

## SUPPLEMENTARY INFORMATION

### Sequence Analysis of Hypothetical Proteins from *Helicobacter pylori* 26695 to Identify Potential Virulence Factors

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**Supplementary Table 4.** List of annotated function of 340 hypothetical proteins (HPs) from *Helicobacter pylori* using BLASTp, STRING, SMART, InterProScan and Motif

No.	UniProt ID	Major BLAST hit	Predicted functional partner (STRING)	SMART	Motif found	
					InterProScan	Motif
1	O24859	Valyl-tRNA synthetase	DNA primase	No result	No result	Protein similar to CwfJ C-terminus 1
2	O24860	TrbC/VIRB2 family protein	VirB4 homolog	TrbC/VIRB2 family	Conjugal transfer TrbC/type IV secretion VirB2 (pfam)	TrbC/VIRB2 family
3	O24861	ComB3 competence protein	VirB4 homolog	Transmembrane region	Membrane-bound protein	Photosystem I psaA/psaB protein Predicted membrane protein
4	O24863	No result	Lipoprotein signal peptidase	No result	Prokaryotic membrane lipoprotein lipid attachment site profile	Prokaryotic membrane lipoprotein lipid attachment site profile
5	O24869	No result	No result	No result	No result	No result
6	O24871	No result	Isocitrate dehydrogenase	Protein of unknown function	Protein of unknown function	Protein of unknown function
7	O24873	No result	S-adenosylmethionine synthetase	No result	No result	No result
8	P56066	ATP-dependent Clp protease ClpS	ATP-dependent Clp protease (ClpS)	ATP-dependent Clp protease adaptor protein	ATP-dependent Clp protease adaptor protein	ATP-dependent Clp protease adaptor protein

9	O24894	Type II R-M system restriction endonuclease	Adenine/cytosine DNA methyltransferase	ClpS No result	ClpS No result	ClpS HNH endonuclease
10	O24898	No result	No result	No result	Prokaryotic membrane lipoprotein lipid attachment site profile	Prokaryotic membrane lipoprotein lipid attachment site profile
11	O24899	M protein repeat protein	ATP-binding protein	Coiled coil region	Coiled coil region	Coiled-coil region of CCDC155
12	O24900	No result	ATP-binding protein	No result	No result	No result
13	O24901	No result	ATP-binding protein	No result	No result	No result
14	O24902	Chain A, Structure of Protein of Unknown Function Hp0062	Outer membrane protein	Proteins of 100 residues with WXG	Coiled coil	Proteins of 100 residues with WXG
15	O24903	A nuclease of the HNH/ENDO VII superfamily with conserved WHH family protein	ATP-binding protein	Coiled coil	A nuclease of the HNH/ENDO VII superfamily with conserved WHH	A nuclease of the HNH/ENDO VII superfamily with conserved WHH
16	O24904	SMI1 / KNR4 family protein	Cell division protein	SMI1 / KNR4 family	SMI1 / KNR4 family	SMI1 / KNR4 family
17	O24905	No result	Cell division protein	Coiled coil region	Coiled coil region	Protein of unknown function
18	O24909	No result	Outer membrane protein	Signal peptide region	Signal peptide region	Protein of unknown function
19	O24910	No result	Restriction modification system S subunit	No result	No result	No result
20	P64651	No result	RNA polymerase sigma	Transmembrane region	Membrane protein	Predicted membrane

			factor RpoD			protein
21	O24914	SH3 domain of SH3b2 type family protein	Soluble lytic murein transglycosylase	NlpC/P60 family	SH3 domain of the SH3b2 type	SH3 domain of the SH3b2 type
22	O24921	No result	Type II restriction enzyme M protein	No result	No result	Nucleoporin complex subunit 54
23	O24923	Putative lipoprotein	Threonine synthase	Signal peptide	Prokaryotic membrane lipoprotein lipid attachment site profile	Prokaryotic membrane lipoprotein lipid attachment site profile
24	O24926	No result	Methyl-accepting chemotaxis protein	Uncharacterized BCR, COG1636	Uncharacterized BCR, COG1636	Uncharacterized BCR, COG1636
25	O24932	No result	Heat shock protein	No result	No result	Zinc knuckle
26	O24934	Class II Aldolase and Adducin N-terminal domain protein	Heat-inducible transcription repressor	Class II Aldolase and Adducin N-terminal domain	Class II Aldolase and Adducin N-terminal domain	Class II Aldolase and Adducin N-terminal domain
27	O24935	No result	Beta-alanine synthetase-like protein	Internal repeat 1	No result	Protein of unknown function
28	O24936	Motility accessory factor	FlaA1 protein	Protein of unknown function DUF115	Protein of unknown function DUF115	Protein of unknown function DUF115
29	P56080	Radical SAM domain protein	DNA topoisomerase I	Radical SAM superfamily	Radical SAM superfamily	Radical SAM superfamily
30	O24937	No result	Beta-alanine synthetase-like protein	<i>Helicobacter pylori</i> protein of unknown function	<i>Helicobacter pylori</i> protein of unknown function	<i>Helicobacter pylori</i> protein of unknown function
31	O24938	No result	Histidine and glutamine-rich protein	<i>Helicobacter pylori</i> protein of unknown function	<i>Helicobacter pylori</i> protein of unknown function	<i>Helicobacter pylori</i> protein of unknown function
32	O24939	No result	Response regulator	Protein of unknown	<i>Helicobacter pylori</i>	<i>Helicobacter pylori</i>

