

locus tag on <i>P. freudenreichii</i>	gene name on <i>P. freudenreichii</i>	product	locus tag on <i>P. acnes</i>	SurfG+ prediction
PFREUD_00010	dnaA	Chromosomal replication initiator protein	PPA0001	CYT
PFREUD_00090	recF	DNA replication and repair protein recF	PPA0004	CYT
PFREUD_00150	gyrB2	DNA gyrase subunit B	PPA0009	CYT
PFREUD_00160	gyrA	DNA gyrase subunit A	PPA0010	CYT
PFREUD_00170		Hypothetical protein	PPA1806	CYT
PFREUD_00290	iol	myo-inositol 2-dehydrogenase	PPA0466	CYT
PFREUD_00370	ald	Alanine dehydrogenase	PPA2274	CYT
PFREUD_00390		ErfK/YbiS/Ycfs/YnhG precursor	PPA2270	CYT
PFREUD_00410		Hypothetical protein	PPA1095	CYT
PFREUD_00470	rmIA (rfbA)	Glucose-1-phosphate thymidyltransferase	PPA2288	CYT
PFREUD_00670		1-acyl-sn-glycerol-3-phosphate acyltransferase	PPA2237	CYT
PFREUD_00680		dehydrogenase	PPA2236	CYT
PFREUD_00770	gpsA	Glycerol-3-phosphate dehydrogenase [NAD(P)+] (NAD(P)H- dependent glycerol-3-phosphate dehydrogenase)	PPA2315	CYT
PFREUD_00820		two-component response regulator	PPA2112	CYT
PFREUD_00840	ptpA	Low molecular weight protein-tyrosine- phosphatase (protein-tyrosine-phosphatase)	PPA2110	CYT
PFREUD_00860	argF	Ornithine carbamoyltransferase	PPA0584	CYT
PFREUD_01060	aatB	Leucyl/phenylalanyl-tRNA-protein transferase	PPA2221	CYT
PFREUD_01100		Hypothetical protein	PPA2088	CYT
PFREUD_01130	alr	Alanine racemase	PPA2285	CYT
PFREUD_01350	serS1	Seryl-tRNA synthetase	PPA2219	CYT
PFREUD_01430	tpx	thiol peroxidase	PPA0590	CYT
PFREUD_01440	npdA	Silent information regulator protein Sir2 /NAD- dependent deacetylase	PPA2172	CYT
PFREUD_01460	argG	Argininosuccinate synthase	PPA2201	CYT
PFREUD_01470		NADPH:quinone reductase and related Zn-dependent oxidoreductases	PPA2200	CYT
PFREUD_01560		Short chain dehydrogenase	PPA1711	CYT
PFREUD_01580	aroE	Shikimate 5-dehydrogenase	PPA1181	CYT
PFREUD_01630		two-component response regulator LuxR	PPA2028	CYT
PFREUD_01690	fkpB	FK506-binding protein (peptidyl-prolyl cis-trans isomerase)	PPA2163	CYT
PFREUD_01810		Hypothetical protein	PPA0164	CYT
PFREUD_01830		FAD-dependent pyridine nucleotide-disulphide oxidoreductase:4Fe-4S ferredoxin, iron-sulfur binding:Aromatic ring hydroxylase	PPA0163	CYT
PFREUD_01840	nifJ1	Pyruvate synthase/Pyruvate-flavodoxin oxidoreductase	PPA0162	CYT
PFREUD_01850		Dihydroorotate dehydrogenase	PPA0161	CYT
PFREUD_02140		Hypothetical protein	PPA1479	CYT
PFREUD_02170	lysS	Lysyl-tRNA synthetase	PPA0181	CYT
PFREUD_02190	bkdA1	2-oxoisovalerate dehydrogenase subunit alpha (Branched- chain alpha-keto acid dehydrogenase E1 component alpha chain) (BCKDH E1-alpha)	PPA2094	CYT
PFREUD_02200	bkdA2	2-oxoisovalerate dehydrogenase subunit beta (EC 1.2.4.4) (Branched- chain alpha-keto acid dehydrogenase E1 component beta chain) (BCKDH E1-beta) Pyruvate dehydrogenase E1 component subunit beta	PPA2093	CYT
PFREUD_02210	bkdB	dihydrolipoyllysine-residue (2- methylpropanoyl)transferase. Lipamide acyltransferase component of branched-chain alpha-keto acid dehydrogenase complex (E2) (Dihydrolipoamide branched chain transacylase)	PPA2092	CYT
PFREUD_02220		Hypothetical protein	PPA1999	CYT
PFREUD_02240		Hypothetical protein	PPA0183	CYT
PFREUD_02270		Hypothetical protein	PPA0120	CYT
PFREUD_02290		Hypothetical secreted protein	PPA2334	CYT
PFREUD_02370	lacZ	Beta-galactosidase (Lactase) LacZ	PPA1700	CYT
PFREUD_02390		Transcriptional regulator	PPA1140	CYT
PFREUD_02420	caiA	Crotonobetainyl-CoA dehydrogenase (Crotonobetainyl-CoA reductase)	PPA2216	CYT
PFREUD_02480	fixA (ydiQ)	Electron transfer flavoprotein (FixA protein)	PPA2214	CYT
PFREUD_02490	fixB (ydiR)	Electron transfer flavoprotein, carnitine metabolism (FixB protein)	PPA2213	CYT
PFREUD_02500	fixC (ydiS)	Electron transfer flavoprotein-quinone oxidoreductase (FixC protein)	PPA2212	CYT
PFREUD_02520		DNA or RNA helicase	PPA0896	CYT
PFREUD_02540	udgA (rpkK)	UDP-glucose 6-dehydrogenase	PPA0593	CYT
PFREUD_02550	argS	Arginyl-tRNA synthetase (Arginine--tRNA ligase) (ArgRS)	PPA2128	CYT
PFREUD_02560	fepC3	FepC	PPA0792	CYT
PFREUD_02870	dps	Starvation-inducible DNA-binding protein	PPA2134	CYT
PFREUD_03030		Hypothetical protein	PPA0424	CYT
PFREUD_03100	kduD	2-deoxy-D-gluconate 3-dehydrogenase	PPA0372	CYT
PFREUD_03110	cat	Coenzyme A transferase (Putative succinyl-CoA or butyryl-CoA:coenzyme A transferase)	PPA2053	CYT
PFREUD_03160	PF2369	Putative aldo/keto reductase (oxidoreductase)	PPA2129	CYT
PFREUD_03180	rsmC	rRNA (guanine-N2-)-methyltransferase	PPA2050	CYT
PFREUD_03210		Hypothetical protein	PPA2049	CYT
PFREUD_03230	ppdk	Pyruvate phosphate dikinase	PPA2048	CYT
PFREUD_03250	rbsK	carbohydrate or pyrimidine kinases PfkB family	PPA0018	CYT
PFREUD_03270		two component system response regulator	PPA2043	CYT
PFREUD_03290	metN	Methionine import ATP-binding protein metN	PPA1759	CYT
PFREUD_03380	thiM	Hydroxyethylthiazole kinase	PPA0885	CYT
PFREUD_03610		Zinc-containing alcohol dehydrogenase	PPA2245	CYT
PFREUD_03760		Hemerythrin HHE cation binding region	PPA0240	CYT
PFREUD_03830		Hypothetical protein	PPA0205	CYT
PFREUD_03840	recR	Recombination protein recR	PPA0206	CYT
PFREUD_03860	ileS	Isoleucyl-tRNA synthetase (Isoleucine--tRNA ligase)	PPA0216	CYT
PFREUD_03870		oxidoreductase	PPA0219	CYT
PFREUD_03880	ask	Aspartokinase (Aspartate kinase)	PPA2148	CYT
PFREUD_04000	purD	Phosphoribosylamine-glycine ligase	PPA1993	CYT
PFREUD_04010	purB	Adenylosuccinate lyase	PPA1992	CYT
PFREUD_04050	purL/purQ	Phosphoribosylformylglycinamide synthase 1 (Phosphoribosylformylglycinamide synthase I) (FGAM synthase I)	PPA1987	CYT
PFREUD_04250	pepB	Phosphatidylethanolamine-binding protein	PPA2138	CYT
PFREUD_04260		DeaD/DeaH box helicase	PPA2135	CYT
PFREUD_04270	eda, hga, kdgA	2-dehydro-3-deoxyphosphogluconate aldolase/4- hydroxy-2-oxoglutarate aldolase	PPA2133	CYT
PFREUD_04290	pgl, PPA2131	Glucose-6-phosphate isomerase (EC 5.3.1.9) (GPI) (Phosphoglucose isomerase) (PGI) (Phosphohexose isomerase) (PHI)	PPA2131	CYT
PFREUD_04320	Arth_4141	FAD linked oxidase domain protein	PPA0775	CYT
PFREUD_04430		Thiamine pyrophosphate enzyme	PPA1468	CYT
PFREUD_04540	hrpA1	ATP-dependent helicase HrpA	PPA0155	CYT
PFREUD_04550	cobA	CobA Uroporphyrinogen III methyltransferase	PPA0439	CYT
PFREUD_04560	cblO1	Cobalt import ATP-binding protein CblO	PPA0434	CYT

PFREUD_04600	gntR	transcription factor (transcription regulation)	PPA0740	CYT
PFREUD_04650	dnaJ2	Chaperone protein dnaJ 2 (DnaJ2 protein) (Heat shock protein 40 2)	PPA2038	CYT
PFREUD_04660	hspr2	Heat shock protein transcriptional repressor Hspr2 (Hspr2 protein)	PPA2037	CYT
PFREUD_04670		BadF/BadG/BcrA/BcrD ATPase family protein	PPA1986	CYT
PFREUD_04680	purL	Phosphoribosylformylglycinamide synthase II (FGAM synthase II)	PPA1977	CYT
PFREUD_04690		Zinc metalloproteinase	PPA1972	CYT
PFREUD_04720	fhs	Formate--tetrahydrofolate ligase	PPA0049	CYT
PFREUD_04770	purF	Amidophosphoribosyltransferase	PPA1970	CYT
PFREUD_04780	purM	Phosphoribosylformylglycinamide cyclo-ligase	PPA1969	CYT
PFREUD_04810	pf962	Carboxylic ester hydrolase	PPA1967	CYT
PFREUD_05030		Deoxycytidylate deaminase (dCMP deaminase)	PPA1950	CYT
PFREUD_05090		nuclease (RecB family)	PPA1944	CYT
PFREUD_05110		ABC transporter ATP-binding protein	PPA1942	CYT
PFREUD_05130	dhbC	Menaquinone-specific isochorismate synthase	PPA1940	CYT
PFREUD_05140		electron transfer oxidoreductase	PPA1938	CYT
PFREUD_05170	nuoB	NADH-quinone oxidoreductase chain B	PPA1935	CYT
PFREUD_05180	nuoC	NADH-quinone oxidoreductase chain C (NADH dehydrogenase I, chain C)	PPA1934	CYT
PFREUD_05190	nuoD	NADH-quinone oxidoreductase chain D (EC 1.6.99.5) (NADH dehydrogenase I, chain D)	PPA1933	CYT
PFREUD_05200	nuoE	NADH-quinone oxidoreductase chain E	PPA1932	CYT
PFREUD_05210	nuoF	NADH-quinone oxidoreductase chain F (NADH dehydrogenase I, chain F) (NDH-1, chain F)	PPA1931	CYT
PFREUD_05220	nuoG	NADH-quinone oxidoreductase chain G (NADH dehydrogenase I, chain G)	PPA1930	CYT
PFREUD_05240	nuoI	NADH-quinone oxidoreductase subunit I (NADH dehydrogenase I subunit I) (NDH-1 subunit I)	PPA1928	CYT
PFREUD_05300	idsA	Heptaprenyl diphosphate synthase component II	PPA1921	CYT
PFREUD_05330		Metalloprotease (Peptidase family M13)	PPA1909	CYT
PFREUD_05340		Thiamine pyrophosphate (TPP family)	PPA1905	CYT
PFREUD_05350		Pyruvate flavodoxin/ferredoxin oxidoreductase	PPA1904	CYT
PFREUD_05380	xthA	Exodeoxyribonuclease III/exonuclease III	PPA1898	CYT
PFREUD_05410	ahpC	Peroxiredoxin/Alkyl hydroperoxide reductase subunit C /Thioredoxin peroxidase/Alkyl hydroperoxide reductase protein C22/General stress protein 22	PPA1989	CYT
PFREUD_05420	ahpF	Alkyl hydroperoxide reductase subunit F	PPA1990	CYT
PFREUD_05450	rpmG	50S ribosomal protein L33 RpmG	PPA1897	CYT
PFREUD_05460		R_hydratase_like, (R)-hydratase [(R)-specific enoyl-CoA hydratase].	PPA1896	CYT
PFREUD_05470		R_hydratase_like, (R)-hydratase [(R)-specific enoyl-CoA hydratase]	PPA1895	CYT
PFREUD_05480	murB	UDP-N-acetylenolpyruvoylglucosamine reductase (UDP-N- acetylmuramate dehydrogenase)	PPA1894	CYT
PFREUD_05520	nusG	Transcription antitermination protein NusG	PPA1891	CYT
PFREUD_05530	rplK	50S ribosomal protein L11	PPA1890	CYT
PFREUD_05540	rplA	50S ribosomal protein L1	PPA1889	CYT
PFREUD_05550	lipB	Lipoyltransferase (Lipoyl-[acyl-carrier-protein]- protein- N-lipoyltransferase) (Lipoate-protein ligase B)	PPA0692	CYT
PFREUD_05560	lipA	Lipoic acid synthetase	PPA0689	CYT
PFREUD_05570	rplJ	50S ribosomal protein L10	PPA1887	CYT
PFREUD_05580	rplL	50S ribosomal protein L7/L12	PPA1885	CYT
