

Identification of the major outer membrane proteins of *Aeromonas salmonicida*

Roger O. Ebanks*, Michel Goguen, Stewart McKinnon, Devanand M. Pinto, Neil W. Ross

Institute for Marine Biosciences, National Research Council Canada, 1411 Oxford Street, Halifax, Nova Scotia B3H 3Z1, Canada

Diseases of Aquatic Organisms 68:29–38 (2005)

Appendix 1. *Aeromonas salmonicida*. Proteins identified from the carbonate insoluble membrane subfraction of *A. salmonicida*. The protein spot number, accession numbers, names of the proteins and the organism to which the identified protein has sequence homology are given. The protein spot numbers referred to in this Appendix 1 are indicated in Figs. 1 to 3. Protein names and accession numbers are based on BLAST results of the best hits to which the protein has been annotated. *Protein identification based on a single peptide. ND: not determined

Spot no.	Accession no. of best hit	Protein name of best hit	Organism
1	A39351	Tetragonal surface virulence array protein	<i>Aeromonas salmonicida</i>
2	A39351	Tetragonal surface virulence array protein	<i>Aeromonas salmonicida</i>
2	A39351	Tetragonal surface virulence array protein	<i>Aeromonas salmonicida</i>
3	A39351	Tetragonal surface virulence array protein	<i>Aeromonas salmonicida</i>
4	A39351	Tetragonal surface virulence array protein	<i>Aeromonas salmonicida</i>
5	A39351	Tetragonal surface virulence array protein	<i>Aeromonas salmonicida</i>
6	O68309	Protein Cpn60 (GroEL protein)	<i>Aeromonas salmonicida</i>
7	NP_760438	3-phosphoglycerate kinase	<i>Vibrio vulnificus</i> CMCP6
8	XP_306534	Outer membrane porin protein	<i>Anopheles gambiae</i> str. PEST
9	XP_306534	Outer membrane porin protein	<i>Anopheles gambiae</i> str. PEST
10	BAA94579	Iron-cofactored superoxide dismutase	<i>Aeromonas hydrophila</i>
11	XP_306618	Riboflavin synthase, β -chain	<i>Anopheles gambiae</i> str. PEST
12	NP_744587	Alkyl hydroperoxide reductase, C subunit	<i>Pseudomonas putida</i> KT2440
13	AAN55775*	Peptidoglycan-associated lipoprotein	<i>Shewanella oneidensis</i> MR-1
14	O08437	FKBP-type peptidyl-prolyl isomerase	<i>Aeromonas hydrophila</i>
15	CAA63037	Outer membrane protein	<i>Aeromonas salmonicida</i>
16	NP_414739	Putative lipoprotein	<i>Escherichia coli</i> K12
	ZP_00015887*	Hypothetical protein	<i>Rhodospirillum rubrum</i>
	XP_306643*	Phosphate transport regulator protein	<i>Anopheles gambiae</i> str. PEST
17	CAA63037	Major outer membrane protein OmpAII	<i>Aeromonas salmonicida</i>
18	XP_306378	Outer membrane protein OmpK	<i>Anopheles gambiae</i> str. PEST
19	XP_306378	Outer membrane protein OmpK	<i>Anopheles gambiae</i> str. PEST
20	CAA63037	Major outer membrane protein OmpAII	<i>Aeromonas salmonicida</i>
21	CAA63037	Major outer membrane protein OmpAII	<i>Aeromonas salmonicida</i>
	XP_306408*	3'-phosphoadenosine 5'-phosphosulfate	<i>Anopheles gambiae</i> str. PEST
22	CAA63036*	Major outer membrane protein OmpAI	<i>Aeromonas salmonicida</i>
23	AAF95150	Hypothetical protein	<i>Vibrio cholerae</i>
	CAA63037*	Major outer membrane protein OmpAII	<i>Aeromonas salmonicida</i>
24	AAN81339	Long chain fatty acid transport protein	<i>Escherichia coli</i> K12
25	CAA63036	Major outer membrane protein OmpAI	<i>Aeromonas salmonicida</i>
	CAA63037*	Major outer membrane protein OmpAII	<i>Aeromonas salmonicida</i>
26	CAA25062	Outer membrane protein A	<i>Enterobacter aerogenes</i>
27	AAC45362	FKBP-type peptidyl-prolyl isomerase	<i>Aeromonas hydrophila</i>
	XP_306258	Gluconate transcriptional repressor	<i>Anopheles gambiae</i> str. PEST
28	A39351	Tetragonal surface virulence array protein	<i>Aeromonas salmonicida</i>
29	A39351	Tetragonal surface virulence array protein	<i>Aeromonas salmonicida</i>
30	A39351	Tetragonal surface virulence array protein	<i>Aeromonas salmonicida</i>
31	NP_671279	Elongation factor Tu	<i>Yersinia pestis</i> KIM
	AAN53683*	HlfK protein	<i>Shewanella oneidensis</i> MR-1
32	AAD56398	Outer membrane porin II	<i>Aeromonas hydrophila</i>
	NP_798627*	Polar flagellar motor switch protein FliG	<i>Vibrio parahaemolyticus</i>
	XP_306258*	Gluconate transcriptional repressor	<i>Anopheles gambiae</i> str. PEST
33	AAD56398	Outer membrane porin II	<i>Aeromonas hydrophila</i>
34	NP_285791	Cell division protein FtsZ	<i>Escherichia coli</i> O157:H7
35	NP_671279	Elongation factor Tu	<i>Yersinia pestis</i> KIM