				function	protein of unknown function	protein of unknown function
33	P64653	Glutaredoxin	50S ribosomal protein	Signal peptide	Prokaryotic membrane lipoprotein lipid attachment site profile	Prokaryotic membrane lipoprotein lipid attachment site profile
34	O24942	No result	Outer membrane protein	No result	No result	No result
35	O24943	No result	Protein of unknown function (DUF1104)	Protein of unknown function (DUF1104)	Protein of unknown function (DUF1104)	Protein of unknown function (DUF1104)
36	O24944	No result	Outer membrane protein	Signal peptide	No result	No result
37	O24945	No result	No result	No result	No result	No result
38	P64655	Basic membrane protein	Serine transporter	Signal peptide	Prokaryotic membrane lipoprotein lipid attachment site profile	Prokaryotic membrane lipoprotein lipid attachment site profile
39	O24949	No result	Putative iron-sulfur protein	Uncharacterized ACR	YkgG family COG1556	Uncharacterized ACR
40	O24951	Cysteine-rich domain protein	Putative iron-sulfur protein	Cysteine-rich domain	Cysteine-rich domain	Cysteine-rich domain
41	O24959	Putative periplasmic protein	Cytochrome c oxidase	Family of unknown function	Family of unknown function	Family of unknown function
42	O24960	No result	VirB4 homolog	No result	No result	No result
43	O24961	No result	Cytochrome c oxidase	No result	No result	No result
44	O24963	Succinyl-CoA ligase	Recombinase A	No result	Menaquinone biosynthesis	Menaquinone biosynthesis
45	O24964	Septum formation initiator	Phosphopyruvate hydratase	No result	No result	Septum formation initiator
46	O24965	AMIN domain protein	Shikimate kinase	Signal peptide	AMIN domain	AMIN domain
47	O24974	No result	Collagenase	No result	No result	No result
48	O24975	Tetratricopeptide repeat	Collagenase	No result	TPR repeat region	TPR repeat region

		family protein			circular profile	circular profile
49	O24976	Chemotaxis protein	Chemotaxis protein	Coiled coil	Coiled coil	Surfeit locus protein 6
50	O24979	Peptidase	Flagellar biosynthesis protein	No result	Etoposide-induced protein 2.4 (EI24)	Etoposide-induced protein 2.4 (EI24)
51	O24984	ABC transporter	Serine hydroxymethyltransferase	Domain of unknown function	Domain of unknown function	Domain of unknown function
52	O24985	No result	Sugar efflux transporter	Transmembrane region	No result	Protein of unknown function
53	O24986	No result	DNA topoisomerase I	Protein of unknown function	Protein of unknown function	Protein of unknown function
54	O24989	TIGR00645 family protein	Outer membrane protein	Uncharacterized protein family	Uncharacterized protein family, UPF0114	Uncharacterized protein family, UPF0114
55	P56117	Phospholipase D	Glutamate permease	Phospholipase D, active site motifs	PLD-like domain	PLD-like domain
56	O24992	No result	50S ribosomal protein	Low complexity	No result	Uncharacterized ACR, COG1399
57	O24996	No result	No result	No result	No result	No result
58	O25010	Ribbon-helix-helix protein, CopG family	DNA repair protein RadA	Ribbon-helix-helix protein, copG family	Ribbon-helix-helix protein, copG family	Ribbon-helix-helix protein, copG family
59	O25018	Mobility protein	NADH dehydrogenase subunit D	Low complexity	Lipoprotein (Hamap)	Prokaryotic membrane lipoprotein lipid attachment site profile
60	O25022	Cytochrome C oxidase subunit III	Porphobilinogen deaminase	Signal peptide	Cytochrome c family profile	Cytochrome c family profile
61	O25024	No result	Glutamyl-tRNA reductas	No result	No result	No result
62	O25025	Chain A, 2ouf-Ds, A disulfide-linked dimer	Octaprenyl-diphosphate synthase	Domain of unknown function	Domain of unknown function	Domain of unknown function

63	P64657	No result	putative histidine kinase sensor protein	No result	No result	Rod binding protein
64	O25031	No result	DEAD-box ATP dependent DNA helicase	No result	Protein of unknown function	Protein of unknown function
65	O25038	MgtE intracellular N domain protein	Adenylosuccinate synthetase	MgtE intracellular N domain	MgtE intracellular N domain	MgtE intracellular N domain
66	O25041	No result	Adenine specific DNA methyltransferase	No result	No result	Single strand annealing-weakened 1
67	O25042	Type II DNA modification enzyme	Adenine specific DNA methyltransferase	No result	No result	EcoRII C terminal
68	O25047	No result	Putative ATP binding protein	No result	No result	No result
69	O25048	Predicted coding region	3-Deoxy-D-manno-octulosonic-acid transferase	Domain of unknown function	Domain of unknown function	Domain of unknown function
70	O25049	No result	Inosine 5'-monophosphate dehydrogenase	No result	No result	No result
71	O25051	No result	ATP-dependent nuclease	No result	No result	Flagellar C1a complex subunit C1a-32
72	P56132	Flagellin N-methylase family protein	ATP-dependent nuclease	Putative zinc- or iron-chelating domain	Putative zinc- or iron-chelating domain	Putative zinc- or iron-chelating domain
73	O25053	Indole-3-glycerol phosphate synthase	Lipopolysaccharide heptosyltransferase-1	Indole-3-glycerol phosphate synthase	Indole-3-glycerol phosphate synthase	Indole-3-glycerol phosphate synthase
74	O25058	TrkA-C domain protein	Cell division protein	TrkA-C domain	TrkA-C domain	TrkA-C domain
75	O25061	No result	Cell division protein	No result	No result	No result
76	O25065	No result	Para-aminobenzoate synthetase	Uncharacterized conserved protein	Uncharacterized conserved protein	Uncharacterized conserved protein
77	O25075	Alginate lyase	GTPase ObgE	No result	Alginate lyase	Alginate lyase