PFREUD_05600	rpoB	DNA-directed RNA polymerase beta chain (RNAP beta subunit) (Transcriptase beta chain) (RNA polymerase subunit beta)	PPA1884	CYT
PFREUD_05610	rpoC	DNA-directed RNA polymerase beta chain (RNAP beta subunit) (Transcriptase beta chain) (RNA polymerase beta subunit)	PPA1883	CYT
PFREUD_05620	rpsL	30S ribosomal protein S12	PPA1878	CYT
PFREUD_05630	rpsG	30S ribosomal protein S7	PPA1876	CYT
PFREUD_05640	fusA	Elongation factor G (EF-G)	PPA1875	CYT
PFREUD_05650	tuf	Elongation factor Tu	PPA1873	CYT
PFREUD_05680	glxX	Glutamyl-tRNA synthetase (Glutamate--tRNA ligase) (GluRS)	PPA1869	CYT
PFREUD_05690	pabC	Branched-chain amino acid aminotransferase/aminodeoxychorismate lyase	PPA2261	CYT
PFREUD_05700	rpsJ	30S ribosomal protein S10	PPA1865	CYT
PFREUD_05710	rplC	50S ribosomal protein L3	PPA1863	CYT
PFREUD_05730	rplW	50S ribosomal protein L23	PPA1861	CYT
PFREUD_05740	rplB	50S ribosomal protein L2	PPA1860	CYT
PFREUD_05750	rpsS	30S ribosomal protein S19	PPA1859	CYT
PFREUD_05780	rplP	50S ribosomal protein L16	PPA1856	CYT
PFREUD_05790	rpmC	50S ribosomal protein L29	PPA1855	CYT
PFREUD_05800	rpsQ	30S ribosomal protein S17	PPA1853	CYT
PFREUD_05810	rplN	50S ribosomal protein L14	PPA1852	CYT
PFREUD_05820	rplX	50S ribosomal protein L24	PPA1851	CYT
PFREUD_05830	rplE	50S ribosomal protein L5	PPA1850	CYT
PFREUD_05840	rpsN1, rpsZ	30S ribosomal protein S14 type Z	PPA1849	CYT
PFREUD_05850	rpsH	30S ribosomal protein S8	PPA1848	CYT
PFREUD_05860	rplF	50S ribosomal protein L6	PPA1846	CYT
PFREUD_05870	rplR	Ribosomal protein L18	PPA1845	CYT
PFREUD_05890	rpmD	50S ribosomal protein L30	PPA1843	CYT
PFREUD_05900	rplO	50S ribosomal protein L15	PPA1842	CYT
PFREUD_05940		ABC transporter, ATPase subunit	PPA2066	CYT
PFREUD_05980	adk	Adenylate kinase (EC 2.7.4.3) (ATP-AMP transphosphorylase)	PPA1834	CYT
PFREUD_05990	map	Methionine aminopeptidase (MAP) (Peptidase M)	PPA1833	CYT
PFREUD_06010		Hypothetical protein	PPA2117	CYT
PFREUD_06020	infA	Translation initiation factor IF-1	PPA1832	CYT
PFREUD_06030		Hypothetical protein	PPA1831	CYT
PFREUD_06040	rpsM	30S ribosomal protein S13	PPA1829	CYT
PFREUD_06050	rpsK	30S ribosomal protein S11	PPA1828	CYT
PFREUD_06060	rpsD	30S ribosomal protein S4	PPA1827	CYT
PFREUD_06070	rpoA	DNA-directed RNA polymerase alpha chain (RNAP alpha subunit) (Transcriptase alpha chain) (RNA polymerase subunit alpha)	PPA1826	CYT
PFREUD_06090	gtfE	Glycosyltransferase	PPA1824	CYT
PFREUD_06110	sodA	Iron/Manganese superoxide dismutase (Superoxide dismutase [Mn/Fe]) (SODM)	PPA1818	CYT
PFREUD_06120		ABC transporter ATP-binding protein	PPA1817	CYT
PFREUD_06150	cblO2	ABC transporter, ATP-binding protein, cobalt	PPA1813	CYT
PFREUD_06190		methyltransferase	PPA1810	CYT
PFREUD_06200	truA	tRNA pseudouridine synthase A (tRNA-uridine isomerase I) (tRNA pseudouridylate synthase I)	PPA1809	CYT
PFREUD_06240	rplM	50S ribosomal protein L13	PPA1803	CYT
PFREUD_06250	rspl	30S ribosomal protein S9	PPA1802	CYT
PFREUD_06260	glmM	Phosphoglucosamine mutase	PPA1801	CYT
PFREUD_06270	coaA	Pantothenate kinase (Pantothenic acid kinase)	PPA1799	CYT
PFREUD_06280	glmS	Glucosamine--fructose-6-phosphate aminotransferase (Hexosephosphate aminotransferase, D- fructose-6-phosphate amidotransferase)	PPA1794	CYT
PFREUD_06300		Carbohydrate kinase	PPA1792	CYT
PFREUD_06310	sqdX (rfaG)	Glycosyltransferase	PPA1791	CYT

PFREUD_06340		Peptidase, family M22	PPA1784	CYT
PFREUD_06350	rimI	Ribosomal-protein-alanine acetyltransferase	PPA1783	CYT
PFREUD_06360	gcp	Putative O-sialoglycoprotein endopeptidase	PPA1782	CYT
PFREUD_06370	bluB/cobT2	Phosphoribosyltransferase/nitroreductase (fusion gene) (Nicotinate-nucleotide-dimethylbenzimidazole phosphoribosyltransferase)	PPA0953	CYT
PFREUD_06390	mutT	,8-dihydro-8-oxoguanine-triphosphatase (Mutator MutT protein/7,8-dihydro-8-oxoguanine-triphosphatase)	PPA1781	CYT
PFREUD_06410		Hypothetical protein	PPA1776	CYT
PFREUD_06460	groS1(groES1) (hsp10)	10 kDa chaperonin 1 (Protein Cpn10 1) (groES protein 1) (Heat shock 10 1)	PPA1773	CYT
PFREUD_06470	groL1 (groEL1)	60 kDa chaperonin 1 (Protein Cpn60 1) (groEL protein 1) (Heat shock protein 60 1)	PPA1772	CYT
PFREUD_06480	guaB1	Inosine-5'-monophosphate dehydrogenase (IMP dehydrogenase) (IMPDH) (IMPD) / GMP reductase	PPA1768	CYT
PFREUD_06490	guaB2	Inosine-5'-monophosphate dehydrogenase (IMP dehydrogenase) (IMPDH) (IMPD) / GMP reductase	PPA1767	CYT
PFREUD_06550	cysE	Serine acetyltransferase	PPA1765	CYT
PFREUD_06560	cys1	Cysteine synthase 1	PPA0963	CYT
PFREUD_06590	araD1	L-ribulose-5-phosphate 4-epimerase	PPA0882	CYT
PFREUD_06620	lacI1	arabinose operon repressor	PPA0088	CYT
PFREUD_06640		ATP binding protein of ABC transporter , ATPase component	PPA0015	CYT
PFREUD_06680	guaA	GMP synthase [glutamine-hydrolyzing] (Glutamine amidotransferase) (GMP synthetase)	PPA1764	CYT
PFREUD_06800	pcrA	ATP-dependent DNA helicase	PPA1756	CYT
PFREUD_06820	purN	5-phosphoribosylglycinamide formyltransferase (phosphoribosylglycinamide formyltransferase)	PPA1748	CYT
PFREUD_06830	purH	Phosphoribosylaminoimidazolecarboxamide formyltransferase (AICAR transformylase)	PPA1747	CYT
PFREUD_06840	fold	Methylenetetrahydrofolate dehydrogenase (Bifunctional protein)	PPA1743	CYT
PFREUD_06860	mdh	Malate dehydrogenase	PPA1740	CYT
PFREUD_06910		Hypothetical protein	PPA1735	CYT
PFREUD_06930	rnhA	Ribonuclease H	PPA1729	CYT
PFREUD_06950	caiD	Enoyl-CoA hydratase/carnithine racemase CaiD	PPA1899	CYT
PFREUD_06960	metG	Methionyl-tRNA synthetase (Methionine--tRNA ligase) (MetRS)	PPA1728	CYT
PFREUD_07050		zinc-binding dehydrogenase	PPA2035	CYT
PFREUD_07100	accA	Acetyl-CoA carboxylase	PPA1719	CYT
PFREUD_07110	mutM2	Formamidopyrimidine-DNA glycosylase (DNA- formamidopyrimidine glycosylase)	PPA1623	CYT
PFREUD_07150	maf	Maf-like protein	PPA1709	CYT
PFREUD_07170	pccB	Propionyl-CoA carboxylase beta chain	PPA1707	CYT
PFREUD_07250	birA	BirA, Biotin-(acetyl-CoA carboxylase) ligase	PPA1705	CYT
PFREUD_07290		Peptidase S51 family protein, dipeptidase E	PPA1704	CYT
PFREUD_07300	purK	Phosphoribosylaminoimidazole carboxylase ATPase subunit	PPA1702	CYT
PFREUD_07330	manC	Mannose-1-phosphate guanylyltransferase	PPA1696	CYT
PFREUD_07350	whiB1	Transcription factor WhiB	PPA1694	CYT
PFREUD_07380		Hypothetical protein	PPA1691	CYT
PFREUD_07400	pmm	Phosphomannomutase (PMM)	PPA2023	CYT
PFREUD_07420		Hypothetical protein	PPA1688	CYT
PFREUD_07470	malQ1	4-alpha-glucanotransferase (Amylomaltase) (Disproportionating enzyme) (D-enzyme)	PPA1683	CYT
PFREUD_07480	menC	O-succinylbenzoate-CoA synthase (4-(2'- carboxyphenyl)-4-oxybutyric acid synthase)	PPA0902	CYT
PFREUD_07490	menD	Menaquinone biosynthesis protein	PPA0903	CYT
PFREUD_07520	menF	Isochorismate synthetase (enterochelin biosynthesis)	PPA0904	CYT
PFREUD_07530	menE2	O-succinylbenzoic acid-CoA ligase (2- succinylbenzoate--CoA ligase)	PPA0906	CYT
PFREUD_07540	menB	Naphthoate synthase (Dihydroxynaphthoic acid synthetase)	PPA0907	CYT
PFREUD_07550	pncB	Nicotinate phosphoribosyltransferase	PPA1681	CYT
PFREUD_07580	murI	Glutamate racemase	PPA1675	CYT
PFREUD_07590	rph	Ribonuclease PH (RNase PH) (tRNA nucleotidyltransferase)	PPA1674	CYT
PFREUD_07610	thyA	Thymidylate synthase	PPA1672	CYT
PFREUD_07630	dinB	Nucleotidyltransferase/DNA polymerase involved in DNA repair (DNA polymerase IV)	PPA1670	CYT
PFREUD_07640	argK	Kinase ArgK	PPA0597	CYT
PFREUD_07650	mutB	Methylmalonyl-CoA mutase large subunit (Methylmalonyl-CoA mutase alpha subunit) (MCM-alpha) (MUTB- (R)-2- Methyl-3-oxopropanoyl-CoA CoA-carbonylmutase)	PPA0596	CYT
PFREUD_07660	mutA	Methylmalonyl-CoA mutase small subunit (Methylmalonyl-CoA mutase beta subunit) (MCB-beta)	PPA0595	CYT
PFREUD_07680	cbiL	CbiL Precorrin-2 C20-methyltransferase	PPA0420	CYT
PFREUD_07690	cbiF	CbiF Precorrin-4 C11-methyltransferase	PPA0421	CYT
PFREUD_07700	cobJ/cbiE/cbiG/c			
PFREUD_07710	biH	precorrin methylase (precorrin-3B C17- methyltransferase) CbiE/G/H fusion protein	PPA0422	CYT
PFREUD_07730	cysG/cbiX	CysG/CbiX	PPA0423	CYT
PFREUD_07750	cbiC	Precorrin 8X methylmutase CbiC	PPA0429	CYT
PFREUD_07770	cbiT	Precorrin 8 decarboxylase CbiT	PPA0436	CYT
PFREUD_07790	bcp	Bcp Putative peroxiredoxin (Thioredoxin reductase)	PPA1661	CYT
PFREUD_07830	cobB/cobQ	(glutamine amidotransferase) (adenosylcobyric acid synthase (glutamine-hydrolysing))	PPA1654	CYT
PFREUD_07840		UDP-N-acetylmuramyl tripeptide synthase (Mur ligase)	PPA1653	CYT
PFREUD_07890	orn	Oligoribonuclease	PPA1642	CYT
PFREUD_07930		ABC transporter	PPA1639	CYT
PFREUD_07960	ssb2	Single-stranded DNA-binding protein 2 (SSB 2) (Helix-destabilizing protein 2)	PPA1637	CYT
PFREUD_07970		ABC transporter ATP-binding protein	PPA1636	CYT
PFREUD_07980	dhaK	DhaK PTS-dependent dihydroxyacetone kinase, dihydroxyacetone-binding subunit	PPA1947	CYT
PFREUD_07990	dhaL	PTS-dependent dihydroxyacetone kinase, ADP- binding subunit DhaL	PPA1948	CYT
PFREUD_08010	galT	Galactose-1-phosphate uridylyltransferase (UDP- glucose---hexose-1-phosphate uridylyltransferase)	PPA2218	CYT
PFREUD_08040		oxidoreductase	PPA1634	CYT
PFREUD_08050	marR1	Transcriptional regulator, MarR family	PPA1633	CYT
PFREUD_08060		long-chain fatty-acid CoA ligase (AMP-binding enzyme) (long-chain-fatty-acid---CoA ligase)	PPA1632	CYT
PFREUD_08070	pf2652	Hypothetical protein	PPA1631	CYT
PFREUD_08080	thiD2	hydroxymethylpyrimidine/phosphomethylpyrimidinekinase	PPA1712	CYT
PFREUD_08090	gnd2	6-phosphogluconate dehydrogenase, decarboxylating	PPA1629	CYT
PFREUD_08100	pepN	Aminopeptidase N , Lysyl aminopeptidase	PPA1627	CYT