Appendix 1 (continued)

Spot no.	Accession no. of best hit	Protein name of best hit	Organism
36	ND		
37	A39351	Tetragonal surface virulence array protein	<i>Aeromonas salmonicida</i>
38	A39351	Tetragonal surface virulence array protein	<i>Aeromonas salmonicida</i>
39	AAN81339	Long chain fatty acid transport protein	<i>Escherichia coli</i> K12
40	BAA11840*	DNA-directed RNA polymerase α -subunit	<i>Shewanella oneidensis</i> MR-1
41	AAO09596	Enzyme of heme biosynthesis	<i>Vibrio vulnificus</i>
42	NP_670435	Elongation factor Ts	<i>Yersinia pestis</i> KIM
43	AAO09596	Enzyme of heme biosynthesis	<i>Vibrio vulnificus</i>
44	AAO51058	Glycerol dehydrogenase	<i>Dictyostelium discoideum</i>
	AAO07170*	Fructose-specific phosphotransferase system	<i>Vibrio vulnificus</i>
45	A39351	Tetragonal surface virulence array protein	<i>Aeromonas salmonicida</i>
46	A39351	Tetragonal surface virulence array protein	<i>Aeromonas salmonicida</i>
	AAN28926	Enolase	<i>Aeromonas hydrophila</i>
47	AAN28926	Enolase	<i>Aeromonas hydrophila</i>
	A39351*	Tetragonal surface virulence array protein	<i>Aeromonas hydrophila</i>
48	AAN57289	Agglutination protein	<i>Shewanella oneidensis</i> MR-1
	AAO11061	Outer membrane protein	<i>Vibrio vulnificus</i>
	NP_671279	Elongation factor Tu	<i>Yersinia pestis</i> KIM
49	BAC58688	Outer membrane protein TolC	<i>Vibrio parahaemolyticus</i>
50	AAN28926	Enolase	<i>Aeromonas hydrophila</i>
	BAC58688	Outer membrane protein TolC	<i>Vibrio parahaemolyticus</i>
51	NP_667684	Keto-acid reductoisomerase	<i>Yersinia pestis</i> KIM
52	NP_462766	ATP synthase α -subunit	<i>Salmonella typhimurium</i> LT2
	B82202	Thermostable carboxypeptidase	<i>Vibrio cholerae</i>
53	B82202	Thermostable carboxypeptidase	<i>Vibrio cholerae</i>
54	NP_462766	ATP synthase α -subunit	<i>Salmonella typhimurium</i> LT2
	BAC51234*	Blr5969 <i>Bradyrhizobium</i>	<i>japonicum</i> . USDA
55	A39351	Tetragonal surface virulence array protein	<i>Aeromonas salmonicida</i>
56	ND		
57	AAF93256	Ferritin	<i>Vibrio cholerae</i>
	BAC60489*	Conserved hypothetical protein	<i>Vibrio parahaemolyticus</i>
58	Q9KSX1	Histidinol-phosphatase	<i>Vibrio cholerae</i>
59	CAC89297	Purine nucleoside phosphorylase	<i>Yersinia pestis</i>