78	O25076	YceI-like domain protein	Glutamate-1-semialdehyde aminotransferase	YceI-like domain	YceI-like domain	YceI-like domain
79	O25081	No result	ATP binding protein	No result	No result	No result
80	O25085	DNA-damage-inducible protein J	Virulence associated protein	No result	No result	Domain of unknown function
81	O25104	No result	DNA processing chain A	No result	No result	Domain of unknown function
82	O25105	No result	No result	No result	No result	No result
83	O25107	Lysozyme-like protein	Replicative DNA helicase	No result	No result	NmrA-like family
84	O25108	Beta lactamase	No result	No result	No result	No result
85	O25109	Membrane protein	No result	Protein of unknown function	Protein of unknown function	Protein of unknown function
86	O25123	Phenylalanyl-tRNA synthetase subunit alpha	GTP-binding protein LepA	No result	Domain of unknown function	Domain of unknown function
87	O25131	Laminin subunit alpha-2 precursor	Spore coat polysaccharide biosynthesis protein C	No result	No result	CRISPR associated protein Cas2
88	O25145	No result	Zincmetallo protease	No result	No result	D-Ala-teichoic acid biosynthesis protein
89	O25146	Sporulation protein	Cell division protein	Sporulation related domain	Sporulation related domain	Sporulation related domain
90	O25147	ABC transporter substrate-binding protein	Primosome assembly protein PriA	Protein of unknown function	Coiled coil	Protein of unknown function
91	P64659	Lipid-A-disaccharide synthase	Primosome assembly protein PriA	No result	No result	No result
92	O25155	Calcineurin-like phosphoesterase family protein	Chemotaxis protein	Calcineurin-like phosphoesterase	Calcineurin-like phosphoesterase	Calcineurin-like phosphoesterase



93	O25156	Alanine racemase, N-terminal domain protein	Chemotaxis protein	Alanine racemase, N-terminal domain	Alanine racemase, N-terminal domain	Alanine racemase, N-terminal domain
94	O25159	No result	D-3-phosphoglycerate dehydrogenase	No result	No result	SpoIIIAH-like protein
95	O25162	No result	NifS-like protein	No result	Protein of unknown function	Protein of unknown function
96	O25164	No result	GMP synthase	No result	No result	No result
97	O25172	Ferrochelatase	No result	No result	No result	No result
98	O25174	Thioesterase	Type 1 capsular polysaccharide biosynthesis protein J	Thioesterase superfamily	Thioesterase superfamily	Thioesterase superfamily
99	O34995	No result	7-Cyano-7-deazaguanine reductase	No result	No result	No result
100	O34461	No result	Oligopeptide ABC transporter	No result	No result	No result
101	O25177	DHH family protein	Single-stranded-DNA-specific exonuclease	DHH family	DHH family	DHH family
102	O34810	No result	7-Cyano-7-deazaguanine reductase	Protein of unknown function	Protein of unknown function	Protein of unknown function
103	O25178	Tellurite resistance protein TerY	Phage/colicin/tellurite resistance cluster TerY protein	Phage/colicin/tellurite resistance cluster TerY protein/von Willebrand factor (vWF) type A domain	Tellurite resistance, TerY/von Willebrand factor, type A	von Willebrand factor type A domain
104	O25180	Glucose-6-phosphate 1-dehydrogenase	Protein kinase C-like protein	No result	No result	No result
105	O25190	VirB3 type IV secretion	VirB8 like protein	No result	No result	TraL protein

		protein					
106	O25191	VirB3 type IV secretion protein	VirB8 like protein	No result	No result		TraL protein
107	O25192	No result	VirB8 like protein	No result	Toprim-like		Toprim-like
108	O25194	Putative pZ2b	No result	No result	No result		No result
109	O25195	ATPase AAA	DNA topoisomerase 1	AAA domain	AAA domain		AAA domain
110	O25196	D-ribose pyranase	50S ribosomal protein	No result	No result		No result
111	O25197	No result	Glyceraldehyde-3-phosphate dehydrogenase	No result	No result		No result
112	O25198	No result	No result	No result	No result		Domain of unknown function
113	Q9WXL5	Trichohyalin composition-like protein	No result	No result	No result		Protein of unknown function
114	O25200	ATP binding protein	ATP binding protein	Domain of unknown function	Domain of unknown function		Domain of unknown function
115	O25201	CRISPR-associated protein	Putative metalloprotease	AAA domain	AAA domain		AAA domain
116	O25203	AraC family transcriptional regulator	Type IIS restriction enzyme M2 protein	No result	No result		No result
117	K4NBS7	Coiled-coil domain-containing protein 40-like isoform X1	No result	No result	No result		AAA-ATPase_like
118	O25204	ComB3 competence protein	VirB4 type IV secretion ATPase	No result	No result		Photosystem I psaA/psaB protein
119	O25205	Formyltetrahydrofolate synthetase	Protein VirB4	No result	No result		Protein of unknown function
120	O25212	No result	Sialic acid synthase	Protein of unknown	Protein of unknown		Protein of unknown

121	O25213	Tellurite resistance family protein TerB	Oligoendopeptidase F	function Tellurite resistance protein TerB	function Tellurite resistance protein TerB	function Tellurite resistance protein TerB
122	O25214	No result	Oligoendopeptidase F	No result	No result	2Fe-2S iron-sulfur cluster binding domain
123	O25215	No result	Oligoendopeptidase F	No result	No result	No result
124	O25228	Non-functional type II restriction endonuclease	No result	No result	No result	SAS, complex subunit 4
125	O34410	JHP1044 mosaic, putative crystallin beta/gamma motif-containing protein	ATP binding protein	Protein of unknown function	Protein of unknown function	Protein of unknown function
126	O25232	No result	No result	No result	No result	ATP synthase B/B' CF(0)
127	O25237	Chain A, solution structure of protein Hp0495	Putative recombination protein RecO	Protein of unknown function	Protein of unknown function	Protein of unknown function
128	O25251	Urease-enhancing factor	Outer membrane protein	No result		
129	O25252	No result	GTP binding protein	Protein of unknown function	Protein of unknown function	Protein of unknown function
130	O25255	L,D-transpeptidase catalytic domain protein	GTP binding protein	L,D-transpeptidase catalytic domain	L,D-transpeptidase catalytic domain	L,D-transpeptidase catalytic domain
131	O25280	Sialidase	3-Oxoacyl-(acyl carrier protein) synthase II	No result	No result	Occlusion-derived virus envelope protein ODV-E18
132	O25282	Membrane protein	Outer membrane protein	No result	No result	Domain of unknown function
133	O25287	No result	30S ribosomal protein S21	No result	No result	No result

