

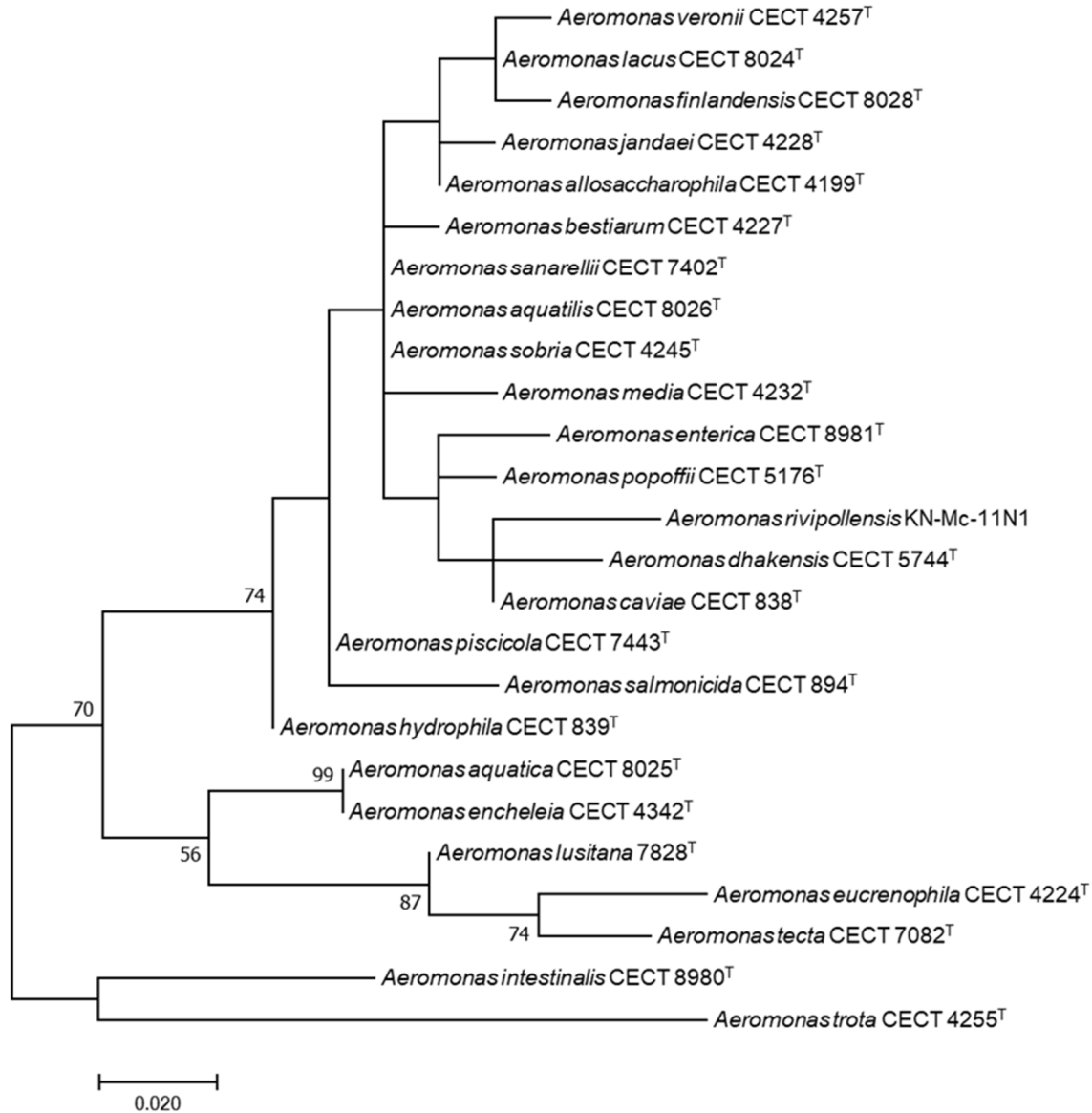
## Supplementary material

### *The Metallochaperone Encoding Gene hypA Is Widely Distributed among Pathogenic Aeromonas spp. and Its Expression Is Increased under Acidic pH and within Macrophages.*

Ana Fernández-Bravo, Loida López-Fernández\*, Maria José Figueras\*.

Unit of Microbiology, Department of Basic Health Sciences, Faculty of Medicine and Health Sciences, IISPV, University Rovira i Virgili, Reus, Spain.

