenylalanyl-tRNA synthetase, beta subunit , PHENYLALANYL-TRNA SYNTHETASE BETA CHAIN	Protein Synthesis and Processing
0	HP0403	JHP0978	pheS	phenylalanyl-tRNA synthetase, alpha subunit , PHENYLALANYL-TRNA SYNTHETASE ALPHA CHAIN	Protein Synthesis and Processing
1	HP0404	JHP0977		protein kinase C inhibitor , HIT FAMILY PROTEIN	Protein Synthesis and Processing
0	HP0405	JHP0976		nifS-like protein, putative AMINOTRANSFERASE	Unknown Hypothetical
7	HP0406	JHP0975			Unknown Hypothetical
9	HP0407	JHP0974	bisC	biotin sulfoxide reductase , putative S/N-oxide reductase	Biosynthesis and Metabolism
0	HP0408	JHP0973			Unknown Hypothetical
0	HP0409	JHP0972	guaA	GMP synthase , GMP SYNTHETASE	Biosynthesis and Metabolism
2	HP0410	JHP0971	hpaA	putative neuraminyllactose-binding hemagglutinin homolog , putative PARALOG OF HpaA	Motility
2	HP0411	N/A			Unknown Hypothetical
1	HP0412	JHP0970			Unknown Hypothetical
2	HP0415	JHP0969		conserved hypothetical integral membrane protein	Conserve Hypothetical
8	HP0416	JHP0968	cfa	cyclopropane fatty acid synthase , CYCLOPOCYCLOPROPANE FATTY ACID SYNTHASE	Biosynthesis and Metabolism
2	HP0417	JHP0967	metS, metG	methionyl-tRNA synthetase	Protein Synthesis and Processing
0	HP0418	JHP0966			Unknown Hypothetical
0	HP0419	JHP0965		conserved hypothetical protein	Conserve Hypothetical
4	HP0420	JHP0964			Unknown Hypothetical
2	HP0421	JHP0963	capJ	type 1 capsular polysaccharide biosynthesis protein J , putative POLYSACCHARIDE BIOSYNTHESIS PROTEIN	Cell Envelope
2	HP0422	JHP0962	speA	arginine decarboxylase	Biosynthesis and Metabolism
3	HP0423	N/A			Unknown Hypothetical
4	HP0424	N/A			Unknown Hypothetical
2	HP0425	N/A			Unknown Hypothetical
3	HP0426	N/A			Unknown Hypothetical
2	HP0427	JHP0952			Unknown Hypothetical
1	HP0428	N/A		phage/colicin/tellurite resistance cluster terY protein	Outer Membrane Protein
7	HP0430	N/A			Unknown Hypothetical
2	HP0431	N/A	ptc1	protein phosphatase 2C homolog	Unknown Hypothetical

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
4	HP0432	N/A		protein kinase C-like protein	Other
8	HP0438	N/A	tnpB	IS605 transposase	Transposon
0	HP0439	N/A			Unknown Hypothetical
0	HP0445	N/A			Unknown Hypothetical
4	HP0453	N/A			Unknown Hypothetical
3	HP0454	N/A			Unknown Hypothetical
0	HP0456	N/A			Unknown Hypothetical
2	HP0457	N/A			Unknown Hypothetical
0	HP0460	N/A			Unknown Hypothetical
1	HP0462	N/A	hsdS	type I restriction enzyme S protein	Restiction Modification
3	HP0463	JHP0415	hsdM, hsdM_1	type I restriction enzyme M protein , TYPE I RESTRICTION ENZYME (MODIFICATION SUBUNIT)	Restiction Modification
9	HP0464	JHP0416	hsdR	type I restriction enzyme R protein	Restiction Modification
3	HP0465	JHP0417		conserved hypothetical protein	Conserve Hypothetical
0	HP0466	JHP0418		conserved hypothetical protein	Conserve Hypothetical
14	HP0467	JHP0419		conserved hypothetical integral membrane protein	Conserve Hypothetical
2	HP0468	JHP0420		conserved hypothetical protein	Conserve Hypothetical
0	HP0469	JHP0421		conserved hypothetical protein	Conserve Hypothetical
0	HP0470	JHP0422	pepF	oligoendopeptidase F , OLIGOPEPTIDASE	Protein Synthesis and Processing
3	HP0471	JHP0423	kefB	glutathione-regulated potassium-efflux system protein	Transporters
4	HP0472	JHP0424	omp11	outer membrane protein , putative Outer membrane protein	Outer Membrane Protein
3	HP0473	JHP0425	modA	molybdenum ABC transporter, periplasmic molybdate-binding protein , Molybdate ABC transporter, periplasmic-binding protein	Transporters
5	HP0474	JHP0426	modB	molybdenum ABC transporter, permease protein , Molybdate ABC transporter, permease	Transporters
2	HP0475	JHP0427	modD, modC	molybdenum ABC transporter, ATP-binding protein , Molybdate ABC transporter, ATP-binding protein	Transporters
9	HP0476	JHP0428	gltX, gltX_1	glutamyl-tRNA synthetase	Protein Synthesis and Processing
8	HP0477	JHP0429	omp12	outer membrane protein , putative Outer membrane protein	Outer Membrane Protein
4	HP0478	JHP0430	VSPIM	adenine specific DNA methyltransferase , TYPE II DNA MODIFICATION ENZYME (METHYLTRANSFERASE)	Restiction Modification
3	HP0479	JHP0431			Unknown Hypothetical
6	HP0480	JHP0432	yihK	GTP-binding protein, fusA-homolog	Unknown Hypothetical
6	HP0481	JHP0433	MFOKI	adenine specific DNA methyltransferase , putative TYPE II DNA MODIFICATION ENZYME (METHYLTRANSFERASE)	Restiction Modification
4	HP0482	JHP0434			Unknown Hypothetical

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
4	HP0483	JHP0435		TYPE II DNA MODIFICATION ENZYME (METHYLTRANSFERASE)	Restiction Modification
4	HP0484	JHP0436			Unknown Hypothetical
10	HP0485	JHP0437		catalase-like protein	Unknown Hypothetical
13	HP0486	JHP0438		Outer membrane protein	Outer Membrane Protein
1	HP0487	JHP0439		putative Outer membrane protein	Outer Membrane Protein
0	HP0488	JHP0440			Unknown Hypothetical
0	HP0489	JHP0441			Unknown Hypothetical
2	HP0490	JHP0442		putative potassium channel protein, putative, PUTATIVE POTASSIUM CHANNEL PROTEIN	Transporters
0	HP0491	JHP0443	rpL28, rpmB	ribosomal protein L28 , 50S RIBOSOMAL PROTEIN L28	Protein Synthesis and Processing
1	HP0492	JHP0444		putative paralog of HpaA	Outer Membrane Protein
2	HP0493	JHP0445	mraY	phospho-N-acetylmuramoyl-pentapeptide-transferase	Cell Envelope
1	HP0494	JHP0446	murD	UDP-N-acetylmuramoylalanine-D-glutamate ligase , UDP-N-ACETYLMURAMOYLALANINE--D-GLUTAMATE LIGASE	Cell Envelope
2	HP0495	JHP0447			Unknown Hypothetical
1	HP0496	JHP0448		conserved hypothetical protein	Conserve Hypothetical
5	HP0497	JHP0449		sodium- and chloride-dependent transporter, putative transporter	Transporters
6	HP0498	JHP0450		sodium- and chloride-dependent transporter, putative transporter	Transporters
3	HP0499	JHP0451	pIdA	phospholipase A1 precursor (DR-phospholipase A), putative PHOSPHOLIPASE A1	Biosynthesis and Metabolism
0	HP0500	JHP0452	dnaN	DNA polymerase III beta-subunit , DNA POLYMERASE III, BETA CHAIN	DNA/RNA Synthesis and Processing
6	HP0501	JHP0453	gyrB	DNA gyrase, sub B , DNA GYRASE SUBUNIT B	DNA/RNA Synthesis and Processing
1	HP0502	JHP0454			Unknown Hypothetical
4	HP0503	JHP0454			Unknown Hypothetical
1	HP0504	JHP0455			Unknown Hypothetical
0	HP0505	JHP0455			Unknown Hypothetical
2	HP0506	JHP0456		conserved hypothetical secreted protein, putative Outer membrane protein	Conserve Hypothetical
0	HP0507	JHP0457		conserved hypothetical protein	Conserve Hypothetical
9	HP0508	JHP0458			Unknown Hypothetical
8	HP0509	JHP0459	glcD	glycolate oxidase subunit , putative Glycolate oxidase	Biosynthesis and Metabolism
0	HP0510	JHP0460	dapB	dihydrodipicolinate reductase	Biosynthesis and Metabolism
1	HP0514	JHP0463	rpI9, rpII	ribosomal protein L9 , 50S RIBOSOMAL PROTEIN L9	Protein Synthesis and Processing

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
1	HP0515	JHP0464	hslV	heat shock protein	Protein Synthesis and Processing
5	HP0516	JHP0465	hslU	heat shock protein	Protein Synthesis and Processing
5	HP0517	JHP0466	era	GTP-binding protein	Other
1	HP0518	JHP0467		conserved hypothetical secreted protein	Conserve Hypothetical
1	HP0519	JHP0468		conserved hypothetical protein	Conserve Hypothetical
9	HP0520	JHP0469	cag1, orf6	cag pathogenicity island protein , putative cag island protein	PAI
3	HP0521	JHP0470	orf7	cag island protein	PAI
6	HP0522	JHP0471	cag3, orf8	cag pathogenicity island protein , cag island protein	PAI
3	HP0523	JHP0472	cag4, orf9	cag pathogenicity island protein , cag island protein	PAI
11	HP0524	JHP0473	cag5, virD4	cag pathogenicity island protein , cag island protein, DNA transfer protein	PAI
5	HP0525	JHP0474	virB11_1	virB11 homolog, cag island protein, DNA transfer protein	PAI
7	HP0526	JHP0475	cag6, orf12	cag pathogenicity island protein , cag island protein	PAI
10	HP0527	JHP0476	cag7, orf13/14	cag pathogenicity island protein , cag island protein	PAI
3	HP0528	JHP0477	cag8, orf15	cag pathogenicity island protein , cag island protein	PAI
6	HP0529	JHP0478	cag9, orf16	cag pathogenicity island protein , cag island protein	PAI
4	HP0530	JHP0479	cag10, orf17	cag pathogenicity island protein , cag island protein	PAI
3	HP0531	JHP0480	cag11, orf18	cag pathogenicity island protein , cag island protein	PAI
0	HP0532	JHP0481	cag12, cagT	cag pathogenicity island protein , cag island protein	PAI
2	HP0534	JHP0482	cag13, cagS	cag pathogenicity island protein , cag island protein	PAI
2	HP0535	JHP0483	cag14, cagQ	cag pathogenicity island protein , cag island protein	PAI
1	HP0536	JHP0484	cag15, cagP	cag pathogenicity island protein , cag island protein	PAI
5	HP0537	JHP0485	cag16, cagM	cag pathogenicity island protein , cag island protein	PAI
4	HP0538	JHP0486	cag17, cagN	cag pathogenicity island protein , cag island protein	PAI
3	HP0539	JHP0487	cag18, cagL	cag pathogenicity island protein , cag island protein	PAI

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
1	HP0540	JHP0488	cag19, cagl	cag pathogenicity island protein , cag island protein	PAI
2	HP0541	JHP0489	cag20, cagH	cag pathogenicity island protein , cag island protein	PAI
1	HP0542	JHP0490	cag21, cagG	cag pathogenicity island protein , cag island protein	PAI
5	HP0543	JHP0491	cag22, cagF	cag pathogenicity island protein , cag island protein	PAI
9	HP0544	JHP0492	cag23, cagE	cag pathogenicity island protein , DNA transfer protein (Agrobacterium VirB4 homolog)	PAI
0	HP0545	JHP0493	cag24, cagD	cag pathogenicity island protein , cag island protein	PAI
1	HP0546	JHP0494	cag25, cagC	cag pathogenicity island protein , cag island protein	PAI
7	HP0547	JHP0495	cag26, cagA	cag pathogenicity island protein , cag island protein, CYTOTOXICITY ASSOCIATED IMMUNODOMINANT ANTIGEN	PAI
0	HP0548	N/A			DNA/RNA Synthesis and Processing
3	HP0549	JHP0496	glr, murl	glutamate racemase	Cell Envelope
4	HP0550	JHP0497	rho	transcription termination factor Rho , TRANSCRIPTION TERMINATION FACTOR	DNA/RNA Synthesis and Processing
0	HP0551	JHP0498	rpl31, rpmE	ribosomal protein L31 , 50S RIBOSOMAL PROTEIN L31	Protein Synthesis and Processing
3	HP0552	JHP0499		conserved hypothetical protein	Conserve Hypothetical
1	HP0553	JHP0500		conserved hypothetical protein	Conserve Hypothetical
0	HP0554	JHP0501			Unknown Hypothetical
4	HP0555	JHP0502			Unknown Hypothetical
5	HP0556	JHP0503			Unknown Hypothetical
6	HP0557	JHP0504	accA	acetyl-coenzyme A carboxylase , ACETYL-COENZYME A CARBOXYLASE SUBUNIT A	Biosynthesis and Metabolism
6	HP0558	JHP0505	fabF, fabB	beta ketoacyl-acyl carrier protein synthase II , BETA-KETOACYL-ACP SYNTHASE I	Biosynthesis and Metabolism
0	HP0559	JHP0506	acpP	acyl carrier protein	Biosynthesis and Metabolism
4	HP0560	JHP0507			Unknown Hypothetical
18	HP0561	JHP0508	fabG	3-ketoacyl-acyl carrier protein reductase , ACETYL-COENZYME A CARBOXYLASE SUBUNIT A	Biosynthesis and Metabolism
4	HP0563	JHP0510			Unknown Hypothetical

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
1	HP0564	JHP0511			Unknown Hypothetical
2	HP0565	JHP0512			Unknown Hypothetical
5	HP0566	JHP0513	dapF	diaminopimelate epimerase	Biosynthesis and Metabolism
6	HP0567	JHP0514		membrane protein, putative Inner membrane protein	Outer Membrane Protein
7	HP0568	JHP0515			Unknown Hypothetical
17	HP0569	JHP0516	gtp1	GTP-binding protein	Unknown Hypothetical
1	HP0570	JHP0517	pepA	aminopeptidase a/i , AMINOPEPTIDASE	Protein Synthesis and Processing
0	HP0572	JHP0519	apt	adenine phosphoribosyltransferase	Biosynthesis and Metabolism
0	HP0573	JHP0520			Unknown Hypothetical
0	HP0574	JHP0521	lacA, rpi	galactosidase acetyltransferase , RIBOSE 5-PHOSPHATE ISOMERASE	Biosynthesis and Metabolism
2	HP0575	JHP0522		conserved hypothetical membrane protein	Conserve Hypothetical
4	HP0576	JHP0523	lepB	signal peptidase I	Protein Synthesis and Processing
1	HP0577	JHP0524	folD	methylene-tetrahydrofolate dehydrogenase , METHYLENETETRAHYDROFOLATE DEHYDROGENASE/METHENYLTETRAHYDROFOLATE CYCLOHYDROLASE	Biosynthesis and Metabolism
5	HP0578	JHP0525			Unknown Hypothetical
4	HP0579	JHP0526			Unknown Hypothetical
5	HP0580	JHP0527			Unknown Hypothetical
6	HP0581	JHP0528	pyrC, pyrC_2	dihydroorotase	Biosynthesis and Metabolism
3	HP0582	JHP0529	tonB_1	putative SIDEROPHORE-MEDIATED IRON TRANSPORT PROTEIN	Iron Uptake
0	HP0583	JHP0530			Unknown Hypothetical
1	HP0584	JHP0531	fliN	flagellar switch protein	Motility
1	HP0585	JHP0532	nth	endonuclease III	DNA/RNA Synthesis and Processing
0	HP0586	JHP0534			Unknown Hypothetical
0	HP0587	JHP0535	pabC	aminodeoxychorismate lyase	Biosynthesis and Metabolism
13	HP0588	JHP0536	oorD	ferredoxin-like protein, SUBUNIT OF 2-OXOGLUTARATE OXIDOREDUCTASE	Biosynthesis and Metabolism
0	HP0589	JHP0537	oorA	ferredoxin oxidoreductase, alpha subunit, SUBUNIT OF 2-OXOGLUTARATE OXIDOREDUCTASE	Biosynthesis and Metabolism
0	HP0590	JHP0538	oorB	ferredoxin oxidoreductase, beta subunit, SUBUNIT OF 2-OXOGLUTARATE OXIDOREDUCTASE	Biosynthesis and Metabolism
0	HP0591	JHP0539	oorC	ferredoxin oxidoreductase, gamma subunit, SUBUNIT OF 2-OXOGLUTARATE OXIDOREDUCTASE	Biosynthesis and Metabolism