134	O25288	No result	No result	No result	No result	Ribbon-helix-helix protein, copG family
135	O25292	Fe-S oxidoreductase	Leucyl aminopeptidase	No result	Iron-sulfur cluster-binding domain	Iron-sulfur cluster-binding domain
136	O25301	Arylsulfatase	Dihydroorotase	Sulfatase	Sulfatase	Sulfatase
137	O25305	No result	Flagellar motor switch protein	No result	No result	ORF6N domain
138	K4NB13	No result	Putative peptidyl-prolyl cis-trans isomerase	Cytochrome P450	No result	EpsG family
139	O25308	Putative periplasmic protein	Aminodeoxychorismate lyase	No result	AsmA-like C-terminal region	AsmA-like C-terminal region
140	O25309	Aminodeoxychorismate lyase	Aminodeoxychorismate lyase	Aminodeoxychorismate lyase	YceG-like family	YceG-like family
141	O25316	Dihydroneopterin aldolase	Adenine specific DNA methyltransferase	No result	No result	O-Antigen ligase
142	O25317	Disulfide bond formation protein DsbB	Preprotein translocase subunit SecE	Disulfide bond formation protein DsbB	Disulfide bond formation protein DsbB	Disulfide bond formation protein DsbB
143	O25324	No result	3-Methyladenine DNA glycosylase	No result	No result	No result
144	O25333	ABC transporter ATP-binding protein	ABC transporter, ATP-binding protein	No result	No result	ABC-2 type transporter
145	O25346	Rlof	4-Hydroxy-3-methylbut-2-en-1-yl diphosphate synthase	Protein of unknown function	Protein of unknown function	Protein of unknown function
146	O25354	No result	Outer membrane protein	No result	Prokaryotic membrane lipoprotein lipid attachment site profile	Prokaryotic membrane lipoprotein lipid attachment site profile

147	O25358	No result	NAD(P)H-flavin oxidoreductase	No result	No result	No result
148	O25364	UDP-N-acetylglucosamine 1-carboxyvinyltransferase	UDP-N-acetylglucosamine 1-carboxyvinyltransferase	No result	No result	GDP/GTP exchange factor Sec2p
149	O25373	Chaperone SurA	Ribonuclease H	SurA N-terminal domain	SurA N-terminal domain	SurA N-terminal domain
150	O25374	No result	Ribonuclease H	No result	TPR repeat region circular profile	TPR repeat region circular profile
151	P64663	No result	Coproporphyrinogen III oxidase	Protein of unknown function	Protein of unknown function	Protein of unknown function
152	O25381	No result	Glycerol-3-phosphate dehydrogenase	No result	No result	TonB-dependent receptor proteins signature 1
153	O25392	Pantothenate kinase	Beta-alanine synthetase	No result	No result	Glycine zipper 2TM domain
154	O25406	No result	Diacylglycerol kinase	No result	No result	No result
155	O25407	No result	Response regulator	No result	No result	No result
156	O25408	ATPase AAA	Response regulator	Response regulator	Response regulator receiver domain	Response regulator receiver domain
157	O25412	No result	S-adenosyl-methyltransferase MraW	No result	No result	Exo70 exocyst complex subunit
158	O25423	Zinc ABC transporter substrate-binding protein	ss-DNA binding protein	Protein of unknown function	Protein of unknown function	Protein of unknown function
159	O25429	ATP-binding protein	Transcriptional regulator	No result	No result	No result
160	O25430	No result	Transcriptional regulator	No result	No result	Borrelia burgdorferi virulent strain associated lipoprotein
161	O25431	Dynamin family protein	Preprotein translocase	Dynamin family	50S ribosome-binding	Dynamin family

162	O25442	Fibronectin type-III domain	subunit SecA tRNA (guanine-N(7)-)-methyltransferase	Fibronectin type-III domain profile	GTPase Fibronectin type-III domain profile PROSITE profile	Fibronectin type-III domain profile
163	O25450	Molybdopterin biosynthesis protein	Molybdopterin biosynthesis protein	Molybdopterin biosynthesis protein (MoeB)	ThiF family/ molybdenum cofactor biosynthesis, MoeB	ThiF family
164	O25451	No result	No result	No result	No result	No result
165	O25456	5-Formyltetrahydrofolate cyclo-ligase family protein	Methylene-tetrahydrofolate dehydrogenase	5-Formyltetrahydrofolate cyclo-ligase family	5-Formyltetrahydrofolate cyclo-ligase family Pfam	5-Formyltetrahydrofolate cyclo-ligase family
166	O25457	No result	Cell division protein	No result	Prokaryotic membrane lipoprotein lipid attachment site profile	Prokaryotic membrane lipoprotein lipid attachment site profile
167	O25459	Sortase	No result	No result	Putative zinc- or iron-chelating domain	Putative zinc- or iron-chelating domain
168	O25460	ABC transporter ATP-binding protein	No result	No result	No result	Nicastrin
169	O25461	No result	Molybdenum cofactor biosynthesis protein A	No result	No result	LysR substrate binding domain
170	O25468	Menaquinone biosynthesis family protein	Uridylate kinase	Domain of unknown function	Menaquinone biosynthesis Pfam	Menaquinone biosynthesis
171	O25469	No result	Bifunctional aconitate hydratase	No result	Domain of unknown function	Domain of unknown function
172	O25470	Putative periplasmic protein	No result	No result	No result	LppC putative lipoprotein