\*Correspondence: Dr. Maria José Figueras, mariajose.figueras@urv.cat; Dr. Loida López-Fernández, loida.lopez@urv.cat



**Figure S1.** Phylogenetic tree constructed with 25 species of *Aeromonas* based on sequences of the protein HypA by the Maximum-Likelihood algorithm (model JTT+G). Numbers at nodes denote the level of bootstrap based on 1000 replicates; only values greater than 50% are shown. Scale bar, base substitutions per site.

**Table S1.** Genetic analyses and diversity of *hypA* presence at strain-level in 143 genomes from 36 different species from the genus *Aeromonas*. <sup>†</sup> indicates type strain.

Species	Strain	Identified (NCBI)	Accession number (genome)	Re-identification	HypA Presence	Rate of hypA presence (%)
<i>A. allosaccharophila</i>	CECT 4199 <sup>†</sup>	<i>A. allosaccharophila</i>	NZ_CDBR00000000.1	-	Yes	4/4 (100)
	BVH88	<i>A. allosaccharophila</i>	NZ_CDCCB00000000.1	<i>A. allosaccharophila</i>	Yes	
	Z9-6	<i>A. allosaccharophila</i>	NZ_NXBS00000000.1	<i>A. allosaccharophila</i>	Yes	
	TTU2014-	<i>A. allosaccharophila</i>	NZ_CDCCB00000000.1	<i>A. allosaccharophila</i>	Yes	
<i>A. bestiarum</i>	CECT 4227 <sup>†</sup>	<i>A. bestiarum</i>	NZ_CDDA00000000.1	-	Yes	2/2 100
	CA23	<i>Aeromonas sp.</i>	NZ_CP023818.1	<i>A. bestiarum</i>	Yes	
<i>A. bivalvium</i>	CECT 7113 <sup>†</sup>	<i>A. bivalvium</i>	NZ_CDBT00000000.1	-	No	3/3 100
	ZJ19-2	<i>A. bivalvium</i>	NZ_NXBQ00000000.1	<i>A. bivalvium</i>	No	
	ZJ20-2	<i>A. bivalvium</i>	NZ_NXBX00000000.1	<i>A. bivalvium</i>	No	
<i>A. caviae</i>	CECT 838 <sup>†</sup>	<i>A. caviae</i>	NZ_CDBK00000000.1	-	Yes	14/20 (70)
	FDAARGOS_7	<i>A. caviae</i>	NZ_CP026055.1	<i>A. caviae</i>	Yes	
	NCTC12244	<i>A. caviae</i>	NZ_LS483441.1	<i>A. caviae</i>	Yes	
	R25-6	<i>A. caviae</i>	NZ_CP025705.1	<i>A. caviae</i>	Yes	
	ASNIH3	<i>Aeromonas sp.</i>	NZ_CP026222.1	<i>A. caviae</i>	Yes	
	8LM	<i>A. caviae</i>	NZ_CP024198.1	<i>A. caviae</i>	Yes	
	Aer593	<i>A. caviae</i>	NZ_RQJZ00000000.1	<i>A. caviae</i>	Yes	
	CHZ306	<i>A. caviae</i>	NZ_MDSC00000000.1	<i>A. caviae</i>	Yes	
	HAMBI_1972	<i>A. caviae</i>	NZ_QLLA00000000.1	<i>A. caviae</i>	Yes	