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
2	HP0592	N/A	res	type III restriction enzyme R protein	Restiction Modification
1	HP0593	N/A	mod	adenine specific DNA methyltransferase	Restiction Modification
5	HP0594	JHP0541			Unknown Hypothetical
8	HP0595	JHP0542			Unknown Hypothetical
4	HP0596	JHP0543			Unknown Hypothetical
0	HP0597	JHP0544	PBP-1A	penicillin-binding protein 1A , PENICILLIN-BINDING PROTEIN	Cell Envelope
0	HP0598	JHP0545	bioF	8-amino-7-oxononanoate synthase	Biosynthesis and Metabolism
1	HP0599	JHP0546	hylB	hemolysin secretion protein precursor , methyl-accepting chemotaxis protein (MCP)	Other
6	HP0600	JHP0547	spaB	multidrug resistance protein , putative secretion/efflux abc transporter, ATP-binding protein	Transporters
4	HP0601	JHP0548	flaA	flagellin A	Motility
5	HP0602	JHP0549		endonuclease III	DNA/RNA Synthesis and Processing
3	HP0603	JHP0550			Unknown Hypothetical
5	HP0604	JHP0551	hemE	uroporphyrinogen decarboxylase	Biosynthesis and Metabolism
0	HP0605	JHP0552			Unknown Hypothetical
2	HP0606	JHP0553	mtrC	membrane fusion protein , putative efflux transporter	Outer Membrane Protein
2	HP0607	JHP0554	acrB	acriflavine resistance protein , putative efflux transporter	Transporters
1	HP0608	JHP0555			Unknown Hypothetical
8	HP0609	JHP0556		putative vacuolating cytotoxin (VacA) paralog	Unknown Hypothetical
3	HP0610	JHP0556		toxin-like outer membrane protein	Outer Membrane Protein
3	HP0611	JHP0299			Unknown Hypothetical
3	HP0612	JHP0299			Unknown Hypothetical
4	HP0613	JHP0300		ABC transporter, ATP-binding protein, putative abc transporter, ATP-binding protein	Transporters
0	HP0614	JHP0557			Unknown Hypothetical
4	HP0615	JHP0558	lig	DNA ligase	DNA/RNA Synthesis and Processing
1	HP0616	JHP0559	cheV, cheV_2	chemotaxis protein , putative chemotaxis protein	Motility
1	HP0617	JHP0560	aspS	aspartyl-tRNA synthetase	Protein Synthesis and Processing
2	HP0618	JHP0561	adk	adenylate kinase	Biosynthesis and Metabolism
3	HP0619	JHP0563		putative lipopolysaccharide biosynthesis protein	Cell Envelope
1	HP0620	JHP0564	ppa	inorganic pyrophosphatase	Biosynthesis and Metabolism

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
1	HP0621	JHP0565	MutS	DNA mismatch repair protein	DNA/RNA Synthesis and Processing
2	HP0622	JHP0566			Unknown Hypothetical
2	HP0623	JHP0567	murC	UDP-N-acetylmuramate-alanine ligase , UDP-N-ACETYLMURAMATE--ALANINE LIGASE	Cell Envelope
2	HP0624	JHP0568	aspB	solute-binding signature and mitochondrial signature protein , AMINOTRANSFERASE	Protein Synthesis and Processing
3	HP0625	JHP0569	gcpE	protein E	Other
4	HP0626	JHP0570	dapD	tetrahydrodipicolinate N-succinyltransferase , putative 2,3,4,5-TETRAHYDROPYRIDINE 2-CARBOXYLATE N-SUCCINYLTRANSFERASE	Biosynthesis and Metabolism
2	HP0627	JHP0571			Unknown Hypothetical
4	HP0628	JHP0571			Unknown Hypothetical
2	HP0629	JHP0572			Unknown Hypothetical
10	HP0630	JHP0573	mda66	modulator of drug activity	Outer Membrane Protein
9	HP0631	JHP0574	hydA, hyaA	quinone-reactive Ni/Fe hydrogenase, small subunit , Hydrogenase, small subunit	Biosynthesis and Metabolism
10	HP0632	JHP0575	hydB, hyaB	quinone-reactive Ni/Fe hydrogenase, large subunit , Hydrogenase, large subunit	Biosynthesis and Metabolism
3	HP0633	JHP0576	hydC, hyaC	quinone-reactive Ni/Fe hydrogenase, cytochrome b subunit , Hydrogenase, cytochrome subunit	Biosynthesis and Metabolism
5	HP0634	JHP0577	hydD, hyaD	quinone-reactive Ni/Fe hydrogenase , Hydrogenase expression/formation protein	Biosynthesis and Metabolism
5	HP0635	JHP0578			Unknown Hypothetical
2	HP0637	JHP0580			Unknown Hypothetical
2	HP0638	JHP0581	omp13	outer membrane protein , putative Outer membrane protein	Outer Membrane Protein
1	HP0639	JHP0582		conserved hypothetical protein	Conserve Hypothetical
5	HP0640	JHP0583	papS, pcnB	poly(A) polymerase , POLYNUCLEOTIDE ADENYLYLTRANSFERASE	DNA/RNA Synthesis and Processing
0	HP0641	JHP0584			Unknown Hypothetical
1	HP0642	JHP0586		NAD(P)H-flavin oxidoreductase, putative Oxidoreductase	Biosynthesis and Metabolism
11	HP0643	JHP0588	gltX, gltX_2	glutamyl-tRNA synthetase	Protein Synthesis and Processing
0	HP0644	JHP0589		conserved hypothetical integral membrane protein	Conserve Hypothetical
3	HP0645	JHP0590	slt	soluble lytic murein transglycosylase , LYTIC MUREIN TRANSGLYCOSYLASE	Cell Envelope

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
0	HP0646	JHP0591	galU	UDP-glucose pyrophosphorylase , UTP--GLUCOSE-1-PHOSPHATE URIDYLYLTRANSFERASE	Biosynthesis and Metabolism
0	HP0647	JHP0592			Unknown Hypothetical
0	HP0648	JHP0593	murZ, murA	UDP-N-acetylglucosamine enolpyruvyl transferase , UDP-N-ACETYLGLUCOSAMINE ENOLPYRUVYLTRANSFERASE	Cell Envelope
1	HP0649	JHP0594	aspA	aspartate ammonia-lyase	Biosynthesis and Metabolism
0	HP0650	JHP0595			Unknown Hypothetical
2	HP0652	JHP0597	serB	phosphoserine phosphatase	Biosynthesis and Metabolism
1	HP0653	JHP0598	pfr	nonheme iron-containing ferritin	Transporters
1	HP0654	JHP0599			Conserve Hypothetical
9	HP0655	JHP0600		putative Outer membrane protein	Outer Membrane Protein
0	HP0656	JHP0601			Conserve Hypothetical
1	HP0657	JHP0602		putative PROCESSING PROTEASE	Protein Synthesis and Processing
0	HP0658	JHP0603	gatB	GLU-TRNA AMIDOTRANSFERASE, SUBUNIT B	Protein Synthesis and Processing
2	HP0659	JHP0604			Unknown Hypothetical
6	HP0660	JHP0605			Unknown Hypothetical
0	HP0661	JHP0606	rnhA	RIBONUCLEASE HI	DNA/RNA Synthesis and Processing
0	HP0662	JHP0607	rnc	RIBONUCLEASE III	DNA/RNA Synthesis and Processing
0	HP0663	JHP0608	aroC	CHORISMATE SYNTHASE	Biosynthesis and Metabolism
0	HP0664	JHP0609			Unknown Hypothetical
1	HP0665	JHP0610	hemN_1	OXYGEN-INDEPENDENT COPROPORPHYRINOGEN III OXIDASE	Biosynthesis and Metabolism
3	HP0666	JHP0611	glpC	glycerol-3-phosphate dehydrogenase	Biosynthesis and Metabolism
2	HP0667	JHP0612			Unknown Hypothetical
7	HP0668	JHP0612			Unknown Hypothetical
10	HP0669	JHP0613			Unknown Hypothetical
5	HP0671	JHP0614	omp14	outer membrane protein , putative Outer membrane protein	Outer Membrane Protein
2	HP0672	JHP0615	aspB	solute-binding signature and mitochondrial signature protein , ASPARTATE AMINOTRANSFERASE	Biosynthesis and Metabolism
1	HP0673	N/A			Unknown Hypothetical
3	HP0675	JHP0617	xerC	integrase/recombinase , INTEGRASE-RECOMBINASE PROTEIN (XERCD FAMILY)	DNA/RNA Synthesis and Processing
4	HP0676	JHP0618	dat1, ogt	methylated-DNA--protein-cysteine methyltransferase	DNA/RNA Synthesis and Processing

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
1	HP0677	JHP0619		conserved hypothetical integral membrane protein	Conserve Hypothetical
2	HP0679	JHP0620	wbpB	lipopolysaccharide biosynthesis protein , putative LIPOPOLYSACCHARIDE BIOSYNTHESIS PROTEIN	Cell Envelope
2	HP0680	JHP0621	nrdA	ribonucleoside-diphosphate reductase 1 alpha subunit , RIBONUCLEOSIDE-DIPHOSPHATE REDUCTASE 1 ALPHA CHAIN	Biosynthesis and Metabolism
5	HP0683	JHP0624	glmU	UDP-N-acetylglucosamine pyrophosphorylase	Biosynthesis and Metabolism
0	HP0684	JHP0625	fliP	FLAGELLAR BIOSYNTHESIS PROTEIN	Motility
1	HP0685	JHP0625	fliP	flagellar biosynthetic protein	Motility
5	HP0686	JHP0626	fecA, fecA_1	iron(III) dicitrate transport protein	Transporters
9	HP0687	JHP0627	feoB	iron(II) transport protein , FERROUS IRON TRANSPORT PROTEIN B	Transporters
3	HP0689	JHP0628			Unknown Hypothetical
12	HP0690	JHP0638	fadA, thl	acetyl coenzyme A acetyltransferase(thiolase) , ACETYL-COA ACETYLTRANSFERASE	Biosynthesis and Metabolism
2	HP0691	JHP0637	yxjD, scoA	3-oxoadipate coA-transferase subunit A , 3-OXOACID COA-TRANSFERASE, SUBUNIT A	Biosynthesis and Metabolism
14	HP0692	JHP0636	yxjE, scoB	3-oxoadipate coA-transferase subunit B , 3-OXOACID COA-TRANSFERASE, SUBUNIT B	Biosynthesis and Metabolism
11	HP0693	JHP0635	atoE	conserved hypothetical integral membrane protein, short-chain fatty acids transporter	Conserve Hypothetical
4	HP0694	JHP0634		putative Outer membrane protein	Outer Membrane Protein
15	HP0695	JHP0633	hyuA	hydantoin utilization protein A , putative HYDANTOIN UTILIZATION	Biosynthesis and Metabolism
7	HP0696	JHP0632		N-methylhydantoinase, putative HYDANTOIN UTILIZATION	Biosynthesis and Metabolism
3	HP0697	JHP0631			Unknown Hypothetical
2	HP0698	N/A			Unknown Hypothetical
11	HP0699	JHP0639			Unknown Hypothetical
0	HP0700	JHP0640	dgkA	diacylglycerol kinase	Biosynthesis and Metabolism
4	HP0701	JHP0641	gyrA	DNA gyrase, sub A , DNA GYRASE SUBUNIT A	DNA/RNA Synthesis and Processing
3	HP0702	JHP0642			Unknown Hypothetical
12	HP0703	JHP0643		response regulator, putative TRANSCRIPTIONAL REGULATOR	Regulation
14	HP0705	JHP0644	uvrA	excinuclease ABC subunit A , EXCINUCLEASE ABC SUBUNIT A.	DNA/RNA Synthesis and Processing

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
5	HP0706	JHP0645	omp15 , hopE	outer membrane protein , Outer membrane protein/porin	Outer Membrane Protein
0	HP0707	JHP0646		conserved hypothetical protein	Conserve Hypothetical
0	HP0708	JHP0647			Unknown Hypothetical
1	HP0709	JHP0648		conserved hypothetical protein	Conserve Hypothetical
4	HP0710	JHP0649		conserved hypothetical protein, putative Outer membrane protein	Conserve Hypothetical
3	HP0711	JHP0650			Unknown Hypothetical
4	HP0712	JHP0651			Unknown Hypothetical
1	HP0713	JHP0651			Conserve Hypothetical
10	HP0714	JHP0652	rpoN	RNA polymerase sigma-54 factor	Regulation
5	HP0715	JHP0653		ABC transporter, ATP-binding protein, putative abc transporter, ATP-binding protein	Transporters
0	HP0716	JHP0654		conserved hypothetical protein	Conserve Hypothetical
4	HP0717	JHP0655	dnaX	DNA polymerase III gamma and tau subunits , DNA POLYMERASE III SUBUNITS GAMMA AND TAU	DNA/RNA Synthesis and Processing
2	HP0718	JHP0656		conserved hypothetical integral membrane protein	Conserve Hypothetical
2	HP0719	JHP0657			Unknown Hypothetical
6	HP0720	JHP0657			Unknown Hypothetical
3	HP0721	JHP0658			Unknown Hypothetical
3	HP0722	JHP0659		putative Outer membrane protein	Outer Membrane Protein
6	HP0723	JHP0661	ansB	L-asparaginase II	Biosynthesis and Metabolism
12	HP0724	JHP0660	dcuA	anaerobic C4-dicarboxylate transport protein , ANAEROBIC C4-DICARBOXYLATE MEMBRANE TRANSPORTER	Transporters
3	HP0725	JHP0662		putative Outer membrane protein	Outer Membrane Protein
5	HP0726	JHP0663		putative Outer membrane protein	Outer Membrane Protein
5	HP0727	JHP0664		transcriptional regulator, putative, putative TRANSCRIPTIONAL REGULATOR	Regulation
6	HP0728	JHP0665		conserved hypothetical protein	Conserve Hypothetical
0	HP0729	JHP0666			Unknown Hypothetical
1	HP0730	JHP0667			Unknown Hypothetical
2	HP0731	JHP0668			Unknown Hypothetical
4	HP0733	JHP0670			Unknown Hypothetical
3	HP0734	JHP0671		conserved hypothetical protein	Conserve Hypothetical
3	HP0735	JHP0672	gpt	xanthine guanine phosphoribosyl transferase , XANTHINE-GUANINE PHOSPHORIBOSYLTRANSFERASE	Biosynthesis and Metabolism
0	HP0736	JHP0673	serC	phosphoserine aminotransferase , putative aminotransferase	Biosynthesis and Metabolism