60	AAO09524	Thiol-disulfide isomerase	<i>Vibrio vulnificus</i>
61	XP_306658	Maltose-binding periplasmic protein	<i>Anopheles gambiae</i> str. PEST
62	AAO11460	Glyceraldehyde-3-phosphate dehydrogenase	<i>Vibrio vulnificus</i>
	P37592	Outer membrane porin protein OmpD	<i>Salmonella typhimurium</i> LT2
63	AAO11460	Glyceraldehyde-3-phosphate dehydrogenase	<i>Vibrio vulnificus</i>
	P37592	Outer membrane porin protein OmpD	<i>Salmonella typhimurium</i> LT2
64	NP_312054	Putative methyltransferase	<i>Escherichia coli</i> O157:H7
65	ND		
66	NP_312054	Phosphoribosylpyrophosphate synthetase	<i>Yersinia pestis</i> KIM
	AAN83771	Carbamate kinase	<i>Escherichia coli</i> CFT073
67	BAC60927	ABC transporter, ATP-binding protein	<i>Vibrio parahaemolyticus</i>
68	CAD29802	Histone-like nucleoid structuring protein	<i>Aeromonas hydrophila</i>
69	ND		
70	NP_803897	DnaK heat shock protein 70	<i>Salmonella enterica</i>
	AAC64133	Phospholipase A1	<i>Aeromonas hydrophila</i>
	XP_306428	Acetoacetyl-CoA synthetase	<i>Anopheles gambiae</i> str. PEST
71	AAN56622	Organic solvent tolerance protein	<i>Shewanella oneidensis</i> MR-1
72	AAF95396	Surface antigen	<i>Vibrio cholerae</i>
75	BAC58431	Hypothetical TonB-dependent receptor	<i>Vibrio parahaemolyticus</i>
76	AAN56622	Organic solvent tolerance protein	<i>Shewanella oneidensis</i> MR-1
	NP_462350	Elongation factor G	<i>Salmonella typhimurium</i> LT2
	AAN54278*	Polyribonucleotide nucleotidyltransferase	<i>Shewanella oneidensis</i> MR-1
77	AAF95396	Surface antigen	<i>Vibrio cholerae</i>
78	AAN81146	Colicin I receptor precursor	<i>Escherichia coli</i> CFT073
79	CAA56668	ExeD protein	<i>Aeromonas salmonicida</i>
80	NP_462766	Membrane-bound ATP synthase α -subunit	<i>Salmonella typhimurium</i> LT2
	BAC51234*	Putative phenylacetate-CoA ligase	<i>Bradyrhizobium japonicum</i> USDA
	AAF95082*	GGDEF family protein	<i>Vibrio cholerae</i>
81	NP_462766	Membrane-bound ATP synthase α -subunit	<i>Salmonella typhimurium</i> LT2
	BAC51234*	Putative phenylacetate-CoA ligase	<i>Bradyrhizobium japonicum</i> USDA
	AAF95082*	GGDEF family protein	<i>Vibrio cholerae</i>
82	AAC09226	Chaperonin GroEL	<i>Aeromonas salmonicida</i>

