

SUPPLEMENTAL MATERIALS

Analysis of the spore membrane proteome in *Clostridium perfringens* implicates cyanophycin in spore coat assembly

Hualan Liu¹, W. Keith Ray², Richard F. Helm², David L. Popham¹, and Stephen B. Melville^{1*}

¹Department of Biological Sciences, ²Department of Biochemistry, Virginia Tech, Blacksburg, VA 24061, USA

* Corresponding author: Department of Biological Sciences,
217 Life Sciences 1, Virginia Tech, Blacksburg, VA 24061
phone: 540-231-1441, fax: 540-231-9307, e-mail: melville@vt.edu

CONTENTS

Table S1. Total proteins detected in dormant spore membrane samples

Table S2. Total proteins detected in germinated spore membrane samples

Table S3. Predicted spore inner membrane proteins.

Table S4. Differentially detected Membrane Protein Function Categorization

Figure S1. β -glucuronidase activity in strain SM101 carrying plasmids pHLL71 (*cphB-gusA*) and pSM240 (empty vector).

Figure S2. Survival of spores in spent sporulation medium (DSSM).

Figure S3. Spore sizes measured by phase contrast light microscopy of dormant spores and spores germinated and stored for 16 h in nutrient free medium.

Table S1. Total proteins detected in dormant spore membrane samples

UniProt ID	gene name (CPR_)	protein localization ^a	protein function
tr Q0SQS3 Q0SQS3_CLOPS	2258	cell wall	Oligopeptide/dipeptide ABC transporter, oligopeptide/dipeptide-binding protein
tr Q0SWX9 Q0SWX9_CLOPS	0006	Cytoplasmic	DNA gyrase subunit B, GyrB
tr Q0SWX8 Q0SWX8_CLOPS	0007	Cytoplasmic	DNA gyrase subunit A, GyrA
sp Q0SWW9 SYS_CLOPS	0014	Cytoplasmic	Serine--tRNA ligase, SerS
tr Q0SWX5 Q0SWX5_CLOPS	0015	Cytoplasmic	Uncharacterized protein
sp Q0SWT9 PEPT_CLOPS	0029	Cytoplasmic	Peptidase T, PepT
tr Q0SWT7 Q0SWT7_CLOPS	0032	Cytoplasmic	Uncharacterized
tr Q0SWZ0 Q0SWZ0_CLOPS	0082	Cytoplasmic	Glycogen synthase, GlgA
tr Q0SWY9 Q0SWY9_CLOPS	0083	Cytoplasmic	Phosphorylase
sp Q0SWS5 GLGC_CLOPS	0086	Cytoplasmic	Glucose-1-phosphate adenylyltransferase, GlgC
tr Q0SWS4 Q0SWS4_CLOPS	0087	Cytoplasmic	Glucose-1-phosphate adenylyltransferase, GlgD subunit
tr Q0SWS0 Q0SWS0_CLOPS	0092	Cytoplasmic	Putative PTS system, N-acetylglucosamine-specific IIA component
tr Q0SWR5 Q0SWR5_CLOPS	0098	Cytoplasmic	Putative glucokinase
tr Q0SWR4 Q0SWR4_CLOPS	0099	Cytoplasmic	Rubredoxin/rubrerythrin
sp Q0SWR1 LDH_CLOPS	0102	Cytoplasmic	L-lactate dehydrogenase, LDH
tr Q0SWN1 Q0SWN1_CLOPS	0132	Cytoplasmic	Rubrerythrin, Rbr_1
tr Q0SWK7 Q0SWK7_CLOPS	0156	cytoplasmic	Beta-galactosidase
sp Q0SWK6 ARCA_CLOPS	0157	Cytoplasmic	Arginine deiminase, ArcA
sp Q0SWK5 OTC_CLOPS	0158	Cytoplasmic	Ornithine carbamoyltransferase, ArcB
tr Q0SWJ0 Q0SWJ0_CLOPS	0173	Cytoplasmic	Nitroreductase family protein
tr Q0SWG2 Q0SWG2_CLOPS	0203	Cytoplasmic	Heme oxygenase
tr Q0SWB3 Q0SWB3_CLOPS	0256	Cytoplasmic	Glycosyl transferase, group 1 family protein
tr Q0SWA8 Q0SWA8_CLOPS	0261	Cytoplasmic	[Fe] hydrogenase
tr Q0SW95 Q0SW95_CLOPS	0275	Cytoplasmic	Metallo-beta-lactamase family/flavodoxin
tr Q0SW87 Q0SW87_CLOPS	0284	Cytoplasmic	Uncharacterized protein
tr Q0SW84 Q0SW84_CLOPS	0287	Cytoplasmic	Putative transketolase, N-terminal subunit
tr Q0SW83 Q0SW83_CLOPS	0288	Cytoplasmic	Putative transketolase, C-terminal subunit
tr Q0SW42 Q0SW42_CLOPS	0329	Cytoplasmic	UvrABC system protein, UvrA
sp Q0SW37 MURB_CLOPS	0334	Cytoplasmic	UDP-N-acetylenolpyruvoylglucosamine reductase, MurB
tr Q0SW30 Q0SW30_CLOPS	0341	Cytoplasmic	6-phosphofructokinase, PfkA
tr Q0SW29 Q0SW29_CLOPS	0342	Cytoplasmic	Pyruvate kinase, Pyk_1
tr Q0SW01 Q0SW01_CLOPS	0370	Cytoplasmic	Uridine phosphorylase, Udp
sp Q0SW00 DEOB_CLOPS	0371	Cytoplasmic	Phosphopentomutase, DeoB
tr Q0SVZ8 Q0SVZ8_CLOPS	0373	Cytoplasmic	Histidine decarboxylase, pyruvoyl type
tr Q0SVT9 Q0SVT9_CLOPS	0432	Cytoplasmic	Uncharacterized protein

tr Q0SVR5 Q0SVR5_CLOPS	0456	Cytoplasmic	UDP-glucose/GDP-mannose dehydrogenase family
tr Q0SVQ3 Q0SVQ3_CLOPS	0468	Cytoplasmic	UDP-glucose 4-epimerase, GalE_2
tr Q0SVP7 Q0SVP7_CLOPS	0475	Cytoplasmic	Alpha-galactosidase, Aga
tr Q0SVL0 Q0SVL0_CLOPS	0512	Cytoplasmic	Nitrite/sulfite reductase homolog
tr Q0SVK3 Q0SVK3_CLOPS	0519	Cytoplasmic	FMN-dependent NADH-azoreductase, Azor
tr Q0SVF7 Q0SVF7_CLOPS	0566	Cytoplasmic	Uncharacterized protein
tr Q0SVE6 Q0SVE6_CLOPS	0577	Cytoplasmic	M18 family aminopeptidase
tr Q0SVE2 Q0SVE2_CLOPS	0581	Cytoplasmic	Peptide chain release factor 3, PrfC
sp Q0SVB1 SYQ_CLOPS	0612	Cytoplasmic	Glutamine--tRNA ligase, GlnS
tr Q0SVA5 Q0SVA5_CLOPS	0618	Cytoplasmic	Uncharacterized protein
sp Q0SVA4 SYY_CLOPS	0619	Cytoplasmic	Tyrosine--tRNA ligase, TyrS
tr Q0SV42 Q0SV42_CLOPS	0682	Cytoplasmic	Rubredoxin/rubrerythrin
sp Q0SV41 TAL_CLOPS	0683	Cytoplasmic	Probable transaldolase, Tal
tr Q0SV09 Q0SV09_CLOPS	0715	Cytoplasmic	Pyridine nucleotide-disulphide oxidoreductase family protein
sp Q0SUV5 AZOR_CLOPS	0777	Cytoplasmic	FMN-dependent NADH-azoreductase, Azor
tr Q0SUS8 Q0SUS8_CLOPS	0804	Cytoplasmic	PTS system, mannose/fructose/sorbose family, IIAB
tr Q0SUR7 Q0SUR7_CLOPS	0815	cytoplasmic	Glycosyl hydrolase, family 2
tr Q0SUP2 Q0SUP2_CLOPS	0840	Cytoplasmic	Rubrerythrin, Rbr_2
tr Q0SUP0 Q0SUP0_CLOPS	0842	Cytoplasmic	Nadh-dependent butanol dehydrogenase a
tr Q0SUH5 Q0SUH5_CLOPS	0908	Cytoplasmic	Sucrose-6-phosphate hydrolase
tr Q0SUE9 Q0SUE9_CLOPS	0934	Cytoplasmic	Spore coat peptide assembly protein CotJc
tr Q0SUC5 Q0SUC5_CLOPS	0959	Cytoplasmic	Glycosyl hydrolase, family 20
tr Q0SUB0 Q0SUB0_CLOPS	0974	Cytoplasmic	Hydroxylamine reductase, Hcp
tr Q0SU99 Q0SU99_CLOPS	0985	Cytoplasmic	Uncharacterized protein
tr Q0SU73 Q0SU73_CLOPS	1011	Cytoplasmic	1,3-propanediol dehydrogenase, DhaT
tr Q0SU57 Q0SU57_CLOPS	1027	Cytoplasmic	Collagen triple helix repeat protein
tr Q0SU24 Q0SU24_CLOPS	1061	cytoplasmic	Oxidoreductase, 2-nitropropane dioxygenase family
sp Q0SU18 SYE_CLOPS	1067	Cytoplasmic	Glutamate--tRNA ligase, GltX
tr Q0SU09 Q0SU09_CLOPS	1076	Cytoplasmic	M18 family aminopeptidase
tr Q0SU05 Q0SU05_CLOPS	1080	Cytoplasmic	Uncharacterized protein
tr Q0STZ4 Q0STZ4_CLOPS	1091	Cytoplasmic	Rubredoxin/flavodoxin/oxidoreductase
tr Q0STY1 Q0STY1_CLOPS	1104	Cytoplasmic	Uncharacterized protein
tr Q0STW2 Q0STW2_CLOPS	1123	Cytoplasmic	Cyclopropane-fatty-acyl-phospholipid synthase, Cfa
tr Q0STV6 Q0STV6_CLOPS	1129	Cytoplasmic	Tetratricopeptide repeat protein
tr Q0STV5 Q0STV5_CLOPS	1130	Cytoplasmic	Glutamine-dependent NAD(+) synthetase, NadE
tr Q0STV3 Q0STV3_CLOPS	1132	Cytoplasmic	SPFH domain protein/band 7 family protein
sp Q0STU9 FABH_CLOPS	1136	Cytoplasmic	3-oxoacyl-[acyl-carrier-protein] synthase 3, FabH

tr Q0STU8 Q0STU8_CLOPS	1137	Cytoplasmic	Malonyl CoA-acyl carrier protein transacylase, FabD
tr Q0STU7 Q0STU7_CLOPS	1138	Cytoplasmic	3-oxoacyl-[acyl-carrier-protein] reductase, FabG
sp Q0STU4 FABZ_CLOPS	1141	Cytoplasmic	3-hydroxyacyl-[acyl-carrier-protein] dehydratase FabZ
tr Q0STU3 Q0STU3_CLOPS	1142	Cytoplasmic	Acetyl-CoA carboxylase, biotin carboxylase subunit, AccC
sp Q0STS8 CAPPA_CLOPS	1157	Cytoplasmic	Phosphoenolpyruvate carboxylase, PpcA
tr Q0STR6 Q0STR6_CLOPS	1169	Cytoplasmic	Formate acetyltransferase, Pfl
tr Q0STQ4 Q0STQ4_CLOPS	1181	Cytoplasmic	Threonine dehydratase, catabolic, TdcB
tr Q0STP7 Q0STP7_CLOPS	1188	Cytoplasmic	Haloacid dehalogenase, IB family protein
tr Q0STN2 Q0STN2_CLOPS	1203	Cytoplasmic	6-phosphofructokinase, PfkA
tr Q0STM9 Q0STM9_CLOPS	1206	Cytoplasmic	UDP-N-acetylmuramyl tripeptide synthetase MurC homolog
tr Q0STL0 Q0STL0_CLOPS	1225	Cytoplasmic	Amidohydrolase family protein
tr Q0STI9 Q0STI9_CLOPS	1246	Cytoplasmic	Uncharacterized protein
tr Q0STI8 Q0STI8_CLOPS	1247	Cytoplasmic	Uncharacterized protein
sp Q0STE8 XPT2_CLOPS	1287	Cytoplasmic	Xanthine phosphoribosyltransferase 2, Xpt2
tr Q0STE7 Q0STE7_CLOPS	1288	Cytoplasmic	Tetratricopeptide repeat protein
tr Q0STE3 Q0STE3_CLOPS	1292	cytoplasmic	Ribonuclease R, Rnr
sp Q0STE0 ENO_CLOPS	1295	Cytoplasmic	Enolase, Eno
sp Q0STD7 GPMI_CLOPS	1298	Cytoplasmic	2,3-bisphosphoglycerate-independent phosphoglycerate mutase, GpmI
sp Q0STD6 TPIS_CLOPS	1299	Cytoplasmic	Triosephosphate isomerase, TpiA
sp Q0STD5 PGK_CLOPS	1300	Cytoplasmic	Phosphoglycerate kinase, Pgk
tr Q0STD4 Q0STD4_CLOPS	1301	Cytoplasmic	Glyceraldehyde-3-phosphate dehydrogenase, type I, Gap
tr Q0STB4 Q0STB4_CLOPS	1323	Cytoplasmic	CBS domain/MgtE intracellular domain protein
tr Q0STA6 Q0STA6_CLOPS	1331	Cytoplasmic	Rubryerythrin
sp Q0STA4 Y1333_CLOPS	1333	Cytoplasmic	UPF0229 protein
tr Q0STA3 Q0STA3_CLOPS	1334	Cytoplasmic	Non-specific serine/threonine protein kinase, PrkA
sp Q0ST92 GAL1_CLOPS	1345	Cytoplasmic	Galactokinase, GalK
tr Q0ST87 Q0ST87_CLOPS	1350	Cytoplasmic	Fructose-1,6-bisphosphate aldolase, class II, Fba
tr Q0ST63 Q0ST63_CLOPS	1375	Cytoplasmic	Methionine aminopeptidase, Map_1
sp Q0ST54 CLPX_CLOPS	1384	Cytoplasmic	ATP-dependent Clp protease ATP-binding subunit ClpX
sp Q0ST53 CLPP_CLOPS	1385	Cytoplasmic	ATP-dependent Clp protease proteolytic subunit, ClpP
tr Q0ST49 Q0ST49_CLOPS	1389	Cytoplasmic	ATP-dependent RNA helicase, DEAD/DEAH box family
sp Q0ST47 DEOD_CLOPS	1391	cytoplasmic	Purine nucleoside phosphorylase DeoD-type, DeoD
tr Q0ST43 Q0ST43_CLOPS	1395	Cytoplasmic	Putative peptidase
sp Q0ST36 THII_CLOPS	1402	Cytoplasmic	Probable tRNA sulfurtransferase, Thil