PFREUD_08130	ligA	DNA ligase (NAD+)	PPA1626	CYT
PFREUD_08210	tig	Trigger factor (TF)	PPA1575	CYT
PFREUD_08240	clpP1	ATP-dependent Clp protease proteolytic subunit 1 (Endopeptidase Clp 1)	PPA1573	CYT
PFREUD_08250	clpP2	ATP-dependent Clp protease proteolytic subunit 2 (Endopeptidase Clp 2)	PPA1572	CYT
PFREUD_08260	clpX	ATP-dependent Clp protease (ATP-dependent Clp protease, ATP-binding subunit ClpX)	PPA1571	CYT
PFREUD_08290	pfkA	6-phosphofructokinase	PPA0090	CYT
PFREUD_08310	valS	Valyl-tRNA synthetase (Valine--tRNA ligase) (ValRS)	PPA1568	CYT
PFREUD_08350	folC	Folypolyglutamate synthase (bifunctional enzyme)	PPA0821	CYT
PFREUD_08360	ndk	Nucleoside-diphosphate kinase	PPA0823	CYT
PFREUD_08380		Fe-S oxidoreductases family 2	PPA0824	CYT
PFREUD_08420		Hypothetical protein	PPA0825	CYT
PFREUD_08450	rplU	50S ribosomal protein L21	PPA0827	CYT
PFREUD_08460	rpmA	50S ribosomal protein L27	PPA0829	CYT
PFREUD_08480	obg	GTPase	PPA0833	CYT

PFREUD_08490	proB	Glutamate 5-kinase (Gamma-glutamyl kinase) (GK)	PPA0834	CYT
PFREUD_08510	proA	Gamma-glutamyl phosphate reductase (GPR) (Glutamate-5- semialdehyde dehydrogenase) (Glutamyl-gamma-semialdehyde dehydrogenase) (GSA dehydrogenase)	PPA0835	CYT
PFREUD_08540		Conserved protein, DUF143 domain	PPA0837	CYT
PFREUD_08600		Hypothetical protein	PPA0891	CYT
PFREUD_08610	leuS	Leucyl-tRNA synthetase (Leucine--tRNA ligase) (LeuRS)	PPA0893	CYT
PFREUD_08620	pyrC	Dihydroorotase multifunctional complex type (dihydroorotase)	PPA0998	CYT
PFREUD_08630	PPA0888	NAD-dependent malic enzyme (NAD-ME) (Malate dehydrogenase)	PPA0888	CYT
PFREUD_08660	holA	DNA polymerase III, delta subunit	PPA0897	CYT
PFREUD_08680	rpsT	30S Ribosomal protein S20p	PPA0898	CYT
PFREUD_08710	lepA	GTP-binding protein LepA	PPA0901	CYT
PFREUD_08720	hemM	Coproporphyrinogen oxidase / Oxygen-independent coproporphyrinogen III oxidase	PPA0911	CYT
PFREUD_08730		Hypothetical protein	PPA0912	CYT
PFREUD_08740		inositol-phosphate phosphatase	PPA0913	CYT
PFREUD_08750	hrcA	Heat-inducible transcription repressor hrcA	PPA0915	CYT
PFREUD_08760	dnaj3	Chaperone protein dnaj 3 (DnaJ3 protein) (Heat shock protein 40 3)	PPA0916	CYT
PFREUD_08770		Hypothetical protein	PPA0917	CYT
PFREUD_08790		Queueine tRNA-ribosyltransferase	PPA0924	CYT
PFREUD_08810	pip2	Proline iminopeptidase	PPA0932	CYT
PFREUD_08840	phoH	Phosphate starvation-inducible protein PhoH-like protein	PPA0936	CYT
PFREUD_08850		Hypothetical protein	PPA0937	CYT
PFREUD_08870	era	GTP-binding protein	PPA0939	CYT
PFREUD_08910		Metal-dependent hydrolase	PPA0940	CYT
PFREUD_08920	leuA1	2-isopropylmalate synthase	PPA0941	CYT
PFREUD_08930		Hypothetical protein	PPA0409	CYT
PFREUD_08940	uppS2	Undecaprenyl diphosphate synthase (di-trans,poly- cis-decaprenylcistransferase)	PPA0942	CYT
PFREUD_08950	recO	DNA repair protein recO (Recombination protein O)	PPA0944	CYT
PFREUD_09130	pduP	CoA-dependent propionaldehyde dehydrogenase PduP	PPA1741	CYT
PFREUD_09190	glyQS	Glycyl-tRNA synthetase (Glycine--tRNA ligase) (GlyRS)	PPA0949	CYT
PFREUD_09250	sdhA	Succinate dehydrogenase, subunit A	PPA0951	CYT
PFREUD_09260	sdhB	Succinate dehydrogenase, subunit B	PPA0952	CYT
PFREUD_09280	dgt	Deoxyguanosinetriphosphate triphosphohydrolase (dGTPase)	PPA0955	CYT
PFREUD_09320	cof	Cof-like hydrolase	PPA0973	CYT
PFREUD_09340	moxR	ATPases MoxR family	PPA0974	CYT
PFREUD_09350		Hypothetical protein	PPA0975	CYT
PFREUD_09380		alanine racemase	PPA0978	CYT
PFREUD_09400		Hypothetical protein	PPA0979	CYT
PFREUD_09410	fabF (fabB)	3-oxoacyl-[acyl-carrier-protein] synthase (Beta- ketoacyl-ACP synthase)	PPA0980	CYT
PFREUD_09420	acpP	Acyl carrier protein (ACP)	PPA0982	CYT
PFREUD_09440	pf3004	Carboxylic ester hydrolase	PPA0984	CYT
PFREUD_09450		Hypothetical protein	PPA0988	CYT
PFREUD_09470	aceE	dehydrogenase E1 component (2-oxo-acid dehydrogenase E1 subunit, homodimeric type)	PPA0989	CYT
PFREUD_09480		Hypothetical protein	PPA0991	CYT
PFREUD_09550	fnk	fructosamine kinase	PPA1005	CYT
PFREUD_09580	prfB	Peptide chain release factor 2 (RF-2)	PPA1354	CYT
PFREUD_09590	ftsE	ABC transporter, ATP-binding protein	PPA1353	CYT
PFREUD_09630	smgB	SmpB SsrA-binding protein	PPA1351	CYT
PFREUD_09650		Hypothetical protein	PPA1339	CYT
PFREUD_09660		two-component system response regulator	PPA1338	CYT
PFREUD_09670	prt	phosphoribosyltransferase	PPA1335	CYT
PFREUD_09680		ribosomal S30AE, sigma 54 modulation protein	PPA1334	CYT
PFREUD_09690		Preprotein translocase SecA subunit	PPA1333	CYT
PFREUD_09710		Hypothetical protein	PPA1331	CYT
PFREUD_09730		Hypothetical protein	PPA1330	CYT
PFREUD_09740	PPA1328	Predicted metal-dependent phosphoesterase	PPA1328	CYT
PFREUD_09750	trpS	Tryptophanyl-tRNA synthetase	PPA1327	CYT
PFREUD_09760		DEAD/DEAH box helicase domain protein	PPA1325	CYT
PFREUD_09780		Hypothetical protein	PPA1323	CYT
PFREUD_09810		ATP-dependent DNA helicase	PPA1320	CYT
PFREUD_09820	urvD	UvrD/REP helicase / ATP-dependent DNA helicase	PPA1319	CYT
PFREUD_09840	recD	Probable exodeoxyribonuclease V alpha chain RecD	PPA1317	CYT
PFREUD_09850	recB	Exodeoxyribonuclease V beta chain RecB	PPA1316	CYT
PFREUD_09860	recC	Exodeoxyribonuclease V gamma subunit RecC	PPA1315	CYT
PFREUD_09880	uvrD	DNA helicase	PPA1314	CYT
PFREUD_09910		metal dependant hydrolase	PPA1312	CYT
PFREUD_09920		Hypothetical protein	PPA1311	CYT
PFREUD_09950		Hypothetical protein	PPA1309	CYT
PFREUD_09970		Zn dependant peptidase	PPA0122	CYT
PFREUD_09990	pip1	Proline iminopeptidase	PPA2174	CYT
PFREUD_10000		acetyltransferase	PPA0096	CYT
PFREUD_10010	bioB	Biotin synthase	PPA1407	CYT
PFREUD_10060		ATP-binding ABC transporter protein	PPA1274	CYT
PFREUD_10070		ABC transporter ATP-binding protein	PPA1273	CYT
PFREUD_10080		D-3-phosphoglycerate dehydrogenase / erythronate 4-phosphate dehydrogenase	PPA1272	CYT
PFREUD_10160		monophosphatase	PPA1271	CYT
PFREUD_10170	engC	GTPase	PPA1269	CYT
PFREUD_10180	aroA	3-phosphoshikimate 1-carboxyvinyltransferase (phosphoenolpyruvate:3-phosphoshikimate5-O-(1- carboxyvinyl)-transferase) (EPSP synthase)	PPA1268	CYT
PFREUD_10200	rpoE	RNA polymerase sigma -70 factor, sigma-E factor	PPA1266	CYT
PFREUD_10210		anti-sigma factor	PPA2382	CYT
PFREUD_10230		Sensory transduction histidine kinase	PPA1265	CYT
PFREUD_10250	odhA	2-oxoglutarate dehydrogenase, E1 and E2 components	PPA1261	CYT
PFREUD_10300	lysA	Diaminopimelate decarboxylase (DAP decarboxylase)	PPA1259	CYT
PFREUD_10320	thrA/hom	Homoserine dehydrogenase	PPA1258	CYT
PFREUD_10340		Transcription termination factor Rho	PPA1254	CYT
PFREUD_10350	rpmE	50S ribosomal protein L31	PPA1253	CYT
PFREUD_10360	prfA	Peptide chain release factor 1 (RF-1)	PPA1252	CYT
PFREUD_10370	hemK	Methylase	PPA1250	CYT
PFREUD_10460	atpH	ATP synthase delta chain	PPA1242	CYT
PFREUD_10470	atpA	ATP synthase subunit alpha (ATPase subunit alpha) (ATP synthase F1 sector subunit alpha)	PPA1241	CYT
PFREUD_10480	atpG	ATP synthase gamma chain (ATP synthase F1 sector gamma subunit)	PPA1240	CYT
PFREUD_10490	atpD	ATP synthase subunit beta (ATPase subunit beta) (ATP synthase F1 sector subunit beta)	PPA1239	CYT
PFREUD_10530		Cobalamin adenosyltransferase	PPA1236	CYT
PFREUD_10540	pf1509	Putative carboxylic ester hydrolase	PPA1101	CYT

PFREUD_10560		Nuclease of the RecB family	PPA1102	CYT
PFREUD_10590		Methylmalonyl-CoA epimerase	PPA1104	CYT
PFREUD_10600	trxA3	Thioredoxin	PPA1106	CYT
PFREUD_10610	pgm1	Phosphoglucomutase	PPA1105	CYT
PFREUD_10620		NUDIX hydrolase	PPA1110	CYT
PFREUD_10630	glgB	1,4-alpha-glucan branching enzyme (Glycogen branching enzyme) (BE) (1,4-alpha-D-glucan:1,4-alpha-D- glucan 6 glucosyl- transferase)	PPA1111	CYT
PFREUD_10640	PPA1112	Uncharacterized protein probably involved in trehalose biosynthesis	PPA1112	CYT
PFREUD_10650	treS	Trehalose synthase	PPA1113	CYT
PFREUD_10660	glgE	Glycosyl hydrolase, family 13 (putative alpha- amylase, catalytic domain)	PPA1114	CYT
PFREUD_10700	glgX/treX	Glycogen debranching enzyme GlgX Isoamylase	PPA1115	CYT
PFREUD_10710	trmU	tRNA (5-methylaminomethyl-2-thiouridylate)- methyltransferase	PPA1117	CYT
PFREUD_10720	metE	Methionine synthase, vitamin-B12 independent	PPA1118	CYT
PFREUD_10740		Amino acid-binding ACT	PPA1121	CYT
PFREUD_10750	gatC	Glutamyl-tRNA(Gln) amidotransferase subunit C (Aspartyl/glutamyl-tRNA(Asn/Gln) amidotransferase subunit C)	PPA1122	CYT
PFREUD_10760	gatA	Glutamyl-tRNA(Gln) amidotransferase subunit A (Glu-ADT subunit A)	PPA1123	CYT
PFREUD_10770	gatB	Aspartyl/glutamyl-tRNA(Asn/Gln) amidotransferase subunit B (Asp/Glu-ADT subunit B)	PPA1124	CYT
PFREUD_10890	lpd	Dihydrolipoyl dehydrogenase (E3 component of alpha keto acid dehydrogenase complexes) (Dihydrolipoamide dehydrogenase)	PPA1227	CYT
PFREUD_10900	MurA	UDP-N-acetylglucosamine 1- carboxyvinyltransferase (Enoylpyruvate transferase)	PPA1226	CYT
PFREUD_10910	pdxY	Pyridoxal kinase	PPA1225	CYT
PFREUD_10930	glpQ	glycerophosphoryl diester phosphodiesterase	PPA1224	CYT
PFREUD_10940		Hypothetical protein	PPA1223	CYT
PFREUD_10950	dpm	dolichyl-phosphate beta-D-mannosyltransferase	PPA1222	CYT
PFREUD_10980		AsnC-family transcriptional regulatory protein	PPA1220	CYT
PFREUD_11050	luxS	S-ribosylhomocysteine lyase (Autoinducer-2 production protein luxS) (AI-2 synthesis protein)	PPA0450	CYT
PFREUD_11250		Hypothetical protein	PPA1342	CYT
PFREUD_11260	engA	GTP binding protein	PPA1210	CYT
PFREUD_11270	cmk	Cytidylate kinase (CK) (Cytidine monophosphate kinase) (CMP kinase)	PPA1209	CYT
PFREUD_11280	tyrA	Prephenate dehydrogenase	PPA1208	CYT
PFREUD_11290	prcA	20S proteasome alpha-subunit	PPA1207	CYT