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
0	HP0737	JHP0674	pgpA	conserved hypothetical integral membrane protein, PHOSPHATIDYLGLYCEROPHOSPHATA SE A	Conserve Hypothetical
0	HP0738	JHP0675	ddlA, ddl	D-alanine:D-alanine ligase A , D-ALANINE--D-ALANINE LIGASE	Cell Envelope
5	HP0739	JHP0676		2-hydroxy-6-oxohepta-2,4-dienoate hydrolase	Other
0	HP0740	JHP0677	murF	UDP-MurNac-pentapeptide presynthetase , D-ALANYL-D-ALANINE-ADDING ENZYME	Cell Envelope
1	HP0741	JHP0678		conserved hypothetical protein, HIT FAMILY PROTEIN	Conserve Hypothetical
0	HP0742	JHP0679	prsA	phosphoribosylpyrophosphate synthetase , PHOSPHORIBOSYL PYROPHOSPHATE SYNTHETASE	Biosynthesis and Metabolism
1	HP0743	JHP0680	mreB, rodA_1	rod shape-determining protein , putative ROD SHAPE-DETERMINING PROTEIN	Cell Envelope
2	HP0744	JHP0681			Unknown Hypothetical
0	HP0745	JHP0682		conserved hypothetical protein	Conserve Hypothetical
0	HP0746	JHP0683			Unknown Hypothetical
2	HP0747	JHP0684		conserved hypothetical protein	Conserve Hypothetical
0	HP0748	JHP0685	ftsE	cell division protein , putative abc transporter, ATP-binding protein	Cell Division
0	HP0749	JHP0686	ftsX	cell division membrane protein	Cell Division
0	HP0750	JHP0687			Unknown Hypothetical
9	HP0751	JHP0688	flaG	polar flagellin , putative FLAGELLIN PROTEIN	Motility
7	HP0752	JHP0689	fliD	flagellar hook-associated protein 2 , putative FLAGELLAR HOOK-ASSOCIATED PROTEIN 2 (HAP2)	Motility
4	HP0753	JHP0690	fliS	flagellar protein , putative FLAGELLAR PROTEIN	Motility
3	HP0754	JHP0691			Unknown Hypothetical
3	HP0755	JHP0692	moeB	molybdopterin biosynthesis protein	Biosynthesis and Metabolism
3	HP0756	JHP0693			Unknown Hypothetical
3	HP0757	JHP0694		beta-alanine synthetase homolog	Biosynthesis and Metabolism
4	HP0758	JHP0695		conserved hypothetical integral membrane protein	Conserve Hypothetical
4	HP0759	JHP0696		conserved hypothetical integral membrane protein	Conserve Hypothetical
0	HP0760	JHP0697		conserved hypothetical protein	Conserve Hypothetical
0	HP0761	JHP0698			Unknown Hypothetical
3	HP0762	JHP0699			Unknown Hypothetical
0	HP0763	JHP0700	ftsY	cell division protein , FUNCTIONAL HOMOLOG OF SRP RECEPTOR	Cell Division
1	HP0764	JHP0701	JHP0702		Unknown Hypothetical

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
0	HP0767	N/A			Unknown Hypothetical
3	HP0768	JHP0705	moaA	molybdenum cofactor biosynthesis protein A , MOLYBDOPTERIN COFACTOR BIOSYNTHETIC PROTEIN	Biosynthesis and Metabolism
1	HP0769	JHP0706	mobA	molybdopterin-guanine dinucleotide biosynthesis protein A	Biosynthesis and Metabolism
2	HP0770	JHP0707	flhB, flhB_1	flagellar biosynthetic protein , FLAGELLAR BIOSYNTHESIS PROTEIN	Motility
3	HP0771	JHP0708			Unknown Hypothetical
5	HP0772	JHP0709	amiA	N-acetylmuramoyl-L-alanine amidase , putative PROBABLE N-ACETYLMURAMOYL-L-ALANINE AMIDASE	Cell Envelope
0	HP0773	JHP0710			Unknown Hypothetical
4	HP0774	JHP0711	tyrS	tyrosyl-tRNA synthetase	Protein Synthesis and Processing
0	HP0775	JHP0712	spoT	penta-phosphate guanosine-3'-pyrophosphohydrolase , GUANOSINE-3',5'-BIS(DIPHOSPHATE) 3'-PYROPHOSPHOHYDROLASE	Regulation
0	HP0776	JHP0713			Unknown Hypothetical
12	HP0777	JHP0714	pyrH	uridine 5'-monophosphate (UMP) kinase, URIDYLATE KINASE	Biosynthesis and Metabolism
11	HP0778	JHP0715			Unknown Hypothetical
2	HP0779	JHP0716	acnB	aconitase B , ACONITATE HYDRATASE	Biosynthesis and Metabolism
1	HP0780	JHP0717			Unknown Hypothetical
1	HP0781	JHP0718			Unknown Hypothetical
6	HP0782	JHP0719		putative Outer membrane protein	Outer Membrane Protein
7	HP0783	JHP0720			Unknown Hypothetical
0	HP0785	JHP0722		conserved hypothetical secreted protein	Conserve Hypothetical
5	HP0786	JHP0723	secA	preprotein translocase subunit	Protein Synthesis and Processing
2	HP0787	JHP0724		conserved hypothetical integral membrane protein	Conserve Hypothetical
4	HP0788	JHP0725		putative Outer membrane protein	Outer Membrane Protein
3	HP0789	N/A			Unknown Hypothetical
5	HP0790	N/A	prfB	anti-codon nuclease masking agent	DNA/RNA Synthesis and Processing
0	HP0791	JHP0727	cadA, hmcT	cadmium-transporting ATPase, P-type , putative HEAVY-METAL CATION-TRANSPORTING P-TYPE ATPASE	Transporters
4	HP0792	JHP0728		sigma-54 interacting protein	Regulation
0	HP0793	JHP0729	def	polypeptide deformylase	Protein Synthesis and Processing
1	HP0794	JHP0730	clpP	ATP-dependent clp protease proteolytic component , ATP-DEPENDENT PROTEASE, PROTEOLYTIC SUBUNIT	Protein Synthesis and Processing

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
3	HP0795	JHP0731	tig	trigger factor	Protein Synthesis and Processing
7	HP0796	JHP0732	omp18	outer membrane protein , putative Outer membrane protein	Outer Membrane Protein
1	HP0797	JHP0733	hpaA	flagellar sheath adhesin hpaA, NEURAMINYLLACTOSE-BINDING HEMAGGLUTININ PRECURSOR	Motility
0	HP0798	JHP0734	moaC	molybdenum cofactor biosynthesis protein C	Biosynthesis and Metabolism
0	HP0799	JHP0735	mog	molybdopterin biosynthesis protein	Biosynthesis and Metabolism
2	HP0800	JHP0736	moaE	molybdopterin converting factor, subunit 2	Biosynthesis and Metabolism
1	HP0801	JHP0737	moaD	molybdopterin converting factor, subunit 1 , putative MOLYBDOPTERIN CONVERTING FACTOR, SUBUNIT 1	Biosynthesis and Metabolism
5	HP0802	JHP0738	ribA	GTP cyclohydrolase II	Biosynthesis and Metabolism
6	HP0803	JHP0739			Unknown Hypothetical
5	HP0804	JHP0740	ribA, ribB, ribBA	GTP cyclohydrolase II/3,4-dihydroxy-2-butanone 4-phosphate synthase , GTP CYCLOHYDROLASE II/3,4-DIHYDROXY-2-BUTANONE 4- PHOSPHATE SYNTHASE	Biosynthesis and Metabolism
4	HP0805	JHP0741	lex2B	lipooligosaccharide 5G8 epitope biosynthesis-associated protein , putative lipopolysaccharide biosynthesis protein	Cell Envelope
6	HP0806	JHP0742			Unknown Hypothetical
0	HP0807	JHP0743	fecA, fecA_2	iron(III) dicitrate transport protein	Transporters
3	HP0808	JHP0744	acpS	holo-acp synthase , HOLO-ACYL CARRIER PROTEIN SYNTHASE	Biosynthesis and Metabolism
0	HP0809	JHP0745	fliL	putative FLAGELLAR BIOSYNTHESIS PROTEIN	Motility
5	HP0810	JHP0746		conserved hypothetical protein	Conserve Hypothetical
0	HP0811	JHP0747			Unknown Hypothetical
1	HP0812	JHP0748			Unknown Hypothetical
1	HP0813	JHP0749		conserved hypothetical protein	Conserve Hypothetical
1	HP0814	JHP0750	thiF, moeB	thiamin biosynthesis protein , MOLYBDOPTERIN-SYNTHASE SULFURYLASE	Biosynthesis and Metabolism
7	HP0816	JHP0752	motB	flagellar motor rotation protein , FLAGELLAR MOTOR PROTEIN	Motility
5	HP0817	JHP0753			Unknown Hypothetical
4	HP0818	JHP0754	proWX	osmoprotection protein	Transporters
2	HP0819	JHP0758	proV	osmoprotection protein , osmoprotection ATP-binding protein	Transporters

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
0	HP0820	JHP0759			Unknown Hypothetical
4	HP0821	JHP0760	uvrC	excinuclease ABC subunit C	DNA/RNA Synthesis and Processing
4	HP0822	JHP0761	metL, hom	homoserine dehydrogenase	Biosynthesis and Metabolism
1	HP0823	JHP0762		conserved hypothetical protein	Conserve Hypothetical
1	HP0824	JHP0763	trxA	thioredoxin	Biosynthesis and Metabolism
4	HP0825	JHP0764	trxB, trxB_1	thioredoxin reductase	Biosynthesis and Metabolism
2	HP0826	JHP0765	lex2B	lipooligosaccharide 5G8 epitope biosynthesis-associated protein , putative lipopolysaccharide biosynthesis protein	Cell Envelope
1	HP0827	JHP0766		ss-DNA binding protein 12RNP2 precursor	Other
2	HP0828	JHP0767	atpB	ATP synthase F0, subunit a	Biosynthesis and Metabolism
7	HP0829	JHP0768	guaB	inosine-5'-monophosphate dehydrogenase	Biosynthesis and Metabolism
12	HP0830	JHP0769	gatA	Glu-tRNA(Gln) amidotransferase, subunit A , GLU-TRNA AMIDOTRANSFERASE, SUBUNIT A	Protein Synthesis and Processing
0	HP0831	JHP0770		conserved hypothetical ATP binding protein	Conserve Hypothetical
3	HP0832	JHP0771	speE	spermidine synthase , putative spermidine synthase	Biosynthesis and Metabolism
3	HP0833	JHP0772			Unknown Hypothetical
7	HP0834	JHP0773	yphC	GTP-binding protein homologue	Conserved Hypothetical
0	HP0835	JHP0774	hup	histone-like DNA-binding protein HU , DNA-BINDING PROTEIN HU	Protein Synthesis and Processing
1	HP0836	JHP0775			Unknown Hypothetical
1	HP0837	JHP0775			Unknown Hypothetical
2	HP0838	JHP0776			Unknown Hypothetical
6	HP0839	JHP0777	ompP1	outer membrane protein P1 , putative Outer membrane protein	Outer Membrane Protein
2	HP0840	JHP0778		flaA1 protein, putative SUGAR NUCLEOTIDE BIOSYNTHESIS PROTEIN	Motility
1	HP0841	JHP0779	dfp	pantothenate metabolism flavoprotein	Biosynthesis and Metabolism
2	HP0842	JHP0780			Unknown Hypothetical
4	HP0843	JHP0781	thiB, thiE	thiamin phosphate pyrophosphorylase/hydroxyethylthiazole kinase , THIAMINE PHOSPHATE PYROPHOSPHORYLASE	Biosynthesis and Metabolism

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
2	HP0844	JHP0782	thi, thiD	thiamine biosynthesis protein , PHOSPHOMETHYLPYRIMIDINE KINASE	Biosynthesis and Metabolism
1	HP0845	JHP0783	thiM	thiamin phosphate pyrophosphorylase/hydroxyethylthiazole kinase , HYDROXYETHYLTHIAZOLE KINASE	Biosynthesis and Metabolism
5	HP0846	JHP0784	hsdR, hsdR_2	type I restriction enzyme R protein , TYPE I RESTRICTION ENZYME (RESTRICTION SUBUNIT)	Restriction Modification
0	HP0849	JHP0785			Unknown Hypothetical
2	HP0850	JHP0786	hsdM, hsdM_2	type I restriction enzyme M protein , TYPE I RESTRICTION ENZYME (MODIFICATION SUBUNIT)	Restriction Modification
0	HP0851	JHP0787		conserved hypothetical integral membrane protein	Conserve Hypothetical
0	HP0852	JHP0788			Unknown Hypothetical
2	HP0853	JHP0789	yheS	ABC transporter, ATP-binding protein , putative abc transporter, ATP-binding protein	Transporters
0	HP0854	JHP0790	guaC	GMP reductase	Biosynthesis and Metabolism
3	HP0857	JHP0791	gmhA	phosphoheptose isomerase	Cell Envelope
0	HP0858	JHP0792	rfaE, waaE	ADP-heptose synthase , putative ADP-D-glycero-D-mannoheptose synthase	Cell Envelope
2	HP0859	JHP0793	rfaD, gmhD	ADP-L-glycero-D-mannoheptose-6-epimerase	Cell Envelope
0	HP0860	JHP0794		conserved hypothetical protein	Conserve Hypothetical
3	HP0861	JHP0795			Unknown Hypothetical
4	HP0862	JHP0796			Unknown Hypothetical
3	HP0863	JHP0797			Unknown Hypothetical
1	HP0864	JHP0798			Unknown Hypothetical
3	HP0865	JHP0799	dut	deoxyuridine 5'-triphosphate nucleotidohydrolase	Biosynthesis and Metabolism
0	HP0866	JHP0800	greA	transcription elongation factor GreA , TRANSCRIPTION ELONGATION FACTOR (TRANSCRIPT CLEAVAGE FACTOR)	DNA/RNA Synthesis and Processing
1	HP0867	JHP0801	lpxB	lipid A disaccharide synthetase , LIPID-A-DISACCHARIDE SYNTHASE	Cell Envelope
0	HP0868	JHP0802			Unknown Hypothetical
1	HP0869	JHP0803	hypA	hydrogenase expression/formation protein	Biosynthesis and Metabolism
10	HP0870	JHP0804	flgE	flagellar hook , FLAGELLAR HOOK PROTEIN	Motility
1	HP0871	JHP0805	cdh	CDP-diglyceride hydrolase , CDP-DIACYLGLYCEROL PYROPHOSPHATASE	Biosynthesis and Metabolism