tr Q0ST22 Q0ST22_CLOPS	1416	cytoplasmic	ClpB protein
tr Q0SSY7 Q0SSY7_CLOPS	1451	Cytoplasmic	Uncharacterized protein
tr Q0SST9 Q0SST9_CLOPS	1499	Cytoplasmic	Glutamate dehydrogenase, GdhA
tr Q0SSS2 Q0SSS2_CLOPS	1517	Cytoplasmic	SpoVK domain protein
tr Q0SSR9 Q0SSR9_CLOPS	1520	Cytoplasmic	Uncharacterized protein
tr Q0SSQ1 Q0SSQ1_CLOPS	1539	Cytoplasmic	Peptidyl-prolyl cis-trans isomerase, cyclophilin-type
tr Q0SSM8 Q0SSM8_CLOPS	1563	Cytoplasmic	Uncharacterized protein
tr Q0SSI4 Q0SSI4_CLOPS	1607	Cytoplasmic	V-type ATP synthase subunit D, AtpD
sp Q0SSI3 VATB_CLOPS	1608	Cytoplasmic	V-type ATP synthase beta chain, AtpB
sp Q0SSI2 VATA_CLOPS	1609	Cytoplasmic	V-type ATP synthase alpha chain, AtpA
sp Q0SSH9 VATE_CLOPS	1612	Cytoplasmic	V-type ATP synthase subunit E, AtpE
tr Q0SSF9 Q0SSF9_CLOPS	1633	Cytoplasmic	Arginine--tRNA ligase, ArgS
tr Q0SSF4 Q0SSF4_CLOPS	1638	Cytoplasmic	Putative DNA polymerase III, epsilon subunit
sp Q0SSE8 RNY_CLOPS	1644	Cytoplasmic	Ribonuclease Y, Rny
sp Q0SSE7 RECA_CLOPS	1645	Cytoplasmic	Protein RecA
sp Q0SSE5 RIMO_CLOPS	1647	Cytoplasmic	Ribosomal protein S12 methylthiotransferase RimO
tr Q0SSE3 Q0SSE3_CLOPS	1649	Cytoplasmic	Putative endopeptidase, ClpP
sp Q0SSE0 PNP_CLOPS	1652	Cytoplasmic	Polyribonucleotide nucleotidyltransferase, Pnp
sp Q0SSD4 IF2_CLOPS	1658	Cytoplasmic	Translation initiation factor IF-2, InfB
tr Q0SSC8 Q0SSC8_CLOPS	1664	Cytoplasmic	4-hydroxy-3-methylbut-2-en-1-yl diphosphate synthase, IspG
sp Q0SSC2 PYRH_CLOPS	1670	cytoplasmic	Uridylate kinase, PyrH
sp Q0SSC1 EFTS_CLOPS	1671	Cytoplasmic	Elongation factor Ts, Tsf
sp Q0SSC0 RS2_CLOPS	1672	Cytoplasmic	30S ribosomal protein S2, RpsB
tr Q0SSB2 Q0SSB2_CLOPS	1680	Cytoplasmic	50S ribosomal protein L19, RplS
tr Q0SS97 Q0SS97_CLOPS	1695	Cytoplasmic	Acetate kinase, AckA_2
tr Q0SS89 Q0SS89_CLOPS	1703	Cytoplasmic	DAK2 domain protein
sp Q0SS87 RL28_CLOPS	1705	Cytoplasmic	50S ribosomal protein L28, RpmB
tr Q0SS68 Q0SS68_CLOPS	1724	Cytoplasmic	Stage IV sporulation protein A, SpoIVA
tr Q0SS60 Q0SS60_CLOPS	1732	Cytoplasmic	RNA polymerase sigma factor, SigG
tr Q0SS51 Q0SS51_CLOPS	1741	Cytoplasmic	Peptidase, U32 family
tr Q0SS47 Q0SS47_CLOPS	1745	Cytoplasmic	RNA-metabolizing metallo-beta-lactamase family protein
sp Q0SS42 SYA_CLOPS	1750	Cytoplasmic	Alanine--tRNA ligase, AlaS
tr Q0SS37 Q0SS37_CLOPS	1755	Cytoplasmic	Cysteine desulfurase, IscS
tr Q0SS25 Q0SS25_CLOPS	1767	Cytoplasmic	Nitrate reductase, catalytic subunit, NarA
sp Q0SRY9 EFP_CLOPS	1803	Cytoplasmic	Elongation factor P, Efp
tr Q0SRV2 Q0SRV2_CLOPS	1841	Cytoplasmic	Phosphoglucosyltransferase/phosphomannosyltransferase family protein
tr Q0SRU2 Q0SRU2_CLOPS	1851	Cytoplasmic	Phenylalanine--tRNA ligase beta subunit, PheT
sp Q0SRT7 RL20_CLOPS	1856	Cytoplasmic	50S ribosomal protein L20, RplT
sp Q0SRT6 RL35_CLOPS	1857	Cytoplasmic	50S ribosomal protein L35, RplI
tr Q0SR56 Q0SR56_CLOPS	1871	cytoplasmic	Aspartate-semialdehyde

			dehydrogenase, Asd
tr Q0SRS2 Q0SRS2_CLOPS	1875	cytoplasmic	Putative cob(I)alamin adenosyltransferase
tr Q0SRR1 Q0SRR1_CLOPS	1886	Cytoplasmic	Valine--tRNA ligase, ValS
sp Q0SRP8 SYD_CLOPS	1899	cytoplasmic	Aspartate--tRNA ligase, AspS
tr Q0SRM0 Q0SRM0_CLOPS	1927	Cytoplasmic	GTPase HflX
tr Q0SRL9 Q0SRL9_CLOPS	1928	Cytoplasmic	Hypoxanthine phosphoribosyltransferase, Hpt_1
tr Q0SRI7 Q0SRI7_CLOPS	1961	Cytoplasmic	Dephospho-CoA kinase, CoaE
tr Q0SRI3 Q0SRI3_CLOPS	1965	Cytoplasmic	Aminopeptidase
tr Q0SRG5 Q0SRG5_CLOPS	1983	Cytoplasmic	Pyruvate, phosphate dikinase, PpdK
sp Q0SRF3 RS21_CLOPS	1995	Cytoplasmic	30S ribosomal protein, RpsU
tr Q0SRE4 Q0SRE4_CLOPS	2004	Cytoplasmic	Chaperone protein DnaJ
sp Q0SRE3 DNAK_CLOPS	2005	Cytoplasmic	Chaperone protein DnaK
tr Q0SRD0 Q0SRD0_CLOPS	2018	Cytoplasmic	Stage V sporulation protein AD, SpoVAD
sp Q0SRC7 SP2AB_CLOPS	2021	Cytoplasmic	Anti-sigma F factor, SpoIIAB
tr Q0SRC1 Q0SRC1_CLOPS	2027	Cytoplasmic	Putative manganese-dependent inorganic pyrophosphatase
tr Q0SRB9 Q0SRB9_CLOPS	2029	Cytoplasmic	Glutamate decarboxylase
tr Q0SRA9 Q0SRA9_CLOPS	2039	Cytoplasmic	DNA gyrase/topoisomerase IV, A subunit family protein
tr Q0SR89 Q0SR89_CLOPS	2059	cytoplasmic	FemAB family protein
sp Q0SR54 OBG_CLOPS	2094	Cytoplasmic	GTPase obg
sp Q0SR51 RL21_CLOPS	2097	Cytoplasmic	50S ribosomal protein L21, RplU
tr Q0SR48 Q0SR48_CLOPS	2100	Cytoplasmic	Radical SAM domain protein
tr Q0SR38 Q0SR38_CLOPS	2110	Cytoplasmic	Rod shape-determining protein MreB
tr Q0SR33 Q0SR33_CLOPS	2115	Cytoplasmic	Aminoacyl-histidine dipeptidase, PepD_1
tr Q0SR32 Q0SR32_CLOPS	2116	Cytoplasmic	Pyruvate kinase, Pyk
sp Q0SR11 SECA_CLOPS	2139	Cytoplasmic	Protein translocase subunit SecA
sp Q0SR05 METK_CLOPS	2145	Cytoplasmic	S-adenosylmethionine synthase, MetK
sp Q0SQZ4 ATPG_CLOPS	2163	Cytoplasmic	ATP synthase gamma chain, AtpG
sp Q0SQZ3 ATPA_CLOPS	2164	Cytoplasmic	ATP synthase subunit alpha, AtpA
tr Q0SQY7 Q0SQY7_CLOPS	2170	Cytoplasmic	Acetyl-CoA acetyltransferase
tr Q0SQY6 Q0SQY6_CLOPS	2171	Cytoplasmic	UDP-N-acetylglucosamine 2-epimerase, MnaA
sp Q0SQY5 UPP_CLOPS	2172	Cytoplasmic	Uracil phosphoribosyltransferase, Upp
sp Q0SQY1 RF1_CLOPS	2176	Cytoplasmic	Peptide chain release factor 1, PrfA
sp Q0SQX5 PYRG_CLOPS	2182	Cytoplasmic	CTP synthase, PyrG
tr Q0SQW8 Q0SQW8_CLOPS	2189	cytoplasmic	LysM domain protein
sp Q0SQS9 G6PI_CLOPS	2252	cytoplasmic	Glucose-6-phosphate isomerase, Pgi
tr Q0SQS0 Q0SQS0_CLOPS	2261	Cytoplasmic	Inosine-5'-monophosphate dehydrogenase, GuaB
tr C6UAS4 C6UAS4_CLOPS	2275	Cytoplasmic	60 kDa chaperonin, GroEL
tr Q0SQP9 Q0SQP9_CLOPS	2283	Cytoplasmic	3-hydroxybutyryl-CoA dehydrogenase, Hbd
tr Q0SQP8 Q0SQP8_CLOPS	2284	Cytoplasmic	Electron transfer flavoprotein, alpha subunit/FixB family protein, fixB
tr Q0SQP6 Q0SQP6_CLOPS	2286	Cytoplasmic	Butyryl-CoA dehydrogenase, Bcd

tr Q0SQP5 Q0SQP5_CLOPS	2287	Cytoplasmic	3-hydroxybutyryl-CoA dehydratase ,Crt
sp Q0SQP4 REX_CLOPS	2288	Cytoplasmic	Redox-sensing transcriptional repressor Rex
tr Q0SQN8 Q0SQN8_CLOPS	2294	Cytoplasmic	Mannose-1-phosphate guanylyltransferase
sp Q0SQM4 SYT_CLOPS	2317	Cytoplasmic	Threonine--tRNA ligase, ThrS
tr Q0SQL9 Q0SQL9_CLOPS	2322	Cytoplasmic	Glutamine--fructose-6-phosphate aminotransferase [isomerizing], GlmS1
tr Q0SQL8 Q0SQL8_CLOPS	2323	Cytoplasmic	Rubryerythrin family protein
sp Q0SQL7 GLMM_CLOPS	2324	Cytoplasmic	Phosphoglucosamine mutase, GlmM
tr Q0SQL0 Q0SQL0_CLOPS	2332	Cytoplasmic	Phosphorylase, GlgP
tr Q0SQK1 Q0SQK1_CLOPS	2341	Cytoplasmic	Iron hydrogenase, HydA
sp Q0SQK0 BUK_CLOPS	2342	cytoplasmic	Probable butyrate kinase, Buk
tr Q0SQJ9 Q0SQJ9_CLOPS	2343	cytoplasmic	Phosphate butyryltransferase, Ptb
tr Q0SQJ2 Q0SQJ2_CLOPS	2350	Cytoplasmic	Thioredoxin, Trx
tr Q0SQJ1 Q0SQJ1_CLOPS	2351	cytoplasmic	Isoaspartyl dipeptidase , ladA
tr Q0SQJ0 Q0SQJ0_CLOPS	2352	Cytoplasmic	Phosphoenolpyruvate-protein phosphotransferase, PtsI
sp Q0SQH9 RS9_CLOPS	2363	Cytoplasmic	30S ribosomal protein S9, RpsI
sp Q0SQH8 RL13_CLOPS	2364	Cytoplasmic	50S ribosomal protein L13, RplM
sp Q0SQH4 RL17_CLOPS	2369	Cytoplasmic	50S ribosomal protein L17, RplQ
sp Q0SQH3 RPOA_CLOPS	2370	Cytoplasmic	DNA-directed RNA polymerase subunit alpha, RpoA
sp Q0SQH2 RS4A_CLOPS	2371	Cytoplasmic	30S ribosomal protein S4 A, RpsD
sp Q0SQH1 RS11_CLOPS	2372	Cytoplasmic	30S ribosomal protein S11, RpsK
sp Q0SQH0 RS13_CLOPS	2373	Cytoplasmic	30S ribosomal protein S13, RpsM
sp Q0SQG1 RS5_CLOPS	2382	Cytoplasmic	30S ribosomal protein S5, RpsE
sp Q0SQG0 RL18_CLOPS	2383	Cytoplasmic	50S ribosomal protein L18, RplR
sp Q0SQF9 RL6_CLOPS	2384	Cytoplasmic	50S ribosomal protein L6, RplF
sp Q0SQF8 RS8_CLOPS	2385	Cytoplasmic	30S ribosomal protein S8, RpsH
sp Q0SQF6 RL5_CLOPS	2387	Cytoplasmic	50S ribosomal protein L5, RplE
sp Q0SQF5 RL24_CLOPS	2388	Cytoplasmic	50S ribosomal protein L24, RplX
sp Q0SQF4 RL14_CLOPS	2389	Cytoplasmic	50S ribosomal protein L14, RplN
sp Q0SQF3 RS17_CLOPS	2390	Cytoplasmic	30S ribosomal protein S17, RpsQ
sp Q0SQF1 RL16_CLOPS	2392	Cytoplasmic	50S ribosomal protein L16, RplP
sp Q0SQF0 RS3_CLOPS	2393	Cytoplasmic	30S ribosomal protein S3, RpsC
sp Q0SQE9 RL22_CLOPS	2394	Cytoplasmic	50S ribosomal protein L22, RplV
sp Q0SQE8 RS19_CLOPS	2395	Cytoplasmic	30S ribosomal protein S19, RpsS
sp Q0SQE4 RL3_CLOPS	2399	cytoplasmic	50S ribosomal protein L3, RplC
sp Q0SQC8 EFTU_CLOPS	2402	cytoplasmic	Elongation factor Tu, Tuf1
sp Q0SQE1 EFG_CLOPS	2403	Cytoplasmic	Elongation factor G, Fusa
sp Q0SQD9 RS12_CLOPS	2405	Cytoplasmic	30S ribosomal protein S12, RpsL
sp Q0SQD7 RPOC_CLOPS	2407	Cytoplasmic	DNA-directed RNA polymerase subunit beta, RpoC
sp Q0SQD6 RPOB_CLOPS	2408	Cytoplasmic	DNA-directed RNA polymerase subunit beta, RpoB
tr Q0SQD4 Q0SQD4_CLOPS	2410	Cytoplasmic	50S ribosomal protein L10, RplJ
sp Q0SQD3 RL1_CLOPS	2411	Cytoplasmic	50S ribosomal protein L1, RplA