PFREUD_11300	pcrB	20S proteasome beta-subunit	PPA1206	CYT
PFREUD_11350		Hypothetical protein	PPA1200	CYT
PFREUD_11370	rpe	Ribulose-phosphate 3-epimerase	PPA1199	CYT
PFREUD_11380		Sun, tRNA and rRNA cytosine-C5-methylases	PPA1196	CYT
PFREUD_11390	fmt	Methionyl-tRNA formyltransferase	PPA1195	CYT
PFREUD_11400	priA	Primosomal protein N	PPA1194	CYT
PFREUD_11410	metK	S-adenosylmethionine synthetase (Methionine adenosyltransferase) (AdoMet synthetase) (MAT)	PPA1193	CYT
PFREUD_11420	rpoZ	DNA-directed RNA polymerase omega chain (RNAP omega subunit) (Transcriptase omega chain) (RNA polymerase omega subunit)	PPA1191	CYT
PFREUD_11430	gmk	Guanylate kinase , Guanosine monophosphate kinase (GMP kinase)	PPA1190	CYT
PFREUD_11440	mihF	Integration host factor MihF	PPA1189	CYT
PFREUD_11470	carB (pyrA)	Carbamoyl-phosphate synthase large chain (Carbamoyl- phosphate synthetase ammonia chain)	PPA1000	CYT
PFREUD_11480	carA	Carbamoyl-phosphate synthase small chain	PPA0999	CYT
PFREUD_11530	aroF	Chorismate synthase (5-enolpyruvylshikimate-3- phosphate phospholyase)	PPA1182	CYT
PFREUD_11560	alaS	Alanyl-tRNA synthetase (Alanine--tRNA ligase) (AlaRS)	PPA1178	CYT
PFREUD_11570	ldh1	L-Lactate dehydrogenase	PPA1952	CYT
PFREUD_11580		Uncharacterized ATPase related to the helicase subunit of the holliday junction resolvase	PPA1176	CYT
PFREUD_11590	aspS	Aspartyl-tRNA synthetase (Aspartate--tRNA ligase) (AspRS)	PPA1175	CYT
PFREUD_11600		Hypothetical protein	PPA1174	CYT
PFREUD_11620	hisS	Histidyl-tRNA synthetase (Histidine--tRNA ligase) (HisRS)	PPA1169	CYT
PFREUD_11630		Beta-lactamase-like	PPA1168	CYT
PFREUD_11640		Hypothetical protein	PPA1167	CYT
PFREUD_11650	relA	GTP pyrophosphokinase	PPA1166	CYT
PFREUD_11660	apt	Adenine phosphoribosyltransferase (AMP:diphosphate phospho-D-ribosyltransferase)	PPA1164	CYT
PFREUD_11700	ruvB	Holliday junction ATP-dependent DNA helicase	PPA1160	CYT
PFREUD_11710	ruvA	Holliday junction ATP-dependent DNA helicase	PPA1159	CYT
PFREUD_11720	ruvC	Crossover junction endodeoxyribonuclease (Holliday junction nuclease) (Holliday junction resolvase)	PPA1158	CYT
PFREUD_11730		Hypothetical protein	PPA1157	CYT
PFREUD_11750	hisA	Phosphoribosyl isomerase A (1-(5-phosphoribosyl)- 5-[(5- phosphoribosylamino)methylideneamino] imidazole-4-carboxamide isomerase) (Phosphoribosylformimino-5- aminoimidazole carboxamide ribotide isomerase) (N-(5 - phosphoribosyl)anthranilate isomerase) (PRAI)	PPA1156	CYT
PFREUD_11760	hisH	Imidazole glycerol phosphate synthase subunit hisH (IGP synthase glutamine amidotransferase subunit) (IGP synthase subunit hisH) (ImGP synthase subunit hisH) (IGPS subunit hisH)	PPA1155	CYT
PFREUD_11770	hisB	Imidazoleglycerol-phosphate dehydratase (IGPD)	PPA1154	CYT
PFREUD_11780	hisC	Histidinol-phosphate aminotransferase (Imidazole acetol- phosphate transaminase)	PPA1153	CYT
PFREUD_11790	hisD	Histidinol dehydrogenase (HDH)	PPA1152	CYT
PFREUD_11810	ybaK/EbsC	YbaC/EbsC protein	PPA2262	CYT
PFREUD_11830	dnaE1	DNA polymerase III alpha subunit	PPA1150	CYT
PFREUD_11850	gltD	Glutamate synthase small subunit	PPA1135	CYT
PFREUD_11860	gltB	Glutamate synthase large subunit (Ferrodoxin)	PPA1134	CYT
PFREUD_11890	trpB	Tryptophan synthase beta chain (TrpB)	PPA1131	CYT
PFREUD_11900	trpC	Indole-3-glycerol phosphate synthase (TrpC)	PPA1130	CYT
PFREUD_11920	hisI2	Phosphoribosyl-AMP cyclohydrolase	PPA1126	CYT
PFREUD_11930		Hypothetical protein	PPA1125	CYT
PFREUD_11940	glnS	Glutaminyl-tRNA synthetase	PPA1870	CYT
PFREUD_11990		Hypothetical protein	PPA1099	CYT
PFREUD_12020		SuaS_yciO_yrdC	PPA1092	CYT
PFREUD_12040	pfp (pfk)	pyrophosphate phosphofructokinase	PPA1090	CYT
PFREUD_12060		Hypothetical protein	PPA0959	CYT
PFREUD_12070	hrdD1	RNA polymerase principal sigma factor HrdD	PPA0958	CYT
PFREUD_12080	dnaG1	DNA primase	PPA0957	CYT
PFREUD_12170	otsA	Trehalose-6-phosphate synthase (Alpha,alpha- trehalose-phosphate synthase)	PPA0961	CYT
PFREUD_12190	cbiB/cobD	CbiB/CobD	PPA0418	CYT
PFREUD_12200	cbiP/cobQ	Cobyrlic acid synthase CbiP/CobQ	PPA0419	CYT
PFREUD_12210	cobA2	Cob(I)alamin adenosyltransferase	PPA0437	CYT
PFREUD_12300	gcvP	Glycine dehydrogenase [decarboxylating] (Glycine decarboxylase) (Glycine cleavage system P-protein)	PPA0742	CYT
PFREUD_12320			PPA1086	CYT
PFREUD_12330	merR1	Transcriptional regulator, MerR	PPA1085	CYT
PFREUD_12340		Forkhead-associated protein	PPA1084	CYT
PFREUD_12350	gcvH	Glycine cleavage H-protein (lipoate-binding)	PPA0743	CYT
PFREUD_12440	thrS	Threonyl-tRNA synthetase (Threonine--tRNA ligase) (ThrRS)	PPA1076	CYT

PFREUD_12500		Hypothetical protein	PPA1066	CYT
PFREUD_12520	msrB	L-methionine (S)-S-oxide reductase	PPA1065	CYT
PFREUD_12530	ybaK	YbaK / prolyl-tRNA synthetases	PPA2186	CYT
PFREUD_12540		Hypothetical protein	PPA1064	CYT
PFREUD_12550	rnd	Ribonuclease D (3'-5' exonuclease)	PPA1063	CYT
PFREUD_12560	dxs	Deoxyxylulose-5-phosphate synthase	PPA1062	CYT
PFREUD_12590	acn	Aconitase, Aconitate hydratase	PPA1061	CYT
PFREUD_12680		SAM-dependent methyltransferase related to tRNA (tRNA (uracil-5-)-methyltransferase)	PPA1060	CYT
PFREUD_12700	TrkA	Trk system potassium uptake protein TrkA	PPA1058	CYT
PFREUD_12710	trkA (ceoC)	Trk system potassium uptake protein TrkA (K(+)- uptake protein TrkA)	PPA1057	CYT
PFREUD_12720		Nucleic acid binding, OB-fold, tRNA/helicase- type	PPA1056	CYT
PFREUD_12770		Type I phosphodiesterase / nucleotide pyrophosphatase	PPA1048	CYT
PFREUD_12780		Hypothetical protein	PPA1047	CYT
PFREUD_12790		Hypothetical protein	PPA1046	CYT
PFREUD_12800	gyrA2	DNA gyrase subunit A (DNA topoisomerase (ATP- hydrolysing))	PPA1045	CYT
PFREUD_12810	panE	2-dehydropanoate 2-reductase	PPA0985	CYT
PFREUD_12820	gyrB1	DNA gyrase subunit B	PPA1042	CYT
PFREUD_12840	ldh2	L-lactate dehydrogenase	PPA0887	CYT
PFREUD_12850	hrdB	RNA polymerase principal sigma factor HrdB	PPA1032	CYT
PFREUD_12860	hrdD2	RNA polymerase principal sigma factor HrdD	PPA1031	CYT
PFREUD_12910	pf1637	Putative carboxylic ester hydrolase	PPA1030	CYT
PFREUD_12920	hrpA2	ATP-dependent helicase HrpA	PPA1029	CYT
PFREUD_12960	deoR2	DeoR transcriptional regulator	PPA2306	CYT
PFREUD_12970	glpC	Anaerobic glycerol-3-phosphate dehydrogenase subunit C	PPA2248	CYT
PFREUD_12980	glpB	Anaerobic glycerol-3-phosphate dehydrogenase subunit B	PPA2249	CYT
PFREUD_12990	glpA	Anaerobic glycerol-3-phosphate dehydrogenase subunit A	PPA2250	CYT
PFREUD_13010	nrdJ	Vitamin B12-dependent ribonucleotide reductase (Ribonucleoside-diphosphate reductase NrdJ)	PPA1026	CYT
PFREUD_13020	nrdR	Transcriptional repressor nrdR	PPA1025	CYT
PFREUD_13050	dinG	ATP-dependent helicase	PPA1022	CYT
PFREUD_13060		FeoB, Ferrous iron transport protein B	PPA1021	CYT
PFREUD_13070	dapF	Diaminopimelate epimerase	PPA1020	CYT
PFREUD_13080	miaA	TRNA isopentenyltransferase	PPA1019	CYT
PFREUD_13090	miaB1	2-methylthioadenine synthetase MiaB protein	PPA1017	CYT
PFREUD_13130	recA	RecA (Recombinase A)	PPA1012	CYT
PFREUD_13140		Hypothetical protein	PPA1011	CYT
PFREUD_13180	cinA	CinA, Competence-damaged protein	PPA1008	CYT
PFREUD_13200	miaB2	2-methylthioadenine synthetase MiaB protein	PPA1006	CYT
PFREUD_13220	thiL	Thiamine monophosphate kinase	PPA1357	CYT
PFREUD_13250	ddlA	D-alanine--D-alanine ligase (D-alanylalanine synthetase)	PPA1359	CYT
PFREUD_13260	plsC1	1-acylglycerol-3-phosphate O-acyltransferase	PPA1360	CYT
PFREUD_13290	iclR	IclR transcriptional regulator	PPA1364	CYT
PFREUD_13330	PPA1366	Putative 2-hydroxyhepta-2,4-diene-1,7-dioate isomerase	PPA1366	CYT
PFREUD_13350	ilvE (bcaT)	Branched-chain amino acid aminotransferase	PPA1368	CYT
PFREUD_13390	ilvC	Ketol-acid reductoisomerase (Acetohydroxy-acid isomeroeductase) (Alpha-keto-beta-hydroxylacil reductoisomerase)	PPA1372	CYT
PFREUD_13430	hisF	Imidazole glycerol phosphate synthase subunit HisF	PPA1376	CYT
PFREUD_13460		Superfamily II RNA helicase	PPA1377	CYT
PFREUD_13470	cof2	Cof protein:HAD-superfamily hydrolase subfamily IIB	PPA0211	CYT
PFREUD_13530		Regulatory protein	PPA1381	CYT
PFREUD_13540		DeoR-family transcriptional regulator	PPA1382	CYT
PFREUD_13550	gluQ	Glutamyl-Q tRNA(Asp) synthetase (Glu-Q-RSs), Glutamyl-Q tRNA(Asp) synthetase	PPA1383	CYT
PFREUD_13580	rluB	Pseudouridine synthase	PPA1385	CYT
PFREUD_13620		ATPase involved in cell division	PPA1387	CYT
PFREUD_13630	xerD	Site-specific recombinase	PPA1388	CYT
PFREUD_13640	nudF	ADP-ribose pyrophosphatase	PPA1389	CYT
PFREUD_13650	pyrG	CTP synthase (UTP--ammonia ligase) (CTP synthetase)	PPA1390	CYT
PFREUD_13660	recN	DNA repair protein	PPA1394	CYT
PFREUD_13670	ppnK	Probable inorganic polyphosphate/ATP-NAD kinase (Poly(P)/ATP NAD kinase)	PPA1395	CYT
PFREUD_13730	nagD	Phosphatase	PPA1401	CYT
PFREUD_13930	tyrS	Tyrosyl-tRNA synthetase (Tyrosine--tRNA ligase) (TyrRS)	PPA1404	CYT
PFREUD_13940	argH	Argininosuccinate lyase (Arginosuccinase)	PPA1346	CYT
PFREUD_13950	argR	Arginine repressor, ArgR	PPA0586	CYT
PFREUD_13960	argD	Acetylornithine and succinylornithine aminotransferase (ACOAT)	PPA1347	CYT
PFREUD_13970	argB	Acetylglutamate kinase	PPA1348	CYT
PFREUD_13990	argC	N-acetyl-gamma-glutamyl-phosphate reductase (AGPR) (N- acetyl-glutamate semialdehyde dehydrogenase) (NAGSA dehydrogenase)	PPA1350	CYT
PFREUD_14010	pheT	Phenylalanyl-tRNA synthetase beta chain (Phenylalanine-- tRNA ligase beta chain) (PheRS)	PPA1408	CYT
PFREUD_14020	pheS	Phenylalanyl-tRNA synthetase alpha chain (Phenylalanine--tRNA ligase alpha chain) (PheRS)	PPA1409	CYT
PFREUD_14040	spoU1	rRNA methylase	PPA1410	CYT