173	O25472	No result	No result	No result	No result	Autophagy protein 16
174	O25478	Type I restriction- modification system restriction subunit R	Type I restriction enzyme R protein	No result	No result	Protein of unknown function
175	O25483	Ubiquitin-protein ligase	GTP cyclohydrolase II	No result	Domain of unknown function	Domain of unknown function
176	O25491	Dihydroneopterin aldolase	Flagellar basal body- associated protein	No result	No result	SRI (Set2 Rpb1 interacting) domain
177	O25495	Dihydroorotase	Thiamin biosynthesis protein	No result	No result	No result
178	O25498	No result	No result	No result	No result	No result
179	O25499	Putative endonuclease	Homoserine dehydrogenase	Uncharacterized protein family	Uncharacterized protein family	Uncharacterized protein family
180	O25504	No result	GTP-binding protein EngA	No result	Prokaryotic membrane lipoprotein lipid attachment site profile	Prokaryotic membrane lipoprotein lipid attachment site profile
181	O25509	Putative lipoprotein	Outer membrane protein	No result	Prokaryotic membrane lipoprotein lipid attachment site profile	Prokaryotic membrane lipoprotein lipid attachment site profile
182	O25510	Outer membrane protein P1	Outer membrane protein P1 (ompP1)	Outer membrane protein P1 (OmpP1)	Outer membrane protein transport protein (OMPP1/FadL/TodX)	Outer membrane protein transport protein (OMPP1/FadL/TodX)
183	O25513	No result	Outer membrane protein	No result	No result	No result
184	O25520	Type I restriction endonuclease subunit S	Type I restriction endonuclease S protein	No result	No result	No result
185	O25523	HrgA like protein	ABC transporter	Protein of unknown function	No result	Protein of unknown function

186	O25527	Glycosyl hydrolase	Alginate O-acetylation protein	No result	No result	Bacterial PH domain
187	O25535	50s ribosomal protein	Transcription elongation factor GreA	Transmembrane region	Transmembrane region phobius	Sec63 Brl domain
188	O25538	No result	Hydrogenase nickel incorporation protein	Coiled coil region	Coiled coil region	No result
189	O25542	Tat pathway signal protein	Catalase	Low complexity region	TAT_signal_seq TIGRFAM	TAT (twin-arginine translocation) pathway signal sequence
190	O25545	Nuclease	Holliday junction resolvase	Transmembrane region	TMhelix region TMHMM	No result
191	O25546	Nuclease	Adenine specific DNA methyltransferase	No result	No result	No result
192	O25547	Lipoprotein	Restriction modification system S subunit	No result	No result	Spc7 kinetochore protein
193	O25548	No result	No result	Signal peptide	Signal peptide region	No result
194	O25550	No result	Holliday junction DNA helicase RuvA	Protein of unknown function	No result	Protein of unknown function
195	O25553	No result	No result	Coiled coil region	No result	Lago virus protein of unknown function
196	O25555	DNA-damage-inducibile protein	Virulence associated protein D	Coiled coil region	No result	No result
197	O25557	Conserved hypothetical protein	Replicative DNA helicase	Low complexity region	No result	Cytosolic fatty-acid binding proteins signature
198	O25562	Cupin [ <i>Helicobacter pylori</i> ]	ss-DNA binding protein	Cupin domain	Cupin domain Pfam	Cupin domain



199	O25564	Flagellar hook-length control protein	Flagellar hook protein FlgE	Flagellar hook-length control protein FliK	Flagellar hook-length control protein FliK Pfam	Flagellar hook-length control protein FliK
200	O25567	Restriction endonuclease	Adenine specific DNA methyltransferase	No result	No result	Lipoprotein associated domain
201	O25576	Sua5 YciO YrdC YwlC family protein	Carbamoyl phosphate synthase large subunit	No result	DHBP synthase RibB-like alpha/beta domain	Telomere recombination
202	O25579	Toxin-like outer membrane protein	Toxin-like outer membrane protein	Toxin-like outer membrane protein	Vacuolating cytotoxin	Putative vacuolating cytotoxin
203	O25589	Acetyltransferase family protein	Proline/betaine transporter	Acetyltransferase (GNAT) family	Acetyltransferase family protein Pfam	Gcn5-related N-acetyltransferase (GNAT) domain profile PROSITE
204	O25592	No result	No result	Protein of unknown function DUF262	Protein of unknown function DUF262	Protein of unknown function DUF262
205	O25601	No result	subunit M	No result	No result	No result
206	O25602	No result	Acetyl-CoA carboxylase subunit beta	Transmembrane region	Transmembrane region Phobius	Protein of unknown function
207	O25607	No result	Oxygen-insensitive NAD(P)H nitroreductase	Signal peptide	Signal peptide region Phobius	No result
208	O25616	ATPase [ <i>Helicobacter pylori</i> ]	Acyl carrier protein	50S ribosome-binding GTPase	50S ribosome-binding GTPase Pfam	50S ribosome-binding GTPase
209	O25617	GTPase [ <i>Helicobacter pylori</i> ]	Acyl carrier protein	No result	No result	Mnd1 family
210	O25618	50S ribosome-binding GTPase family protein	Glycyl-tRNA synthetase subunit alpha	Dynamin family	PF00350 Dynamin family	Dynamin family