sp Q0SQD2 RL11_CLOPS	2412	Cytoplasmic	50S ribosomal protein L11, RplK
tr Q0SQC4 Q0SQC4_CLOPS	2421	Cytoplasmic	Thymidylate synthase ThyX
sp Q0SQC1 SYC_CLOPS	2424	Cytoplasmic	Cysteine--tRNA ligase, CysS
sp Q0SQC0 SYP_CLOPS	2425	Cytoplasmic	Proline--tRNA ligase, ProS
tr Q0SQB1 Q0SQB1_CLOPS	2434	Cytoplasmic	Glyceraldehyde-3-phosphate dehydrogenase, NADP-dependent, GapN
tr Q0SQ95 Q0SQ95_CLOPS	2450	Cytoplasmic	Amidohydrolase homolog
tr Q0SQ87 Q0SQ87_CLOPS	2465	Cytoplasmic	Glycine--tRNA ligase, GlyS
sp Q0SQ86 SYK_CLOPS	2467	Cytoplasmic	Lysine--tRNA ligase, LysS
tr Q0SQ69 Q0SQ69_CLOPS	2491	Cytoplasmic	Stage V sprulation protein T, SpoVT
tr Q0SQ67 Q0SQ67_CLOPS	2493	Cytoplasmic	Transcription-repair coupling factor, Mfd
tr Q0SQ62 Q0SQ62_CLOPS	2498	Cytoplasmic	Ribose-phosphate pyrophosphokinase, PrsA
sp Q0SQ51 SYN_CLOPS	2509	cytoplasmic	Asparagine--tRNA ligase, AsnS
sp Q0SQ50 AMPA_CLOPS	2510	cytoplasmic	Probable cytosol aminopeptidase, PepA
tr Q0SQ42 Q0SQ42_CLOPS	2518	Cytoplasmic	DegV family protein
tr Q0SQ35 Q0SQ35_CLOPS	2525	Cytoplasmic	Uncharacterized protein
tr Q0SQ27 Q0SQ27_CLOPS	2533	Cytoplasmic	Methionine--tRNA ligase, MetG_2
tr Q0SQ21 Q0SQ21_CLOPS	2539	Cytoplasmic	Xaa-pro aminopeptidase, PepP
tr Q0SQ20 Q0SQ20_CLOPS	2540	Cytoplasmic	Aldehyde-alcohol dehydrogenase, AdhE
tr Q0SQ10 Q0SQ10_CLOPS	2550	Cytoplasmic	Isoleucine--tRNA ligase, IleS
sp Q0SQ01 GLPK_CLOPS	2559	Cytoplasmic	Glycerol kinase, GlpK
tr Q0SPZ6 Q0SPZ6_CLOPS	2564	Cytoplasmic	Putative lipoprotein
tr Q0SPY7 Q0SPY7_CLOPS	2573	Cytoplasmic	Putative glutamine synthetase
sp Q0SPX8 PROA_CLOPS	2582	Cytoplasmic	Gamma-glutamyl phosphate reductase, ProA
tr Q0SPX6 Q0SPX6_CLOPS	2584	Cytoplasmic	Oxidoreductase, short chain dehydrogenase/reductase family
tr Q0SPU4 Q0SPU4_CLOPS	2616	Cytoplasmic	UDP-N-acetylglucosamine 1-carboxyvinyltransferase, MurA_2
tr Q0SPT1 Q0SPT1_CLOPS	2641	Cytoplasmic	Adenylosuccinate synthetase, PurA
tr Q0SPS1 Q0SPS1_CLOPS	2651	Cytoplasmic	DHH family protein
sp Q0SPR8 RS18_CLOPS	2654	Cytoplasmic	30S ribosomal protein S18 ,RpsR
tr Q0SPQ8 Q0SPQ8_CLOPS	2664	Cytoplasmic	Uncharacterized protein
sp Q0SPP8 RL34_CLOPS	2674	Cytoplasmic	50S ribosomal protein L34, RpmH
sp Q0SWW1 PDRP_CLOPS	0076	Cytoplasmic membrane	Putative pyruvate, phosphate dikinase regulatory protein
tr Q0SWR9 Q0SWR9_CLOPS	0093	Cytoplasmic Membrane	PTS system, N-acetylglucosamine-specific IIBC component, NagE
tr Q0SWK4 Q0SWK4_CLOPS	0159	Cytoplasmic Membrane	Arginine/ornithine antiporter, ArcD
tr Q0SWI7 Q0SWI7_CLOPS	0176	Cytoplasmic Membrane	Sodium:solute transporter
tr Q0SWD6 Q0SWD6_CLOPS	0230	Cytoplasmic Membrane	Uncharacterized protein
tr Q0SWC5 Q0SWC5_CLOPS	0241	Cytoplasmic Membrane	Uncharacterized protein
tr Q0SW99 Q0SW99_CLOPS	0271	Cytoplasmic Membrane	Putative transcriptional regulator
tr Q0SW79 Q0SW79_CLOPS	0292	Cytoplasmic Membrane	Cell division protein FtsX
tr Q0SW78 Q0SW78_CLOPS	0293	Cytoplasmic Membrane	Carboxyl-terminal protease
tr Q0SW39 Q0SW39_CLOPS	0332	Cytoplasmic Membrane	Putative penicillin-binding protein

tr Q0SW08 Q0SW08_CLOPS	0363	Cytoplasmic Membrane	ABC transporter, permease/ATP-binding protein
tr Q0SW07 Q0SW07_CLOPS	0364	Cytoplasmic Membrane	ABC transporter, permease/ATP-binding protein
tr Q0SVX2 Q0SVX2_CLOPS	0399	Cytoplasmic Membrane	PTS system, mannose/fructose/sorbose family, IID component
tr Q0SVV6 Q0SVV6_CLOPS	0415	Cytoplasmic Membrane	Uncharacterized protein
tr Q0SVV3 Q0SVV3_CLOPS	0418	Cytoplasmic Membrane	PTS system, IIBC component
tr Q0SVU0 Q0SVU0_CLOPS	0431	Cytoplasmic Membrane	Uncharacterized protein
tr Q0SVP6 Q0SVP6_CLOPS	0476	Cytoplasmic Membrane	ABC transporter, substrate-binding protein
tr Q0SVP5 Q0SVP5_CLOPS	0477	Cytoplasmic Membrane	ABC transporter, permease protein
tr Q0SVP4 Q0SVP4_CLOPS	0478	Cytoplasmic Membrane	ABC transporter, permease protein
tr Q0SVJ4 Q0SVJ4_CLOPS	0528	Cytoplasmic Membrane	Stage V sporulation protein D
tr Q0SVF9 Q0SVF9_CLOPS	0564	Cytoplasmic Membrane	Signal peptidase I
tr Q0SVF8 Q0SVF8_CLOPS	0565	Cytoplasmic Membrane	ATP-dependent zinc metalloprotease FtsH
tr Q0SVC5 Q0SVC5_CLOPS	0598	Cytoplasmic Membrane	Cell envelope-related transcriptional attenuator domain family
tr Q0SVC0 Q0SVC0_CLOPS	0603	Cytoplasmic Membrane	Phosphate ABC transporter, phosphate-binding protein, PstS_1
sp Q0SVB6 PSTB_CLOPS	0607	Cytoplasmic Membrane	Phosphate import ATP-binding protein PstB
tr Q0SVA9 Q0SVA9_CLOPS	0614	Cytoplasmic Membrane	Spore germination protein
tr Q0SVA8 Q0SVA8_CLOPS	0615	Cytoplasmic Membrane	Spore germination protein, GerABKA family
tr Q0SV26 Q0SV26_CLOPS	0698	Cytoplasmic Membrane	ABC transporter, ATP-binding protein
tr Q0SV08 Q0SV08_CLOPS	0716	Cytoplasmic Membrane	YeeE/YedE family protein
tr Q0SUS7 Q0SUS7_CLOPS	0805	Cytoplasmic Membrane	PTS system, mannose/fructose/sorbose family, IIC component
tr Q0SUS6 Q0SUS6_CLOPS	0806	Cytoplasmic Membrane	PTS system, mannose/fructose/sorbose family, IID component
tr Q0SUR3 Q0SUR3_CLOPS	0819	Cytoplasmic Membrane	Antibiotic ABC transporter, permease protein
tr Q0SUM3 Q0SUM3_CLOPS	0859	Cytoplasmic Membrane	Uncharacterized protein
tr Q0SUH9 Q0SUH9_CLOPS	0904	Cytoplasmic Membrane	Substrate-binding protein MsmE
tr Q0SUE8 Q0SUE8_CLOPS	0935	Cytoplasmic Membrane	PTS system, N-acetylglucosamine-specific IIBC component, NagE
tr Q0SUA1 Q0SUA1_CLOPS	0983	Cytoplasmic Membrane	Cation efflux family protein
tr Q0SU83 Q0SU83_CLOPS	1001	Cytoplasmic Membrane	Glycerol uptake facilitator protein, GlpE
tr Q0SU32 Q0SU32_CLOPS	1053	Cytoplasmic Membrane	GerA spore germination protein
tr Q0SU31 Q0SU31_CLOPS	1054	Cytoplasmic Membrane	C4-dicarboxylate anaerobic carrier family protein
tr Q0STX0 Q0STX0_CLOPS	1115	Cytoplasmic Membrane	Iron compound ABC transporter, iron-binding protein
tr Q0STU6 Q0STU6_CLOPS	1139	Cytoplasmic Membrane	3-oxoacyl-[acyl-carrier-protein] synthase 2, FabF
tr Q0STF9 Q0STF9_CLOPS	1276	Cytoplasmic Membrane	Oligopeptide transporter, OPT family
tr Q0STE2 Q0STE2_CLOPS	1293	Cytoplasmic Membrane	Preprotein translocase, SecG subunit
tr Q0STA8 Q0STA8_CLOPS	1329	Cytoplasmic Membrane	CDP-diacylglycerol--serine O-

			phosphatidyltransferase, PssA
tr Q0ST94 Q0ST94_CLOPS	1343	Cytoplasmic Membrane	Galactoside ABC transporter, permease protein, MglC
tr Q0ST89 Q0ST89_CLOPS	1348	Cytoplasmic Membrane	Uncharacterized protein
tr Q0SSP8 Q0SSP8_CLOPS	1542	Cytoplasmic Membrane	Phage shock protein A, PspA
tr Q0SSH8 Q0SSH8_CLOPS	1613	Cytoplasmic Membrane	V-type ATPase, K subunit
tr Q0SSH7 Q0SSH7_CLOPS	1614	Cytoplasmic Membrane	V-type ATPase, I subunit
tr Q0SSE6 Q0SSE6_CLOPS	1646	Cytoplasmic Membrane	CDP-diacylglycerol--glycerol-3-phosphate 3-phosphatidyltransferase, PgsA
tr Q0SSC7 Q0SSC7_CLOPS	1665	Cytoplasmic Membrane	RIP metalloprotease RseP
tr Q0SS83 Q0SS83_CLOPS	1709	Cytoplasmic Membrane	Serine/threonine protein kinase BH2504
tr Q0SS79 Q0SS79_CLOPS	1713	Cytoplasmic Membrane	Putative neutral zinc metalloproteinase
sp Q0SS66 DER_CLOPS	1726	Cytoplasmic Membrane	GTPase Der
tr Q0SS49 Q0SS49_CLOPS	1743	Cytoplasmic Membrane	Uncharacterized protein
tr Q0SS48 Q0SS48_CLOPS	1744	Cytoplasmic Membrane	GTP-binding protein TypA
tr Q0SRW8 Q0SRW8_CLOPS	1824	Cytoplasmic Membrane	Small basic protein, Sbp
tr Q0SRP0 Q0SRP0_CLOPS	1907	Cytoplasmic Membrane	Protein-export membrane protein SecF
tr Q0SRN9 Q0SRN9_CLOPS	1908	Cytoplasmic Membrane	Protein translocase subunit SecD
tr Q0SRN6 Q0SRN6_CLOPS	1911	Cytoplasmic Membrane	Preprotein translocase, YajC_2
sp Q0SRL7 PBPA_CLOPS	1930	Cytoplasmic Membrane	Penicillin-binding protein 1A, PbpA
tr Q0SRL6 Q0SRL6_CLOPS	1931	Cytoplasmic membrane	Sodium:alanine symporter family protein
tr Q0SRL1 Q0SRL1_CLOPS	1936	Cytoplasmic Membrane	Spermidine/putrescine ABC transporter, permease protein PotB
tr Q0SRK4 Q0SRK4_CLOPS	1943	Cytoplasmic Membrane	D-alanyl-D-alanine carboxypeptidase family protein
tr Q0SRG7 Q0SRG7_CLOPS	1981	Cytoplasmic Membrane	Putative permease
sp Q0SRD8 LEPA_CLOPS	2010	Cytoplasmic Membrane	Elongation factor 4, LepA
tr Q0SRD1 Q0SRD1_CLOPS	2017	Cytoplasmic Membrane	Stage V sporulation protein AE, SpoVAE
tr Q0SRC9 Q0SRC9_CLOPS	2019	Cytoplasmic Membrane	Stage V sporulation protein AC, SpoVAC
sp Q0SRB4 MURG_CLOPS	2034	Cytoplasmic Membrane	MURG transferasetransferase
tr Q0SR43 Q0SR43_CLOPS	2105	Cytoplasmic Membrane	Site-determining protein, MinD
tr Q0SR25 Q0SR25_CLOPS	2123	Cytoplasmic Membrane	MutS domain protein
tr Q0SR24 Q0SR24_CLOPS	2124	Cytoplasmic Membrane	PTS system, glucose-specific IIBC component, PtsG
tr Q0SR23 Q0SR23_CLOPS	2125	Cytoplasmic Membrane	ABC transporter, substrate-binding protein
sp Q0SQZ5 ATPB_CLOPS	2162	Cytoplasmic Membrane	ATP synthase subunit beta, AtpD
sp Q0SQZ1 ATPF_CLOPS	2166	Cytoplasmic Membrane	ATP synthase subunit b, AtpF
tr Q0SQY9 Q0SQY9_CLOPS	2168	Cytoplasmic Membrane	ATP synthase subunit a, AtpB
tr Q0SQX6 Q0SQX6_CLOPS	2181	Cytoplasmic Membrane	Transcription termination factor Rho
tr Q0SQW9 Q0SQW9_CLOPS	2188	Cytoplasmic Membrane	Cyanophycinase, CphB
tr Q0SQS7 Q0SQS7_CLOPS	2254	Cytoplasmic Membrane	Oligopeptide/dipeptide ABC transporter, ATP-binding protein
tr Q0SQS2 Q0SQS2_CLOPS	2259	Cytoplasmic Membrane	Major facilitator family transporter
tr Q0SQP3 Q0SQP3_CLOPS	2289	Cytoplasmic Membrane	Zinc-transporting atpase
tr Q0SQK2 Q0SQK2_CLOPS	2340	Cytoplasmic Membrane	ABC transporter, ATP-binding protein
tr Q0SQG4 Q0SQG4_CLOPS	2379	Cytoplasmic Membrane	Protein translocase subunit SecY