	FDAARGOS_7	<i>A. caviae</i>	NZ_JTBH00000000.2	<i>A. caviae</i>	Yes	
	GEO_48_Eff_A	<i>A. caviae</i>	NZ_QKOS00000000.1	<i>A. caviae</i>	Yes	
	GEO_47_Up_A	<i>A. caviae</i>	NZ_QKOU00000000.1	<i>A. caviae</i>	Yes	
	CH129	<i>A. caviae</i>	NZ_MDSD00000000.1	<i>A. caviae</i>	Yes	
	S2-003-000-	<i>A. media</i>	QFQK00000000.1	<i>A. caviae</i>	Yes	
	T25-39	<i>A. caviae</i>	NZ_CP025706	<i>A. caviae</i>	No	
	WCW1-2	<i>A. caviae</i>	NZ_CP039832	<i>A. caviae</i>	No	
	GSH8M-1	<i>A. caviae</i>	NZ_AP019195	<i>A. caviae</i>	No	
	R25-2	<i>A. caviae</i>	NZ_CP025777	<i>A. caviae</i>	No	
	ASNHI7	<i>Aeromonas sp.</i>	NZ_CP026226	<i>A. caviae</i>	No	
ASNHI1	<i>Aeromonas sp.</i>	NZ_CP026228	<i>A. caviae</i>	No		
<i>A. dhakensis</i>	CECT 5744 <sup>†</sup>	<i>A. dhakensis</i>	NZ_CDBH00000000.1	-	Yes	10/10 (100)
	BVH70	<i>A. dhakensis</i>	NZ_NKWO00000000.1	<i>A. dhakensis</i>	Yes	
	BVH68	<i>A. dhakensis</i>	NZ_NKWQ00000000.1	<i>A. dhakensis</i>	Yes	
	BVH69	<i>A. dhakensis</i>	NZ_NKWP00000000.1	<i>A. dhakensis</i>	Yes	
	KN-Mc-6U21	<i>A. dhakensis</i>	NZ_CP023141.1	<i>A. dhakensis</i>	Yes	
	Cr2	<i>A. dhakensis</i>	NZ_LBDJ00000000.1	<i>A. dhakensis</i>	Yes	
	Aer283	<i>A. dhakensis</i>	NZ_RQKD00000000.1	<i>A. dhakensis</i>	Yes	
	277	<i>A. dhakensis</i>	NZ_AOBQ00000000.1	<i>A. dhakensis</i>	Yes	
	KOR1	<i>A. dhakensis</i>	NZ_LJOE00000000.1	<i>A. dhakensis</i>	Yes	
	L14h	<i>A. jandaei</i>	NZ_JWJR00000000.1	<i>A. dhakensis</i>	Yes	
<i>A. hydrophila</i>	CECT 839 <sup>†</sup>	<i>A. hydrophila</i>	NC_008570.1	-	Yes	33/33 (100)
	Ae34	<i>A. hydrophila</i>	NZ_BAXY00000000.1	<i>A. hydrophila</i>	Yes	
	AH10	<i>A. hydrophila</i>	NZ_CP011100.1	<i>A. hydrophila</i>	Yes	
	AL06-01	<i>A. hydrophila</i>	SAMN01085623	<i>A. hydrophila</i>	Yes	
	AL10-121	<i>A. hydrophila</i>	NZ_LRRW00000000.1	<i>A. hydrophila</i>	Yes	
	226	<i>A. hydrophila</i>	NZ_JEML00000000.1	<i>A. hydrophila</i>	Yes	
	ML09-121	<i>A. hydrophila</i>	NZ_LRRX00000000.1	<i>A. hydrophila</i>	Yes	
	AD9	<i>A. hydrophila</i>	NZ_JFJO00000000.1	<i>A. hydrophila</i>	Yes	
	RB-AH	<i>A. hydrophila</i>	NZ_JPEH00000000.1	<i>A. hydrophila</i>	Yes	
	YL17	<i>A. hydrophila</i>	NZ_CP007518.2	<i>A. hydrophila</i>	Yes	