PFREUD_14050	rplT	50S ribosomal protein L20	PPA1412	CYT
PFREUD_14060	rplM	50S ribosomal protein L35	PPA1413	CYT
PFREUD_14070	infC	Translation initiation factor IF-3	PPA1414	CYT
PFREUD_14100	hisG	ATP phosphoribosyltransferase	PPA1417	CYT
PFREUD_14110	hisE	Phosphoribosyl-ATP pyrophosphohydrolase	PPA1418	CYT
PFREUD_14140		oxidoreductase	PPA1422	CYT
PFREUD_14230	dprA	DNA processing / uptake protein	PPA1429	CYT
PFREUD_14240	chlI	Magnesium chelatase, subunit ChlI	PPA1430	CYT
PFREUD_14260		Hypothetical protein	PPA1432	CYT
PFREUD_14270	rnhB	Ribonuclease HII	PPA1433	CYT
PFREUD_14290	rplS	50S ribosomal protein L19	PPA1435	CYT
PFREUD_14300	sdhB3	Succinate dehydrogenase	PPA1437	CYT
PFREUD_14340	trmD	tRNA (guanine-N1-)-methyltransferase / S- adenosyl-L-methionine:tRNA (guanine-N1-)- methyltransferase	PPA1440	CYT
PFREUD_14350	rimM	16S rRNA processing protein	PPA1441	CYT
PFREUD_14360		Hypothetical protein	PPA1442	CYT
PFREUD_14380		Metallo-dependent hydrolases, subgroup A	PPA1444	CYT
PFREUD_14390	ffh	GTP binding signal recognition particle protein	PPA1445	CYT
PFREUD_14440	mutM3	Formamidopyrimidine-DNA glycosylase (Fapy-DNA glycosylase) (DNA-(apurinic or apyrimidinic site) lyase mutM) (AP lyase mutM)	PPA1451	CYT
PFREUD_14470		Hypothetical protein	PPA1453	CYT
PFREUD_14480	coaD	Phosphopantetheine adenyltransferase (Pantetheine- phosphate adenyltransferase) (PPAT) (Dephospho-CoA pyrophosphorylase)	PPA1463	CYT
PFREUD_14490		Methylase	PPA1464	CYT
PFREUD_14500		Hypothetical protein	PPA1465	CYT

PFREUD_14510	recG	ATP-dependent DNA helicase RecG	PPA1466	CYT
PFREUD_14530		Beta-lactamase-like:RNA-metabolising metallo- beta-lactamase	PPA1467	CYT
PFREUD_14560	dapB	Dihydrodipicolinate reductase (DHPR)	PPA1470	CYT
PFREUD_14570	pnpA	Polyribonucleotide nucleotidyltransferase (Polynucleotide phosphorylase) (PNPase) (Guanosine pentaphosphate synthetase)	PPA1471	CYT
PFREUD_14580	rpsO	30S ribosomal protein S15	PPA1472	CYT
PFREUD_14600	glpK	Glycerol kinase (ATP:glycerol 3- phosphotransferase) (Glycerokinase) (GK)	PPA2304	CYT
PFREUD_14620	truB	tRNA pseudouridine synthase B (tRNA pseudouridine 55 synthase)	PPA1478	CYT
PFREUD_14630	rbfA	Ribosome-binding factor A	PPA1489	CYT
PFREUD_14640	infB	Translation initiation factor IF-2	PPA1493	CYT
PFREUD_14660	nusA	Transcription termination/ antitermination factor NusA	PPA1494	CYT
PFREUD_14670		Hypothetical protein	PPA1495	CYT
PFREUD_14690	proS	Prolyl-tRNA synthetase (Proline--tRNA ligase) (ProRS)	PPA1499	CYT
PFREUD_14700		Acetyltransferase family protein	PPA1505	CYT
PFREUD_14710	ispG	4-hydroxy-3-methylbut-2-en-1-yl diphosphate synthase (1- hydroxy-2-methyl-2-(E)-butenyl 4-diphosphate synthase)	PPA1506	CYT
PFREUD_14720	dxr	1-deoxy-D-xylulose 5-phosphate reductoisomerase (DXP reductoisomerase) (1-deoxyxylulose-5-phosphate reductoisomerase) (2-C- methyl-D-erythritol 4-phosphate synthase)	PPA1510	CYT
PFREUD_14730		Hypothetical protein	PPA1514	CYT
PFREUD_14750	frr	Ribosome recycling factor (Ribosome-releasing factor) (RRF)	PPA1518	CYT
PFREUD_14760	pyrH	Uridylate kinase PyrH	PPA1519	CYT
PFREUD_14770	tsf	Elongation factor Ts (EF-Ts)	PPA1520	CYT
PFREUD_14780	rpsB	30S ribosomal protein S2	PPA1521	CYT
PFREUD_14800	xerC	Integrase/recombinase	PPA1522	CYT
PFREUD_14810	def	Polypeptide deformylase	PPA1525	CYT
PFREUD_14820	spoU2	RRNA methylase family protein (TRNA/rRNA methyltransferase)	PPA1526	CYT
PFREUD_14840	PPA1530	ABC transporter ATP-binding protein	PPA1530	CYT
PFREUD_14850		Hypothetical protein	PPA1531	CYT
PFREUD_14860	inhA	Enoyl-[acyl-carrier-protein] reductase (NADH)	PPA1532	CYT
PFREUD_14870	fabG	3-oxoacyl-[acyl-carrier protein] reductase	PPA1533	CYT
PFREUD_14890	myrA	resistance protein	PPA1536	CYT
PFREUD_14910		ABC transporter ATP binding protein	PPA1538	CYT
PFREUD_14930	nifU1	Nitrogen-fixing NifU-like	PPA1544	CYT
PFREUD_14940	sufS	Cysteine desulphurases, SufS	PPA1545	CYT
PFREUD_14950	sufC	ABC-type transport system involved in Fe-S cluster assembly, ATPase component, SufC	PPA1546	CYT
PFREUD_14960		Dioxygenase	PPA1547	CYT
PFREUD_14970	sufD	FeS assembly protein SufD	PPA1548	CYT
PFREUD_14980	sufB	FeS assembly protein SufB	PPA1549	CYT
PFREUD_14990	arsR4	Transcriptional regulator, ArsR family	PPA1550	CYT
PFREUD_15030	pdxT	Glutamine amidotransferase subunit pdxT (Glutamine amidotransferase glutaminase subunit pdxT)	PPA0966	CYT
PFREUD_15040	pdxS	Pyridoxal biosynthesis lyase pdxS	PPA0965	CYT
PFREUD_15050		Transcriptional regulator	PPA0964	CYT
PFREUD_15060	zwf	Glucose-6-phosphate 1-dehydrogenase	PPA1563	CYT
PFREUD_15070	opcA	glucose 6-phosphate dehydrogenase effector OpcA	PPA1564	CYT
PFREUD_15080	devB	6-phosphogluconolactonase	PPA1565	CYT
PFREUD_15090		electron transport protein	PPA0820	CYT
PFREUD_15110	tpi1	triosephosphate isomerase 1	PPA0818	CYT
PFREUD_15120	pgk	Phosphoglycerate kinase	PPA0817	CYT
PFREUD_15130	gap	Glyceraldehyde-3-phosphate dehydrogenase / erythrose 4 phosphate dehydrogenase	PPA0816	CYT
PFREUD_15170		Hypothetical protein	PPA0815	CYT
PFREUD_15180		Hypothetical protein	PPA0814	CYT
PFREUD_15190		ATPase	PPA0813	CYT
PFREUD_15200	uvrC	UvrABC system protein C (Protein uvrC) (Excinuclease ABC subunit C)	PPA0812	CYT
PFREUD_15220		two-component response regulator	PPA0926	CYT
PFREUD_15230		ABC transporter, ATP-binding protein	PPA0927	CYT
PFREUD_15260	uvrA3	UvrABC system protein A (UvrA protein) (Excinuclease ABC subunit A)	PPA0807	CYT
PFREUD_15270		Hypothetical protein	PPA0806	CYT
PFREUD_15280		Beta-lactamase-like	PPA0805	CYT
PFREUD_15300	uvrB	UvrABC system protein B (Protein uvrB) (Excinuclease ABC subunit B)	PPA0803	CYT
PFREUD_15310	coaE	Dephospho-CoA kinase (Dephosphocoenzyme A kinase)	PPA0785	CYT
PFREUD_15330	rpsA	30S ribosomal protein S1	PPA0778	CYT
PFREUD_15340	gab	Aldehyde dehydrogenase (Succinate-semialdehyde dehydrogenase) (NAD-dependent aldehyde dehydrogenase)	PPA0079	CYT
PFREUD_15360	polA	Putative DNA polymerase I	PPA0774	CYT
PFREUD_15370		two-component system response regulator	PPA0772	CYT
PFREUD_15390	pyk1	Pyruvate kinase 1	PPA0769	CYT
PFREUD_15400	rluA	Pseudouridylate synthase, Uncharacterized RNA pseudouridine synthase	PPA0768	CYT
PFREUD_15420	dskA	Transcriptional regulators, TraR/DksA family	PPA0766	CYT
PFREUD_15430		Hypothetical protein	PPA0765	CYT
PFREUD_15450		Hypothetical protein	PPA0763	CYT
PFREUD_15460		Hypothetical protein	PPA0762	CYT
PFREUD_15470	ftsZ	Cell division protein FtsZ	PPA0761	CYT
PFREUD_15490	murC	UDP-N-acetylmuramate--L-alanine ligase (UDP-N- acetylmuramoyl-L-alanine synthetase)	PPA0759	CYT
PFREUD_15500	murG	UDP-N-acetylglucosamine--N-acetylmuramyl- (pentapeptide) pyrophosphoryl-undecaprenol N- acetylglucosamine transferase (Undecaprenyl-PP-MurNAc- pentapeptide-UDPGlcNAc GlcNAc transferase)	PPA0758	CYT
PFREUD_15520	murD	UDP-N-acetylmuramoylalanine--D-glutamate ligase (UDP-N- acetylmuramoyl-L-alanyl-D-glutamate synthetase) (D- glutamic acid- adding enzyme)	PPA0756	CYT
PFREUD_15540	murF	UDP-N-acetylmuramoyl-tripeptide--D-alanyl-D- alanine ligase (UDP- MurNAc-pentapeptide synthetase) (D- alanyl- D-alanine-adding enzyme)	PPA0754	CYT
PFREUD_15550	murE	UDP-N-acetylmuramoylalanyl-D-glutamate--2,6- diaminopimelate ligase (UDP-N-acetylmuramyl-tripeptide synthetase) (Meso- diaminopimelate-adding enzyme) (UDP- MurNAc-tripeptide synthetase)	PPA0753	CYT
PFREUD_15560	ftsI	Cell division protein FtsI (penicillin-binding protein 2) (Peptidoglycan glycosyltransferase)	PPA0752	CYT
PFREUD_15580	mraW	S-adenosyl-L-methionine-dependent methyltransferase mraW	PPA0750	CYT
PFREUD_15590	mraZ	Protein mraZ	PPA0749	CYT
PFREUD_15640	dnaE2	DNA polymerase III alpha subunit	PPA1650	CYT
PFREUD_15660		Helicase protein	PPA0733	CYT
PFREUD_15680		Farnesyltranstransferase / Geranylgeranyl pyrophosphate synthase	PPA0732	CYT
PFREUD_15710		Zn-dependent hydrolase, beta-lactamase fold	PPA0727	CYT
PFREUD_15720	aroH	Phospho-2-dehydro-3-deoxyheptonate aldolase	PPA0726	CYT
PFREUD_15740	plsC3	Acyltransferase PlsC	PPA0724	CYT
PFREUD_15770	ppiA (cypB)	Probable peptidyl-prolyl cis-trans isomerase A	PPA0718	CYT
PFREUD_15850	guaB3	Inosine-5 -monophosphate dehydrogenase (IMP dehydrogenase) (IMPDH) (IMPD) / GMP reductase	PPA0708	CYT

PFREUD_15860		HesB protein	PPA0700	CYT
PFREUD_15880		Hypothetical protein	PPA0699	CYT
PFREUD_15890	pspA	Phage shock protein A	PPA0698	CYT
PFREUD_15920		Hypothetical protein	PPA0696	CYT
PFREUD_15930	gcvT1	Glycine cleavage system T protein, aminomethyltransferase	PPA0744	CYT
PFREUD_15960		ABC transporter	PPA0682	CYT
PFREUD_15970		Glutamine synthetase	PPA0671	CYT
PFREUD_15990		Tetracycline repressor protein, TetR-family transcriptional regulator	PPA1406	CYT
PFREUD_16010	glnE	Glutamate-ammonia-ligase adenyllyltransferase ([Glutamate--ammonia-ligase] adenyllyltransferase) (Glutamine-synthetase adenyllyltransferase) (ATase)	PPA0666	CYT
PFREUD_16020		Hypothetical protein	PPA0665	CYT
PFREUD_16030	glnA	Glutamine synthetase	PPA0664	CYT
PFREUD_16060	map, mapB	Methionine aminopeptidase (MAP) (Peptidase M)	PPA0661	CYT
PFREUD_16080		Hypothetical protein	PPA0651	CYT
PFREUD_16090	pepP	Xaa-Pro aminopeptidase I	PPA0650	CYT
PFREUD_16110	citE	Citrate lyase beta chain (Citrate beta chain) (Citrate(Pro-3S)-lyase beta chain)	PPA1919	CYT
PFREUD_16120	mgtE	magnesium (Mg2+) transporter	PPA0647	CYT
PFREUD_16140	PF47	Protein mrp homolog (ATP-binding protein)	PPA0645	CYT
PFREUD_16150	tatB	Sec-independent protein translocase protein TatB precursor	PPA0643	CYT
PFREUD_16160	dapA	Dihydrodipicolinate synthase	PPA0642	CYT