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
2	HP0872	JHP0806	phnA	alkylphosphonate uptake protein , putative ALKYLPHOSPHONATE UPTAKE PROTEIN	Conserved Hypothetical
1	HP0873	JHP0807			Unknown Hypothetical
3	HP0874	JHP0808			Unknown Hypothetical
3	HP0875	JHP0809	katA	catalase	Detoxification
4	HP0876	JHP0810	frpB, frpB_1	iron-regulated outer membrane protein , putative IRON-REGULATED OUTER MEMBRANE PROTEIN	Transporters
2	HP0877	JHP0811	ruvC	Holliday junction endodeoxyribonuclease , CROSSOVER JUNCTION ENDODEOXYRIBONUCLEASE	DNA/RNA Synthesis and Processing
2	HP0878	JHP0812			Unknown Hypothetical
3	HP0879	JHP0812			Unknown Hypothetical
0	HP0880	N/A			Unknown Hypothetical
2	HP0883	JHP0815	ruvA	Holliday junction DNA helicase	DNA/RNA Synthesis and Processing
12	HP0884	JHP0816			Unknown Hypothetical
2	HP0885	JHP0817	mviN	virulence factor mviN protein	Other
1	HP0886	JHP0818	cysS	cysteinyI-tRNA synthetase	Protein Synthesis and Processing
6	HP0887	JHP0819	vacA	vacuolating cytotoxin	Outer Membrane Protein
4	HP0888	JHP0821	fecE	iron(III) dicitrate ABC transporter, ATP-binding protein, IRON(III) DICITRATE TRANSPORT SYSTEM ATP-BINDING PROTEIN	Transporters
9	HP0889	JHP0822	fecD	iron(III) dicitrate ABC transporter, permease protein , IRON(III) DICITRATE TRANSPORT SYSTEM PERMEASE PROTEIN	Transporters
6	HP0890	JHP0823		conserved hypothetical protein	Conserve Hypothetical
3	HP0891	JHP0824		conserved hypothetical protein	Conserve Hypothetical
1	HP0892	JHP0831		conserved hypothetical protein	Conserve Hypothetical
3	HP0893	JHP0832			Unknown Hypothetical
3	HP0895	N/A			Unknown Hypothetical
1	HP0896	JHP1164	omp19 , babB	outer membrane protein , outer membrane protein - adhesin	Outer Membrane Protein
2	HP0897	N/A			Unknown Hypothetical
2	HP0898	JHP0835	hypD	hydrogenase expression/formation protein	Biosynthesis and Metabolism
2	HP0899	JHP0836	hypC	hydrogenase expression/formation protein	Biosynthesis and Metabolism
2	HP0900	JHP0837	hypB	hydrogenase expression/formation protein	Biosynthesis and Metabolism
1	HP0901	JHP0838			Unknown Hypothetical
4	HP0902	JHP0839			Unknown Hypothetical
4	HP0907	JHP0843	flgD	hook assembly protein, flagella , putative FLAGELLAR BIOSYNTHESIS PROTEIN	Motility

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
11	HP0908	JHP0844	flgE	flagellar hook , putative FLAGELLAR BASAL-BODY/ROD/HOOKPROTEIN	Motility
6	HP0909	JHP0845			Unknown Hypothetical
7	HP0910	JHP0846	HINDII M	adenine specific DNA methyltransferase , TYPE II DNA MODIFICATION ENZYME (METHYLTRANSFERASE)	Restiction Modification
5	HP0911	JHP0847	rep	rep helicase, single-stranded DNA-dependent ATPase , putative ATP-DEPENDENT HELICASE	DNA/RNA Synthesis and Processing
10	HP0912	JHP0848	omp20 , hopC	outer membrane protein , Outer membrane protein/porin	Outer Membrane Protein
9	HP0913	JHP0849	omp21 , hopB	outer membrane protein , Outer membrane protein/porin	Outer Membrane Protein
6	HP0914	JHP0850		putative Outer membrane protein	Outer Membrane Protein
5	HP0915	JHP0851	frpB, frpB_2	iron-regulated outer membrane protein , putative IRON-REGULATED OUTER MEMBRANE PROTEIN	Transporters
7	HP0916	JHP0851	frpB	iron-regulated outer membrane protein	Transporters
5	HP0917	N/A			Unknown Hypothetical
2	HP0918	JHP0852			Unknown Hypothetical
4	HP0919	JHP0853	pyrAb, carB	carbamoyl-phosphate synthase (glutamine-hydrolysing) , CARBAMOYL-PHOSPHATE SYNTHASE LARGE CHAIN	Biosynthesis and Metabolism
0	HP0920	JHP0854		conserved hypothetical integral membrane protein	Conserve Hypothetical
2	HP0921	JHP0855	gap, gap_1	glyceraldehyde-3-phosphate dehydrogenase , GLYCERALDEHYDE 3-PHOSPHATE DEHYDROGENASE	Biosynthesis and Metabolism
1	HP0922	JHP0856		toxin-like outer membrane protein, putative vacuolating cytotoxin (VacA) paralog	Outer Membrane Protein
3	HP0923	JHP0857	omp22	outer membrane protein , putative Outer membrane protein	Outer Membrane Protein
2	HP0924	JHP0858	dmpl	4-oxalocrotonate tautomerase	Other
3	HP0925	JHP0859	recR	recombinational DNA repair protein , RECOMBINATION PROTEIN	DNA/RNA Synthesis and Processing
3	HP0926	JHP0860		conserved hypothetical protein	Conserve Hypothetical
0	HP0927	JHP0861	htpX	heat shock protein , stress protein	Other
0	HP0928	JHP062 JH	folE	GTP cyclohydrolase I	Biosynthesis and Metabolism
0	HP0929	JHP0864	ispA	geranyltranstransferase	Biosynthesis and Metabolism
2	HP0930	JHP0865	surE	stationary-phase survival protein , STATIONARY PHASE PROTEIN	Other
0	HP0931	JHP0866			Unknown Hypothetical
0	HP0932	JHP0866			Unknown Hypothetical

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
2	HP0933	JHP0867			Unknown Hypothetical
2	HP0934	JHP0868		conserved hypothetical protein	Conserve Hypothetical
0	HP0935	JHP0869			Unknown Hypothetical
2	HP0936	JHP0871	proP	proline/betaine transporter	Transporters
3	HP0937	JHP0872			Unknown Hypothetical
7	HP0938	JHP0873			Unknown Hypothetical
6	HP0939	JHP0874	yckJ	amino acid ABC transporter, permease protein , putative AMINO ACID ABC TRANSPORTER, PERMEASE PROTEIN	Transporters
2	HP0940	JHP0875	yckK	amino acid ABC transporter, periplasmic binding protein , putative AMINO ACID ABC TRANSPORTER, BINDING PROTEIN PRECURSOR	Transporters
0	HP0941	JHP0876	alr	alanine racemase, biosynthetic , ALANINE RACEMASE	Biosynthesis and Metabolism
3	HP0942	JHP0877	dagA	D-alanine glycine permease , putative SODIUM/ALANINE SYMPORTER	Transporters
13	HP0943	JHP0878	dadA	D-amino acid dehydrogenase	Biosynthesis and Metabolism
1	HP0944	JHP0879		conserved hypothetical protein	Protein Synthesis and Processing
5	HP0946	JHP0880		conserved hypothetical integral membrane protein	Conserve Hypothetical
2	HP0947	JHP0881			Unknown Hypothetical
1	HP0948	JHP0882			Unknown Hypothetical
1	HP0949	JHP0883		conserved hypothetical secreted protein	Conserve Hypothetical
1	HP0950	JHP0884	accD	acetyl-CoA carboxylase beta subunit , ACETYL-COENZYME A CARBOXYLASE SUBUNIT B	Biosynthesis and Metabolism
3	HP0951	JHP0885			Unknown Hypothetical
2	HP0952	JHP0886		conserved hypothetical integral membrane protein	Conserve Hypothetical
2	HP0953	JHP0887			Unknown Hypothetical
6	HP0954	JHP0888		oxygen-insensitive NAD(P)H nitroreductase, putative aldehyde dehydrogenase	Biosynthesis and Metabolism
2	HP0955	JHP0889	lgt	prolipoprotein diacylglyceryl transferase , putative PROLIPOPROTEIN DIACYLGLYCERYL TRANSFERASE	Outer Membrane Protein
0	HP0956	JHP0890		conserved hypothetical protein	Conserve Hypothetical
0	HP0957	JHP0891	kdtA, waaA	3-deoxy-d-manno-octulosonic-acid transferase	Cell Envelope
1	HP0958	JHP0892			Unknown Hypothetical
0	HP0959	JHP0893		conserved hypothetical protein	Conserve Hypothetical
4	HP0960	JHP0894	glyQ	glycyl-tRNA synthetase, alpha subunit , GLYCYL-TRNA SYNTHETASE ALPHA CHAIN	Protein Synthesis and Processing

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
5	HP0961	JHP0895	gpsA	glycerol-3-phosphate dehydrogenase, NAD(P)+ dependent, GLYCEROL-3-PHOSPHATE DEHYDROGENASE (NAD+)	Biosynthesis and Metabolism
2	HP0962	N/A	acpP	acyl carrier protein	Biosynthesis and Metabolism
0	HP0963	JHP0897			Unknown Hypothetical
1	HP0965	JHP0899			Unknown Hypothetical
4	HP0966	JHP0900	JHP0901	conserved hypothetical protein	Conserve Hypothetical
0	HP0968	JHP0902			Unknown Hypothetical
6	HP0969	JHP0903	czcA, czcA_1	cation efflux system protein , putative cation efflux system protein	Transporters
5	HP0970	JHP0904	nccB, czcB_1	nickel-cobalt-cadmium resistance protein , putative cation efflux system protein	Other
6	HP0971	JHP0905			Unknown Hypothetical
5	HP0972	JHP0906	glyS	glycyl-tRNA synthetase, beta subunit , GLYCYL-TRNA SYNTHETASE BETA CHAIN	Protein Synthesis and Processing
0	HP0973	JHP0907			Unknown Hypothetical
1	HP0974	JHP0908	pgm	phosphoglycerate mutase , 2,3-BISPHOSPHOGLYCERATE-INDEPENDENT PHOSPHOGLYCERATE MUTASE	Biosynthesis and Metabolism
2	HP0976	JHP0910	bioA	adenosylmethionine-8-amino-7-oxononanoate aminotransferase	Biosynthesis and Metabolism
1	HP0977	JHP0911		conserved hypothetical secreted protein	Conserve Hypothetical
5	HP0978	JHP0912	ftsA	cell division protein, septum formation protein	Cell Division
0	HP0979	JHP0913	ftsZ	cell divison protein , GTPase in circumferential ring formation	Cell Division
3	HP0980	N/A		conserved hypothetical secreted protein	Conserve Hypothetical
2	HP0981	N/A	xseA	exonuclease VII-like protein	Conserved Hypothetical
1	HP0982	N/A			Unknown Hypothetical
4	HP0983	JHP0915		conserved hypothetical integral membrane protein	Conserve Hypothetical
0	HP0984	N/A			Unknown Hypothetical
4	HP0985	N/A			Unknown Hypothetical
4	HP0986	N/A			Unknown Hypothetical
5	HP0988	N/A	tnpA	IS605 transposase	Transposon
7	HP0989	N/A	tnpB	IS605 transposase	Transposon
0	HP0993	N/A			Unknown Hypothetical
9	HP0997	N/A	tnpB	IS605 transposase	Transposon
12	HP0998	N/A	tnpA	IS605 transposase	Transposon
3	HP0999	N/A			Unknown Hypothetical
6	HP1000	N/A		PARA protein	Other
5	HP1001	N/A			Unknown Hypothetical
7	HP1002	N/A			Unknown Hypothetical

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
3	HP1003	N/A			Unknown Hypothetical
1	HP1004	N/A			Unknown Hypothetical
1	HP1005	N/A			Unknown Hypothetical
2	HP1006	N/A	traG	conjugal transfer protein	Other
3	HP1009	N/A		site-specific recombinase	DNA/RNA Synthesis and Processing
4	HP1010	JHP0413	ppk	polyphosphate kinase	Biosynthesis and Metabolism
1	HP1011	JHP0412	pyrD	dihydroorotate dehydrogenase	Biosynthesis and Metabolism
0	HP1012	JHP0411	pqqE	protease , putative ZINC PROTEASE	Protein Synthesis and Processing
0	HP1013	JHP0410	dapA	dihydrodipicolinate synthetase , DIHYDRODIPICOLINATE SYNTHASE	Biosynthesis and Metabolism
4	HP1014	JHP0409	hdhA	7-alpha-hydroxysteroid dehydrogenase , putative Short chain dehydrogenase	Biosynthesis and Metabolism
1	HP1015	JHP0408			Unknown Hypothetical
0	HP1016	JHP0407	pgsA	phosphatidylglycerophosphate synthase	Biosynthesis and Metabolism
0	HP1017	JHP0406	rocE	amino acid permease	Transporters
0	HP1019	JHP0405	htrA	serine protease , PROTEASE DO	Protein Synthesis and Processing
1	HP1020	JHP0404		conserved hypothetical protein	Conserve Hypothetical
3	HP1021	JHP0403		response regulator, putative TRANSCRIPTIONAL REGULATOR	Regulation
5	HP1022	JHP0402			Unknown Hypothetical
3	HP1023	JHP0401			Unknown Hypothetical
4	HP1024	JHP0400	CbpA, dnaJ_1	co-chaperone-curved DNA binding protein A , putative co-chaperone with DnaK	Chaperones
17	HP1025	JHP0399	hspR	putative heat shock protein , putative TRANSCRIPTIONAL REGULATOR	Regulation
9	HP1026	JHP0398		conserved hypothetical helicase-like protein	Conserve Hypothetical
4	HP1027	JHP0397	fur	ferric uptake regulation protein	Regulation
2	HP1028	JHP0396			Unknown Hypothetical
3	HP1029	JHP0395			Unknown Hypothetical
11	HP1030	JHP0394	fliY	fliY protein , FLAGELLAR MOTOR SWITCH PROTEIN	Motility
4	HP1031	JHP0393	fliM	flagellar motor switch protein	Motility
10	HP1032	JHP0392	fliA	alternative transcription initiation factor, sigma-F , RNA POLYMERASE SIGMA FACTOR (sigma 28)	Regulation
1	HP1033	JHP0391			Unknown Hypothetical
0	HP1034	JHP0390	ylxH	ATP-binding protein	Other
4	HP1035	JHP0389	flhF	flagellar biosynthesis protein , putative FLAGELLAR BIOSYNTHESIS PROTEIN	Motility
1	HP1036	JHP0388	folk	7, 8-dihydro-6-hydroxymethylpterin-pyrophosphokinase	Biosynthesis and Metabolism

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
2	HP1037	JHP0387	pepQ	conserved hypothetical protein, putative proline peptidase	Conserve Hypothetical
0	HP1038	JHP0386	aroQ, aroD	3-dehydroquinase type II , 3-DEHYDROQUINATE DEHYDRATASE	Biosynthesis and Metabolism
1	HP1039	JHP0385			Unknown Hypothetical
0	HP1040	JHP0384	rps15, rpsO	ribosomal protein S15 , 30S RIBOSOMAL PROTEIN S15	Protein Synthesis and Processing
15	HP1041	JHP0383	flhA	flagellar biosynthesis protein	Motility
1	HP1042	JHP0382			Unknown Hypothetical
2	HP1043	JHP0381		response regulator, putative TRANSCRIPTIONAL REGULATOR	Regulation
9	HP1044	JHP0380		conserved hypothetical integral membrane protein	Conserve Hypothetical
11	HP1045	N/A	acoE	acetyl-CoA synthetase	Biosynthesis and Metabolism
1	HP1046	JHP0379		conserved hypothetical protein	Conserve Hypothetical
0	HP1047	JHP0378	rbfA	ribosome-binding factor A , putative RIBOSOME-BINDING FACTOR A	Protein Synthesis and Processing
2	HP1048	JHP0377	infB	translation initiation factor IF-2	Protein Synthesis and Processing
1	HP1049	JHP0376		conserved hypothetical protein	Conserve Hypothetical
2	HP1050	JHP0375	thrB	homoserine kinase	Biosynthesis and Metabolism
1	HP1051	JHP0374			Unknown Hypothetical
0	HP1052	JHP0373	envA, lpxC	UDP-3-O-acyl N-acetylglucosamine deacetylase , UDP-3-O-[3-HYDROXYMYRISTOYL	Cell Envelope
0	HP1053	JHP0372			Unknown Hypothetical
0	HP1054	JHP0371			Unknown Hypothetical
0	HP1055	JHP0370			Unknown Hypothetical
0	HP1056	JHP0369			Unknown Hypothetical
0	HP1057	JHP0368			Unknown Hypothetical
0	HP1058	JHP0367	panB	3-methyl-2-oxobutanoate hydroxymethyltransferase	Biosynthesis and Metabolism
0	HP1059	JHP0366	ruvB	Holliday junction DNA helicase , HOLLIDAY JUNCTION DNA HELICASE RUVB	DNA/RNA Synthesis and Processing
0	HP1060	JHP0365			Unknown Hypothetical
0	HP1061	JHP0364		conserved hypothetical integral membrane protein	Conserve Hypothetical
1	HP1062	JHP0363	queA	S-adenosylmethionine:tRNA ribosyltransferase-isomerase , S-ADENOSYLMETHIONINE TRNA RIBOSYLTRANSFERASE-ISOMERASE	Protein Synthesis and Processing
4	HP1063	JHP0362	gidB	glucose-inhibited division protein , GLUCOSE INHIBITED DIVISION PROTEIN B	DNA/RNA Synthesis and Processing
0	HP1064	JHP0361			Unknown Hypothetical
0	HP1065	JHP0360			Unknown Hypothetical