tr Q0SQB8 Q0SQB8_CLOPS	2427	Cytoplasmic Membrane	PIN/TRAM domain protein
tr Q0SQ81 Q0SQ81_CLOPS	2472	Cytoplasmic Membrane	ATP-dependent zinc metalloprotease FtsH
sp Q0SQ68 PRSA_CLOPS	2492	Cytoplasmic Membrane	Foldase protein PrsA
tr Q0SQ55 Q0SQ55_CLOPS	2505	Cytoplasmic Membrane	Nucleoside transporter, NupC family
tr Q0SPX4 Q0SPX4_CLOPS	2586	Cytoplasmic Membrane	Xanthine/uracil permease family protein
tr Q0SPW7 Q0SPW7_CLOPS	2593	Cytoplasmic Membrane	Putative phage infection protein
tr Q0SPW6 Q0SPW6_CLOPS	2594	Cytoplasmic Membrane	Putative phage infection protein
tr Q0SPQ1 Q0SPQ1_CLOPS	2671	Cytoplasmic Membrane	Membrane protein OxaA
tr Q0STI4 Q0STI4_CLOPS	1251	extracellular	Superoxide dismutase, SodF
tr Q0STC4 Q0STC4_CLOPS	1311	extracellular	Glycosyl hydrolase, family 25
tr Q0SWT8 Q0SWT8_CLOPS	0030	unknown	DegV family protein
sp Q0SWN5 CINA_CLOPS	0128	unknown	Putative competence-damage inducible protein, CinA
tr Q0SWH6 Q0SWH6_CLOPS	0188	unknown	5'-nucleotidase, lipoprotein e(P4) family
tr Q0SW97 Q0SW97_CLOPS	0273	unknown	UDP-glucose 4-epimerase, GalE_1
tr Q0SW33 Q0SW33_CLOPS	0338	unknown	Putative lipoprotein
tr Q0SVR9 Q0SVR9_CLOPS	0452	unknown	Capsule chain length determinant protein
tr Q0SVM0 Q0SVM0_CLOPS	0502	unknown	Putative lipoprotein
tr Q0SUS5 Q0SUS5_CLOPS	0807	unknown	Uncharacterized protein
tr Q0SU80 Q0SU80_CLOPS	1004	unknown	Glycerol dehydratase, large subunit, DhaB
tr Q0STY5 Q0STY5_CLOPS	1100	unknown	Putative lipoprotein
tr Q0STM6 Q0STM6_CLOPS	1209	unknown	VanW-related protein
tr Q0STC9 Q0STC9_CLOPS	1306	unknown	Lipoprotein, BMP family
tr Q0STC5 Q0STC5_CLOPS	1310	unknown	VanW-like family protein
tr Q0STB8 Q0STB8_CLOPS	1319	unknown	1-acyl-sn-glycerol-3-phosphate acyltransferase family protein
tr Q0ST96 Q0ST96_CLOPS	1341	unknown	Putative galactoside ABC transporter, galactoside-binding protein
tr Q0ST88 Q0ST88_CLOPS	1349	unknown	Uncharacterized protein
tr Q0ST82 Q0ST82_CLOPS	1355	unknown	Uncharacterized protein
tr Q0SSX2 Q0SSX2_CLOPS	1466	unknown	Uncharacterized protein
tr Q0SST6 Q0SST6_CLOPS	1502	unknown	Uncharacterized protein
tr Q0SSN8 Q0SSN8_CLOPS	1552	unknown	Lipoprotein, BMP family
tr Q0SSE2 Q0SSE2_CLOPS	1650	unknown	Aspartokinase
tr Q0SS80 Q0SS80_CLOPS	1712	unknown	Ribosomal RNA small subunit methyltransferase B, Sun
tr Q0SS20 Q0SS20_CLOPS	1772	unknown	Uncharacterized protein
tr Q0SRV7 Q0SRV7_CLOPS	1836	unknown	Delta-lactam-biosynthetic de-N-acetylase, PdaA
tr Q0SRI6 Q0SRI6_CLOPS	1962	unknown	DNA polymerase, PolA
tr Q0SRG6 Q0SRG6_CLOPS	1982	unknown	Uncharacterized protein
tr Q0SRC3 Q0SRC3_CLOPS	2025	unknown	Uncharacterized protein
tr Q0SRB6 Q0SRB6_CLOPS	2032	unknown	Pyruvate-flavodoxin oxidoreductase, NifJ
tr Q0SR94 Q0SR94_CLOPS	2054	unknown	Molybdate ABC transporter, molybdate-binding protein, ModA

tr Q0SR41 Q0SR41_CLOPS	2107	unknown	Putative penicillin-binding protein
tr Q0SQV7 Q0SQV7_CLOPS	2200	unknown	Serine protease
tr Q0SQR1 Q0SQR1_CLOPS	2270	unknown	Prepilin-type N-terminal cleavage/methylation domain protein
tr Q0SQP7 Q0SQP7_CLOPS	2285	unknown	Electron transfer flavoprotein, beta subunit/FixA family protein
tr Q0SQK4 Q0SQK4_CLOPS	2338	unknown	Putative maltose/maltodextrin ABC transporter, maltose/maltodextrin-binding protein
tr Q0SQJ7 Q0SQJ7_CLOPS	2345	unknown	Uncharacterized protein
sp Q0SQG3 RL15_CLOPS	2380	unknown	50S ribosomal protein L15, RplO
sp Q0SQE7 RL2_CLOPS	2396	unknown	50S ribosomal protein L2, RplB
sp Q0SQE5 RL4_CLOPS	2398	unknown	50S ribosomal protein L4, RplD
sp Q0SQ58 MURC_CLOPS	2502	unknown	UDP-N-acetylmuramate--L-alanine ligase, MurC
tr Q0SQ56 Q0SQ56_CLOPS	2504	unknown	Purine nucleoside phosphorylase, PunA
tr Q0SQ30 Q0SQ30_CLOPS	2530	unknown	Uncharacterized protein
tr Q0SPZ4 Q0SPZ4_CLOPS	2566	unknown	Spore cortex-lytic enzyme SleC
tr Q0SPY2 Q0SPY2_CLOPS	2578	unknown	Conserved domain protein
tr Q0SPX1 Q0SPX1_CLOPS	2589	unknown	Conserved domain protein

Table S2. Total proteins detected in germinated spore membrane samples

UniProt ID	gene name (CPR_)	protein localization ^a	protein function
tr Q0SQS3 Q0SQS3_CLOPS	2258	cell wall	Oligopeptide/dipeptide ABC transporter, oligopeptide/dipeptide-binding protein
tr Q0SWX7 Q0SWX7_CLOPS	0002	Cytoplasmic	DNA polymerase III subunit beta, DnaN
sp Q0SWW9 SYS_CLOPS	0014	Cytoplasmic	Serine--tRNA ligase, SerS
tr Q0SWX5 Q0SWX5_CLOPS	0015	Cytoplasmic	Uncharacterized protein
tr Q0SWZ0 Q0SWZ0_CLOPS	0082	Cytoplasmic	Glycogen synthase, GlgA
tr Q0SWY9 Q0SWY9_CLOPS	0083	Cytoplasmic	Phosphorylase
sp Q0SWS5 GLGC_CLOPS	0086	Cytoplasmic	Glucose-1-phosphate adenylyltransferase, GlgC
tr Q0SWS4 Q0SWS4_CLOPS	0087	Cytoplasmic	Glucose-1-phosphate adenylyltransferase, GlgD
tr Q0SWS0 Q0SWS0_CLOPS	0092	Cytoplasmic	Putative PTS system, N-acetylglucosamine-specific IIA component
tr Q0SWR5 Q0SWR5_CLOPS	0098	Cytoplasmic	Putative glucokinase
tr Q0SWR4 Q0SWR4_CLOPS	0099	Cytoplasmic	Rubredoxin/rubrerythrin
tr Q0SWN1 Q0SWN1_CLOPS	0132	Cytoplasmic	Rubrerythrin, Rbr_1
sp Q0SWK5 OTC_CLOPS	0158	Cytoplasmic	Ornithine carbamoyltransferase, ArcB
tr Q0SWJ0 Q0SWJ0_CLOPS	0173	Cytoplasmic	Nitroreductase family protein
tr Q0SWG2 Q0SWG2_CLOPS	0203	Cytoplasmic	Heme oxygenase
tr Q0SWB7 Q0SWB7_CLOPS	0251	Cytoplasmic	AhpC/TSA family protein
tr Q0SWB3 Q0SWB3_CLOPS	0256	Cytoplasmic	Glycosyl transferase, group 1 family protein
tr Q0SWA8 Q0SWA8_CLOPS	0261	Cytoplasmic	[Fe] hydrogenase
tr Q0SW95 Q0SW95_CLOPS	0275	Cytoplasmic	Metallo-beta-lactamase family/flavodoxin
tr Q0SW87 Q0SW87_CLOPS	0284	Cytoplasmic	Uncharacterized protein
tr Q0SW84 Q0SW84_CLOPS	0287	Cytoplasmic	Putative transketolase, N-terminal subunit
tr Q0SW83 Q0SW83_CLOPS	0288	Cytoplasmic	Putative transketolase, C-terminal subunit
tr Q0SW42 Q0SW42_CLOPS	0329	Cytoplasmic	UvrABC system protein A, UvrA
tr Q0SW30 Q0SW30_CLOPS	0341	Cytoplasmic	6-phosphofructokinase, PfkA
tr Q0SW29 Q0SW29_CLOPS	0342	Cytoplasmic	Pyruvate kinase, Pyk_1
sp Q0SW00 DEOB_CLOPS	0371	Cytoplasmic	Phosphopentomutase, DeoB
tr Q0SVV7 Q0SVV7_CLOPS	0414	Cytoplasmic	Uncharacterized protein
tr Q0SVT9 Q0SVT9_CLOPS	0432	Cytoplasmic	Uncharacterized protein
tr Q0SVQ3 Q0SVQ3_CLOPS	0468	Cytoplasmic	UDP-glucose 4-epimerase, GalE_2
tr Q0SVL0 Q0SVL0_CLOPS	0512	Cytoplasmic	Nitrite/sulfite reductase homolog
tr Q0SVK3 Q0SVK3_CLOPS	0519	Cytoplasmic	FMN-dependent NADH-azoreductase, AzoR

tr Q0SVH4 Q0SVH4_CLOPS	0548	Cytoplasmic	Uncharacterized protein
tr Q0SVE6 Q0SVE6_CLOPS	0577	Cytoplasmic	M18 family aminopeptidase
tr Q0SVA5 Q0SVA5_CLOPS	0618	Cytoplasmic	Uncharacterized protein
sp Q0SVA4 SYY_CLOPS	0619	Cytoplasmic	Tyrosine--tRNA ligase, TyrS
tr Q0SV42 Q0SV42_CLOPS	0682	Cytoplasmic	Rubredoxin/rubrerythrin
sp Q0SV41 TAL_CLOPS	0683	Cytoplasmic	Probable transaldolase, Tal
tr Q0SUZ0 Q0SUZ0_CLOPS	0734	Cytoplasmic	Uncharacterized protein
sp Q0SUV5 AZOR_CLOPS	0777	Cytoplasmic	FMN-dependent NADH-azoreductase, AzoR
tr Q0SUS8 Q0SUS8_CLOPS	0804	Cytoplasmic	PTS system, mannose/fructose/sorbose family, IIB component
tr Q0SUP2 Q0SUP2_CLOPS	0840	Cytoplasmic	Rubrerythrin, Rbr_2
tr Q0SUP0 Q0SUP0_CLOPS	0842	Cytoplasmic	Nadh-dependent butanol dehydrogenase a
tr Q0SUM4 Q0SUM4_CLOPS	0858	Cytoplasmic	Acetyltransferase, GNAT family
tr Q0SUH5 Q0SUH5_CLOPS	0908	Cytoplasmic	Sucrose-6-phosphate hydrolase
tr Q0SUE9 Q0SUE9_CLOPS	0934	Cytoplasmic	Spore coat peptide assembly protein CotJc
tr Q0SUB0 Q0SUB0_CLOPS	0974	Cytoplasmic	Hydroxylamine reductase, Hcp
tr Q0SU99 Q0SU99_CLOPS	0985	Cytoplasmic	Uncharacterized protein
tr Q0SU73 Q0SU73_CLOPS	1011	Cytoplasmic	1,3-propanediol dehydrogenase, DhaT
tr Q0SU58 Q0SU58_CLOPS	1026	Cytoplasmic	Glutathione peroxidase
tr Q0SU57 Q0SU57_CLOPS	1027	Cytoplasmic	Collagen triple helix repeat protein
tr Q0SU38 Q0SU38_CLOPS	1047	Cytoplasmic	Ferritin family protein
tr Q0SU24 Q0SU24_CLOPS	1061	cytoplasmic	Oxidoreductase, 2-nitropropane dioxygenase family
sp Q0SU11 HPRK_CLOPS	1074	Cytoplasmic	HPr kinase/phosphorylase, HprK
tr Q0SU06 Q0SU06_CLOPS	1079	Cytoplasmic	Uncharacterized protein
tr Q0SU05 Q0SU05_CLOPS	1080	Cytoplasmic	Uncharacterized protein
tr Q0STY1 Q0STY1_CLOPS	1104	Cytoplasmic	Uncharacterized protein
tr Q0STV6 Q0STV6_CLOPS	1129	Cytoplasmic	Tetratricopeptide repeat protein
tr Q0STV5 Q0STV5_CLOPS	1130	Cytoplasmic	Glutamine-dependent NAD(+) synthetase, NadE
tr Q0STV3 Q0STV3_CLOPS	1132	Cytoplasmic	SPFH domain protein/band 7 family protein
sp Q0STU9 FABH_CLOPS	1136	Cytoplasmic	3-oxoacyl-[acyl-carrier-protein] synthase 3, FabH
tr Q0STU8 Q0STU8_CLOPS	1137	Cytoplasmic	Malonyl CoA-acyl carrier protein transacylase, FabD
tr Q0STU7 Q0STU7_CLOPS	1138	Cytoplasmic	3-oxoacyl-[acyl-carrier-protein] reductase, FabG
sp Q0STU4 FABZ_CLOPS	1141	Cytoplasmic	3-hydroxyacyl-[acyl-carrier-protein] dehydratase FabZ
tr Q0STU3 Q0STU3_CLOPS	1142	Cytoplasmic	Acetyl-CoA carboxylase, biotin carboxylase subunit, AccC
tr Q0STR6 Q0STR6_CLOPS	1169	Cytoplasmic	Formate acetyltransferase, Pfl
tr Q0STQ4 Q0STQ4_CLOPS	1181	Cytoplasmic	Threonine dehydratase, catabolic,

			TdcB
tr Q0STN2 Q0STN2_CLOPS	1203	Cytoplasmic	6-phosphofructokinase, PfkA
tr Q0STM9 Q0STM9_CLOPS	1206	Cytoplasmic	UDP-N-acetylmuramyl tripeptide synthetase MurC homolog
tr Q0STM0 Q0STM0_CLOPS	1215	Cytoplasmic	Putative CoA-substrate-specific enzyme activase
tr Q0STL0 Q0STL0_CLOPS	1225	Cytoplasmic	Amidohydrolase family protein
tr Q0STK4 Q0STK4_CLOPS	1231	Cytoplasmic	Putative dipeptidase
tr Q0STI9 Q0STI9_CLOPS	1246	Cytoplasmic	Uncharacterized protein
tr Q0STI8 Q0STI8_CLOPS	1247	Cytoplasmic	Uncharacterized protein
tr Q0STH0 Q0STH0_CLOPS	1265	Cytoplasmic	NADPH-dependent butanol dehydrogenase, Adh1
tr Q0STE7 Q0STE7_CLOPS	1288	Cytoplasmic	Tetratricopeptide repeat protein
tr Q0STE3 Q0STE3_CLOPS	1292	cytoplasmic	Ribonuclease R, Rnr
sp Q0STE0 ENO_CLOPS	1295	Cytoplasmic	Enolase, Eno
sp Q0STD7 GPMI_CLOPS	1298	Cytoplasmic	2,3-bisphosphoglycerate-independent phosphoglycerate mutase, Gpml
sp Q0STD6 TPIS_CLOPS	1299	Cytoplasmic	Triosephosphate isomerase, TpiA
sp Q0STD5 PGK_CLOPS	1300	Cytoplasmic	Phosphoglycerate kinase, Pgk
tr Q0STD4 Q0STD4_CLOPS	1301	Cytoplasmic	Glyceraldehyde-3-phosphate dehydrogenase, type I, Gap
tr Q0STC8 Q0STC8_CLOPS	1307	Cytoplasmic	DegV family protein
tr Q0STB6 Q0STB6_CLOPS	1321	Cytoplasmic	Serine acetyltransferase, CysE
tr Q0STA9 Q0STA9_CLOPS	1328	Cytoplasmic	Diacylglycerol kinase catalytic domain protein
tr Q0STA6 Q0STA6_CLOPS	1331	Cytoplasmic	Rubrerythrin
sp Q0STA4 Y1333_CLOPS	1333	Cytoplasmic	UPF0229 protein
tr Q0STA3 Q0STA3_CLOPS	1334	Cytoplasmic	Non-specific serine/threonine protein kinase, PrkA
sp Q0ST92 GAL1_CLOPS	1345	Cytoplasmic	Galactokinase, GalK
tr Q0ST87 Q0ST87_CLOPS	1350	Cytoplasmic	Fructose-1,6-bisphosphate aldolase, class II, Fba
sp Q0ST54 CLPX_CLOPS	1384	Cytoplasmic	ATP-dependent Clp protease ATP-binding subunit ClpX
sp Q0ST53 CLPP_CLOPS	1385	Cytoplasmic	ATP-dependent Clp protease proteolytic subunit, ClpP
sp Q0ST52 TIG_CLOPS	1386	Cytoplasmic	Trigger factor, Tig
sp Q0ST47 DEOD_CLOPS	1391	cytoplasmic	Purine nucleoside phosphorylase DeoD-type, DeoD
tr Q0ST22 Q0ST22_CLOPS	1416	cytoplasmic	ClpB protein
tr Q0SSZ0 Q0SSZ0_CLOPS	1448	Cytoplasmic	Aminotransferase, class V
tr Q0SSS9 Q0SSS9_CLOPS	1510	Cytoplasmic	Fructokinase
tr Q0SSR9 Q0SSR9_CLOPS	1520	Cytoplasmic	Uncharacterized protein
tr Q0SSQ1 Q0SSQ1_CLOPS	1539	Cytoplasmic	Peptidyl-prolyl cis-trans isomerase, cyclophilin-type
tr Q0SSM8 Q0SSM8_CLOPS	1563	Cytoplasmic	Uncharacterized protein
tr Q0SSI4 Q0SSI4_CLOPS	1607	Cytoplasmic	V-type ATP synthase subunit D, AtpD