PFREUD_16170		Methyltransferase	PPA0641	CYT
PFREUD_16180	glgC	Glucose-1-phosphate adenyllyltransferase (ADP- glucose synthase) (ADP-glucose pyrophosphorylase) (ADPGlc PPase)	PPA0640	CYT
PFREUD_16190	glgA	glycosyltransferase (glycogen synthase)	PPA0639	CYT
PFREUD_16200		Hypothetical protein	PPA0638	CYT
PFREUD_16240	dapE2	Succinyl-diaminopimelate desuccinylase	PPA0636	CYT
PFREUD_16250	dapD	2,3,4,5-tetrahydropyridine-2,6-dicarboxylate N- succinyltransferase	PPA0630	CYT
PFREUD_16270		aminotransferase	PPA0628	CYT
PFREUD_16280	fdxA	Ferredoxin	PPA0627	CYT
PFREUD_16290	gya	Glyoxylate reductase	PPA2251	CYT
PFREUD_16300	fumC	Fumarate hydratase, class-II	PPA2292	CYT
PFREUD_16320	aspA1	Aspartate ammonia-lyase (Aspartase)	PPA0094	CYT
PFREUD_16370		Acetyltransferase	PPA0624	CYT
PFREUD_16380	gpt	Putative purine phosphoribosyltransferase	PPA0623	CYT
PFREUD_16400		Hypothetical protein	PPA1744	CYT
PFREUD_16460		Hypothetical protein	PPA0587	CYT
PFREUD_16490	glxK/garK	Glycerate kinase GlxK/GarK	PPA2299	CYT
PFREUD_16550	thiG	Thiazole biosynthesis family protein	PPA0519	CYT
PFREUD_16570	dadA1	DadA, Glycine/D-amino acid oxidases	PPA0520	CYT
PFREUD_16930	ychF	GTPase YchF	PPA0575	CYT
PFREUD_16940	apeB	Aminopeptidase	PPA0574	CYT
PFREUD_16970	ispH (lytB)	4-hydroxy-3-methylbut-2-enyl diphosphate reductase	PPA0572	CYT
PFREUD_16980	xseA	Exodeoxyribonuclease VII large subunit	PPA0569	CYT
PFREUD_17010	uppS	Undecaprenyl pyrophosphate synthase (di- trans,poly-cis-decaprenylcistransferase)	PPA0564	CYT
PFREUD_17050	greA	Transcription elongation factor GreA	PPA0561	CYT
PFREUD_17060		Hypothetical membrane protein	PPA0920	CYT
PFREUD_17070		Hypothetical protein	PPA0560	CYT
PFREUD_17090	ung	Uracil-DNA glycosylase	PPA0558	CYT
PFREUD_17100	msrA	peptide-methionine (S)-S-oxide reductase	PPA0556	CYT
PFREUD_17180	mpg	3-methyladenine DNA glycosylase	PPA2247	CYT
PFREUD_17200		NUDIX hydrolase	PPA0550	CYT
PFREUD_17290	ppx	Ppx/GppA phosphatase family	PPA0548	CYT
PFREUD_17300		Hypothetical protein	PPA0547	CYT
PFREUD_17320	eno1	Enolase 1	PPA0545	CYT
PFREUD_17330		MazG-family transcriptional regulator	PPA0543	CYT
PFREUD_17350	mfd	Transcription-repair coupling factor	PPA0541	CYT
PFREUD_17370	pth	Peptidyl-tRNA hydrolase (aminoacyl-tRNA hydrolase)	PPA0536	CYT
PFREUD_17400	prs	Ribose-phosphate pyrophosphokinase	PPA0531	CYT
PFREUD_17440	pyrB	Aspartate carbamoyltransferase	PPA0997	CYT
PFREUD_17460	ispE	4-diphosphocytidyl-2-C-methyl-D-erythritol kinase (CMK) (4-(cytidine-5 -diphospho)-2-C-methyl-D- erythritol kinase)	PPA0527	CYT
PFREUD_17470	ksgA	Dimethyladenosine transferase (S- adenosylmethionine-6-N , N -adenosyl(rRNA) dimethyltransferase) (16S rRNA dimethylase) (High level kasugamycin resistance protein ksgA) (Kasugamycin dimethyltransferase)	PPA0526	CYT
PFREUD_17480	tatD	DNase	PPA0525	CYT
PFREUD_17490		Methylase	PPA0524	CYT
PFREUD_17610	gdh	glutamate dehydrogenase (NAD(P)-glutamate dehydrogenase)	PPA1513	CYT
PFREUD_17840	dnaK1	Chaperone protein dnaK 1 (Heat shock protein 70 1) (Heat shock 70 kDa protein 1) (HSP70 1	PPA2040	CYT
PFREUD_17920	clpB 2	Chaperone clpB 2 (ATP-dependent Clp protease B2) (Clp chaperone)	PPA2021	CYT
PFREUD_17990	rimJ	ribosomal-protein-alanine acetyltransferase	PPA0495	CYT
PFREUD_18000	moeA1	Molybdenum cofactor synthesis domain	PPA0494	CYT
PFREUD_18070	ugpA	UTP--glucose-1-phosphate uridylyltransferase	PPA0489	CYT
PFREUD_18140	trxA4	thiredoxine	PPA0487	CYT
PFREUD_18150	dtxR	Iron-dependent repressor	PPA0485	CYT
PFREUD_18160	serC	Phosphoserine aminotransferase (phosphoserine transaminase)	PPA0483	CYT
PFREUD_18200		Hypothetical protein	PPA0478	CYT
PFREUD_18210	cspB	Cold shock protein	PPA0477	CYT
PFREUD_18230		Hypothetical protein	PPA0474	CYT
PFREUD_18470	groL2 (groEL2) (hsp60)	60 kDa chaperonin 2 (Protein Cpn60 2) (groEL protein 2) (Heat shock protein 60 2)	PPA0453	CYT
PFREUD_18490	mana	Phosphomannose isomerase	PPA0451	CYT
PFREUD_18570	sdaA	L-serine dehydratase (L-serine ammonia-lyase)	PPA0396	CYT
PFREUD_18580		ABC transporter ATP-binding protein	PPA0395	CYT
PFREUD_18600		Hypothetical protein	PPA0386	CYT
PFREUD_18630		Hypothetical protein	PPA0169	CYT
PFREUD_18640		iron-sulfur protein	PPA0168	CYT
PFREUD_18650		Oxidoreductase	PPA0167	CYT
PFREUD_18680	cysS2	Cysteinylyl-tRNA synthetase (Cysteine--tRNA ligase)	PPA0384	CYT
PFREUD_18690		tRNA/rRNA methyltransferase	PPA0383	CYT
PFREUD_18730	ansA	L-asparaginase I	PPA0367	CYT
PFREUD_18740	glyA	Glycine hydroxymethyltransferase precursor	PPA0369	CYT
PFREUD_18750	ispF	2-C-methyl-D-erythritol 2,4-cyclodiphosphate synthase (MECP5) (MECDP-synthase)	PPA0354	CYT
PFREUD_18760	ispD	2-C-methyl-D-erythritol 4-phosphate cytidylyltransferase (4-diphosphocytidyl-2C-methyl-D- erythritol synthase) (MEP cytidylyltransferase) (MCT)	PPA0353	CYT

PFREUD_18770	carD	transcriptional regulator CarD	PPA0357	CYT
PFREUD_18780	regX	Response regulator receiver	PPA0359	CYT
PFREUD_18800	phoU	Putative phosphate transport system protein	PPA0361	CYT
PFREUD_18810	gpm2	phosphoglycerate mutase	PPA0364	CYT
PFREUD_18830	sdh	Serine 3-dehydrogenase	PPA0350	CYT
PFREUD_18840	bccp	Methylmalonyl-CoA carboxytransferase , 1.3S subunit (Transcarboxylase, 1.3S subunit). 123bp	PPA2005	CYT
PFREUD_18850		Hypothetical protein	PPA2006	CYT
PFREUD_18860	mmdA	Methylmalonyl-CoA carboxytransferase 12S subunit (EC2.1.3.1) (Transcarboxylase 12S subunit). 610 bp	PPA2007	CYT
PFREUD_18870		Methylmalonyl-CoA carboxytransferase 5S subunit. (transcarboxylase 5S) 505 bp	PPA2008	CYT
PFREUD_18880	hemL1	Glutamate-1-semialdehyde 2,1-aminomutase (GSA) (Glutamate-1-semialdehyde aminotransferase)(GSA-AT)	PPA0301	CYT
PFREUD_18910	hemB	Delta-aminolevulinic acid dehydratase (Porphobilinogen synthase)	PPA0302	CYT
PFREUD_18930	hemY	Protoporphyrinogen oxidase (PPO) HemY	PPA2095	CYT
PFREUD_18940		Fe-S oxidoreductase	PPA2096	CYT
PFREUD_18970	hemA	Glutamyl-tRNA reductase	PPA0307	CYT
PFREUD_19030	iolG1	iolG1 (Myo-inositol catabolism iolG1 protein) (myo-inositol 2-dehydrogenase)	PPA0469	CYT
PFREUD_19040	tal2	Transaldolase 2	PPA0454	CYT
PFREUD_19050		GntR-family protein transcriptional regulator	PPA0455	CYT
PFREUD_19060	iolC	iolC (Myo-inositol catabolism iolC protein)	PPA0456	CYT
PFREUD_19070		Hypothetical protein	PPA0457	CYT
PFREUD_19080	iolB	iolB (Myo-inositol catabolism iolB protein)	PPA0458	CYT
PFREUD_19090	iolD	iolD (Myo-inositol catabolism iolD protein) (acetolactate synthase protein) (pyruvate:pyruvate acetaldehydetransferase (decarboxylating))	PPA0459	CYT
PFREUD_19100	iolA (msdA)	iolA (Myo-inositol catabolism iolA protein) (Methylmalonic acid semialdehyde dehydrogenase)	PPA0461	CYT
PFREUD_19150	fba1	Fructose-bisphosphate aldolase class II	PPA2011	CYT
PFREUD_19230	speE	spermidine synthase	PPA2016	CYT
PFREUD_19280	purA	Adenylosuccinate synthetase (IMP--aspartate ligase) (AdSS) (AMPSase)	PPA1994	CYT
PFREUD_19310	iunH	Inosine/uridine-preferring nucleoside hydrolase (purine nucleosidase)	PPA2076	CYT
PFREUD_19430		Endoribonuclease L-PSP	PPA0221	CYT
PFREUD_19460	hslR	Ribosome-associated heat shock protein implicated in the recycling of the 50S subunit (S4 paralog)	PPA0202	CYT
PFREUD_19480		Phosphocarrier, HPr family	PPA0141	CYT
PFREUD_19560		Forkhead-associated protein	PPA0189	CYT
PFREUD_19630	galK2	Galactokinase	PPA2192	CYT
PFREUD_19640	nifU2	NifU-like protein	PPA1678	CYT
PFREUD_19710	mesJ	CMP/dCMP deaminase, zinc-binding	PPA2182	CYT
PFREUD_19730	upp	Uracil phosphoribosyltransferase (UMP pyrophosphorylase) (UPRTase)	PPA2184	CYT
PFREUD_19810	typA	GTP-binding protein typA/BipA (Tyrosine phosphorylated protein A)	PPA2003	CYT
PFREUD_19820	gcvT2	glycine cleavage T-protein, aminomethyl transferase	PPA0348	CYT
PFREUD_19830		Hypothetical protein	PPA0347	CYT
PFREUD_19860	dtb	D-tyrosyl-tRNA(Tyr) deacylase	PPA0346	CYT
PFREUD_19870	glnR	Transcriptional regulatory protein	PPA0344	CYT
PFREUD_19910	galE3	UDP-glucose 4-epimerase	PPA0069	CYT
PFREUD_19930	ppk	Polyphosphate kinase	PPA0343	CYT
PFREUD_19940		NUDIX hydrolase NTP pyrophosphohydrolases including oxidative damage repair enzymes	PPA0342	CYT
PFREUD_19980	pstB	Phosphate import ATP-binding protein pstB (Phosphate- transporting ATPase) (ABC phosphate transporter)	PPA0338	CYT
PFREUD_20050		Pyridine nucleotide-disulphide oxidoreductase	PPA0333	CYT
PFREUD_20060	pgm/fbp	phosphoglycerate mutase/Fructose-2,6- bisphosphatase	PPA0324	CYT
PFREUD_20070	hemD	Uroporphyrinogen-III synthase HemD	PPA0323	CYT
PFREUD_20090		Delta 1-pyrroline-5-carboxylate reductase	PPA0319	CYT
PFREUD_20130		endonuclease	PPA0315	CYT
PFREUD_20140		Hypothetical protein	PPA0314	CYT
PFREUD_20150	sms	DNA repair protein	PPA0312	CYT
PFREUD_20160	disA	DNA integrity scanning protein disA	PPA0311	CYT
PFREUD_20170	mutY	MutY, A/G-specific DNA glycosylase	PPA0300	CYT
PFREUD_20210		cobalt ABC transporter	PPA0288	CYT
PFREUD_20250	clpC	chaperone clpC (Clp-family ATP-binding protease) (ATP-dependent Clp protease ATP-binding subunit)	PPA0278	CYT
PFREUD_20260		Lsr2-like protein	PPA0277	CYT
PFREUD_20270	folK	Putative hydroxymethyldihydropteridine pyrophosphokinase	PPA0273	CYT
PFREUD_20280	folB	Dihydroneopterin aldolase	PPA0272	CYT
PFREUD_20290	folP2	Dihydropteroate synthase((2-amino-4-hydroxy-7,8- dihydropteridin-6- yl)methyl-diphosphate:4-aminobenzoate 2-amino-4-hydroxydihydropteridine-6-methenyltransferase)	PPA0271	CYT
PFREUD_20310	folE	GTP cyclohydrolase I (GTP-CH-I)	PPA0261	CYT
PFREUD_20330	hpt	hypoxanthine phosphoribosyltransferase	PPA0259	CYT
PFREUD_20340	tilS	TRNA(Ile)-lysidine synthetase	PPA0258	CYT