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
2	HP1066	JHP0359		conserved hypothetical protein, putative Outer membrane protein	Conserve Hypothetical
0	HP1067	JHP0358	cheY	chemotaxis protein , response regulator	Motility
5	HP1068	JHP0357	prmA	ribosomal protein L11 methyltransferase , putative RIBOSOMAL PROTEIN L11 METHYLTRANSFERASE	Protein Synthesis and Processing
0	HP1069	JHP0356	ftsH, ftsH_2	cell division protein , ATP-DEPENDENT ZINC METALLOPEPTIDASE	Cell Division
0	HP1070	JHP0355			Unknown Hypothetical
1	HP1071	JHP0354	pssA	phosphatidylserine synthase	Biosynthesis and Metabolism
5	HP1072	JHP0353	copA	copper-transporting ATPase, P-type , COPPER-TRANSPORTING P-TYPE ATPASE	Transporters
1	HP1073	JHP0352	copP	copper ion binding protein , copper-associated protein	Transporters
10	HP1075	JHP0350		conserved hypothetical secreted protein	Conserve Hypothetical
0	HP1076	JHP0349			Unknown Hypothetical
8	HP1077	JHP0348	nixA	nickel transport protein , HIGH-AFFINITY NICKEL-TRANSPORT PROTEIN	Transporters
3	HP1080	JHP0345		conserved hypothetical integral membrane protein	Conserve Hypothetical
3	HP1081	JHP0344			Unknown Hypothetical
4	HP1082	JHP0343	msbA	multidrug resistance protein , multi-drug resistance protein	Transporters
2	HP1083	JHP0342		putative Outer membrane protein	Outer Membrane Protein
2	HP1084	JHP0341	pyrB	aspartate transcarbamoylase , ASPARTATE CARBAMOYLTRANSFERASE CATALYTIC CHAIN	Biosynthesis and Metabolism
0	HP1085	JHP0340			Unknown Hypothetical
0	HP1086	JHP0339	tly, hlyA	hemolysin , putative hemolysin	Other
0	HP1087	JHP0338	ribC, ribF	riboflavin biosynthesis regulatory protein , RIBOFLAVIN KINASE	Biosynthesis and Metabolism
9	HP1088	JHP0337	tktA	transketolase A , transketolase	Biosynthesis and Metabolism
0	HP1089	JHP0336			Unknown Hypothetical
9	HP1090	JHP0335	ftsK	cell division protein , septum formation protein	Cell Division
5	HP1091	JHP0334	kgtP	alpha-ketoglutarate permease	Transporters
5	HP1092	JHP0333	flgG, flgG_1	flagellar basal-body rod protein	Motility
0	HP1093	N/A			Unknown Hypothetical
1	HP1094	N/A			Unknown Hypothetical
10	HP1095	N/A	tnpB	IS605 transposase	Transposon
11	HP1096	N/A	tnpA	IS605 transposase	Transposon
7	HP1097	N/A			Unknown Hypothetical
6	HP1098	JHP1024		conserved hypothetical secreted protein	Conserve Hypothetical

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
5	HP1099	JHP1025	eda	2-keto-3-deoxy-6-phosphogluconate aldolase	Biosynthesis and Metabolism
2	HP1100	JHP1026	edd	6-phosphogluconate dehydratase, PHOSPHOGLUCONATE DEHYDRATASE	Biosynthesis and Metabolism
4	HP1101	JHP1027	g6pD, zwf	glucose-6-phosphate dehydrogenase , GLUCOSE-6-PHOSPHATE 1-DEHYDROGENASE	Biosynthesis and Metabolism
0	HP1102	JHP1028	devB	glucose-6-phosphate 1-dehydrogenase , putative dehydrogenase	Biosynthesis and Metabolism
6	HP1103	JHP1029	glk	glucokinase	Biosynthesis and Metabolism
7	HP1104	JHP1030	cad	cinnamyl-alcohol dehydrogenase ELI3-2 , ZINC-DEPENDENT ALCOHOL DEHYDROGENASE	Biosynthesis and Metabolism
2	HP1105	JHP1031		LPS biosynthesis protein, putative lipopolysaccharide biosynthesis protein	Cell Envelope
2	HP1106	JHP1033			Unknown Hypothetical
13	HP1107	JHP1034	omp23	outer membrane protein , putative Outer membrane protein	Outer Membrane Protein
0	HP1108	JHP1035	porG	pyruvate ferredoxin oxidoreductase, gamma subunit, Pyruvate ferredoxin oxidoreductase	Biosynthesis and Metabolism
2	HP1109	JHP1036	porD	pyruvate ferredoxin oxidoreductase, delta subunit, Pyruvate ferredoxin oxidoreductase	Biosynthesis and Metabolism
10	HP1110	JHP1037	porA	pyruvate ferredoxin oxidoreductase, alpha subunit, Pyruvate ferredoxin oxidoreductase	Biosynthesis and Metabolism
7	HP1111	JHP1038	porB	pyruvate ferredoxin oxidoreductase, beta subunit, Pyruvate ferredoxin oxidoreductase	Biosynthesis and Metabolism
5	HP1112	JHP1039	purB	adenylosuccinate lyase	Biosynthesis and Metabolism
15	HP1113	JHP1040	omp24	outer membrane protein , putative Outer membrane protein	Outer Membrane Protein
11	HP1114	JHP1041	uvrB	excinuclease ABC subunit B	DNA/RNA Synthesis and Processing
10	HP1115	JHP1042			Unknown Hypothetical
1	HP1116	JHP1044			Unknown Hypothetical
2	HP1117	JHP1045		conserved hypothetical secreted protein	Conserve Hypothetical
2	HP1118	JHP1046	ggt	gamma-glutamyltranspeptidase	Biosynthesis and Metabolism
6	HP1119	JHP1047	flgK	flagellar hook-associated protein 1 (HAP1)	Motility
7	HP1120	JHP1048			Unknown Hypothetical
1	HP1121	JHP1050	BSP6I M	cytosine specific DNA methyltransferase , TYPE II DNA MODIFICATION ENZYME (METHYLTRANSFERASE)	Restiction Modification
1	HP1122	JHP1051			Unknown Hypothetical

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
3	HP1123	JHP1052	slyD	peptidyl-prolyl cis-trans isomerase, FKBP-type rotamase , FKBP-TYPE PEPTIDYL-PROLYL CIS-TRANS ISOMERASE	Protein Synthesis and Processing
2	HP1124	JHP1053			Unknown Hypothetical
2	HP1125	JHP1054	omp18	peptidoglycan associated lipoprotein precursor , putative Outer membrane protein	Cell Envelope
2	HP1126	JHP1055	tolB	colicin tolerance-like protein , putative TONB-INDEPENDENT PROTEIN-UPTAKE PROTEIN	Outer Membrane Protein
0	HP1127	JHP1056			Unknown Hypothetical
0	HP1129	JHP1057	exbD, exbD_1	biopolymer transport protein	Transporters
0	HP1130	JHP1058	exbB, exbB_1	biopolymer transport protein	Transporters
0	HP1131	JHP1059	atpC	ATP synthase F1, subunit epsilon	Biosynthesis and Metabolism
0	HP1132	JHP1060	atpD	ATP synthase F1, subunit beta	Biosynthesis and Metabolism
0	HP1133	JHP1061	atpG	ATP synthase F1, subunit gamma	Biosynthesis and Metabolism
2	HP1134	JHP1062	atpA	ATP synthase F1, subunit alpha	Biosynthesis and Metabolism
0	HP1135	JHP1063	atpH	ATP synthase F1, subunit delta , putative ATP synthase F1, subunit delta	Biosynthesis and Metabolism
0	HP1136	JHP1064	atpF	ATP synthase F0, subunit b	Biosynthesis and Metabolism
0	HP1137	JHP1065	atpF', atpX	ATP synthase F0, subunit b' , ATP synthase B'	Biosynthesis and Metabolism
1	HP1138	JHP1066		plasmid replication-partition related protein	DNA/RNA Synthesis and Processing
0	HP1139	JHP1067	soj	SpoOJ regulator	Other
15	HP1140	JHP1068	birA	biotin operon repressor/biotin acetyl coenzyme A carboxylase synthetase , putative BIOTIN ACTIVATION PROTEIN	Biosynthesis and Metabolism
2	HP1141	JHP1069	fmt	methionyl-tRNA formyltransferase	Protein Synthesis and Processing
5	HP1143	JHP1071			Unknown Hypothetical
1	HP1144	JHP1072			Unknown Hypothetical
1	HP1145	JHP1073			Unknown Hypothetical
3	HP1146	JHP1073			Unknown Hypothetical
4	HP1147	JHP1074	rpl19, rplS	ribosomal protein L19 , 50S RIBOSOMAL PROTEIN L19.	Protein Synthesis and Processing
1	HP1148	JHP1075	trmD	tRNA (guanine-N1)-methyltransferase	Protein Synthesis and Processing
0	HP1149	JHP1076		conserved hypothetical protein	Conserve Hypothetical
0	HP1150	JHP1077			Unknown Hypothetical

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
6	HP1151	JHP1078	rpS16, rpsP	ribosomal protein S16 , 30S RIBOSOMAL PROTEIN S16	Protein Synthesis and Processing
6	HP1152	JHP1079	ffh	signal recognition particle protein , putative SIGNAL RECOGNITION PARTICLE PROTEIN	Protein Synthesis and Processing
0	HP1153	JHP1080	valS	valyl-tRNA synthetase	Protein Synthesis and Processing
2	HP1154	JHP1081			Unknown Hypothetical
4	HP1155	JHP1082	murG	transferase, peptidoglycan synthesis , UDP-N-ACETYLGLUCOSAMINE--N-ACETYLMURAMYL-(PENTAPEPTIDE) PYROPHOSPHORYL-UNDECAPRENOL N-ACETYLGLUCOSAMINE TRANSFERASE	Cell Envelope
7	HP1156	JHP1083	omp25	outer membrane protein , putative Outer membrane protein	Outer Membrane Protein
7	HP1157	JHP1084	omp26	outer membrane protein , putative Outer membrane protein	Outer Membrane Protein
1	HP1158	JHP1085	proC	pyrroline-5-carboxylate reductase , putative PYRROLINE-5-CARBOXYLATE REDUCTASE	Biosynthesis and Metabolism
6	HP1159	JHP1086	fic	cell filamentation protein , putative cAMP-induced cell filamentation protein	Cell Division
1	HP1160	JHP1087		conserved hypothetical protein	Conserve Hypothetical
0	HP1161	JHP1088	fldA	flavodoxin	Biosynthesis and Metabolism
1	HP1162	JHP1089		conserved hypothetical integral membrane protein	Conserve Hypothetical
0	HP1163	JHP1090	fixS	putative component of cation transport for cbb3-type oxidase	Conserved Hypothetical
1	HP1164	JHP1091	trxB, trxB_2	thioredoxin reductase , putative THIOREDOXIN REDUCTASE	Biosynthesis and Metabolism
5	HP1165	JHP1092		tetracycline resistance protein tetA(P), putative	Outer Membrane Protein
6	HP1166	JHP1093	pgi	glucose-6-phosphate isomerase	Biosynthesis and Metabolism
4	HP1167	JHP1094		putative Outer membrane protein	Outer Membrane Protein
13	HP1168	JHP1095	cstA	carbon starvation protein	Regulation
4	HP1169	JHP1096	glnP	glutamine ABC transporter, permease protein , AMINO ACID ABC TRANSPORTER, PERMEASE PROTEIN	Transporters
0	HP1170	JHP1097	glnP	glutamine ABC transporter, permease protein , AMINO ACID ABC TRANSPORTER, PERMEASE PROTEIN	Transporters

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
1	HP1171	JHP1098	glnQ	glutamine ABC transporter, ATP-binding protein , AMINO ACID ABC TRANSPORTER, ATP-BINDING PROTEIN	Transporters
10	HP1172	JHP1099	glnH	glutamine ABC transporter, periplasmic glutamine-binding protein , AMINO ACID ABC TRANSPORTER, BINDING PROTEIN PRECURSOR	Transporters
4	HP1173	JHP1100			Unknown Hypothetical
6	HP1174	JHP1101	gluP	glucose/galactose transporter	Transporters
4	HP1175	JHP1102		conserved hypothetical integral membrane protein	Conserve Hypothetical
8	HP1177	JHP1103	omp27	outer membrane protein , putative Outer membrane function	Outer Membrane Protein
2	HP1178	JHP1104	deoD	purine-nucleoside phosphorylase , PURINE NUCLEOSIDE PHOSPHORYLASE	Biosynthesis and Metabolism
2	HP1179	JHP1105	deoB	phosphopentomutase	Biosynthesis and Metabolism
5	HP1180	JHP1106	nupC	pyrimidine nucleoside transport protein , putative nucleoside transporter	Transporters
16	HP1181	JHP1107		multidrug-efflux transporter, putative transporter	Transporters
9	HP1182	JHP1108		conserved hypothetical protein	Conserve Hypothetical
7	HP1183	JHP1109	napA	NA ⁺ /H ⁺ antiporter , putative NA ⁺ /H ⁺ ANTIPORTER	Transporters
8	HP1184	JHP1110		conserved hypothetical integral membrane protein	Conserve Hypothetical
6	HP1185	JHP1111		conserved hypothetical integral membrane protein	Conserve Hypothetical
6	HP1186	JHP1112		carbonic anhydrase	Biosynthesis and Metabolism
5	HP1187	JHP1113			Unknown Hypothetical
7	HP1188	N/A			Unknown Hypothetical
7	HP1189	JHP1114	asd	aspartate-semialdehyde dehydrogenase	Biosynthesis and Metabolism
0	HP1190	JHP1115	hisS	histidyl-tRNA synthetase	Protein Synthesis and Processing
3	HP1191	JHP1116	rfaF, waaF	ADP-heptose-lps heptosyltransferase II , ADP-HEPTOSE--LPS HEPTOSYLTRANSFERASE II	Cell Envelope
4	HP1192	JHP1117		secreted protein involved in flagellar motility, putative motility protein	Motility
10	HP1193	N/A		aldo-keto reductase, putative	Conserved Hypothetical
1	HP1194	N/A			Unknown Hypothetical
2	HP1195	JHP1118	fusA	translation elongation factor EF-G , ELONGATION FACTOR G (EF-G)	Protein Synthesis and Processing
0	HP1196	JHP1119	rps7, rpsG	ribosomal protein S7 , 30S RIBOSOMAL PROTEIN S7	Protein Synthesis and Processing