sp Q0SSI3 VATB_CLOPS	1608	Cytoplasmic	V-type ATP synthase beta chain, AtpB
sp Q0SSI2 VATA_CLOPS	1609	Cytoplasmic	V-type ATP synthase alpha chain, AtpA
sp Q0SSH9 VATE_CLOPS	1612	Cytoplasmic	V-type ATP synthase subunit E, AtpE
tr Q0SSG4 Q0SSG4_CLOPS	1627	Cytoplasmic	Conserved domain protein
tr Q0SSF9 Q0SSF9_CLOPS	1633	Cytoplasmic	Arginine--tRNA ligase, ArgS
tr Q0SSF5 Q0SSF5_CLOPS	1637	Cytoplasmic	PhoH family protein
tr Q0SSF4 Q0SSF4_CLOPS	1638	Cytoplasmic	Putative DNA polymerase III, epsilon subunit
tr Q0SSF1 Q0SSF1_CLOPS	1641	Cytoplasmic	Phosphocarrier, HPr family
tr Q0SSF0 Q0SSF0_CLOPS	1642	Cytoplasmic	Aspartate aminotransferase, AspB
sp Q0SSE8 RNY_CLOPS	1644	Cytoplasmic	Ribonuclease Y, Rny
sp Q0SSE7 RECA_CLOPS	1645	Cytoplasmic	Protein RecA
sp Q0SSE5 RIMO_CLOPS	1647	Cytoplasmic	Ribosomal protein S12 methylthiotransferase RimO
tr Q0SSE3 Q0SSE3_CLOPS	1649	Cytoplasmic	Putative endopeptidase, ClpP
sp Q0SSE0 PNP_CLOPS	1652	Cytoplasmic	Polyribonucleotide nucleotidyltransferase, Pnp
sp Q0SSD9 RS15_CLOPS	1653	Cytoplasmic	30S ribosomal protein S15, RpsO
tr Q0SSD1 Q0SSD1_CLOPS	1661	Cytoplasmic	N utilization substance protein A, NusA
tr Q0SSC8 Q0SSC8_CLOPS	1664	Cytoplasmic	4-hydroxy-3-methylbut-2-en-1-yl diphosphate synthase, IspG
sp Q0SSC2 PYRH_CLOPS	1670	cytoplasmic	Uridylate kinase, PyrH
sp Q0SSC1 EFTS_CLOPS	1671	Cytoplasmic	Elongation factor Ts, Tsf
sp Q0SSC0 RS2_CLOPS	1672	Cytoplasmic	30S ribosomal protein S2, RpsB
tr Q0SSB2 Q0SSB2_CLOPS	1680	Cytoplasmic	50S ribosomal protein L19, RplS
sp Q0SSA8 RS16_CLOPS	1684	Cytoplasmic	30S ribosomal protein S16, RpsP
tr Q0SS97 Q0SS97_CLOPS	1695	Cytoplasmic	Acetate kinase, AckA_2
tr Q0SS89 Q0SS89_CLOPS	1703	Cytoplasmic	DAK2 domain protein
sp Q0SS87 RL28_CLOPS	1705	Cytoplasmic	50S ribosomal protein L28, RpmB
tr Q0SS75 Q0SS75_CLOPS	1717	Cytoplasmic	Phosphopantothenoylcysteine decarboxylase/phosphopantothenate--cysteine ligase, CoaBC
tr Q0SS68 Q0SS68_CLOPS	1724	Cytoplasmic	Stage IV sporulation protein A, SpoIVA
tr Q0SS60 Q0SS60_CLOPS	1732	Cytoplasmic	RNA polymerase sigma factor, SigG
tr Q0SS51 Q0SS51_CLOPS	1741	Cytoplasmic	Peptidase, U32 family
tr Q0SS47 Q0SS47_CLOPS	1745	Cytoplasmic	RNA-metabolizing metallo-beta-lactamase family protein
tr Q0SS37 Q0SS37_CLOPS	1755	Cytoplasmic	Cysteine desulfurase, IscS
sp Q0SR9 EFP_CLOPS	1803	Cytoplasmic	Elongation factor P, Efp
tr Q0SRV8 Q0SRV8_CLOPS	1835	Cytoplasmic	GTP-binding protein YchF
tr Q0SRV2 Q0SRV2_CLOPS	1841	Cytoplasmic	Phosphoglucomutase/phosphomanomutase family protein
sp Q0SRT7 RL20_CLOPS	1856	Cytoplasmic	50S ribosomal protein L20, RplT
sp Q0SRT6 RL35_CLOPS	1857	Cytoplasmic	50S ribosomal protein L35, RplI

tr Q0SRS6 Q0SRS6_CLOPS	1871	cytoplasmic	Aspartate-semialdehyde dehydrogenase, Asd
tr Q0SRS2 Q0SRS2_CLOPS	1875	cytoplasmic	Putative cob(I)alamin adenosyltransferase
sp Q0SRS1 DAPH_CLOPS	1876	Cytoplasmic	2,3,4,5-tetrahydropyridine-2,6-dicarboxylate N-acetyltransferase, DapH
sp Q0SRP8 SYD_CLOPS	1899	cytoplasmic	Aspartate--tRNA ligase, AspS
tr Q0SRM0 Q0SRM0_CLOPS	1927	Cytoplasmic	GTPase HflX
tr Q0SRI8 Q0SRI8_CLOPS	1960	Cytoplasmic	Transglycosylase, SLT family
tr Q0SRI3 Q0SRI3_CLOPS	1965	Cytoplasmic	Aminopeptidase
tr Q0SRH3 Q0SRH3_CLOPS	1975	Cytoplasmic	RNA polymerase sigma factor, RpoD
tr Q0SRG5 Q0SRG5_CLOPS	1983	Cytoplasmic	Pyruvate, phosphate dikinase, PpdK
sp Q0SRF3 RS21_CLOPS	1995	Cytoplasmic	30S ribosomal protein S21, RpsU
tr Q0SRE4 Q0SRE4_CLOPS	2004	Cytoplasmic	Chaperone protein DnaJ
sp Q0SRE3 DNAK_CLOPS	2005	Cytoplasmic	Chaperone protein DnaK
sp Q0SRD5 GPR_CLOPS	2013	Cytoplasmic	Germination protease, Gpr
tr Q0SRD0 Q0SRD0_CLOPS	2018	Cytoplasmic	Stage V sporulation protein AD, SpoVAD
sp Q0SRC7 SP2AB_CLOPS	2021	Cytoplasmic	Anti-sigma F factor, SpoIIAB
tr Q0SRC6 Q0SRC6_CLOPS	2022	Cytoplasmic	Anti-sigma F factor antagonist, SpoIIAA
sp Q0SRC4 DEOC_CLOPS	2024	Cytoplasmic	Deoxyribose-phosphate aldolase, DeoC
tr Q0SRC1 Q0SRC1_CLOPS	2027	Cytoplasmic	Putative manganese-dependent inorganic pyrophosphatase
tr Q0SRB9 Q0SRB9_CLOPS	2029	Cytoplasmic	Glutamate decarboxylase
tr Q0SR89 Q0SR89_CLOPS	2059	cytoplasmic	FemAB family protein
tr Q0SR77 Q0SR77_CLOPS	2071	Cytoplasmic	CspA family protein
sp Q0SR54 OBG_CLOPS	2094	Cytoplasmic	GTPase obg
sp Q0SR51 RL21_CLOPS	2097	Cytoplasmic	50S ribosomal protein L21, RplU
tr Q0SR48 Q0SR48_CLOPS	2100	Cytoplasmic	Radical SAM domain protein
tr Q0SR38 Q0SR38_CLOPS	2110	Cytoplasmic	Rod shape-determining protein MreB
tr Q0SR33 Q0SR33_CLOPS	2115	Cytoplasmic	Aminoacyl-histidine dipeptidase, PepD_1
tr Q0SR32 Q0SR32_CLOPS	2116	Cytoplasmic	Pyruvate kinase, Pyk
tr Q0SR19 Q0SR19_CLOPS	2131	Cytoplasmic	CBS domain protein
sp Q0SR11 SECA_CLOPS	2139	Cytoplasmic	Protein translocase subunit SecA
sp Q0SR05 METK_CLOPS	2145	Cytoplasmic	S-adenosylmethionine synthase, MetK
sp Q0SQZ4 ATPG_CLOPS	2163	Cytoplasmic	ATP synthase gamma chain, AtpG
sp Q0SQZ3 ATPA_CLOPS	2164	Cytoplasmic	ATP synthase subunit alpha, AtpA
tr Q0SQY7 Q0SQY7_CLOPS	2170	Cytoplasmic	Acetyl-CoA acetyltransferase
tr Q0SQY6 Q0SQY6_CLOPS	2171	Cytoplasmic	UDP-N-acetylglucosamine 2-epimerase, MnaA
sp Q0SQY5 UPP_CLOPS	2172	Cytoplasmic	Uracil phosphoribosyltransferase, Upp
sp Q0SQX5 PYRG_CLOPS	2182	Cytoplasmic	CTP synthase, PyrG

tr Q0SQW8 Q0SQW8_CLOPS	2189	cytoplasmic	LysM domain protein
sp Q0SQS9 G6PI_CLOPS	2252	cytoplasmic	Glucose-6-phosphate isomerase, Pgi
tr C6UAS4 C6UAS4_CLOPS	2275	Cytoplasmic	60 kDa chaperonin, GroEL
tr Q0SQP9 Q0SQP9_CLOPS	2283	Cytoplasmic	3-hydroxybutyryl-CoA dehydrogenase, Hbd
tr Q0SQP8 Q0SQP8_CLOPS	2284	Cytoplasmic	Electron transfer flavoprotein, alpha subunit/FixB family protein, FixB
tr Q0SQP6 Q0SQP6_CLOPS	2286	Cytoplasmic	Butyryl-CoA dehydrogenase, Bcd
tr Q0SQP5 Q0SQP5_CLOPS	2287	Cytoplasmic	3-hydroxybutyryl-CoA dehydratase, Crt
sp Q0SQP4 REX_CLOPS	2288	Cytoplasmic	Redox-sensing transcriptional repressor rex
tr Q0SQN8 Q0SQN8_CLOPS	2294	Cytoplasmic	Mannose-1-phosphate guanylyltransferase
sp Q0SQM4 SYT_CLOPS	2317	Cytoplasmic	Threonine--tRNA ligase, ThrS
tr Q0SQL9 Q0SQL9_CLOPS	2322	Cytoplasmic	Glutamine--fructose-6-phosphate aminotransferase [isomerizing], GlmS
tr Q0SQL8 Q0SQL8_CLOPS	2323	Cytoplasmic	Rubrerythrin family protein
sp Q0SQL7 GLMM_CLOPS	2324	Cytoplasmic	Phosphoglucosamine mutase, GlmM
sp Q0SQK0 BUK_CLOPS	2342	cytoplasmic	Probable butyrate kinase buk
tr Q0SQJ9 Q0SQJ9_CLOPS	2343	cytoplasmic	Phosphate butyryltransferase ptb
tr Q0SQJ1 Q0SQJ1_CLOPS	2351	cytoplasmic	Isoaspartyl dipeptidase, ladA
tr Q0SQJ0 Q0SQJ0_CLOPS	2352	Cytoplasmic	Phosphoenolpyruvate-protein phosphotransferase, PtsI
sp Q0SQI8 RS4B_CLOPS	2354	Cytoplasmic	30S ribosomal protein S4 B, RpsD2
sp Q0SQH9 RS9_CLOPS	2363	Cytoplasmic	30S ribosomal protein S9, RpsI
sp Q0SQH8 RL13_CLOPS	2364	Cytoplasmic	50S ribosomal protein L13, RplM
sp Q0SQH4 RL17_CLOPS	2369	Cytoplasmic	50S ribosomal protein L17, RplQ
sp Q0SQH3 RPOA_CLOPS	2370	Cytoplasmic	DNA-directed RNA polymerase subunit alpha, RpoA
sp Q0SQH2 RS4A_CLOPS	2371	Cytoplasmic	30S ribosomal protein S4 AR, psD1
sp Q0SQH1 RS11_CLOPS	2372	Cytoplasmic	30S ribosomal protein S11, RpsK
sp Q0SQH0 RS13_CLOPS	2373	Cytoplasmic	30S ribosomal protein S13, RpsM
sp Q0SQG1 RS5_CLOPS	2382	Cytoplasmic	30S ribosomal protein S5, RpsE
sp Q0SQG0 RL18_CLOPS	2383	Cytoplasmic	50S ribosomal protein L18, RplR
sp Q0SQF9 RL6_CLOPS	2384	Cytoplasmic	50S ribosomal protein L6, RplF
sp Q0SQF8 RS8_CLOPS	2385	Cytoplasmic	30S ribosomal protein S8, RpsH
sp Q0SQF6 RL5_CLOPS	2387	Cytoplasmic	50S ribosomal protein L5, RplE
sp Q0SQF4 RL14_CLOPS	2389	Cytoplasmic	50S ribosomal protein L14, RplN
sp Q0SQF3 RS17_CLOPS	2390	Cytoplasmic	30S ribosomal protein S17, RpsQ
sp Q0SQF1 RL16_CLOPS	2392	Cytoplasmic	50S ribosomal protein L16, RplP
sp Q0SQF0 RS3_CLOPS	2393	Cytoplasmic	30S ribosomal protein S3, RpsC
sp Q0SQE9 RL22_CLOPS	2394	Cytoplasmic	50S ribosomal protein L22, RplV
sp Q0SQE8 RS19_CLOPS	2395	Cytoplasmic	30S ribosomal protein S19, RpsS
sp Q0SQE6 RL23_CLOPS	2397	Cytoplasmic	50S ribosomal protein L23, RplW