PFREUD_20380		Hypothetical protein	PPA0255	CYT
PFREUD_20390	sixA	phosphohistidine phosphatase	PPA0252	CYT
PFREUD_20440	mao	flavin-containing amine oxidase	PPA0250	CYT
PFREUD_20530	dnaX	DNA polymerase III, delta prime subunit	PPA0244	CYT
PFREUD_20540	tmk	Thymidylate kinase (dTMP kinase)	PPA0243	CYT
PFREUD_20550		Hypothetical protein	PPA0242	CYT
PFREUD_20560	topA	DNA topoisomerase I	PPA0241	CYT
PFREUD_20570		transferase	PPA0238	CYT
PFREUD_20600	dmsB	Anaerobic dimethyl sulfoxide reductase, chain B	PPA0516	CYT
PFREUD_20610	dmsA	Anaerobic dimethyl sulfoxide reductase chain A	PPA0517	CYT
PFREUD_20710		secretory protein	PPA0230	CYT
PFREUD_20720		Hypothetical protein	PPA0229	CYT
PFREUD_20770		Hypothetical protein	PPA2173	CYT
PFREUD_20800		Hypothetical protein	PPA2243	CYT
PFREUD_20810	dnaB	Replicative DNA helicase	PPA2244	CYT
PFREUD_20840	namA	NADH-dependent flavin oxidoreductase	PPA2118	CYT
PFREUD_21320	merA	Pyridine nucleotide-disulphide oxidoreductase	PPA1981	CYT
PFREUD_21390	modB	DNA methylase (site-specific DNA- methyltransferase adenine-specific, Putative type III restriction-modification system)	PPA1611	CYT
PFREUD_21400		Putative type III restriction enzyme	PPA1612	CYT
PFREUD_21440	ribH	6,7-dimethyl-8-ribityllumazine synthase (Riboflavin synthase beta chain)	PPA1749	CYT
PFREUD_21450	ribAB	GTP cyclohydrolase II protein, Riboflavin biosynthesis protein	PPA1750	CYT
PFREUD_21460	ribC (ribE)	Riboflavin synthase alpha chain	PPA1751	CYT
PFREUD_21470	ribD	Riboflavin-specific deaminase (diaminohydroxyphosphoribosylaminopyrimidine deaminase) (5- amino-6-(5-phosphoribosylamino)uracil reductase)	PPA1752	CYT
PFREUD_21660	rpiB3	Ribose-5-phosphate isomerase 3	PPA1624	CYT
PFREUD_21700		Hypothetical fusion protein	PPA1172	CYT
PFREUD_21760	moaE2, moaE	Molybdopterin synthase MoaE, Molybdenum cofactor biosynthesis protein E 2	PPA0500	CYT
PFREUD_21810	moaB (mog)	Molybdenum cofactor biosynthesis protein	PPA0513	CYT

PFREUD_21980		Two component transcriptional regulator, LuxR family	PPA0055	CYT
PFREUD_22110		Hypothetical protein	PPA0040	CYT
PFREUD_22160		Metal binding protein	PPA0443	CYT
PFREUD_22330		Aldose 1-epimerase	PPA2052	CYT
PFREUD_22340	uvrA4	Excinuclease ATPase subunit UvrA	PPA0877	CYT
PFREUD_22360	tkt	Transketolase	PPA2318	CYT
PFREUD_22370	araB	L-ribulokinase	PPA2319	CYT
PFREUD_22380	araM	L-arabinose utilization protein	PPA2320	CYT
PFREUD_22400	araB, xylB	Carbohydrate kinase	PPA2321	CYT
PFREUD_22410	araL	L-arabinose operon protein, hydrolase	PPA2322	CYT
PFREUD_22430	rpiB2	Ribose-5-phosphate isomerase 2	PPA2324	CYT
PFREUD_22450	deoR3	Putative regulatory protein, DeoR family	PPA2326	CYT
PFREUD_22470	dhaK/dhaL	Dihydroxyacetone kinase	PPA0622	CYT
PFREUD_22780	hsp20 1	Heat shock protein 20 1 (20 kDa chaperone 1)	PPA0737	CYT
PFREUD_22840		hexulose-6-phosphate isomerase	PPA0881	CYT
PFREUD_22860	pdxA2	4-hydroxythreonine-4-phosphate dehydrogenase	PPA0296	CYT
PFREUD_22890	nadE	Glutamine-dependent NAD(+) synthetase	PPA2266	CYT
PFREUD_22910		polar amino acid ABC transporter, ATP binding component	PPA0600	CYT
PFREUD_22960	pncA	pyrazinamidase/nicotinamidase	PPA0993	CYT
PFREUD_23000		Putative long-chain-fatty-acid--CoA ligase/synthetase	PPA2234	CYT
PFREUD_23010	nfo	endonuclease IV (deoxyribonuclease IV (phage-T4- induced))	PPA2235	CYT
PFREUD_23130	iolH	iolH (Myo-inositol catabolism IolH protein) (isomerase:epimerase)	PPA0465	CYT
PFREUD_23150	pf667	Carboxylic ester hydrolase	PPA0594	CYT
PFREUD_23160	ugpQ2	Glycerophosphoryl diester phosphodiesterase	PPA1839	CYT
PFREUD_23190		sugar (xylose) phosphate isomerase/epimerase	PPA0464	CYT
PFREUD_23200		Inositol 2-dehydrogenase	PPA0463	CYT
PFREUD_23210	lacI4	Transcriptional regulator, LacI family (HTH-type transcriptional regulator degA)	PPA0462	CYT
PFREUD_23300	proV	ABC-type glycine betaine transport, ATP-binding protein	PPA0407	CYT
PFREUD_23440	rpII	50S ribosomal protein L9	PPA2227	CYT
PFREUD_23450	rpsR	30S ribosomal protein S18	PPA2228	CYT
PFREUD_23460	ssb	Single-strand binding protein	PPA2229	CYT
PFREUD_23470	rpsF	30S ribosomal protein S6	PPA2230	CYT
PFREUD_23520		Hypothetical protein	PPA2231	CYT
PFREUD_23650		Hypothetical protein	PPA0125	CYT
PFREUD_23740	aglA	Alpha-1,4-glucosidase	PPA1630	CYT
PFREUD_23780	acs	Fatty-acyl-CoA synthase	PPA1724	CYT
PFREUD_23800	katA	Catalase	PPA0097	CYT
PFREUD_23890	fbA2	Fructose-bisphosphate aldolase class I	PPA2024	CYT
PFREUD_23910	glT1A1	Citrate synthase	PPA2272	CYT
PFREUD_23920	yghZ	Oxidoreductase	PPA0994	CYT
PFREUD_24000	fepC1	ABC transporter, iron transport ATPase protein	PPA0658	CYT
PFREUD_24040	pcnB	tRNA nucleotidyltransferase PcnB	PPA2301	CYT
PFREUD_24080	gpm1	phosphoglycerate mutase/fructose-2,6- bisphosphatase	PPA0809	CYT
PFREUD_24100	trxB	Thioredoxin reductase	PPA2309	CYT
PFREUD_24120	osmC	OsmC protein	PPA2313	CYT
PFREUD_24140	parB	chromosome partitioning protein	PPA2341	CYT
PFREUD_24220		Hypothetical protein	PPA2353	CYT
PFREUD_00300	iolT2	iolT2 (myo-inositol transporter iolT2)	PPA0467	MEMBRANE
PFREUD_00380	cycA2	D-serine/D-alanine/glycine transporter	PPA2269	MEMBRANE
PFREUD_00960	hflC1	Stomatin/prohibitin homolog	PPA1973	MEMBRANE
PFREUD_01640		two component sensor kinase	PPA2027	MEMBRANE
PFREUD_01730	cydB	Cytochrome d ubiquinol oxidase, subunit II	PPA0175	MEMBRANE
PFREUD_02100		ABC-type transporter	PPA0179	MEMBRANE
PFREUD_02230	whiP	Hypothetical transmembrane protein	PPA0182	MEMBRANE
PFREUD_02360	galP	Sodium:galactoside symporter	PPA2331	MEMBRANE
PFREUD_02650		sugar transporter	PPA1822	MEMBRANE
PFREUD_03190	matE	Multi antimicrobial extrusion protein MatE	PPA2259	MEMBRANE
PFREUD_03280		ABC-type transport systems, periplasmic component	PPA1758	MEMBRANE
PFREUD_03300		ABC transporter, permease protein	PPA1760	MEMBRANE
PFREUD_03400	aroP	Aromatic amino acid transport protein aroP	PPA1069	MEMBRANE
PFREUD_03410		Cation-efflux transport protein	PPA1228	MEMBRANE
PFREUD_03570	PPA1043	Anaerobic C4-dicarboxylate transporter	PPA1043	MEMBRANE
PFREUD_03780		Hypothetical membrane protein	PPA0093	MEMBRANE
PFREUD_03890	mviN	Conserved membrane protein, MviN-like protein	PPA2147	MEMBRANE
PFREUD_03930		aminoacid permease	PPA0177	MEMBRANE
PFREUD_03990		transport protein	PPA2034	MEMBRANE
PFREUD_04230		Hypothetical protein	PPA2140	MEMBRANE
PFREUD_04490	PPA2042	Putative low-affinity phosphate transport protein	PPA2042	MEMBRANE
PFREUD_04500		Hypothetical protein	PPA2041	MEMBRANE
PFREUD_04570	cbiQ2	Cobalt transport protein CbiQ	PPA0433	MEMBRANE
PFREUD_04590	cbiM	Cobalt transport protein CbiM	PPA0430	MEMBRANE
PFREUD_04610	gnuT	Gluconate permease (transmembrane)	PPA0738	MEMBRANE
PFREUD_05020	czcD	Co/Zn/Cd cation transporter CzcD	PPA1951	MEMBRANE
PFREUD_05080	menA	1,4-dihydroxy-2-naphthoateoctaprenyltransferase	PPA1945	MEMBRANE
PFREUD_05120		Hypothetical membrane protein	PPA1941	MEMBRANE
PFREUD_05160	nuoA	NADH-quinone oxidoreductase chain	PPA1936	MEMBRANE
PFREUD_05230	nuoH	NADH-quinone oxidoreductase subunit H (NADH dehydrogenase I subunit H)	PPA1929	MEMBRANE
PFREUD_05250	nuoJ	NADH-quinone oxidoreductase chain J (NADH dehydrogenase I, chain J)	PPA1926	MEMBRANE
PFREUD_05260	nuoK	NADH dehydrogenase I chain K	PPA1925	MEMBRANE
PFREUD_05270	nuoL	NADH dehydrogenase (quinone)	PPA1924	MEMBRANE
PFREUD_05280	nuoM	NADH dehydrogenase I chain M	PPA1923	MEMBRANE
PFREUD_05290	nuoN	NADH dehydrogenase I chain N	PPA1922	MEMBRANE
PFREUD_05360		Hypothetical membrane protein	PPA1900	MEMBRANE
PFREUD_05950	oppC	ABC transporter, permease protein OppC	PPA2065	MEMBRANE
PFREUD_05970	secY	Preprotein translocase SecY subunit	PPA1835	MEMBRANE
PFREUD_06130		ABC transporter	PPA1816	MEMBRANE
PFREUD_06140	pf2694	ABC-type transporter, permease components	PPA1814	MEMBRANE
PFREUD_06160		ABC transporter-associated permease	PPA1812	MEMBRANE
PFREUD_06710	pspC	Possible stress-response transcriptional regulator protein PspC	PPA1763	MEMBRANE
PFREUD_06740		Hypothetical protein	PPA1762	MEMBRANE
PFREUD_07180		Hypothetical protein	PPA0667	MEMBRANE
PFREUD_07310	purE	Phosphoribosylaminoimidazole carboxylase catalytic subunit	PPA1701	MEMBRANE
PFREUD_07430		Cation transport protein	PPA1687	MEMBRANE
PFREUD_07900		Membrane protein	PPA1641	MEMBRANE

PFREUD_07920		Hypothetical membrane protein	PPA1640	MEMBRANE
PFREUD_07940	PPA1638	Putative ABC transporter	PPA1638	MEMBRANE
PFREUD_08220		Hypothetical membrane protein	PPA1574	MEMBRANE
PFREUD_08860		Hypothetical secreted protein	PPA0938	MEMBRANE
PFREUD_09240	sdhC1	Succinate dehydrogenase subunit C	PPA0950	MEMBRANE
PFREUD_09290		ABC-type transport system, permease component	PPA0956	MEMBRANE
PFREUD_09510		Amino acid permease. Membran protein	PPA0969	MEMBRANE
PFREUD_10050		Permease protein of oligopeptide ABC transporter	PPA1275	MEMBRANE
PFREUD_10270		Hypothetical protein	PPA1260	MEMBRANE
PFREUD_10390	tagO	Undecaprenyl-phosphate alpha-N- acetylglucosaminyltransferase	PPA1248	MEMBRANE
PFREUD_10430	atpB	ATP synthase A chain (ATPase protein 6) (F1F0- ATPase subunit a)	PPA1245	MEMBRANE
PFREUD_10440	atpE	ATP synthase C chain (F1F0-ATPase subunit c)	PPA1244	MEMBRANE
PFREUD_10450	atpF	ATP synthase B chain (F0F1 ATP synthase subunit B)	PPA1243	MEMBRANE
PFREUD_10510		Hypothetical secreted protein	PPA1237	MEMBRANE
PFREUD_10730		Hypothetical membrane anchored protein	PPA1119	MEMBRANE
PFREUD_11200		Permeases of the drug/metabolite transporter (DMT) superfamily	PPA0923	MEMBRANE
PFREUD_11670	secF	Protein-export membrane protein secF	PPA1163	MEMBRANE