Appendix 1 (continued)

Spot no.	Accession no. of best hit	Protein name of best hit	Organism
83	AAN83357 AAO09644	Vitamin B12 receptor precursor Outer membrane cobalamin receptor protein	<i>Escherichia coli</i> CFT073 <i>Vibrio vulnificus</i> CMCP6
84	S37779	Maltose-inducible porin precursor	<i>Aeromonas salmonicida</i>
85	S37779	Maltose-inducible porin precursor	<i>Aeromonas salmonicida</i>
86	S37779	Maltose-inducible porin precursor	<i>Aeromonas salmonicida</i>
87	D64071	H ⁺ -transporting 2-sector ATPase	<i>Haemophilus influenzae</i>
88	AAN28926	Enolase	<i>Aeromonas hydrophila</i>
89	AAN28926	Enolase	<i>Aeromonas hydrophila</i>
90	AAN28926	Enolase	<i>Aeromonas hydrophila</i>
91	AAN57289 AAO11061	Agglutination protein Outer membrane protein	<i>Shewanella oneidensis</i> MR-1 <i>Vibrio vulnificus</i> CMCP6
92	AAN57289 AAO11061	Agglutination protein Outer membrane protein	<i>Shewanella oneidensis</i> MR-1 <i>Vibrio vulnificus</i> CMCP6
	NP_671279	Protein chain elongation factor EF-Tu	<i>Yersinia pestis</i> KIM
	BAC58688	Outer membrane protein TolC	<i>Vibrio parahaemolyticus</i>
93	BAC58688	Outer membrane protein TolC	<i>Vibrio parahaemolyticus</i>
	AAO11061	Outer membrane protein	<i>Vibrio vulnificus</i> CMCP6
	AAN57289	Agglutination protein	<i>Shewanella oneidensis</i> MR-1
94	AAO51058	Similar <i>E. coli</i> Glycerol dehydrogenase	<i>Dictyostelium discoideum</i>
95	XP_306534 BAC58688	Outer membrane porin OmpD precursor Outer membrane protein TolC	<i>Anopheles gambiae</i> str. PEST <i>Vibrio parahaemolyticus</i>
96	AAD56398	Outer membrane protein porin II	<i>Aeromonas hydrophila</i>
97	AAD56398	Outer membrane protein porin II	<i>Aeromonas hydrophila</i>
	AAO70632*	Conserved hypothetical protein	<i>Salmonella enterica</i>
98	AAD56398	Outer membrane protein porin II	<i>Aeromonas hydrophila</i>
	BAC58688*	Outer membrane protein TolC	<i>Vibrio parahaemolyticus</i>
	AAO70632*	Conserved hypothetical protein	<i>Salmonella enterica</i>
99	AAD56398	Outer membrane protein porin II	<i>Aeromonas hydrophila</i>
	BAC60954*	Rod shape-determining protein MreB	<i>Vibrio parahaemolyticus</i>
100	AAN57187	Cell division protein FtsZ	<i>Shewanella oneidensis</i> MR-1
101	JC6558	Outer membrane protein A precursor	<i>Klebsiella pneumoniae</i>
	CAA63037*	Major outer membrane protein OmpAII	<i>Aeromonas salmonicida</i>
102	CAA63037	Major outer membrane protein OmpAII	<i>Aeromonas salmonicida</i>
	AAD56398	Outer membrane protein porin II	<i>Aeromonas hydrophila</i>
	JC6558*	Outer membrane protein A precursor	<i>Klebsiella pneumoniae</i>
103	CAA63037	Major outer membrane protein OmpAII	<i>Aeromonas salmonicida</i>
	CAA63036	Major outer membrane protein OmpAI	<i>Aeromonas salmonicida</i>
104	CAA63037	Major outer membrane protein OmpAII	<i>Aeromonas salmonicida</i>
	CAA63036*	Major outer membrane protein OmpAI	<i>Aeromonas salmonicida</i>
	D82129*	Hypothetical protein VC2002	<i>Vibrio cholerae</i>
	JC6558*	Outer membrane protein A precursor	<i>Klebsiella pneumoniae</i>
105	CAA63037	Major outer membrane protein OmpAII	<i>Aeromonas salmonicida</i>
	CAA63036	Major outer membrane protein OmpAI	<i>Aeromonas salmonicida</i>
	D82129	Hypothetical protein VC2002	<i>Vibrio cholerae</i>
106	ND		
107	NP_668107*	Aconitate hydratase B	<i>Yersinia pestis</i> KIM
108	NP_803897	DnaK heat shock protein 70	<i>Salmonella enterica</i>
	AAC64133	Phospholipase A1	<i>Aeromonas hydrophila</i>
109	B82099	Surface antigen VC2252	<i>Vibrio cholerae</i>
110	B82099	Surface antigen VC2252	<i>Vibrio cholerae</i>
	AAN54278	Polyribonucleotide nucleotidyltransferase	<i>Shewanella oneidensis</i> MR-1
111	NP_462350	Protein chain elongation factor EF-G	<i>Salmonella typhimurium</i> LT2
	CAC07184*	Exo-1,4-beta-glucosidase	<i>Prevotella albensis</i>
	AAC64133	Phospholipase A1	<i>Aeromonas hydrophila</i>
112	AAN57375	Virulence regulator BipA	<i>Shewanella oneidensis</i> MR-1
113	ND		
114	ND		
115	NP_670081	30S ribosomal subunit protein S1	<i>Yersinia pestis</i> KIM
116	AAC09226	Chaperonin GroEL	<i>Aeromonas salmonicida</i>
	A39442	Conjugative transfer protein trbC	<i>Escherichia coli</i>
117	ND		
118	AAO09234 AAN82874*	Sulfate adenylate transferase subunit 1 2,3-bisphosphoglycerate-independent phosphoglycerate mutase	<i>Vibrio vulnificus</i> CMCP6 <i>Escherichia coli</i> CFT073
119	BAC59179	Trigger factor	<i>Vibrio parahaemolyticus</i>