sp Q0SQE4 RL3_CLOPS	2399	cytoplasmic	50S ribosomal protein L3, RplC
sp Q0SQE3 RS10_CLOPS	2400	Cytoplasmic	30S ribosomal protein S10, RpsJ
sp Q0SQC8 EFTU_CLOPS	2402	cytoplasmic	Elongation factor Tu, Tuf1
sp Q0SQE1 EFG_CLOPS	2403	Cytoplasmic	Elongation factor G, FusA
sp Q0SQE0 RS7_CLOPS	2404	Cytoplasmic	30S ribosomal protein S7, RpsG
sp Q0SQD9 RS12_CLOPS	2405	Cytoplasmic	30S ribosomal protein S12, RpsL
sp Q0SQD7 RPOC_CLOPS	2407	Cytoplasmic	DNA-directed RNA polymerase subunit beta, RpoC
sp Q0SQD6 RPOB_CLOPS	2408	Cytoplasmic	DNA-directed RNA polymerase subunit beta, RpoB
sp Q0SQD5 RL7_CLOPS	2409	Cytoplasmic	50S ribosomal protein L7/L12, RplL
tr Q0SQD4 Q0SQD4_CLOPS	2410	Cytoplasmic	50S ribosomal protein L10, RplJ
sp Q0SQD3 RL1_CLOPS	2411	Cytoplasmic	50S ribosomal protein L1, RplA
sp Q0SQD2 RL11_CLOPS	2412	Cytoplasmic	50S ribosomal protein L11, RplK
tr Q0SQC4 Q0SQC4_CLOPS	2421	Cytoplasmic	Thymidylate synthase ThyX
sp Q0SQC1 SYC_CLOPS	2424	Cytoplasmic	Cysteine--tRNA ligase, CysS
sp Q0SQC0 SYP_CLOPS	2425	Cytoplasmic	Proline--tRNA ligase, ProS
tr Q0SQB7 Q0SQB7_CLOPS	2428	Cytoplasmic	Uncharacterized protein
tr Q0SQB1 Q0SQB1_CLOPS	2434	Cytoplasmic	Glyceraldehyde-3-phosphate dehydrogenase, NADP-dependent, GapN
tr Q0SQ95 Q0SQ95_CLOPS	2450	Cytoplasmic	Amidohydrolase homolog
tr Q0SQ87 Q0SQ87_CLOPS	2465	Cytoplasmic	Glycine--tRNA ligase, GlyS
sp Q0SQ86 SYK_CLOPS	2467	Cytoplasmic	Lysine--tRNA ligase, LysS
tr Q0SQ69 Q0SQ69_CLOPS	2491	Cytoplasmic	Stage V sprulation protein T, SpoVT
tr Q0SQ62 Q0SQ62_CLOPS	2498	Cytoplasmic	Ribose-phosphate pyrophosphokinase, PrsA
sp Q0SQ51 SYN_CLOPS	2509	cytoplasmic	Asparagine--tRNA ligase, AsnS
sp Q0SQ50 AMPA_CLOPS	2510	cytoplasmic	Probable cytosol aminopeptidase, PepA
tr Q0SQ35 Q0SQ35_CLOPS	2525	Cytoplasmic	Uncharacterized protein
tr Q0SQ27 Q0SQ27_CLOPS	2533	Cytoplasmic	Methionine--tRNA ligase, MetG_2
tr Q0SQ20 Q0SQ20_CLOPS	2540	Cytoplasmic	Aldehyde-alcohol dehydrogenase, AdhE
tr Q0SQ12 Q0SQ12_CLOPS	2548	Cytoplasmic	Putative catabolite control protein A
sp Q0SQ01 GLPK_CLOPS	2559	Cytoplasmic	Glycerol kinase, GlpK
tr Q0SPZ6 Q0SPZ6_CLOPS	2564	Cytoplasmic	Putative lipoprotein
tr Q0SPZ0 Q0SPZ0_CLOPS	2570	Cytoplasmic	Peptidyl-prolyl cis-trans isomerase
sp Q0SPX8 PROA_CLOPS	2582	Cytoplasmic	Gamma-glutamyl phosphate reductase, ProA
tr Q0SPX6 Q0SPX6_CLOPS	2584	Cytoplasmic	Oxidoreductase, short chain dehydrogenase/reductase family
tr Q0SPS1 Q0SPS1_CLOPS	2651	Cytoplasmic	DHH family protein
sp Q0SPR8 RS18_CLOPS	2654	Cytoplasmic	30S ribosomal protein S18, RpsR
sp Q0SPP8 RL34_CLOPS	2674	Cytoplasmic	50S ribosomal protein L34, RpmH
sp Q0SWT6 PSD_CLOPS	0033	Cytoplasmic Membrane	Phosphatidylserine decarboxylase proenzyme psd
tr Q0SWV4 Q0SWV4_CLOPS	0036	Cytoplasmic Membrane	Putative transporter

tr Q0SWK4 Q0SWK4_CLOPS	0159	Cytoplasmic Membrane	Arginine/ornithine antiporter, ArcD
tr Q0SWI7 Q0SWI7_CLOPS	0176	Cytoplasmic Membrane	Sodium:solute transporter
tr Q0SWD6 Q0SWD6_CLOPS	0230	Cytoplasmic Membrane	Uncharacterized protein
tr Q0SWC5 Q0SWC5_CLOPS	0241	Cytoplasmic Membrane	Uncharacterized protein
tr Q0SWB6 Q0SWB6_CLOPS	0253	Cytoplasmic Membrane	PPIC-type PPIASE domain protein
tr Q0SW99 Q0SW99_CLOPS	0271	Cytoplasmic Membrane	Putative transcriptional regulator
tr Q0SW80 Q0SW80_CLOPS	0291	Cytoplasmic Membrane	Putative cell division ATP-binding protein FtsE
tr Q0SW79 Q0SW79_CLOPS	0292	Cytoplasmic Membrane	Cell division protein FtsX
tr Q0SW78 Q0SW78_CLOPS	0293	Cytoplasmic Membrane	Carboxyl-terminal protease
tr Q0SW59 Q0SW59_CLOPS	0312	Cytoplasmic Membrane	Uncharacterized protein
tr Q0SW39 Q0SW39_CLOPS	0332	Cytoplasmic Membrane	Putative penicillin-binding protein
tr Q0SW08 Q0SW08_CLOPS	0363	Cytoplasmic Membrane	ABC transporter, permease/ATP-binding protein
tr Q0SW07 Q0SW07_CLOPS	0364	Cytoplasmic Membrane	ABC transporter, permease/ATP-binding protein
tr Q0SW05 Q0SW05_CLOPS	0366	Cytoplasmic Membrane	Toxin secretion/phage lysis holin
tr Q0SVY4 Q0SVY4_CLOPS	0387	Cytoplasmic Membrane	Uncharacterized protein
tr Q0SVX2 Q0SVX2_CLOPS	0399	Cytoplasmic Membrane	PTS system, mannose/fructose/sorbose family, IID component
tr Q0SVU0 Q0SVU0_CLOPS	0431	Cytoplasmic Membrane	Uncharacterized protein
tr Q0SVP6 Q0SVP6_CLOPS	0476	Cytoplasmic Membrane	ABC transporter, substrate-binding protein
tr Q0SVP5 Q0SVP5_CLOPS	0477	Cytoplasmic Membrane	ABC transporter, permease protein
tr Q0SVP4 Q0SVP4_CLOPS	0478	Cytoplasmic Membrane	ABC transporter, permease protein
tr Q0SVJ4 Q0SVJ4_CLOPS	0528	Cytoplasmic Membrane	Stage V sporulation protein D
tr Q0SVI2 Q0SVI2_CLOPS	0540	Cytoplasmic Membrane	ABC transporter, substrate-binding protei
tr Q0SVF9 Q0SVF9_CLOPS	0564	Cytoplasmic Membrane	Signal peptidase I
tr Q0SVF8 Q0SVF8_CLOPS	0565	Cytoplasmic Membrane	ATP-dependent zinc metalloprotease FtsH
tr Q0SVC5 Q0SVC5_CLOPS	0598	Cytoplasmic Membrane	Cell envelope-related transcriptional attenuator domain family
tr Q0SVC0 Q0SVC0_CLOPS	0603	Cytoplasmic Membrane	Phosphate ABC transporter, phosphate-binding protein, PstS_1
tr Q0SVA8 Q0SVA8_CLOPS	0615	Cytoplasmic Membrane	Spore germination protein, GerABKA family
tr Q0SV26 Q0SV26_CLOPS	0698	Cytoplasmic Membrane	ABC transporter, ATP-binding protein
tr Q0SUZ4 Q0SUZ4_CLOPS	0730	Cytoplasmic Membrane	Uncharacterized protein
tr Q0SUS7 Q0SUS7_CLOPS	0805	Cytoplasmic Membrane	PTS system, mannose/fructose/sorbose family, IIC component
tr Q0SUS6 Q0SUS6_CLOPS	0806	Cytoplasmic Membrane	PTS system, mannose/fructose/sorbose family, IID component
tr Q0SUR3 Q0SUR3_CLOPS	0819	Cytoplasmic Membrane	Antibiotic ABC transporter, permease protein

tr Q0SUM3 Q0SUM3_CLOPS	0859	Cytoplasmic Membrane	Uncharacterized protein
tr Q0SUH9 Q0SUH9_CLOPS	0904	Cytoplasmic Membrane	Substrate-binding protein MsmE
tr Q0SUH6 Q0SUH6_CLOPS	0907	Cytoplasmic Membrane	Sugar ABC transporter, ATP-binding protein , MsmK
tr Q0SUE8 Q0SUE8_CLOPS	0935	Cytoplasmic Membrane	PTS system, N-acetylglucosamine-specific IIBC component, NagE
tr Q0SUA1 Q0SUA1_CLOPS	0983	Cytoplasmic Membrane	Cation efflux family protein
tr Q0SU83 Q0SU83_CLOPS	1001	Cytoplasmic Membrane	Glycerol uptake facilitator protein, GlpE
tr Q0SU63 Q0SU63_CLOPS	1021	Cytoplasmic Membrane	ABC transporter, ATP-binding protein
tr Q0SU50 Q0SU50_CLOPS	1034	Cytoplasmic Membrane	Amino acid permease family protein
tr Q0SU32 Q0SU32_CLOPS	1053	Cytoplasmic Membrane	GerA spore germination protein
tr Q0SU31 Q0SU31_CLOPS	1054	Cytoplasmic Membrane	C4-dicarboxylate anaerobic carrier family protein
tr Q0STX0 Q0STX0_CLOPS	1115	Cytoplasmic Membrane	Iron compound ABC transporter, iron-binding protein
tr Q0STU6 Q0STU6_CLOPS	1139	Cytoplasmic Membrane	3-oxoacyl-[acyl-carrier-protein] synthase 2, FabF
tr Q0STF9 Q0STF9_CLOPS	1276	Cytoplasmic Membrane	Oligopeptide transporter, OPT family
tr Q0STA8 Q0STA8_CLOPS	1329	Cytoplasmic Membrane	CDP-diacylglycerol--serine O-phosphatidyltransferase, PssA
tr Q0ST94 Q0ST94_CLOPS	1343	Cytoplasmic Membrane	Galactoside ABC transporter, permease protein, MglC
tr Q0ST89 Q0ST89_CLOPS	1348	Cytoplasmic Membrane	Uncharacterized protein
tr Q0SSS6 Q0SSS6_CLOPS	1513	Cytoplasmic Membrane	PTS system, sucrose-specific IIBC component
tr Q0SSP8 Q0SSP8_CLOPS	1542	Cytoplasmic Membrane	Phage shock protein A, PspA
tr Q0SSP0 Q0SSP0_CLOPS	1550	Cytoplasmic Membrane	ABC transporter, permease protein
tr Q0SSJ7 Q0SSJ7_CLOPS	1594	Cytoplasmic Membrane	Putative lipoprotein
tr Q0SSH8 Q0SSH8_CLOPS	1613	Cytoplasmic Membrane	V-type ATPase, K subunit
tr Q0SSH7 Q0SSH7_CLOPS	1614	Cytoplasmic Membrane	V-type ATPase, I subunit
tr Q0SSG1 Q0SSG1_CLOPS	1631	Cytoplasmic Membrane	Ferrous iron transport protein B, FeoB_2
tr Q0SSC7 Q0SSC7_CLOPS	1665	Cytoplasmic Membrane	RIP metalloprotease RseP
tr Q0SSA5 Q0SSA5_CLOPS	1687	Cytoplasmic Membrane	Signal recognition particle receptor FtsY
tr Q0SS83 Q0SS83_CLOPS	1709	Cytoplasmic Membrane	Serine/threonine protein kinase BH2504
tr Q0SS79 Q0SS79_CLOPS	1713	Cytoplasmic Membrane	Putative neutral zinc metallopeptidase
sp Q0SS66 DER_CLOPS	1726	Cytoplasmic Membrane	GTPase Der
tr Q0SS49 Q0SS49_CLOPS	1743	Cytoplasmic Membrane	Uncharacterized protein
tr Q0SRW6 Q0SRW6_CLOPS	1826	Cytoplasmic Membrane	Cell division protein FtsQ
tr Q0SRP0 Q0SRP0_CLOPS	1907	Cytoplasmic Membrane	Protein-export membrane protein SecF
tr Q0SRN9 Q0SRN9_CLOPS	1908	Cytoplasmic Membrane	Protein translocase subunit SecD
tr Q0SRN6 Q0SRN6_CLOPS	1911	Cytoplasmic Membrane	Preprotein translocase, YajC

			subunit, YajC_2
sp Q0SRL7 PBPA_CLOPS	1930	Cytoplasmic Membrane	Penicillin-binding protein 1A, PbpA
tr Q0SRL1 Q0SRL1_CLOPS	1936	Cytoplasmic Membrane	Spermidine/putrescine ABC transporter, permease protein PotB
tr Q0SRK4 Q0SRK4_CLOPS	1943	Cytoplasmic Membrane	D-alanyl-D-alanine carboxypeptidase family protein
tr Q0SRG7 Q0SRG7_CLOPS	1981	Cytoplasmic Membrane	Putative permease
tr Q0SRD1 Q0SRD1_CLOPS	2017	Cytoplasmic Membrane	Stage V sporulation protein AE, SpoVAE
tr Q0SRC9 Q0SRC9_CLOPS	2019	Cytoplasmic Membrane	Stage V sporulation protein AC, SpoVAC
tr Q0SRC2 Q0SRC2_CLOPS	2026	Cytoplasmic Membrane	Cation-transporting ATPase, P-type
sp Q0SRB4 MURG_CLOPS	2034	Cytoplasmic Membrane	MurG transferasetransferase
tr Q0SR78 Q0SR78_CLOPS	2070	Cytoplasmic Membrane	CspC family protein
tr Q0SR70 Q0SR70_CLOPS	2078	Cytoplasmic Membrane	Transmembrane protein Vexp3
tr Q0SR43 Q0SR43_CLOPS	2105	Cytoplasmic Membrane	Site-determining protein, MinD
tr Q0SR24 Q0SR24_CLOPS	2124	Cytoplasmic Membrane	PTS system, glucose-specific IIBC component, PtsG
tr Q0SR23 Q0SR23_CLOPS	2125	Cytoplasmic Membrane	ABC transporter, substrate-binding protein
sp Q0SQZ5 ATPB_CLOPS	2162	Cytoplasmic Membrane	ATP synthase subunit beta, AtpD
sp Q0SQZ1 ATPF_CLOPS	2166	Cytoplasmic Membrane	ATP synthase subunit b, AtpF
tr Q0SQX6 Q0SQX6_CLOPS	2181	Cytoplasmic Membrane	Transcription termination factor Rho
tr Q0SQW9 Q0SQW9_CLOPS	2188	Cytoplasmic Membrane	Cyanophycinase, CphB
tr Q0SQT7 Q0SQT7_CLOPS	2244	Cytoplasmic Membrane	Uncharacterized protein
tr Q0SQS7 Q0SQS7_CLOPS	2254	Cytoplasmic Membrane	Oligopeptide/dipeptide ABC transporter, ATP-binding protein
tr Q0SQS6 Q0SQS6_CLOPS	2255	Cytoplasmic Membrane	Oligopeptide/dipeptide ABC transporter, ATP-binding protein
tr Q0SQS4 Q0SQS4_CLOPS	2257	Cytoplasmic Membrane	Oligopeptide/dipeptide ABC transporter, permease protein
tr Q0SQS2 Q0SQS2_CLOPS	2259	Cytoplasmic Membrane	Major facilitator family transporter
tr Q0SQP3 Q0SQP3_CLOPS	2289	Cytoplasmic Membrane	Zinc-transporting atpase
tr Q0SQK2 Q0SQK2_CLOPS	2340	Cytoplasmic Membrane	ABC transporter, ATP-binding protein
tr Q0SQG4 Q0SQG4_CLOPS	2379	Cytoplasmic Membrane	Protein translocase subunit SecY
tr Q0SQB8 Q0SQB8_CLOPS	2427	Cytoplasmic Membrane	PIN/TRAM domain protein
tr Q0SQ93 Q0SQ93_CLOPS	2452	Cytoplasmic Membrane	Putative cation transporter2 PE=4 SV=1
tr Q0SQ81 Q0SQ81_CLOPS	2472	Cytoplasmic Membrane	ATP-dependent zinc metalloprotease FtsH
sp Q0SQ68 PRSA_CLOPS	2492	Cytoplasmic Membrane	Foldase protein PrsA
tr Q0SQ55 Q0SQ55_CLOPS	2505	Cytoplasmic Membrane	Nucleoside transporter, NupC family
tr Q0SQ36 Q0SQ36_CLOPS	2524	Cytoplasmic Membrane	Uncharacterized protein
tr Q0SPW7 Q0SPW7_CLOPS	2593	Cytoplasmic Membrane	Putative phage infection protein
tr Q0SPW6 Q0SPW6_CLOPS	2594	Cytoplasmic Membrane	Putative phage infection protein
tr Q0SPQ1 Q0SPQ1_CLOPS	2671	Cytoplasmic Membrane	Membrane protein OxaA