PFREUD_11870	lgt	Prolipoprotein diacylglyceryl transferase	PPA1133	MEMBRANE
PFREUD_12240	cobS	Cobalamin 5 -phosphate synthase (adenosylcobinamide-GDP ribazoletransferase)	PPA0442	MEMBRANE
PFREUD_12370		Small basic protein (membrane)	PPA1081	MEMBRANE
PFREUD_12390	pgs1	CDP-diacylglycerol--glycerol-3-phosphate 3- phosphatidyl- transferase	PPA1079	MEMBRANE
PFREUD_12420	pgs2	CDP-diacylglycerol--glycerol-3-phosphate 3- phosphatidyl-transferase	PPA1078	MEMBRANE
PFREUD_13190		Phosphatidylglycerophosphate synthase	PPA1007	MEMBRANE
PFREUD_13320		Membrane protease	PPA1365	MEMBRANE
PFREUD_13510	tatC	Sec-independent protein translocase protein TatC homolog	PPA1378	MEMBRANE
PFREUD_13690		Cobalt permease	PPA1398	MEMBRANE
PFREUD_13720		BioY family protein. Membrane protein	PPA1400	MEMBRANE
PFREUD_14090		Hypothetical protein	PPA1416	MEMBRANE
PFREUD_14200	uppP (BacA)	Undecaprenyl-diphosphatase (Undecaprenyl pyrophosphate phosphatase) (Bacitracin resistance protein)	PPA2224	MEMBRANE
PFREUD_14320	sdhC2	Succinate dehydrogenase cytochrome B-558 subunit	PPA1439	MEMBRANE
PFREUD_14430		Hypothetical membrane protein	PPA1448	MEMBRANE
PFREUD_14610	glpF	Glycerol uptake facilitator protein,	PPA2305	MEMBRANE
PFREUD_14740	cdsA	Phosphatidate cytidyllyltransferase	PPA1517	MEMBRANE
PFREUD_14830		Transporter, sodium/bile acid symporter family	PPA1527	MEMBRANE
PFREUD_15290	terC	Membrane protein TerC	PPA0804	MEMBRANE
PFREUD_15440		Hypothetical protein	PPA0764	MEMBRANE
PFREUD_15510	ftsW1	Cell division protein FtsW	PPA0757	MEMBRANE
PFREUD_15530	mraY	Phospho- N-acetylmuramoyl-pentapeptide- transferase (UDP- MurNac-pentapeptide phosphotransferase)	PPA0755	MEMBRANE
PFREUD_15700		Hypothetical transmembrane protein	PPA0728	MEMBRANE
PFREUD_15810		Hypothetical protein	PPA0715	MEMBRANE
PFREUD_15950		Hypothetical protein	PPA0683	MEMBRANE
PFREUD_16130		Hypothetical protein	PPA0646	MEMBRANE
PFREUD_16220		Chloride channel	PPA2253	MEMBRANE
PFREUD_16340	dcuA	C4-dicarboxylate transporter	PPA0095	MEMBRANE
PFREUD_16350	pimH	Integral membrane efflux protein	PPA1946	MEMBRANE
PFREUD_16500	cstA	Carbon starvation protein	PPA0660	MEMBRANE
PFREUD_17000		Hypothetical membrane protein	PPA0565	MEMBRANE
PFREUD_17210		Hypothetical membrane protein	PPA0549	MEMBRANE
PFREUD_17510		dolichyl-phosphate-mannose-protein mannosyltransferase (Glycosyl transferase, family 39)	PPA0523	MEMBRANE
PFREUD_17530	rutG	Pyrimidine permease RutG (Pyrimidine utilization protein G)	PPA0522	MEMBRANE
PFREUD_17580		Hypothetical membrane protein	PPA0770	MEMBRANE
PFREUD_17590		Hypothetical protein	PPA0771	MEMBRANE
PFREUD_17660	proP	Proline/betaine transporter	PPA0634	MEMBRANE
PFREUD_17670		Permease	PPA0285	MEMBRANE
PFREUD_17980		Hypothetical membrane protein	PPA0496	MEMBRANE
PFREUD_18180		permease	PPA0480	MEMBRANE
PFREUD_18660	lldP	L-lactate permease	PPA0166	MEMBRANE
PFREUD_18720		Amino acid permease. membrane protein	PPA0368	MEMBRANE
PFREUD_19180	dedD	Conserved membrane protein (DedA family)	PPA2014	MEMBRANE
PFREUD_19240		Oligopeptide transporter, OPT family protein.	PPA0554	MEMBRANE
PFREUD_19320		Hypothetical membrane protein	PPA0931	MEMBRANE
PFREUD_19570		Forkhead-associated protein	PPA0188	MEMBRANE
PFREUD_19590	ftsW2	Cell division protein	PPA0186	MEMBRANE
PFREUD_19650	feoB	Ferrous iron transport protein B	PPA1677	MEMBRANE
PFREUD_19680		Na ⁺ /H ⁺ antiporter	PPA2179	MEMBRANE
PFREUD_20120		Hypothetical membrane protein	PPA0317	MEMBRANE
PFREUD_20180		ABC transporter	PPA0156	MEMBRANE
PFREUD_20400	corA	CorA, Mg ²⁺ and Co ²⁺ transporters	PPA1716	MEMBRANE
PFREUD_20460	cycA1	D-serine/D-alanine/glycine transporter	PPA1643	MEMBRANE
PFREUD_20590	dmsC	Anaerobic dimethyl sulfoxide reductase chain C	PPA0515	MEMBRANE
PFREUD_20700		Hypothetical membrane protein	PPA0231	MEMBRANE
PFREUD_20740	NhaA	sodium:proton antiporter	PPA0227	MEMBRANE
PFREUD_20780		Cation-transporting ATPase	PPA2240	MEMBRANE
PFREUD_20910	slgT	Na ⁺ /galactose cotransporter / Sodium/glucose cotransporter	PPA2193	MEMBRANE
PFREUD_20950	mntH	Mn ²⁺ and Fe ²⁺ transporter	PPA2026	MEMBRANE
PFREUD_21530	pntB	NADH dehydrogenase	PPA0626	MEMBRANE
PFREUD_21540	pntA	NAD(P)(+) transhydrogenase (AB-specific).	PPA0625	MEMBRANE
PFREUD_22020		Major facilitator super family MSF1	PPA0048	MEMBRANE
PFREUD_22420		Hypothetical membrane protein	PPA2323	MEMBRANE
PFREUD_22800	kup	Potassium transport system protein	PPA2187	MEMBRANE
PFREUD_23170		Membrane protein, Transporter, MFS superfamily	PPA1837	MEMBRANE
PFREUD_23310	proW	ABC-type glycine betaine transport protein	PPA0406	MEMBRANE
PFREUD_23320	proZ	PROZ-like protein (ABC-type glycine betaine transport, permease protein)	PPA0405	MEMBRANE
PFREUD_23400		Binding-protein-dependent transport systems inner membrane component	PPA0399	MEMBRANE
PFREUD_23410		Binding-protein-dependent transport systems inner membrane component	PPA0057	MEMBRANE
PFREUD_23620	pigV	GPI mannosyltransferase 2	PPA0128	MEMBRANE
PFREUD_24010	fepD	iron ABC transporter, permease protein	PPA0657	MEMBRANE
PFREUD_24190	oxaA	Conserved membrane protein	PPA2350	MEMBRANE
PFREUD_00180		Hypothetical protein	PPA1807	PSE
PFREUD_00350		ABC transporter	PPA0099	PSE
PFREUD_00810		Sensor protein, ATPase-like:Histidine kinase	PPA2113	PSE
PFREUD_00980	norB	Nitric-oxide reductase subunit B (nitric-oxide reductase)	PPA1975	PSE
PFREUD_01090	gltA2	Citrate synthase	PPA1423	PSE
PFREUD_01490		membrane protein without function	PPA2195	PSE

PFREUD_01610		ABC transporter permease	PPA2031	PSE
PFREUD_01720	cydA	Cytochrome d ubiquinol oxidase subunit I	PPA0176	PSE
PFREUD_02090		ABC transporter, transmembrane region	PPA0178	PSE
PFREUD_05510	secE	SecE/Sec61-gamma subunit of protein translocation complex	PPA1892	PSE
PFREUD_05930	bopA	solute binding protein of the ABC transport system	PPA1840	PSE
PFREUD_06630	biaA	ABC transport system component	PPA0017	PSE
PFREUD_06790		Phospholipase D/Transphosphatidylase	PPA1761	PSE
PFREUD_06900		Hypothetical protein	PPA1736	PSE
PFREUD_07360		Glycosyltransferase	PPA1693	PSE
PFREUD_07460		Hypothetical protein	PPA1684	PSE
PFREUD_08330	dsbG	DSBA oxidoreductase	PPA1567	PSE
PFREUD_08340		Hypothetical membrane protein	PPA1566	PSE
PFREUD_08650	comEC	ComE operon protein 3	PPA0895	PSE
PFREUD_09360	chlD	ChlD, Mg-chelatase subunit ChlD	PPA0976	PSE
PFREUD_09370		Von Willebrand factor, type A	PPA0977	PSE
PFREUD_09430	fabH	3-oxoacyl-(Acyl-carrier-protein) synthase III	PPA0983	PSE
PFREUD_09600	ftsX	Cell division protein	PPA1352	PSE
PFREUD_09640		Hypothetical transmembrane protein	PPA1344	PSE
PFREUD_09940		Secreted protease with a PDZ domain	PPA1310	PSE
PFREUD_10030		ABC transporter, substrate binding protein	PPA1277	PSE
PFREUD_10040		ABC transporter permease protein	PPA1276	PSE
PFREUD_10970		Hypothetical protein	PPA1221	PSE
PFREUD_11540		Aminodeoxychorismate lyase	PPA1180	PSE
PFREUD_11680	secD	Protein-export membrane protein secD	PPA1162	PSE
PFREUD_12270		transporter	PPA1203	PSE
PFREUD_12360		Hypothetical protein	PPA1082	PSE
PFREUD_12380		Hypothetical protein	PPA1080	PSE
PFREUD_12690	ydaO	Amino acid permease	PPA1059	PSE
PFREUD_13110		Metal dependent phosphohydrolase	PPA1014	PSE
PFREUD_13210	ftsK	DNA translocase FtsK	PPA1356	PSE
PFREUD_14120		FtsH	PPA0260	PSE
PFREUD_14280	lepB	Signal peptidase I	PPA1434	PSE
PFREUD_14310	sdhA3	Succinate dehydrogenase flavoprotein subunit	PPA1438	PSE
PFREUD_14550		Hypothetical protein	PPA1469	PSE
PFREUD_14680		Hypothetical protein	PPA1496	PSE
PFREUD_15410	lspA	Lipoprotein signal peptidase, signal peptidase II	PPA0767	PSE
PFREUD_15480	ftsQ	Cell division protein FtsQ	PPA0760	PSE
PFREUD_15780		Hypothetical protein	PPA0717	PSE
PFREUD_16040		Hypothetical protein	PPA0663	PSE
PFREUD_16450		ABC transporter glycine betaine ?	PPA0404	PSE
PFREUD_16480		major facilitator superfamily	PPA1726	PSE
PFREUD_18030		Hypothetical protein	PPA0492	PSE
PFREUD_18790	senX	Sensor-like histidine kinase	PPA0360	PSE
PFREUD_19390		Metallophosphoesterase	PPA2150	PSE
PFREUD_19400	ponA	Penicillin-binding protein (Transglycosylase/transpeptidase)	PPA2149	PSE
PFREUD_19580	pf456	Hypothetical protein	PPA0187	PSE
PFREUD_19610	pknB	Serine/threonine protein kinase	PPA0184	PSE
PFREUD_19960	pstC	ABC transporter, permease protein	PPA0340	PSE
PFREUD_20650		Hypothetical protein	PPA0235	PSE
PFREUD_21970		two component sensor kinase	PPA0068	PSE
PFREUD_22080		Hypothetical membrane protein	PPA0043	PSE
PFREUD_22490		Membrane permease (sugar transporter)	PPA0295	PSE
PFREUD_23610		Alpha-amylase	PPA0592	PSE
PFREUD_23640	mrc/ponA	penicillin-binding protein (peptidoglycan glycosyltransferase)	PPA0126	PSE
PFREUD_23840		Chloride channel protein	PPA0080	PSE
PFREUD_24060		Hypothetical protein	PPA2302	PSE
PFREUD_02530		Hypothetical secreted protein	PPA2130	SECRETED
PFREUD_02660		Metallophosphoesterase	PPA1498	SECRETED
PFREUD_03070		Hypothetical protein	PPA0444	SECRETED
PFREUD_06750	feuS	iron ABC transport system, solute-binding protein precursor	PPA0334	SECRETED
PFREUD_09270	dus	TIM-barrel enzyme, dihydrouridine synthase	PPA0954	SECRETED
PFREUD_12220	cbiA	Cobyric acid A,C-diamide synthase, CbiA	PPA0438	SECRETED
PFREUD_14400	ftsY	Signal recognition particle receptor	PPA1447	SECRETED
PFREUD_16260		Hypothetical secreted protein	PPA0629	SECRETED
PFREUD_16950	rmuC	DNA recombination protein	PPA0573	SECRETED
PFREUD_17340		Hypothetical protein	PPA0542	SECRETED
PFREUD_19470	ptsI	PTS enzyme I	PPA0351	SECRETED
PFREUD_19600	pbpA	Penicillin-binding protein	PPA0185	SECRETED
PFREUD_22120		Hypothetical membrane protein	PPA0039	SECRETED