211	O25619	50S ribosome-binding GTPase family protein	Glycyl-tRNA synthetase subunit alpha	Dynamin family	Pfam PF00350 Dynamin family	Dynamin family
212	O25624	Outer membrane protein	Nickel-cobalt-cadmium resistance protein	Outer membrane efflux protein	Outer membrane efflux protein	Outer membrane efflux protein
213	O25625	No result	Phosphoglyceromutase	No result	No result	No result
214	O25630	Peptidase M50 family protein	Exonuclease VII-like protein	Peptidase family M50	Peptidase family M50 Pfam	Peptidase family M50
215	O25632	PZ16b [ <i>Helicobacter pylori</i> ]	Protein kinase C-like protein	Membrane bound protein	No result	No result
216	O25635	Leucine-rich repeat-containing protein	Cag pathogenicity island protein	No result	Membrane bound protein	No result
217	O25636	CRISPR-associated protein	Outer membrane protein	Domain of unknown function	Domain of unknown function Pfam	Domain of unknown function
218	O25637	Relaxase [ <i>Helicobacter pylori</i> ]	Histidine and glutamine-rich protein	No result	No result	No result
219	O25641	No result	Translation initiation inhibitor	No result	No result	No result
220	O25642	Conserved protein of unknown function	Type I restriction enzyme S protein	Nucleotidyl transferase of unknown function	Nucleotidyl transferase of unknown function	Nucleotidyl transferase of unknown function
221	O25644	Relaxase [ <i>Helicobacter pylori</i> Rif1]	Conjugal transfer protein	No result	No result	No result
222	O25647	PZ8b	IS200 insertion sequence from SARA17	No result	No result	Domain of unknown Function
223	O25648	PZ9b [ <i>Helicobacter pylori</i> ]	PARA protein	No result	Signal peptide region	Lipid attachment

224	O25651	PZ11b [ <i>Helicobacter pylori</i> ]	No result	No result	No result	YlqD protein
225	O25659	Membrane protein	Phosphatidylglycerophosphate synthase	No result	Membrane protein	No result
226	O25667	Outer membrane protein	Recombination factor protein RarA	No result	Membrane bound protein	No result
227	O25672	No result	Recombination factor protein RarA	Uncharacterized protein conserved in bacteria	Uncharacterized protein conserved in bacteria Pfam	Uncharacterized protein conserved in bacteria
228	O25673	Flagellar motor-switch protein	Flagellar motor switch protein FliM	Domain of unknown function	Domain of unknown function Pfam	Domain of unknown function
229	O25689	No result	Translation initiation factor IF-2	Protein of unknown function (DUF448)	Protein of unknown function (DUF448) Pfam	Protein of unknown function (DUF448)
230	O25691	Putative universal bacterial protein YeaZ	Ribosome-binding factor A	Glycoprotease family	No result	Glycoprotease family
231	O25694	No result	UDP-3-O-[3-hydroxymyristoyl] N-acetylglucosamine deacetylase	No result	No result	No result
232	O25704	Prokaryotic metallothionein family protein	16S rRNA methyltransferase GidB	No result	No result	Prokaryotic metallothionein
233	O25705	No result	16S rRNA methyltransferase GidB	No result	No result	No result
234	O07680	Unknown protein	Copper ion binding protein	No result	No result	No result

235	O25707	No result	Signal-transducing protein	No result		Coiled-coil	Uncharacterized coiled-coil protein
236	O25708	Purine nucleoside phosphorylase	Cell binding factor 2	No result		No result	Succinylglutamate desuccinylase/aspartoacylase family
237	O25709	No result	Flagellar protein FljS	No result		No result	No result
238	O25710	Truncated HP1078 [ <i>Helicobacter pylori</i> ]	No result	No result		Toprim domain profile	Toprim domain profile
239	O25713	Neuraminylactose-binding hemagglutinin family protein	Multidrug resistance protein	No result		No result	Neuraminylactose-binding hemagglutinin precursor (NLBH)
240	O25717	Putative lipoprotein	Hemolysin	No result		No result	No result
241	O25721	Exonuclease [ <i>Helicobacter pylori</i> ]	Cell division protein	No result		PD-(D/E)XK nuclease superfamily Pfam	PD-(D/E)XK nuclease superfamily
242	O25726	NUDIX hydrolase	No result	No result		No result	Uncharacterized protein conserved in bacteria
243	O25727	No result	No result	No result		No result	No result
244	O25734	No result	LPS biosynthesis protein	No result		No result	No result
245	O25741	No result	Excinuclease ABC subunit B	No result		No result	ATP synthase B/B' CF(0)
246	O34410	No result	ATP-binding protein	Protein of unknown function		Protein of unknown function	Protein of unknown function
247	O25745	No result	Flagellar hook-associated protein FlgK	No result		No result	FlgN protein
248	O25747	FlgM protein	Flagellar biosynthesis sigma factor	Anti-sigma-28 factor, FlgM		Anti-sigma-28 factor, FlgM	Anti-sigma-28 factor, FlgM

249	K4NFN1	Heme transporter CcmA	FKBP-type peptidyl-prolyl cis-trans isomerase slyD	No result		Pfam No result	YIF1
250	O25749	Periplasmic protein	Peptidoglycan associated lipoprotein precursor	No result		Tetratricopeptide repeat	Tetratricopeptide repeat
251	O25761	AAA domain protein	Methionyl-tRNA formyltransferase	No result		AAA domain Pfam	AAA domain
252	O25762	Caldesmon [ <i>Helicobacter pylori</i> oki102]	Methionyl-tRNA formyltransferase	Uncharacterized protein conserved in bacteria		Uncharacterized protein conserved in bacteria	Uncharacterized protein conserved in bacteria
253	O25768	KH domain RNA binding protein	Valyl-tRNA synthetase	No result		KH domain	KH domain
254	O25787	No result	D-3-Phosphoglycerate dehydrogenase	No result		No result	No result
255	O25799	No result	QueF 7-cyano-7-deazaguanine reductase	<i>Helicobacter pylori</i> protein of unknown function		<i>Helicobacter pylori</i> protein of unknown function	<i>Helicobacter pylori</i> protein of unknown function
256	O25803	Flagellar motility protein	Flagellar motility protein	Flagellar motility protein		No result	Glycine rich protein family
257	K4NT00	Abortive infection family protein	No result	No result		No result	No result
258	O25808	Hydrolase	Ulcer associated adenine specific DNA methyltransferase	Haloacid dehalogenase- like hydrolase		Haloacid dehalogenase- like hydrolase Pfam	Haloacid dehalogenase- like hydrolase
259	O25816	RDD family protein	Polynucleotide phosphorylase	RDD family		RDD family Pfam	RDD family
260	O25818	Predicted coding region	Glycinamide ribonucleotide	No result		No result	No result