tr Q0STI4 Q0STI4_CLOPS	1251	extracellular	Superoxide dismutase, SodF
tr Q0STC4 Q0STC4_CLOPS	1311	extracellular	Glycosyl hydrolase, family 25
tr Q0SPZ3 Q0SPZ3_CLOPS	2567	Extracellular	Protease CspB
tr Q0SWP9 Q0SWP9_CLOPS	0114	unknown	Uncharacterized protein
sp Q0SWN5 CINA_CLOPS	0128	unknown	Putative competence-damage inducible protein, CinA1
tr Q0SWM3 Q0SWM3_CLOPS	0140	unknown	Nad-dependent malic enzyme
tr Q0SWH6 Q0SWH6_CLOPS	0188	unknown	5'-nucleotidase, lipoprotein e(P4) family
tr Q0SW97 Q0SW97_CLOPS	0273	unknown	UDP-glucose 4-epimerase, GalE_1
tr Q0SW33 Q0SW33_CLOPS	0338	unknown	Putative lioprotein
tr Q0SVR9 Q0SVR9_CLOPS	0452	unknown	Capsule chain length determinant protein
tr Q0SVQ8 Q0SVQ8_CLOPS	0463	unknown	Uncharacterized protein
tr Q0SVP3 Q0SVP3_CLOPS	0479	unknown	Sortase family protein
tr Q0SVM0 Q0SVM0_CLOPS	0502	unknown	Putative lipoprotein
tr Q0SVF6 Q0SVF6_CLOPS	0567	unknown	Amino acid ABC transporter, amino acid-binding protein
tr Q0SUS5 Q0SUS5_CLOPS	0807	unknown	Uncharacterized protein
tr Q0SU89 Q0SU89_CLOPS	0995	unknown	Conserved domain protein
tr Q0STY5 Q0STY5_CLOPS	1100	unknown	Putative lipoprotein
tr Q0STM6 Q0STM6_CLOPS	1209	unknown	VanW-related protein
tr Q0STC9 Q0STC9_CLOPS	1306	unknown	Lipoprotein, BMP family
tr Q0STC5 Q0STC5_CLOPS	1310	unknown	VanW-like family protein
tr Q0STB8 Q0STB8_CLOPS	1319	unknown	1-acyl-sn-glycerol-3-phosphate acyltransferase family protein
tr Q0ST96 Q0ST96_CLOPS	1341	unknown	Putative galactoside ABC transporter, galactoside-binding protein
tr Q0ST88 Q0ST88_CLOPS	1349	unknown	Uncharacterized protein
tr Q0ST82 Q0ST82_CLOPS	1355	unknown	Uncharacterized protein
tr Q0ST46 Q0ST46_CLOPS	1392	unknown	Uncharacterized protein
tr Q0SSX2 Q0SSX2_CLOPS	1466	unknown	Uncharacterized protein
tr Q0SSV8 Q0SSV8_CLOPS	1480	unknown	Metallo-beta-lactamase family protein
tr Q0SST6 Q0SST6_CLOPS	1502	unknown	Uncharacterized protein
tr Q0SSN8 Q0SSN8_CLOPS	1552	unknown	Lipoprotein, BMP family
tr Q0SSJ9 Q0SSJ9_CLOPS	1592	unknown	Uncharacterized protein
tr Q0SSE2 Q0SSE2_CLOPS	1650	unknown	Aspartokinase
tr Q0SS88 Q0SS88_CLOPS	1704	unknown	Uncharacterized protein
tr Q0SS80 Q0SS80_CLOPS	1712	unknown	Ribosomal RNA small subunit methyltransferase B, Sun
tr Q0SS20 Q0SS20_CLOPS	1772	unknown	Uncharacterized protein
tr Q0SRV7 Q0SRV7_CLOPS	1836	unknown	Delta-lactam-biosynthetic de-N-acetylase, PdaA
tr Q0SRG6 Q0SRG6_CLOPS	1982	unknown	Uncharacterized protein
tr Q0SRC3 Q0SRC3_CLOPS	2025	unknown	Uncharacterized protein
tr Q0SRB6 Q0SRB6_CLOPS	2032	unknown	Pyruvate-flavodoxin oxidoreductase, NifJ

tr Q0SR94 Q0SR94_CLOPS	2054	unknown	Molybdate ABC transporter, molybdate-binding protein, ModA
tr Q0SR35 Q0SR35_CLOPS	2113	unknown	Uncharacterized protein
tr Q0SQW4 Q0SQW4_CLOPS	2193	unknown	Mannosyltransferase B, MtfB
tr Q0SQV7 Q0SQV7_CLOPS	2200	unknown	Serine protease
tr Q0SQR1 Q0SQR1_CLOPS	2270	unknown	Prepilin-type N-terminal cleavage/methylation domain protein
tr Q0SQP7 Q0SQP7_CLOPS	2285	unknown	Electron transfer flavoprotein, beta subunit/FixA family protein
tr Q0SQK4 Q0SQK4_CLOPS	2338	unknown	Putative maltose/maltodextrin ABC transporter, maltose/maltodextrin-binding protein
tr Q0SQJ7 Q0SQJ7_CLOPS	2345	unknown	Uncharacterized protein
sp Q0SQG3 RL15_CLOPS	2380	unknown	50S ribosomal protein L15, RplO
sp Q0SQE7 RL2_CLOPS	2396	unknown	50S ribosomal protein L2, RplB
sp Q0SQE5 RL4_CLOPS	2398	unknown	50S ribosomal protein L4, RplD
sp Q0SQ58 MURC_CLOPS	2502	unknown	UDP-N-acetylmuramate--L-alanine ligase, MurC
tr Q0SQ56 Q0SQ56_CLOPS	2504	unknown	Purine nucleoside phosphorylase, PunA
tr Q0SQ38 Q0SQ38_CLOPS	2522	unknown	Putative lipoprotein
tr Q0SQ30 Q0SQ30_CLOPS	2530	unknown	Uncharacterized protein
tr Q0SPZ4 Q0SPZ4_CLOPS	2566	unknown	Spore cortex-lytic enzyme SleC
tr Q0SPY2 Q0SPY2_CLOPS	2578	unknown	Conserved domain protein
tr Q0SPX1 Q0SPX1_CLOPS	2589	unknown	Conserved domain protein

Table S3. Predicted spore membrane proteins.

UniProt ID	Gene name (CPR #)	Fold change (G/D) ^a	THMs ^b	membrane association ^c	protein function
Q0SQX6	2181	0.2	0	lipoprotein	transcription termination factor Rho
Q0SVP6	0476	0.3	0	lipoprotein	ABC transporter, substrate-binding protein
Q0SQZ1	2166	0.3	1	IMP	ATP synthase subunit b, AtpF
Q0SPW6	2594	0.3	6	IMP	putative phage infection protein
Q0SR24	2124	0.3	10	IMP	PTS system, glucose-specific IIBC component ptsG
Q0SVC0	0603	0.5	1	lipoprotein	phosphate ABC transporter, phosphate-binding protein PstS_1
Q0SU32	1053	0.5	4	IMP	GerA spore germination protein GerAA
Q0SUE8	0935	0.5	12	IMP	PTS system, N-acetylglucosamine-specific IIBC component NagE
Q0SWC5	0241	0.6	0	lipoprotein	uncharacterized protein
Q0SS66	1726	0.6	0	lipoprotein	GTPase Der
Q0SRL7	1930	0.6	1	IMP	penicillin-binding protein 1A, PbpA
Q0SRG7	1981	0.6	4	IMP	putative permease
Q0SQB8	2427	0.6	4	IMP	PIN/TRAM domain protein
Q0SRL1	1936	0.6	6	IMP	spermidine/putrescine ABC transporter, permease protein PotB
Q0STU6	1139	0.7	0	lipoprotein	3-oxoacyl-[acyl-carrier-protein] synthase 2 FabF
Q0SW79	0292	0.7	4	IMP	cell division protein FtsX
Q0SRC9	2019	0.7	4	IMP	stage V sporulation protein AC, SpoVAC
Q0SVP5	0477	0.7	6	IMP	ABC transporter, permease protein
Q0SSH7	1614	0.7	7	IMP	V-type ATPase, I subunit
Q0SSP8	1542	0.8	0	lipoprotein	phage shock protein A, PspA
Q0SQS7	2254	0.8	0	lipoprotein	oligopeptide/dipeptide ABC transporter, ATP-binding protein
Q0SS79	1713	0.8	4	IMP	putative neutral zinc metallopeptidase
Q0SPQ1	2671	0.8	6	IMP	membrane protein OxaA
Q0SW99	0271	0.9	1	IMP	putative transcriptional regulator
Q0SVF8	0565	0.9	2	IMP	ATP-dependent zinc metalloprotease FtsH
Q0SVA8	0615	0.9	4	IMP	spore germination protein, GerABKA family GerKA
Q0SUM3	0859	0.9	4	IMP	uncharacterized protein
Q0SPW7	2593	0.9	6	IMP	putative phage infection protein
Q0SVC5	0598	1	1	IMP	cell envelope-related transcriptional attenuator domain family
Q0ST94	1343	1	8	IMP	galactoside ABC transporter, permease protein MglC
Q0STF9	1276	1.1	16	IMP	oligopeptide transporter, OPT family
Q0SR43	2105	1.2	0	lipoprotein	site-determining protein MinD

Q0SQZ5	2162	1.2	0	lipoprotein	ATP synthase subunit beta, AtpD
Q0SVU0	0431	1.2	1	IMP	uncharacterized protein
Q0SQ68	2492	1.2	1	lipoprotein	foldase protein PrsA
Q0SRD1	2017	1.2	4	IMP	stage V sporulation protein AE, SpoVAE
Q0SUH9	0904	1.3	0	lipoprotein	substrate-binding protein MsmE
Q0SSC7	1665	1.3	4	IMP	RIP metalloprotease RseP
Q0SQP3	2289	1.3	6	IMP	zinc-transporting ATPase
Q0SV26	0698	1.4	0	lipoprotein	ABC transporter, ATP-binding protein
Q0SW78	0293	1.4	1	IMP	carboxyl-terminal protease
Q0SR23	2125	1.4	1	lipoprotein	ABC transporter, substrate-binding protein
Q0STA8	1329	1.4	5	IMP	CDP-diacylglycerol--serine O-phosphatidyltransferase PssA
Q0SS49	1743	1.5	1	IMP	uncharacterized protein
Q0SUS6	0806	1.5	3	IMP	PTS system, mannose/fructose/sorbose family, IID component
Q0SW07	0364	1.5	4	IMP	ABC transporter, permease/ATP-binding protein
Q0SRP0	1907	1.5	6	IMP	protein-export membrane protein SecF
Q0SUR3	0819	1.5	12	IMP	antibiotic ABC transporter, permease protein
Q0SU31	1054	1.5	12	IMP	C4-dicarboxylate anaerobic carrier family protein
Q0SS83	1709	1.6	1	IMP	serine/threonine protein kinase pknB-like protein
Q0SRN6	1911	1.6	1	IMP	preprotein translocase, YajC subunit YajC_2
Q0SUS7	0805	1.6	7	IMP	PTS system, mannose/fructose/sorbose family, IIC component
Q0SRK4	1943	1.9	2	IMP	D-alanyl-D-alanine carboxypeptidase family protein
Q0SWD6	0230	1.9	3	IMP	uncharacterized protein
Q0SWK4	0159	1.9	12	IMP	arginine/ornithine antiporter ArcD
Q0SQG4	2379	2	10	IMP	protein translocase subunit SecY
Q0ST89	1348	2.2	2	IMP	uncharacterized protein
Q0SQ55	2505	2.2	9	IMP	nucleoside transporter, NupC family
Q0SQS2	2259	2.2	12	IMP	major facilitator family transporter
Q0STX0	1115	2.3	1	lipoprotein	iron compound ABC transporter, iron-binding protein
Q0SWI7	0176	2.3	13	IMP	sodium:solute transporter
Q0SVJ4	0528	2.5	1	IMP	stage V sporulation protein D
Q0SUA1	0983	2.5	6	IMP	cation efflux family protein
Q0SSH8	1613	2.6	4	IMP	V-type ATPase, K subunit
Q0SRN9	1908	2.6	6	IMP	protein translocase subunit SecD
Q0SVP4	0478	2.9	6	IMP	ABC transporter, permease protein
Q0SW39	0332	3.1	1	IMP	putative penicillin-binding protein
Q0SQ81	2472	3.7	2	IMP	ATP-dependent zinc metalloprotease FtsH