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
0	HP1197	JHP1120	rps12, rpsL	ribosomal protein S12 , 30S RIBOSOMAL PROTEIN S12	Protein Synthesis and Processing
7	HP1198	JHP1121	rpoB	DNA-directed RNA polymerase, beta subunit	DNA/RNA Synthesis and Processing
3	HP1199	JHP1122	rpl7/l12, rplL	ribosomal protein L7/L12 , 50S RIBOSOMAL PROTEIN L7/L12	Protein Synthesis and Processing
5	HP1200	JHP1123	rpl10, rplJ	ribosomal protein L10 , 50S RIBOSOMAL PROTEIN L10	Protein Synthesis and Processing
1	HP1201	JHP1124	rpl1, rplA	ribosomal protein L1 , 50S RIBOSOMAL PROTEIN L1	Protein Synthesis and Processing
0	HP1202	JHP1125	rpl11, rplK	ribosomal protein L11 , 50S RIBOSOMAL PROTEIN L11	Protein Synthesis and Processing
0	HP1203	JHP1126	nusG	transcription termination factor NusG , TRANSCRIPTION ANTITERMINATION PROTEIN	DNA/RNA Synthesis and Processing
5	HP1204	JHP1127	rpL33, rpmG	ribosomal protein L33 , 50S RIBOSOMAL PROTEIN L33	Protein Synthesis and Processing
6	HP1205	JHP1128	tufB, tufA	translation elongation factor EF-Tu , ELONGATION FACTOR TU (EF-TU)	Protein Synthesis and Processing
0	HP1206	JHP1129	hetA	multidrug resistance protein , abc transporter, ATP-binding protein	Transporters
17	HP1207	JHP1130			Unknown Hypothetical
1	HP1208	JHP1131	M.HpyI	ulcer associated adenine specific DNA methyltransferase, TYPE II DNA MODIFICATION ENZYME (METHYLTRANSFERASE)	Restiction Modification
6	HP1210	JHP1133	cysE	serine acetyltransferase , O-SERINE ACETYLTRANSFERASE	Biosynthesis and Metabolism
3	HP1211	JHP1134			Unknown Hypothetical
9	HP1212	JHP1135	atpE	ATP synthase F0, subunit c	Biosynthesis and Metabolism
6	HP1213	JHP1136	pnp	polynucleotide phosphorylase , POLYRIBONUCLEOTIDE NUCLEOTIDYLTRANSFERASE	DNA/RNA Synthesis and Processing
4	HP1214	JHP1137		conserved hypothetical protein	Conserve Hypothetical
1	HP1215	JHP1138	imp	putative role in outermembrane permeability	Conserved Hypothetical
0	HP1216	JHP1138		conserved hypothetical secreted protein	Conserve Hypothetical
0	HP1217	JHP1139			Unknown Hypothetical
2	HP1218	JHP1140	purD	glycinamide ribonucleotide synthetase	Biosynthesis and Metabolism
0	HP1219	N/A			Unknown Hypothetical
1	HP1220	JHP1141	yhcG	ABC transporter, ATP-binding protein , putative ABC transporter, ATP-binding protein	Transporters
9	HP1221	JHP1142		conserved hypothetical protein	Conserve Hypothetical
16	HP1222	JHP1143	dld	D-lactate dehydrogenase	Biosynthesis and Metabolism
3	HP1223	JHP1144			Unknown Hypothetical

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
3	HP1224	JHP1145	hemD	uroporphyrinogen III cosynthase , putative UROPORPHYRINOGEN-III SYNTHASE	Biosynthesis and Metabolism
4	HP1225	JHP1146		conserved hypothetical integral membrane protein	Conserve Hypothetical
4	HP1226	JHP1147	hemN, hemN_2	oxygen-independent coproporphyrinogen III oxidase	Biosynthesis and Metabolism
2	HP1227	JHP1148		cytochrome c553, PERIPLASMIC CYTOCHROME C-553	Biosynthesis and Metabolism
1	HP1228	JHP1149	invA, mutT	invasion protein , putative DGTP PYROPHOSPHOHYDROLASE	Other
0	HP1229	JHP1150	lysC	aspartokinase , ASPARTOKINASE 2 ALPHA AND BETA SUBUNITS	Biosynthesis and Metabolism
0	HP1230	JHP1151			Unknown Hypothetical
0	HP1231	JHP1152	holB	DNA polymerase III delta prime subunit , putative DNA poymerase III subunit delta'	DNA/RNA Synthesis and Processing
1	HP1232	JHP1153	folP	dihydropteroate synthase	Biosynthesis and Metabolism
1	HP1233	JHP1154			Unknown Hypothetical
0	HP1234	JHP1155		conserved hypothetical integral membrane protein	Conserve Hypothetical
3	HP1235	JHP1156		conserved hypothetical integral membrane protein	Conserve Hypothetical
0	HP1236	JHP1157			Unknown Hypothetical
5	HP1237	JHP1158	pyrAa, carA	carbamoyl-phosphate synthetase , CARBAMOYL-PHOSPHATE SYNTHASE SMALL CHAIN	Biosynthesis and Metabolism
5	HP1238	JHP1159	aimE	aliphatic amidase	Biosynthesis and Metabolism
0	HP1239	N/A			Unknown Hypothetical
0	HP1240	JHP1161		conserved hypothetical protein	Conserve Hypothetical
6	HP1241	JHP1162	alaS	alanyl-tRNA synthetase	Protein Synthesis and Processing
1	HP1242	JHP1163		conserved hypothetical protein	Conserve Hypothetical
3	HP1243	JHP0833	omp28, babA	outer membrane protein , outer membrane protein - adhesin	Outer Membrane Protein
0	HP1244	JHP1165	rps18, rpsR	ribosomal protein S18 , 30S RIBOSOMAL PROTEIN S18	Protein Synthesis and Processing
0	HP1245	JHP1166	ssb	single-strand DNA-binding protein , SINGLE-STRAND BINDING PROTEIN	DNA/RNA Synthesis and Processing
0	HP1246	JHP1167	rps6, rpsF	ribosomal protein S6 , 30S RIBOSOMAL PROTEIN S6	Protein Synthesis and Processing
0	HP1247	JHP1168			Unknown Hypothetical
6	HP1248	JHP1169	vacB	virulence associated protein homolog , RIBONUCLEASE II FAMILY PROTEIN	Other

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
0	HP1249	JHP1170	aroE	shikimate 5-dehydrogenase	Biosynthesis and Metabolism
5	HP1250	JHP1171			Unknown Hypothetical
15	HP1251	JHP1172	oppB	oligopeptide ABC transporter, permease protein , putative Peptide ABC transporter, ATP-binding protein	Transporters
4	HP1252	JHP1173	oppA	oligopeptide ABC transporter, periplasmic oligopeptide-binding protein	Transporters
0	HP1253	JHP1174	trpS	tryptophanyl-tRNA synthetase	Protein Synthesis and Processing
0	HP1254	JHP1175	bioC	biotin synthesis protein	Biosynthesis and Metabolism
11	HP1255	JHP1176	secG	protein translocation protein, low temperature , PROTEIN-EXPORT MEMBRANE PROTEIN	Protein Synthesis and Processing
14	HP1256	JHP1177	frf	ribosome releasing factor , RIBOSOME RECYCLING FACTOR (RIBOSOME RELEASING FACTOR) (RRF)	Protein Synthesis and Processing
2	HP1257	JHP1178	pyrE	orotate phosphoribosyltransferase	Biosynthesis and Metabolism
1	HP1258	JHP1179		conserved hypothetical mitochondrial protein 4	Conserve Hypothetical
3	HP1259	JHP1180		conserved hypothetical protein	Conserve Hypothetical
2	HP1260	JHP1181	NQO7, nuoA	NADH-ubiquinone oxidoreductase, NQO7 subunit , NADH oxidoreductase I	Biosynthesis and Metabolism
0	HP1261	JHP1182	NQO6, nuoB	NADH-ubiquinone oxidoreductase, NQO6 subunit , NADH oxidoreductase I	Biosynthesis and Metabolism
1	HP1262	JHP1183	NQO5, nuoC	NADH-ubiquinone oxidoreductase, NQO5 subunit , NADH oxidoreductase I	Biosynthesis and Metabolism
1	HP1263	JHP1184	NQO4, nuoD	NADH-ubiquinone oxidoreductase, NQO4 subunit , NADH oxidoreductase I	Biosynthesis and Metabolism
0	HP1264	JHP1185	nuoE	putative NADH oxidoreductase I	Conserved Hypothetical
0	HP1265	JHP1186	nuoF	putative NADH oxidoreductase I	Conserved Hypothetical
0	HP1266	JHP1187	NQO3, nuoG	NADH-ubiquinone oxidoreductase, NQO3 subunit , NADH oxidoreductase I	Biosynthesis and Metabolism
4	HP1267	JHP1188	NQO8, nuoH	NADH-ubiquinone oxidoreductase, NQO8 subunit , NADH oxidoreductase I	Biosynthesis and Metabolism
0	HP1268	JHP1189	NQO9, nuoI	NADH-ubiquinone oxidoreductase, NQO9 subunit , NADH oxidoreductase I	Biosynthesis and Metabolism
2	HP1269	JHP1190	NQO10, nuoJ	NADH-ubiquinone oxidoreductase, NQO10 subunit , NADH oxidoreductase I	Biosynthesis and Metabolism

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
0	HP1270	JHP1191	NQO1 1, nuoK	NADH-ubiquinone oxidoreductase, NQO11 subunit , NADH oxidoreductase I	Biosynthesis and Metabolism
7	HP1271	JHP1192	NQO1 2, nuoL	NADH-ubiquinone oxidoreductase, NQO12 subunit , NADH oxidoreductase I	Biosynthesis and Metabolism
1	HP1272	JHP1193	NQO1 3, nuoM	NADH-ubiquinone oxidoreductase, NQO13 subunit , NADH oxidoreductase I	Biosynthesis and Metabolism
4	HP1273	JHP1194	NQO1 4, nuoN	NADH-ubiquinone oxidoreductase, NQO14 subunit , NADH oxidoreductase I	Biosynthesis and Metabolism
10	HP1274	JHP1195	pflA	paralysed flagella protein , FLAGELLAR FUNCTIONAL PROTEIN	Motility
9	HP1275	JHP1196	algC	phosphomannomutase , phosphohexosemutase	Cell Envelope
10	HP1276	JHP1197			Unknown Hypothetical
4	HP1277	JHP1198	trpA	tryptophan synthase, alpha subunit , TRYPTOPHAN SYNTHASE ALPHA CHAIN	Biosynthesis and Metabolism
3	HP1278	JHP1199	trpB	tryptophan synthase, beta subunit , TRYPTOPHAN SYNTHASE BETA CHAIN	Biosynthesis and Metabolism
5	HP1279	JHP1200	trpC	anthranilate isomerase , INDOLE-3-GLYCEROL PHOSPHATE SYNTHASE	Biosynthesis and Metabolism
3	HP1280	JHP1201	trpD	ANTHRANILATE PHOSPHORIBOSYLTRANSFERASE	Biosynthesis and Metabolism
5	HP1281	JHP1202	trpD, trpG	anthranilate synthase component II	Biosynthesis and Metabolism
3	HP1282	JHP1203	trpE	anthranilate synthase component I	Biosynthesis and Metabolism
6	HP1283	N/A			Unknown Hypothetical
8	HP1284	JHP1204		conserved hypothetical protein	Conserve Hypothetical
4	HP1285	JHP1205		conserved hypothetical secreted protein	Conserve Hypothetical
4	HP1286	JHP1206		conserved hypothetical secreted protein	Conserve Hypothetical
4	HP1287	JHP1207	tenA	transcriptional regulator , putative TRANSCRIPTIONAL REGULATOR	Regulation
0	HP1289	JHP1209			Unknown Hypothetical
2	HP1290	JHP1210	pnuC	nicotinamide mononucleotide transporter	Transporters
3	HP1291	JHP1211		conserved hypothetical protein	Conserve Hypothetical
0	HP1292	JHP1212	rpl17, rplQ	ribosomal protein L17 , 50S RIBOSOMAL PROTEIN L17	Protein Synthesis and Processing
7	HP1293	JHP1213	rpoA	DNA-directed RNA polymerase, alpha subunit , RNA POLYMERASE ALPHA SUBUNIT	DNA/RNA Synthesis and Processing
3	HP1294	JHP1214	rps4, rpsD	ribosomal protein S4 , 30S RIBOSOMAL PROTEIN S4	Protein Synthesis and Processing
6	HP1295	JHP1215	rps11, rpsK	ribosomal protein S11 , 30S RIBOSOMAL PROTEIN S11	Protein Synthesis and Processing

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
11	HP1296	JHP1216	rps13, rpsM	ribosomal protein S13 , 30S RIBOSOMAL PROTEIN S13	Protein Synthesis and Processing
0	HP1297	JHP1217	rpl36, rpmJ	ribosomal protein L36 , 50S RIBOSOMAL PROTEIN L36	Protein Synthesis and Processing
0	HP1298	JHP1218	infA	translation initiation factor EF-1 , TRANSLATION INITIATION FACTOR IF-1	Protein Synthesis and Processing
0	HP1299	JHP1219	map	methionine amino peptidase , METHIONINE AMINOPEPTIDASE	Protein Synthesis and Processing
0	HP1300	JHP1220	secY	preprotein translocase subunit	Protein Synthesis and Processing
0	HP1301	JHP1221	rpl15, rplO	ribosomal protein L15 , 50S RIBOSOMAL PROTEIN L15	Protein Synthesis and Processing
0	HP1302	JHP1222	rps5, rpsE	ribosomal protein S5 , 30S RIBOSOMAL PROTEIN S5	Protein Synthesis and Processing
9	HP1303	JHP1223	rpl18, rplR	ribosomal protein L18 , 50S RIBOSOMAL PROTEIN L18	Protein Synthesis and Processing
2	HP1304	JHP1224	rpl6, rplF	ribosomal protein L6 , 50S RIBOSOMAL PROTEIN L6	Protein Synthesis and Processing
1	HP1305	JHP1225	rps8, rpsH	ribosomal protein S8 , putative 30S RIBOSOMAL PROTEIN S8	Protein Synthesis and Processing
0	HP1306	JHP1226	rpS14, rpsN	ribosomal protein S14 , 30S RIBOSOMAL PROTEIN S14	Protein Synthesis and Processing
0	HP1307	JHP1227	rpl5, rplE	ribosomal protein L5 , 50S RIBOSOMAL PROTEIN L5	Protein Synthesis and Processing
0	HP1308	JHP1228	rpl24, rplX	ribosomal protein L24 , 50S RIBOSOMAL PROTEIN L24	Protein Synthesis and Processing
0	HP1309	JHP1229	rpl14, rplN	ribosomal protein L14 , 50S RIBOSOMAL PROTEIN L14	Protein Synthesis and Processing
1	HP1310	JHP1230	rps17, rpsQ	ribosomal protein S17 , 30S RIBOSOMAL PROTEIN S17	Protein Synthesis and Processing
0	HP1311	JHP1231	rpL29, rpmC	ribosomal protein L29 , 50S RIBOSOMAL PROTEIN L29	Protein Synthesis and Processing
1	HP1312	JHP1232	rpl16, rplP	ribosomal protein L16 , 50S RIBOSOMAL PROTEIN L16	Protein Synthesis and Processing
0	HP1313	JHP1233	rps3, rpsC	ribosomal protein S3 , 30S RIBOSOMAL PROTEIN S3	Protein Synthesis and Processing
0	HP1314	JHP1234	rpl22, rplV	ribosomal protein L22 , 50S RIBOSOMAL PROTEIN L22	Protein Synthesis and Processing
3	HP1315	JHP1235	rps19, rpsS	ribosomal protein S19 , 30S RIBOSOMAL PROTEIN S19	Protein Synthesis and Processing
2	HP1317	JHP1237	rpl23, rplW	ribosomal protein L23 , 50S RIBOSOMAL PROTEIN L23	Protein Synthesis and Processing
0	HP1318	JHP1238	rpl4, rplD	ribosomal protein L4 , 50S RIBOSOMAL PROTEIN L4	Protein Synthesis and Processing
4	HP1319	JHP1239	rpl3, rplC	ribosomal protein L3 , 50S RIBOSOMAL PROTEIN L3	Protein Synthesis and Processing
0	HP1320	JHP1240	rps10, rpsJ	ribosomal protein S10 , 30S RIBOSOMAL PROTEIN S10	Protein Synthesis and Processing