261	O25831	No result	synthetase Flagellar assembly protein FliW	No result	No result	No result
262	O25834	Competence/damage- inducible domain protein	Membrane transport protein	Protein of unknown function	Protein of unknown function	Protein of unknown function
263	O25839	Protein of unknown function	Maf-like protein	Protein of unknown function	Protein of unknown function	Protein of unknown function
264	O25843	SH3 domain protein	Shikimate 5-dehydrogenase	Bacterial SH3 domain homologues	Bacterial SH3 domain homologues	Bacterial SH3 domain homologues
265	O25848	RDD family protein	Orotate phosphoribosyltransferase	RDD family	RDD family	RDD family
266	O25854	NADH-ubiquinone oxidoreductase chain E	NADH dehydrogenase subunit G	No result	No result	No result
267	O25855	NADH-ubiquinone oxidoreductase chain F	NADH dehydrogenase subunit	No result	No result	TCP-1/cpn60 chaperonin family
268	O25864	Paralysed flagella protein (pflA)	Paralysed flagella protein (pflA)	Paralysed flagella protein (PflA)	Tetratricopeptide repeat	Tetratricopeptide repeat
269	O25866	Two-component sensor histidine kinase	Phosphomannomutase	Telomere-length maintenance and DNA damage repair	Telomere-length maintenance and DNA damage repair	Telomere-length maintenance and DNA damage repair
270	O25870	Glycosyltransferase 9 family protein	Outer membrane protein	Glycosyltransferase family 9 (heptosyltransferase)	Glycosyltransferase family 9 (heptosyltransferase)	Glycosyltransferase family 9 (heptosyltransferase)
271	O25872	Acid phosphatase lipoprotein	Beta-alanine synthetase-like protein	HAD superfamily, subfamily IIIB (acid phosphatase)	HAD superfamily, subfamily IIIB (acid phosphatase)	HAD superfamily, subfamily IIIB (acid phosphatase)
272	O25873	YceI-like domain protein	ss-DNA binding protein	YceI-like domain	YceI-like domain	YceI-like domain

273	O25875	Pantothenate kinase	Alkylphosphonate uptake protein	No result	No result	Lycine-zipper containing OmpA-like membrane domain
274	O25881	No result	No result	No result	No result	Flagellar protein FlbT
275	O25882	No result	Alginate O-acetylation protein	No result	No result	2-Oxoacid dehydrogenases acyltransferase (catalytic domain)
276	O25884	YtkA-like family protein	Cation efflux system protein	YtkA-like	YtkA-like	YtkA-like
277	O25886	Cation efflux system protein/hemolysin D	Cation efflux system protein (czcA)	Cation efflux system protein (CzcA)/ HlyD family secretion protein	HlyD family secretion protein	HlyD family secretion protein
278	O25888	Branched-chain amino acid transport protein	Cation efflux system protein	Branched-chain amino acid transport protein (AzlD)	Branched-chain amino acid transport protein (AzlD)	Branched-chain amino acid transport protein (AzlD)
279	O25891	No result	Chaperone protein DnaJ	No result	No result	No result
280	O25892	NYN domain protein	Glutamine ABC transporter	No result	NYN domain	NYN domain
281	O25894	Molecular chaperone DnaJ	Molecular chaperone DnaK	DnaJ molecular chaperone homology domain	DnaJ molecular chaperone homology domain	DnaJ domain profile
282	O25904	Putative periplasmic protein	1-Acyl-glycerol-3-phosphate acyltransferase	No result	No result	Bacterial SH3 domain
283	O25906	No result	Adenine specific DNA methyltransferase	No result	No result	Domain of unknown function
284	O25913	No result	Nicotinate-nucleotide pyrophosphorylase	No result	No result	No result
285	O25930	Outer membrane protein	BamD protein	Outer membrane protein	Outer membrane protein	Outer membrane

		assembly factor BamD		assembly factor BamD	assembly factor BamD [bamD	lipoprotein
286	O25932	No result	Prephenate dehydrogenase	No result	No result	No result
287	O25933	DNA/RNA non-specific endonuclease family protein	Outer membrane protein	DNA/RNA non-specific endonuclease	DNA/RNA non-specific endonuclease	DNA/RNA non-specific endonuclease
288	O25934	Restriction modification system S subunit	Restriction modification system S subunit	Restriction modification system S subunit	Type I restriction modification DNA specificity domain	Type I restriction modification DNA specificity domain
289	O25935	No result	Fructose-1,6-bisphosphatase	No result	No result	Protein of unknown function
290	K4NTI9	No result	No result	No result	No result	Relaxase/Mobilisation nuclease domain
291	O25938	No result	No result	No result	No result	Calponin homology (CH) domain
292	O25939	No result	No result	No result	No result	No result
293	O25940	No result	DNA repair protein	No result	No result	Suppressor of Fused Gli/Ci N terminal binding domain
294	O25941	No result	DNA repair protein	No result	No result	No result
295	O25942	Fibronectin/fibrinogen- binding protein	Fibronectin/fibrinogen- binding protein	Fibronectin/fibrinogen- binding protein	Fibronectin-binding protein A N-terminus (FbpA)	Fibronectin-binding protein A N-terminus (FbpA)
296	O34810	No result	7-Cyano-7-deazaguanine reductase	Protein of unknown function	Protein of unknown function	Protein of unknown function
297	O34461	No result	Oligopeptide ABC transporter, ATP-binding	No result	No result	No result