Q0SQK2	2340	4.4	0	lipoprotein	ABC transporter, ATP-binding protein
Q0SVX2	0399	4.7	3	IMP	PTS system, mannose/fructose/sorbose family, IID component
Q0SU83	1001	6.4	7	IMP	glycerol uptake facilitator protein GlpE
Q0SWW1	0076	D	0	lipoprotein	putative pyruvate, phosphate dikinase regulatory protein
Q0SVB6	0607	D	0	lipoprotein	phosphate import ATP-binding protein PstB
Q0SS48	1744	D	0	lipoprotein	GTP-binding protein TypA
Q0SRD8	2010	D	0	lipoprotein	elongation factor 4 LepA
Q0STE2	1293	D	2	IMP	preprotein translocase, SecG subunit
Q0SRW8	1824	D	4	IMP	small basic protein
Q0SR25	2123	D	4	IMP	MutS domain-containing protein
Q0SVV6	0415	D	5	IMP	uncharacterized protein
Q0SQY9	2168	D	5	IMP	ATP synthase subunit a, AtpB
Q0SSE6	1646	D	6	IMP	Phosphatidylglycerophosphate synthase PgsA
Q0SVV3	0418	D	9	IMP	PTS system, IIBC component
Q0SRL6	1931	D	9	IMP	sodium:alanine symporter family protein
Q0SVA9	0614	D	10	IMP	spore germination protein GerKB
Q0SV08	0716	D	10	IMP	YeeE/YedE family protein
Q0SWR9	0093	D	12	IMP	PTS system, N-acetylglucosamine-specific IIBC component NagE
Q0SPX4	2586	D	13	IMP	xanthine/uracil permease family protein
Q0SWT6	0033	G	0	lipoprotein	phosphatidylserine decarboxylase proenzyme Psd
Q0SWB6	0253	G	0	lipoprotein	PPIC-type PPIASE domain protein
Q0SW80	0291	G	0	lipoprotein	putative cell division ATP-binding protein FtsE
Q0SW59	0312	G	0	lipoprotein	uncharacterized protein
Q0SUH6	0907	G	0	lipoprotein	sugar ABC transporter, ATP-binding protein MsmK
Q0SU63	1021	G	0	lipoprotein	ABC transporter, ATP-binding protein
Q0SSA5	1687	G	0	lipoprotein	signal recognition particle receptor FtsY
Q0SRB4	2034	G	0	membrane-associated	MurG transferase
Q0SQW9	2188	G	0	lipoprotein	cphB, cyanophycinase
Q0SQS6	2255	G	0	lipoprotein	oligopeptide/dipeptide ABC transporter, ATP-binding protein
Q0SVI2	0540	G	1	lipoprotein	ABC transporter, substrate-binding protein
Q0SSJ7	1594	G	1	lipoprotein	putative lipoprotein
Q0SVF9	0564	G	1	IMP	signal peptidase I
Q0SRW6	1826	G	1	IMP	cell division protein FtsQ
Q0SR78	2070	G	1	IMP	CspC family protein
Q0SQT7	2244	G	1	IMP	uncharacterized protein
Q0SQ36	2524	G	1	IMP	uncharacterized protein
Q0SWV4	0036	G	2	IMP	putative transporter

Q0SW05	0366	G	2	IMP	toxin secretion/phage lysis holin
Q0SVY4	0387	G	2	IMP	uncharacterized protein
Q0SQ93	2452	G	2	IMP	putative cation transporter
Q0SUZ4	0730	G	4	IMP	uncharacterized protein
Q0SR70	2078	G	4	IMP	transmembrane protein Vexp3
Q0SW08	0363	G	6	IMP	ABC transporter, permease/ATP-binding protein
Q0SQS4	2257	G	6	IMP	Oligopeptide/dipeptide ABC transporter, permease protein
Q0SSP0	1550	G	8	IMP	ABC transporter, permease protein
Q0SSG1	1631	G	9	IMP	ferrous iron transport protein B, FeoB_2
Q0SSS6	1513	G	10	IMP	PTS system, sucrose-specific IIBC component
Q0SRC2	2026	G	10	IMP	cation-transporting ATPase, P-type
Q0SU50	1034	G	12	IMP	amino acid permease family protein

^aFunction categorization analysis was based on COG database and literature reference.

Table S4. Differentially detected membrane protein function categorization

UniProt ID	gene name (CPR)	fold change (G/D)	protein function	Function categorization ^a
Q0SVP6	0476	0.3	ABC transporter, substrate-binding protein	ABC transporter, general transport system
Q0SR24	2124	0.3	PTS system, glucose-specific IIBC component PtsG	ABC transporter, general transport system
Q0SVC0	0603	0.5	Phosphate ABC transporter, phosphate-binding protein PstS	ABC transporter, general transport system
Q0SUE8	0935	0.5	PTS system, N-acetylglucosamine-specific IIBC component NagE	ABC transporter, general transport system
Q0SQS2	2259	2.2	Major facilitator family transporter	ABC transporter, general transport system
Q0SQ55	2505	2.2	Nucleoside transporter, NupC family	ABC transporter, general transport system
Q0SWI7	0176	2.3	Sodium:solute transporter	ABC transporter, general transport system
Q0STX0	1115	2.3	Iron compound ABC transporter, iron-binding protein	ABC transporter, general transport system
Q0SUA1	0983	2.5	Cation efflux family protein	ABC transporter, general transport system
Q0SVP4	0478	2.9	ABC transporter, permease protein	ABC transporter, general transport system
Q0SQK2	2340	4.4	ABC transporter, ATP-binding protein	ABC transporter, general transport system
Q0SVX2	0399	4.7	PTS system, mannose/fructose/sorbose family, IID component	ABC transporter, general transport system
Q0SU83	1001	6.4	Glycerol uptake facilitator protein GlpE	ABC transporter, general transport system
Q0SWR9	0093	D	PTS system, N-acetylglucosamine-specific IIBC component NagE	ABC transporter, general transport system
Q0SVV3	0418	D	PTS system, IIBC component	ABC transporter, general transport system
Q0SVB6	0607	D	Phosphate import ATP-binding protein PstB	ABC transporter, general transport system
Q0SRL6	1931	D	Sodium:alanine symporter family protein	ABC transporter, general transport system
Q0SPX4	2586	D	Xanthine/uracil permease family protein	ABC transporter, general transport system
Q0SWV4	0036	G	Putative transporter	ABC transporter, general transport system
Q0SW08	0363	G	multidrug ABC transporter, permease/ATP-binding protein	ABC transporter, general transport system
Q0SVI2	0540	G	ABC transporter, substrate-binding protein	ABC transporter, general transport system
Q0SUH6	0907	G	Sugar ABC transporter, ATP-binding protein MsmK	ABC transporter, general transport system
Q0SU63	1021	G	ABC transporter, ATP-binding protein	ABC transporter, general transport system
Q0SU50	1034	G	Amino acid permease family protein	ABC transporter, general transport system
Q0SSS6	1513	G	PTS system, sucrose-specific IIBC component	ABC transporter, general transport system
Q0SSP0	1550	G	ABC transporter, permease protein	ABC transporter, general transport system
Q0SSG1	1631	G	Ferrous iron transport protein B FeoB	ABC transporter, general transport system
Q0SRC2	2026	G	Cation-transporting ATPase, P-type	ABC transporter, general transport system

				system
Q0SR70	2078	G	Transmembrane protein Vexp3	ABC transporter, general transport system
Q0SQS6	2255	G	Oligopeptide/dipeptide ABC transporter, ATP-binding protein	ABC transporter, general transport system
Q0SQS4	2257	G	Oligopeptide/dipeptide ABC transporter, permease protein	ABC transporter, general transport system
Q0SQ93	2452	G	Putative cation transporter	ABC transporter, general transport system
Q0SQX6	2181	0.2	Transcription termination factor Rho	DNA replication, repair, transcription, translation
Q0SR25	2123	0.5	MutS domain-containing protein	DNA replication, repair, transcription, translation
Q0SRD8	2010	D	Elongation factor 4 LepA	DNA replication, repair, transcription, translation
Q0SVJ4	0528	2.5	Stage V sporulation protein D	Cell division, Cell wall and membrane biogenesis
Q0SW39	0332	3.1	Putative penicillin-binding protein	Cell division, Cell wall and membrane biogenesis
Q0SSE6	1646	D	Phosphatidylglycerophosphate synthase PgsA	Cell division, Cell wall and membrane biogenesis
Q0SWT6	0033	G	Phosphatidylserine decarboxylase proenzyme Psd	Cell division, Cell wall and membrane biogenesis
Q0SW80	0291	G	Putative cell division ATP-binding protein FtsE	Cell division, Cell wall and membrane biogenesis
Q0SRW6	1826	G	Cell division protein FtsQ	Cell division, Cell wall and membrane biogenesis
Q0SRB4	2034	G	MurG transferase	Cell division, Cell wall and membrane biogenesis
Q0SQZ1	2166	0.3	ATP synthase subunit b AtpF	Energy production and conversion
Q0SSH8	1613	2.6	V-type ATPase, K subunit	Energy production and conversion
Q0SQY9	2168	D	ATP synthase subunit a AtpB	Energy production and conversion
Q0SQW9	2188	G	Cyanophycinase CphB	Energy production and conversion
Q0SU32	1053	0.5	GerA spore germination protein, GerAA	germination receptor
Q0SVA9	0614	D	Spore germination protein, GerKB	germination receptor
Q0SW05	0366	G	Toxin secretion/phage lysis holin	phage protein
Q0SQG4	2379	2	Protein translocase subunit SecY	protein secretion, translocation, turnover
Q0SRN9	1908	2.6	Protein translocase subunit SecD	protein secretion, translocation, turnover
Q0SQ81	2472	3.7	ATP-dependent zinc metalloprotease FtsH	protein secretion, translocation, turnover
Q0STE2	1293	D	Preprotein translocase, SecG subunit	protein secretion, translocation, turnover
Q0SWB6	0253	G	PPIC-type PPIASE domain protein	protein secretion, translocation, turnover
Q0SVF9	0564	G	Signal peptidase I	protein secretion, translocation, turnover
Q0SSA5	1687	G	Signal recognition particle receptor FtsY	protein secretion, translocation, turnover
Q0SR78	2070	G	CspC family protein	protein secretion, translocation, turnover
Q0SS48	1744	D	GTP-binding protein TypA	signal transduction mechanism
Q0SPW6	2594	0.3	Putative phage infection protein	Unknown function
Q0ST89	1348	2.2	Uncharacterized protein	Unknown function

Q0SWW1	0076	D	Putative pyruvate, phosphate dikinase regulatory protein	Unknown function
Q0SVV6	0415	D	Uncharacterized protein	Unknown function
Q0SV08	0716	D	YeeE/YedE family protein	Unknown function
Q0SRW8	1824	D	Small basic protein Sbp	Unknown function
Q0SW59	0312	G	Uncharacterized protein	Unknown function
Q0SVY4	0387	G	Uncharacterized protein	Unknown function
Q0SUZ4	0730	G	Uncharacterized protein	Unknown function
Q0SSJ7	1594	G	Uncharacterized protein	Unknown function
Q0SQT7	2244	G	Uncharacterized protein	Unknown function
Q0SQ36	2524	G	Uncharacterized protein	Unknown function

^aFunction categorization analysis was based on COG database and literature references.

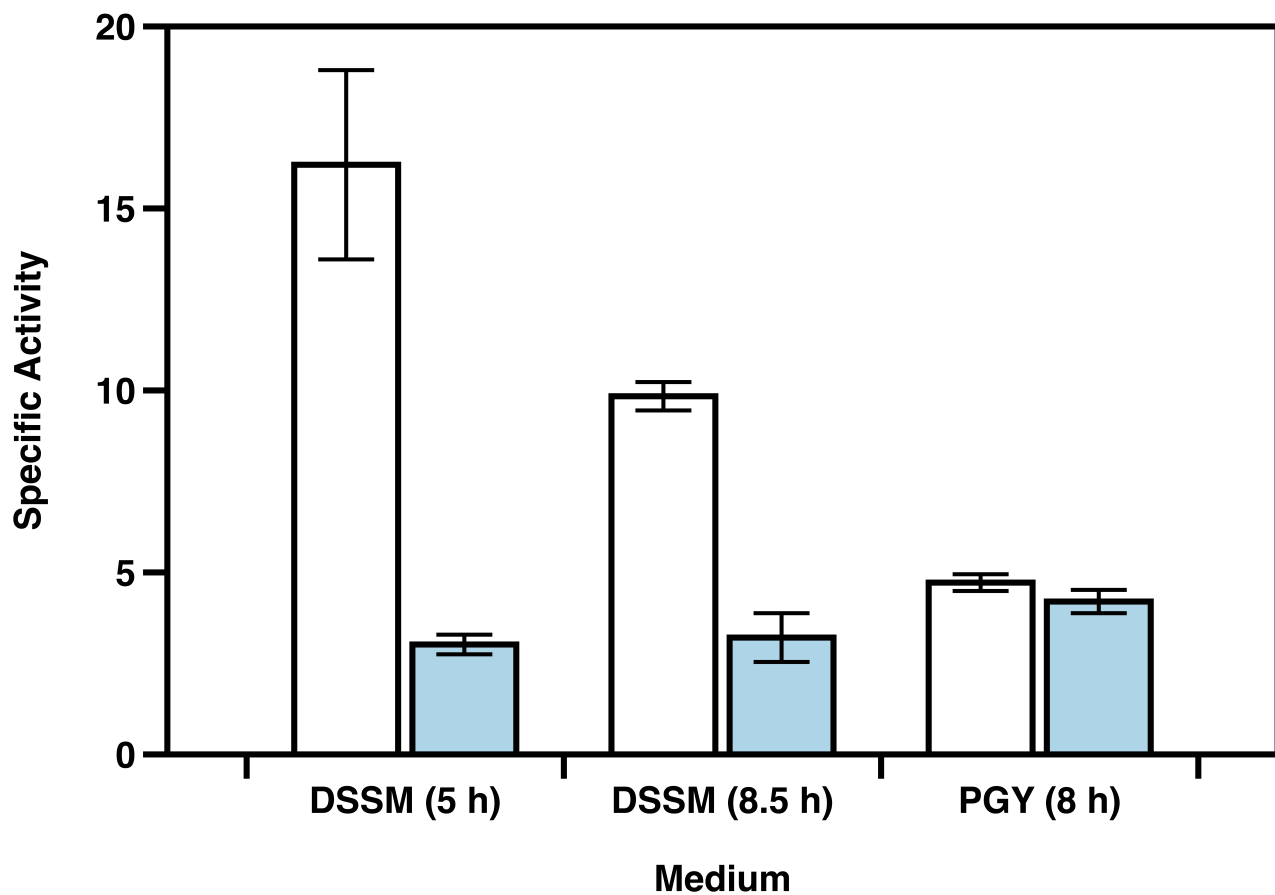


Figure S1. β -glucuronidase activity in strain SM101 carrying plasmids pHLL71 (*cphB-gusA*)(white bars) and pSM240 (empty vector)(blue bars). The mean and SD of three individual experiments are shown. DSSM, Duncan Strong sporulation medium; PGY, proteose peptone-glucose-yeast extract medium.



Figure S2. Survival of spores in spent sporulation medium (DSSM). The graph shows the means and SD of triplicate samples. There was not statistical difference between strain SM101 and strain HLL68 at either time point examined.

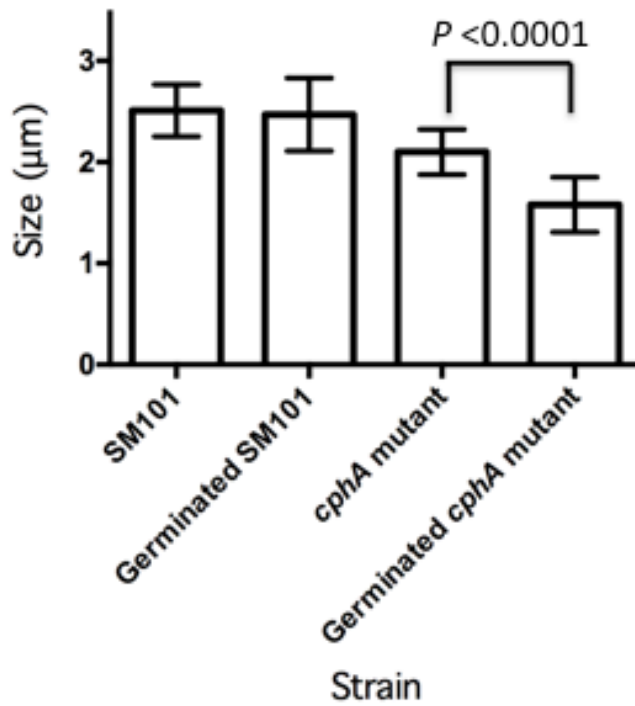


Figure S3. Spore sizes measured by phase contrast light microscopy of dormant spores and spores germinated and stored for 16 h in nutrient free medium.