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
0	HP1321	JHP1241		conserved hypothetical ATP-binding protein	Conserve Hypothetical
5	HP1322	JHP1242			Unknown Hypothetical
2	HP1323	JHP1243	rnhB	ribonuclease HII	DNA/RNA Synthesis and Processing
2	HP1324	JHP1244			Unknown Hypothetical
6	HP1325	JHP1245	fumC	fumarase	Biosynthesis and Metabolism
12	HP1326	JHP1246			Unknown Hypothetical
8	HP1327	JHP1247			Unknown Hypothetical
6	HP1328	JHP1248	czcA, czcB_2	cation efflux system protein	Transporters
15	HP1329	JHP1249	czcA, czcA_2	cation efflux system protein	Transporters
3	HP1330	JHP1250		conserved hypothetical integral membrane protein	Conserve Hypothetical
2	HP1331	JHP1251		conserved hypothetical integral membrane protein	Conserve Hypothetical
8	HP1332	JHP1252	dnaJ, dnaJ_2	co-chaperone and heat shock protein , co-chaperone with DnaK	Chaperones
11	HP1333	JHP1253			Unknown Hypothetical
4	HP1334	N/A			Unknown Hypothetical
3	HP1335	JHP1254	trmU	conserved hypothetical protein, putative TRNA (5-METHYLAMINOMETHYL-2-THIOURIDYLATE)-METHYLTRANSFERASE	Conserve Hypothetical
4	HP1336	JHP1255			Unknown Hypothetical
2	HP1337	JHP1256		conserved hypothetical protein	Conserve Hypothetical
0	HP1338	JHP1257		conserved hypothetical protein	Conserve Hypothetical
0	HP1339	JHP1258	exbB, exbB_2	biopolymer transport protein	Transporters
0	HP1340	JHP1259	exbD, exbD_2	biopolymer transport protein , BIOPOLYMER TRANSPORT EXBD PROTEIN	Transporters
2	HP1341	JHP1260	tonB, tonB_2	siderophore-mediated iron transport protein	Transporters
8	HP1342	JHP1261	omp29	outer membrane protein , putative Outer membrane protein	Outer Membrane Protein
3	HP1343	JHP1262		conserved hypothetical integral membrane protein	Conserve Hypothetical
8	HP1344	JHP1263	corA	magnesium and cobalt transport protein	Transporters
5	HP1345	JHP1264	pgk	phosphoglycerate kinase	Biosynthesis and Metabolism

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
1	HP1346	JHP1265	gap, gap_2	glyceraldehyde-3-phosphate dehydrogenase , GLYCERALDEHYDE 3-PHOSPHATE DEHYDROGENASE	Biosynthesis and Metabolism
2	HP1347	JHP1266	ung	uracil-DNA glycosylase	DNA/RNA Synthesis and Processing
0	HP1348	JHP1267	plsC	1-acyl-glycerol-3-phosphate acyltransferase , 1-ACYL-SN-GLYCEROL-3-PHOSPHATE ACYLTRANSFERASE	Biosynthesis and Metabolism
0	HP1349	JHP1268			Unknown Hypothetical
5	HP1350	JHP1269	prc	protease, CARBOXYL-TERMINAL PROTEASE	Protein Synthesis and Processing
1	HP1351	JHP1270			Unknown Hypothetical
3	HP1352	JHP1271	HINFI M	adenine specific DNA methyltransferase , TYPE II DNA MODIFICATION ENZYME (METHYLTRANSFERASE)	Restiction Modification
6	HP1353	JHP1272			Unknown Hypothetical
8	HP1354	JHP1272		putative adenine specific DNA methyltransferase	Restiction Modification
1	HP1355	JHP1273	nadC	nicotinate-nucleotide pyrophosphorylase	Biosynthesis and Metabolism
1	HP1356	JHP1274	nadA	quinolinate synthetase A , QUINOLINATE SYNTHETASE	Biosynthesis and Metabolism
0	HP1357	JHP1275	psd	phosphatidylserine decarboxylase proenzyme , PHOSPHATIDYLSERINE DECARBOXYLASE	Biosynthesis and Metabolism
2	HP1358	JHP1276			Unknown Hypothetical
0	HP1359	JHP1277			Unknown Hypothetical
0	HP1360	JHP1278	ubiA	4-hydroxybenzoate octaprenyltransferase	Biosynthesis and Metabolism
3	HP1361	JHP1279	comE3 , comE C	competence locus E , DNA transfer protein	Competance
1	HP1362	JHP1280	dnaB	replicative DNA helicase	DNA/RNA Synthesis and Processing
5	HP1363	JHP1281		conserved hypothetical integral membrane protein	Conserve Hypothetical
3	HP1364	JHP1282		signal-transducing protein, histidine kinase, putative histidine kinase sensor protein	Regulation
2	HP1365	JHP1283	JHP1443	response regulator	Regulation
7	HP1369	N/A			Restiction Modification
5	HP1370	N/A	mod	type III restriction enzyme M protein	Restiction Modification
7	HP1371	JHP1285		type III restriction enzyme R protein	Restiction Modification
1	HP1372	JHP1286	mreC	rod shape-determining protein	Cell Envelope
2	HP1373	JHP1287	mreB	rod shape-determining protein	Cell Envelope
2	HP1374	JHP1288	clpX	ATP-dependent protease ATPase subunit , ATP-DEPENDENT PROTEASE,ATP-BINDING SUBUNIT	Protein Synthesis and Processing

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
0	HP1375	JHP1289	lpxA	UDP-N-acetylglucosamine acyltransferase	Cell Envelope
1	HP1376	JHP1290	fabZ	(3R)-hydroxymyristoyl-(acyl carrier protein) dehydratase , HYDROXYMYRISTOYL-ACYL CARRIER PROTEIN DEHYDRATASE	Biosynthesis and Metabolism
1	HP1377	JHP1291			Unknown Hypothetical
4	HP1378	JHP1292	comL	competence lipoprotein	Competance
1	HP1379	JHP1293	lon	ATP-dependent protease , ATP-DEPENDENT PROTEASE LA	Protein Synthesis and Processing
12	HP1380	JHP1294	tyrA	prephenate dehydrogenase	Biosynthesis and Metabolism
3	HP1381	N/A			Unknown Hypothetical
4	HP1382	JHP1295		putative ENDONUCLEASE	Conserved Hypothetical
0	HP1384	JHP1441			Unknown Hypothetical
0	HP1385	JHP1440	fbp	fructose-1,6-bisphosphatase	Biosynthesis and Metabolism
0	HP1386	JHP1439	rpe	D-ribulose-5-phosphate 3 epimerase , RIBULOSE-PHOSPHATE 3-EPIMERASE	Biosynthesis and Metabolism
1	HP1387	JHP1438	dnaQ	DNA polymerase III epsilon subunit , DNA POLYMERASE III	DNA/RNA Synthesis and Processing
0	HP1388	N/A			Unknown Hypothetical
2	HP1391	JHP1436			Unknown Hypothetical
4	HP1392	JHP1435		fibronectin/fibrinogen-binding protein	Cell Envelope
7	HP1393	JHP1434	recN	DNA repair protein , DNA REPAIR PROTEIN(RECOMBINATION PROTEIN N)	DNA/RNA Synthesis and Processing
6	HP1394	JHP1433		conserved hypothetical protein	Conserve Hypothetical
2	HP1395	JHP1432	omp30	outer membrane protein , putative OUTER MEMBRANE PROTEIN	Outer Membrane Protein
1	HP1396	JHP1431			Unknown Hypothetical
5	HP1397	JHP1430			Unknown Hypothetical
7	HP1398	JHP1428	ald	alanine dehydrogenase , L-ALANINE DEHYDROGENASE	Biosynthesis and Metabolism
7	HP1399	JHP1427	rocF	arginase	Biosynthesis and Metabolism
3	HP1400	JHP1426	fecA, fecA_3	iron(III) dicitrate transport protein , putative IRON(III) DICITRATE TRANSPORT PROTEIN	Transporters
2	HP1401	JHP1425		conserved hypothetical protein	Conserve Hypothetical
4	HP1402	JHP1424	hsdR, hsdR_3	type I restriction enzyme R protein , TYPE I RESTRICTION ENZYME (RESTRICTION SUBUNIT)	Restiction Modification
11	HP1403	JHP1423	hsdM, hsdM_3	type I restriction enzyme M protein , TYPE I RESTRICTION ENZYME (MODIFICATION SUBUNIT)	Restiction Modification
0	HP1405	N/A			Unknown Hypothetical

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
1	HP1406	JHP1298	bioB	biotin synthetase	Biosynthesis and Metabolism
6	HP1407	JHP1299	rbn	conserved hypothetical integral membrane protein, putative ribonuclease N	Conserve Hypothetical
2	HP1408	JHP1300			Unknown Hypothetical
8	HP1409	JHP1301	JHP1302		Unknown Hypothetical
4	HP1410	JHP1303			Unknown Hypothetical
3	HP1411	JHP1304	JHP1305		Unknown Hypothetical
5	HP1412	JHP1307			Unknown Hypothetical
0	HP1413	JHP1308		conserved hypothetical protein	Conserve Hypothetical
0	HP1414	JHP1309		conserved hypothetical protein	Conserve Hypothetical
1	HP1415	JHP1310	miaA	tRNA delta(2)-isopentenylpyrophosphate transferase	Protein Synthesis and Processing
4	HP1416	JHP1311	rfaJ	lipopolysaccharide 1,2-glucosyltransferase , lipopolysaccharide biosynthesis protein	Cell Envelope
9	HP1417	JHP1312			Conserve Hypothetical
13	HP1418	JHP1313	murB	UDP-N-acetylenolpyruvoylglucosamine reductase	Cell Envelope
0	HP1419	JHP1314	fliQ	flagellar biosynthetic protein , FLAGELLAR BIOSYNTHESIS PROTEIN	Motility
10	HP1420	JHP1315	fliI	flagellar export protein ATP synthase , FLAGELLUM-SPECIFIC ATP SYNTHASE	Motility
0	HP1421	JHP1316	trbB, virB11_2	conjugative transfer regulon protein , DNA transfer protein	Other
16	HP1423	JHP1318		conserved hypothetical protein	Conserve Hypothetical
1	HP1424	JHP1319			Unknown Hypothetical
2	HP1427	JHP1320	hpn	histidine-rich, metal binding polypeptide , putative histidine-rich metal-binding protein	Transporters
7	HP1428	JHP1325		conserved hypothetical protein	Conserve Hypothetical
2	HP1429	JHP1324	kpsF	polysialic acid capsule expression protein	Cell Envelope
7	HP1430	JHP1323		conserved hypothetical ATP-binding protein	Conserve Hypothetical
1	HP1431	JHP1322	ksgA	16S rRNA(adenosine-N6,N6)-dimethyltransferase , DIMETHYLADENOSINE TRANSFERASE	Protein Synthesis and Processing
4	HP1432	JHP1321		histidine and glutamine-rich protein, putative histidine and glutamine-rich metal-binding protein	Transporters
8	HP1433	JHP1326			Unknown Hypothetical
5	HP1434	JHP1327	purU	formyltetrahydrofolate hydrolase	Biosynthesis and Metabolism
6	HP1435	JHP1328	PspA, sppA	protease IV , putative PROTEASE IV	Protein Synthesis and Processing

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
0	HP1436	JHP1329			Unknown Hypothetical
2	HP1437	JHP1330			Unknown Hypothetical
0	HP1439	JHP1332			Unknown Hypothetical
6	HP1440	JHP1333			Unknown Hypothetical
6	HP1441	JHP1334	ppi, ppiA	peptidyl-prolyl cis-trans isomerase B, cyclosporin-type rotamase , PEPTIDYL- PROLYL CIS-TRANS ISOMERASE	Protein Synthesis and Processing
0	HP1442	JHP1335	csrA	carbon storage regulator , putative carbon storage regulator	Regulation
2	HP1443	JHP1336		conserved hypothetical protein	Conserve Hypothetical
8	HP1444	JHP1337	smpB	small protein	Other
0	HP1445	JHP1338	exbB, exbB_ 3	biopolymer transport protein	Transporters
0	HP1446	JHP1339	exbD, exbD_ 3	biopolymer transport protein	Transporters
0	HP1447	JHP1340	rpl34, rpmH	ribosomal protein L34 , 50S RIBOSOMAL PROTEIN L34	Protein Synthesis and Processing
0	HP1448	JHP1341	rnpA	ribonuclease P, protein component , putative RIBONUCLEASE P PROTEIN COMPONENT	Protein Synthesis and Processing
0	HP1449	JHP1342		conserved hypothetical protein	Conserve Hypothetical
0	HP1450	JHP1343		60 kDa inner-membrane protein, putative Inner membrane protein	Outer Membrane Protein
0	HP1451	JHP1344			Unknown Hypothetical
1	HP1452	JHP1345	tdhF, thdF	thiophene and furan oxidizer , putative thiophene/furan oxidation protein	Detoxification
7	HP1453	JHP1346		conserved hypothetical protein, putative Outer membrane protein	Conserve Hypothetical
8	HP1454	JHP1347			Unknown Hypothetical
6	HP1455	JHP1348			Unknown Hypothetical
0	HP1456	JHP1349	lpp20	membrane-associated lipoprotein , conserved lipoprotein	Cell Envelope
4	HP1457	JHP1350			Unknown Hypothetical
10	HP1458	JHP1351		thioredoxin, putative THIOREDOXIN	Biosynthesis and Metabolism
7	HP1459	JHP1352		conserved hypothetical protein	Conserve Hypothetical
7	HP1460	JHP1353	dnaE	DNA polymerase III alpha-subunit , DNA POLYMERASE III, ALPHA CHAIN	DNA/RNA Synthesis and Processing
2	HP1461	JHP1354		cytochrome c551 peroxidase, putative CYTOCHROME C PEROXIDASE	Biosynthesis and Metabolism
2	HP1462	JHP1355		secreted protein involved in flagellar motility, putative motility protein	Motility
4	HP1463	JHP1356			Unknown Hypothetical
7	HP1464	JHP1357		conserved hypothetical secreted protein	Conserve Hypothetical
2	HP1465	JHP1358	HI108 7	ABC transporter, ATP-binding protein , putative amino acid abc transporter, ATP- binding protein	Transporters