298	O34995	No result	protein 7-Cyano-7-deazaguanine reductase	No result	No result	No result
299	O25960	Iojap-like protein	DNA polymerase III subunit delta	Protein of unknown function	Oligomerization domain	Oligomerization domain
300	O25966	S4 domain protein	Outer membrane protein	S4 domain	S4 domain	S4 domain
301	O25967	No result	Nuclease NucT	No result	Prokaryotic membrane lipoprotein lipid attachment site profile	Prokaryotic membrane lipoprotein lipid attachment site profile
302	O25974	No result	Type IIS restriction enzyme R protein	No result	N-6 Adenine-specific DNA methylases signature	N-6 Adenine-specific DNA methylases signature
303	O25977	No result	Flagellar assembly protein FliW	No result	No result	No result
304	O25978	No result	Lipoprotein	No result	No result	TIR domain
305	O25979	Lipoprotein	Lipoprotein	Lipoprotein	No result	IncA protein
306	O25981	No result	ATP binding protein	No result	No result	ATP synthase alpha and beta subunits signature
307	O25990	SpoIIJ-associated protein	VirB11-like protein	Jag N-terminus	Jag N-terminus	Jag N-terminus
308	O25993	LPP20 lipofamily protein	Type 3 restriction enzyme	No result	LPP20 lipoprotein	LPP20 lipoprotein
309	O25994	No result	Membrane-associated lipoprotein	No result	No result	No result
310	O25998	Flagellar motility secretory protein	Flagellar motility protein	Secreted protein involved in flagellar motility	Domain of unknown function DUF306, Meta/HslJ	META domain
311	O25999	No result	ATP binding protein	Protein of unknown	Protein of unknown	Protein of unknown

312	O26000	Mce related family protein	ABC transporter ATP-binding protein	function Mce related protein	function Mce related protein	function Mce related protein
313	O26006	Type I restriction modification protein	Type IIS restriction enzyme R protein (BCGIB)	Type IIS restriction enzyme R protein (BCGIB)	Type I restriction modification DNA specificity domain	Type I restriction modification DNA specificity domain
314	O26007	Type IIS restriction enzyme M protein (mod)	Type IIS restriction enzyme M protein (mod)	Type IIS restriction enzyme M protein (Mod)	Type I restriction modification DNA specificity domain	N-6 DNA Methylase
315	O26014	TPR repeat family protein	DNA helicase II	TPR repeat	TPR repeat	TPR repeat
316	O26015	Nitrilase	Seryl-tRNA synthetase	Carbon-nitrogen hydrolase	Carbon-nitrogen hydrolase	Carbon-nitrogen hydrolase
317	O26019	X-Pro dipeptidase	Lipase like protein	Uncharacterized protein family	Uncharacterized protein family	Uncharacterized protein family
318	O26020	Antibiotic ABC transporter permease	Lipase like protein	ABC-2 family transporter protein	ABC-2 family transporter protein	ABC-2 family transporter protein
319	O26021	ABC transporter	Acriflavine resistance protein	No result	ABC-2 family transporter protein	ABC-2 family transporter protein
320	O26022	Lipase	Lipase-like protein	Lipase-like protein	Outer membrane efflux protein	Outer membrane efflux protein
321	O26025	Nitrogen-fixing protein NifU	NifU-like protein	NifU-like protein	NifU-like domain	NifU-like domain
322	O26026	Histidine kinase	Transaldolase	No result	TPR repeat	TPR repeat
323	O26035	Riboflavin biosynthesis	Riboflavin biosynthesis	Riboflavin biosynthesis	RibD C-terminal domain	Cytidine and

		protein (ribG)	protein (ribG)	protein (ribG)		deoxycytidylate deaminase zinc-binding region
324	O26041	Iron regulated outer membrane protein	Iron regulated outer membrane protein	No result	No result	No result
325	O26042	TonB-dependent receptor	Iron-regulated outer membrane protein (frpB)	Iron-regulated outer membrane protein	TonB-dependent Receptor Plug Domain	TonB-dependent Receptor Plug Domain
326	O26045	No result	Type IIS restriction enzyme R and M protein	No result	No result	Yip1 domain
327	O26046	Type IIS restriction enzyme R and M protein (ECO57IR)	Type IIS restriction enzyme R and M protein (ECO57IR)	Type IIS restriction enzyme R and M protein (ECO57IR)	Eco57I restriction- modification methylase	Eco57I restriction- modification methylase
328	O26047	Type I restriction endonuclease	Type IIS restriction enzyme R and M protein	No result	No result	SecA Wing and Scaffold domain
329	O26055	Putative periplasmic competence protein	Exodeoxyribonuclease III	No result	No result	No result
330	O26058	Purine nucleoside phosphorylase	Purine nucleoside phosphorylase (PunB)	Purine nucleoside phosphorylase (PunB)	Phosphorylase superfamily	Phosphorylase superfamily
331	P64665	TetR family transcriptional regulator	FAD-dependent thymidylate synthase	Protein of unknown function	Protein of unknown function	Protein of unknown function
332	O26063	Type II restriction enzyme	Virulence associated protein D	No result	No result	Bacterial membrane- spanning protein N- terminus
333	O26088	Sugar ABC transporter substrate-binding protein	Regulatory protein DniR	No result	No result	No result
334	O26089	No result	Regulatory protein DniR	No result	No result	No result

335	O26095					
336	O26099	No result	Methicillin resistance protein	No result	No result	Protein of unknown function
337	O26100	PAP2 family protein	Methicillin resistance protein	PAP2 superfamily	PAP2 superfamily	PAP2 superfamily
338	O26107	Ubiquinol-cytochrome C chaperone	Biotin sulfoxide reductase	Ubiquinol-cytochrome C chaperone	Ubiquinol-cytochrome C chaperone	Ubiquinol-cytochrome C chaperone
339	K4NEW8	Ubiquinol-cytochrome C chaperone family protein	No result	Ubiquinol-cytochrome C chaperone	Ubiquinol-cytochrome C chaperone	Ubiquinol-cytochrome C chaperone
340	O26108	Ubiquinol-cytochrome C chaperone family protein	Transcription antitermination protein NusB	Domain of unknown function	Domain of unknown function	Domain of unknown function

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