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
11	HP1466	JHP1359		conserved hypothetical integral membrane protein	Conserve Hypothetical
3	HP1467	JHP1360		putative Outer membrane protein	Outer Membrane Protein
3	HP1468	JHP1361	ilvE	branched-chain-amino-acid aminotransferase , BRANCHED-CHAIN AMINO ACID AMINOTRANSFERASE	Biosynthesis and Metabolism
5	HP1469	JHP1362	omp31	outer membrane protein , putative Outer membrane protein	Outer Membrane Protein
7	HP1470	JHP1363	polA	DNA polymerase I	DNA/RNA Synthesis and Processing
2	HP1471	JHP1364	BCGIB	type IIS restriction enzyme R protein , putative TYPE II RESTRICTION ENZYME	Restriction Modification
0	HP1473	JHP1366			Unknown Hypothetical
4	HP1474	JHP1367	tmk	thymidylate kinase	Biosynthesis and Metabolism
4	HP1475	JHP1368	kdtB	lipopolysaccharide core biosynthesis protein	Cell Envelope
4	HP1476	JHP1369	ubiD	phenylacrylic acid decarboxylase, OCTAPRENYL-4-HYDROXYBENZOATE CARBOXY-LYASE	Protein Synthesis and Processing
1	HP1477	JHP1370			Unknown Hypothetical
0	HP1478	JHP1371	uvrD, rep	DNA helicase II , putative ATP-DEPENDENT DNA HELICASE	DNA/RNA Synthesis and Processing
19	HP1479	JHP1372			Unknown Hypothetical
0	HP1480	JHP1373	serS	seryl-tRNA synthetase	Protein Synthesis and Processing
0	HP1481	JHP1374			Unknown Hypothetical
0	HP1482	JHP1375			Unknown Hypothetical
0	HP1483	JHP1376	gerC2, ubiE	gerC2 protein , UBIQUINONE/MENAQUINONE BIOSYNTHESIS METHLYTRANSFERASE	Other
0	HP1484	JHP1377		conserved hypothetical integral membrane protein	Conserve Hypothetical
5	HP1485	JHP1378		conserved hypothetical protein	Conserve Hypothetical
5	HP1486	JHP1379		conserved hypothetical integral membrane protein	Conserve Hypothetical
1	HP1487	JHP1380		conserved hypothetical integral membrane protein	Conserve Hypothetical
1	HP1488	JHP1381		conserved hypothetical secreted protein	Conserve Hypothetical
5	HP1489	JHP1382		lipase-like protein	Unknown Hypothetical
2	HP1490	JHP1383		conserved hypothetical protein	Conserve Hypothetical
4	HP1491	JHP1384		phosphate permease, putative PHOSPHATE PERMEASE	Transporters
3	HP1492	JHP1385		conserved hypothetical nifU-like protein	Conserve Hypothetical
0	HP1493	JHP1386			Conserved Hypothetical

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
2	HP1494	JHP1387	murE	UDP-MurNac-tripeptide synthetase , UDP-N-ACETYLMURAMYL-TRIPETIDE SYNTHETASE	Cell Envelope
6	HP1495	JHP1388	tal	transaldolase	Biosynthesis and Metabolism
1	HP1496	JHP1389	ctc, rplY	general stress protein , putative ribosomal protein L25	Other
0	HP1497	JHP1390	pth	peptidyl-tRNA hydrolase	Protein Synthesis and Processing
7	HP1498	JHP1391			Unknown Hypothetical
2	HP1500	JHP1393			Unknown Hypothetical
10	HP1501	JHP1394	omp32	outer membrane protein , putative Outer membrane protein	Outer Membrane Protein
3	HP1502	JHP1395			Unknown Hypothetical
4	HP1503	JHP1396	copA, fixI	cation-transporting ATPase, P-type , putative component of cation transport for cbb3-type oxidase	Transporters
0	HP1504	JHP1397		conserved hypothetical protein	Conserve Hypothetical
1	HP1505	JHP1398	ribG, ribD	riboflavin biosynthesis protein , putative RIBOFLAVIN-SPECIFIC DEAMINASE	Biosynthesis and Metabolism
7	HP1506	JHP1399	gltS	glutamate permease , Sodium/Glutamate Symporter	Transporters
3	HP1507	JHP1400		conserved hypothetical ATP-binding protein	Conserve Hypothetical
2	HP1509	JHP1402		conserved hypothetical integral membrane protein	Conserve Hypothetical
0	HP1510	JHP1403	folB	conserved hypothetical protein, DIHYDRONEOPTERIN ALDOLASE	Conserve Hypothetical
1	HP1511	JHP1404			Unknown Hypothetical
5	HP1512	JHP1405	frpB, frpB_3	iron-regulated outer membrane protein , putative IRON-REGULATED OUTER MEMBRANE PROTEIN	Transporters
1	HP1513	JHP1406	selA	selenocysteine synthase SelA, putative, L-SERYL-TRNA(SER) SELENIUM TRANSFERASE	Protein Synthesis and Processing
0	HP1514	JHP1407	nusA	transcription termination factor NusA , N-UTILIZATION SUBSTANCE PROTEIN A	DNA/RNA Synthesis and Processing
0	HP1518	N/A			Unknown Hypothetical
11	HP1521	JHP1410	res, res_2	type III restriction enzyme R protein , TYPE III RESTRICTION ENZYME	Restiction Modification
0	HP1522	JHP1411	mod_2	TYPE III DNA MODIFICATION ENZYME (METHYLTRANSFERASE)	Restiction Modification
0	HP1523	JHP1412	recG	DNA recombinase , ATP-DEPENDENT DNA HELICASE	DNA/RNA Synthesis and Processing
0	HP1524	JHP1413			Unknown Hypothetical
5	HP1525	JHP1414			Unknown Hypothetical
2	HP1526	JHP1415	lexA, exoA	exodeoxyribonuclease	DNA/RNA Synthesis and Processing
7	HP1527	JHP1416			Unknown Hypothetical
1	HP1528	N/A			Unknown Hypothetical

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
1	HP1529	JHP1417	dnaA	chromosomal replication initiator protein	DNA/RNA Synthesis and Processing
1	HP1530	JHP1418	punB	purine nucleoside phosphorylase	Biosynthesis and Metabolism
0	HP1531	JHP1419			Unknown Hypothetical
15	HP1532	JHP1420	glmS	glucosamine fructose-6-phosphate aminotransferase (isomerizing) , glutamine fructose-6-phosphate aminotransferase	Biosynthesis and Metabolism
3	HP1533	JHP1421		conserved hypothetical protein	Conserve Hypothetical
11	HP1534	N/A	tnpB	IS605 transposase	Transposon
9	HP1535	N/A	tnpA	IS605 transposase	Transposon
0	HP1536	N/A			Unknown Hypothetical
1	HP1537	N/A			Unknown Hypothetical
1	HP1538	JHP1461	petC	Ubiquinol cytochrome c oxidoreductase, cytochrome c1 subunit	Biosynthesis and Metabolism
0	HP1539	JHP1460	fbcH, petB	ubiquinol cytochrome c oxidoreductase, cytochrome b subunit	Biosynthesis and Metabolism
1	HP1540	JHP1459	fbcF, petA	ubiquinol cytochrome c oxidoreductase, Rieske 2Fe-2S subunit , Ubiquinol cytochrome c oxidoreductase, 2Fe-2S subunit	Biosynthesis and Metabolism
9	HP1541	JHP1458	trcF, mfd	transcription-repair coupling factor	DNA/RNA Synthesis and Processing
3	HP1542	JHP1457			Unknown Hypothetical
3	HP1543	JHP1456	tagE	toxR-activated gene	Cell Envelope
6	HP1544	JHP1455	tagE	toxR-activated gene	Cell Envelope
1	HP1545	JHP1454	folC	folypolyglutamate synthase	Biosynthesis and Metabolism
0	HP1546	JHP1453			Unknown Hypothetical
1	HP1547	JHP1452	leuS	leucyl-tRNA synthetase	Protein Synthesis and Processing
0	HP1548	JHP1451		conserved hypothetical integral membrane protein	Conserve Hypothetical
9	HP1549	JHP1450	secF	protein-export membrane protein	Protein Synthesis and Processing
2	HP1550	JHP1449	secD	protein-export membrane protein	Protein Synthesis and Processing
0	HP1551	JHP1448		conserved hypothetical secreted protein	Conserve Hypothetical
0	HP1552	JHP1447	nhaA	Na ⁺ /H ⁺ antiporter , NA(+)/H(+) ANTIPORTER 1	Transporters
0	HP1553	JHP1446	pcrA	helicase, putative ATP-DEPENDENT HELICASE	DNA/RNA Synthesis and Processing
0	HP1554	JHP1445	rps2, rpsB	ribosomal protein S2 , 30S RIBOSOMAL PROTEIN S2	Protein Synthesis and Processing
1	HP1555	JHP1444	tsf, tfs	translation elongation factor EF-Ts , ELONGATION FACTOR TS (EF-TS)	Protein Synthesis and Processing
1	HP1556	JHP1464	ftsI	cell division protein , PENICILLIN-BINDING PROTEIN	Cell Division

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
0	HP1557	JHP1465	fliE	flagellar basal-body protein , FLAGELLAR HOOK-BASAL BODY COMPLEX PROTEIN	Motility
6	HP1558	JHP1466	flgC	flagellar basal-body rod protein (proximal rod protein), FLAGELLAR BASAL-BODY ROD PROTEIN	Motility
1	HP1559	JHP1467	flgB	flagellar basal-body rod protein (proximal rod protein), FLAGELLAR BASAL-BODY ROD PROTEIN	Motility
8	HP1560	JHP1468	ftsW, rodA_2	cell division protein , putative ROD SHAPE-DETERMINING PROTEIN	Cell Division
4	HP1562	JHP1470	ceuE	iron (III) ABC transporter, periplasmic iron-binding protein	Transporters
8	HP1563	JHP1471	tsaA	alkyl hydroperoxide reductase , putative peroxidase	Detoxification
8	HP1564	JHP1472		outer membrane protein, putative Outer membrane protein	Outer Membrane Protein
8	HP1565	JHP1473	pbp2	penicillin-binding protein 2 , PENICILLIN-BINDING PROTEIN	Cell Envelope
0	HP1566	JHP1474			Unknown Hypothetical
0	HP1567	JHP1475		conserved hypothetical GTP-binding protein	Conserve Hypothetical
4	HP1568	JHP1476			Unknown Hypothetical
0	HP1569	JHP1477			Unknown Hypothetical
0	HP1570	JHP1478		conserved hypothetical protein	Conserve Hypothetical
0	HP1571	JHP1479	rlpA	rare lipoprotein A , putative Outer membrane protein	Cell Envelope
2	HP1572	JHP1480	dniR	regulatory protein DniR, putative REGULATORY PROTEIN	Regulation
1	HP1573	JHP1481		conserved hypothetical protein	Conserve Hypothetical
8	HP1574	JHP1482	ribC	riboflavin synthase alpha subunit , RIBOFLAVIN SYNTHASE ALPHA CHAIN	Biosynthesis and Metabolism
5	HP1575	JHP1483	flhB_2	ABC transporter, putative, putative FLAGELLAR BIOSYNTHESIS PROTEIN	Transporters
4	HP1576	JHP1484	abc	ABC transporter, ATP-binding protein	Transporters
2	HP1577	JHP1485	yaeE	ABC transporter, permease protein , ABC transporter, permease	Transporters
1	HP1578	N/A		LPS biosynthesis protein	Cell Envelope
1	HP1579	JHP1486			Unknown Hypothetical
0	HP1580	JHP1487			Unknown Hypothetical
7	HP1581	JHP1488	llm, wecA	methicillin resistance protein , putative UNDECAPRENYL-PHOSPHATE-ALPHA-N-ACETYLGLUCOSAMINYLTRANSFERASE	Cell Envelope
6	HP1582	JHP1489	pdxJ	pyridoxal phosphate biosynthetic protein J , PYRIDOXAL PHOSPHATE SYNTHETASE	Biosynthesis and Metabolism

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
6	HP1583	JHP1490	pdxA	pyridoxal phosphate biosynthetic protein A	Biosynthesis and Metabolism
9	HP1584	JHP1491	gcp, ydiE	sialoglycoprotease , putative O-SIALOGLYCOPROTEIN ENDOPEPTIDASE	Protein Synthesis and Processing
6	HP1585	JHP1492	flgG, flgG_2	flagellar basal-body rod protein , FLAGELLAR BASAL-BODY ROD PROTEIN (DISTAL ROD PROTEIN)	Motility
1	HP1586	N/A			Unknown Hypothetical
2	HP1587	JHP1493		conserved hypothetical protein	Conserve Hypothetical
2	HP1588	JHP1494		conserved hypothetical protein	Conserve Hypothetical
5	HP1589	N/A			Conserve Hypothetical
7	HP1590	N/A			Unknown Hypothetical
10	N/A	JHP0044		putative TYPE II DNA MODIFICATION ENZYME (METHYLTRANSFERASE)	Restriction Modification
0	N/A	JHP0332			Unknown Hypothetical
1	N/A	JHP0585		putative 3-HYDROXYACID DEHYDROGENASE	Conserved Hypothetical
12	N/A	JHP0587			Unknown Hypothetical
1	N/A	JHP0755			Unknown Hypothetical
1	N/A	JHP0756		putative TYPE II DNA MODIFICATION ENZYME (METHYLTRANSFERASE)	Restriction Modification
1	N/A	JHP0825			Unknown Hypothetical
0	N/A	JHP0828			Unknown Hypothetical
1	N/A	JHP0829			Unknown Hypothetical
0	N/A	JHP0830			Unknown Hypothetical
0	N/A	JHP0834			Unknown Hypothetical
6	N/A	JHP0917	virB4_2	DNA transfer protein	Conserved Hypothetical
2	N/A	JHP0918	virB4_3	DNA transfer protein	Conserved Hypothetical
1	N/A	JHP0919	topA_2	topoisomerase I	Conserved Hypothetical
3	N/A	JHP0920			Unknown Hypothetical
2	N/A	JHP0921			Unknown Hypothetical
2	N/A	JHP0922			Unknown Hypothetical
1	N/A	JHP0923			Unknown Hypothetical
1	N/A	JHP0924			Unknown Hypothetical
5	N/A	JHP0927			Unknown Hypothetical
7	N/A	JHP0928			Unknown Hypothetical
0	N/A	JHP0929			Unknown Hypothetical
3	N/A	JHP0945			Unknown Hypothetical
1	N/A	JHP0946			Unknown Hypothetical
1	N/A	JHP0954			Unknown Hypothetical
2	N/A	JHP0955			Unknown Hypothetical
1	N/A	JHP0956			Unknown Hypothetical
1	N/A	JHP0957			Unknown Hypothetical
2	N/A	JHP0958			Unknown Hypothetical
1	N/A	JHP0959			Unknown Hypothetical
0	N/A	JHP0960			Unknown Hypothetical

Tn Hits	TIGR#	ASTRA#	Gene Name	Gene Description	Process
0	N/A	JHP1032		putative lipopolysaccharide biosynthesis protein	Conserved Hypothetical
1	N/A	JHP1132			Unknown Hypothetical
9	N/A	JHP1296	mod_1	putative TYPE III DNA MODIFICATION ENZYME (METHYLTRANSFERASE)	Restriction Modification
9	N/A	JHP1297	res_1	putative TYPE III RESTRICTION ENZYME	Restriction Modification
5	N/A	JHP1306			Unknown Hypothetical
5	N/A	JHP1437			Unknown Hypothetical
0	N/A	JHP1495			Unknown Hypothetical