Species	Strain	Identified (NCBI)	Accession number (genome)	Re-identification	HypA Presence	Rate of hypA presence (%)
	AL06-06	<i>A. hydrophila</i>	NZ_CP010947.1	<i>A. hydrophila</i>	Yes	
	KN-Mc-1R2	<i>A. hydrophila</i>	NZ_CP027804.1	<i>A. hydrophila</i>	Yes	
	ASNIH4	<i>Aeromonas sp.</i>	NZ_CP026217.1	<i>A. hydrophila</i>	Yes	
	GYK1	<i>A. hydrophila</i>	NZ_CP016392.1	<i>A. hydrophila</i>	Yes	
	D4	<i>A. hydrophila</i>	NZ_CP013965.1	<i>A. hydrophila</i>	Yes	
	JBN2301	<i>A. hydrophila</i>	NZ_CP013178.1	<i>A. hydrophila</i>	Yes	
	NJ-35	<i>A. hydrophila</i>	NZ_CP006870.1	<i>A. hydrophila</i>	Yes	
	J-1	<i>A. hydrophila</i>	NZ_CP006883.1	<i>A. hydrophila</i>	Yes	
	pc104A	<i>A. hydrophila</i>	NZ_CP007576.1	<i>A. hydrophila</i>	Yes	
	AL09-71	<i>A. hydrophila</i>	NZ_CP007566.1	<i>A. hydrophila</i>	Yes	
	WCHAH04509	<i>A. hydrophila</i>	NZ_CP028568.2	<i>A. hydrophila</i>	Yes	
	ZYAH72	<i>A. hydrophila</i>	NZ_CP016989.1	<i>A. hydrophila</i>	Yes	
	AHNIH1	<i>A. hydrophila</i>	NZ_CP016380.1	<i>A. hydrophila</i>	Yes	
	MS-18-37	<i>A. hydrophila</i>	NZ_CP033604.1	<i>A. hydrophila</i>	Yes	
	ZYAH75	<i>A. hydrophila</i>	NZ_CP016990.1	<i>A. hydrophila</i>	Yes	
	FC951	<i>A. hydrophila</i>	NZ_CP032839.1	<i>A. hydrophila</i>	Yes	
	MX16A	<i>A. hydrophila</i>	NZ_CP018201.1	<i>A. hydrophila</i>	Yes	
	WCX23 <sup>a</sup>	<i>A. hydrophila</i>	NZ_CP038463.1	<i>A. hydrophila</i>	Yes	
	WCX23 <sup>a</sup>	<i>A. hydrophila</i>	CP028418.1	<i>A. hydrophila</i>	Yes	
	GSH8-2 DNA	<i>A. hydrophila</i>	NZ_AP019193.1	<i>A. hydrophila</i>	Yes	
	23-C-23	<i>A. hydrophila</i>	NZ_CP038465.1	<i>A. hydrophila</i>	Yes	
	4AK4	<i>A. hydrophila</i>	NZ_CP006579.1	<i>A. hydrophila</i>	Yes	
	AH10	<i>A. hydrophila</i>	NZ_CP011100.1	<i>A. hydrophila</i>	Yes	
<i>A. jandaei</i>	CECT 4228 <sup>T</sup>	<i>A. jandaei</i>	NZ_JWJR00000000.1	-	Yes	
	Riv2	<i>A. jandaei</i>	NZ_JFDL00000000.1	<i>A. jandaei</i>	Yes	
	Aer337	<i>A. jandaei</i>	NZ_RQKB00000000.1	<i>A. jandaei</i>	Yes	5/5 (100)
	IMET J	<i>A. jandaei</i>	NZ_PRCV00000000.1	<i>A. jandaei</i>	Yes	
	Ho603	<i>A. jandaei</i>	NZ_NKVG00000000.1	<i>A. jandaei</i>	Yes	
<i>A. media</i>	CECT 4232 <sup>T</sup>	<i>A. media</i>	NZ_CDBZ00000000.1	-	yes	
	ARB13	<i>A. media</i>	NZ_JRBG00000000.1	<i>A. media</i>	Yes	
	ARB20	<i>A. media</i>	NZ_JRBG00000000.1	<i>A. media</i>	Yes	3/4 (75)
	WS	<i>A. media</i>	NZ_LR134376.1	<i>A. media</i>	No	
<i>A. rivipollensis</i>	KN-Mc-11N1	<i>A. rivipollensis</i>	NZ_CP027856.1	-	Yes	
	BAQ071013-132	<i>A. media</i>	NZ_NKWW00000000.1	<i>A. rivipollensis</i>	Yes	3/3 (100)
	Z1-6	<i>A. media</i>	NZ_NXBV00000000.1	<i>A. rivipollensis</i>	Yes	
<i>A. salmonicida</i>	CECT 894 <sup>T</sup>	<i>A. salmonicida</i>	NC_009348.1	-	yes	
	O23A	<i>A. salmonicida</i>	NZ_CP021654.1	<i>A. salmonicida</i>	Yes	
	34mel	<i>A. salmonicida</i>	NZ_CP022426.1	<i>A. salmonicida</i>	Yes	
	01-B526	<i>A. salmonicida</i>	NZ_CP027000.1	<i>A. salmonicida</i>	Yes	
	RFAS1	<i>A. salmonicida</i>	NZ_CP017143.1	<i>A. salmonicida</i>	Yes	
	S68	<i>A. salmonicida</i>	NZ_CP022186.1	<i>A. salmonicida</i>	Yes	10/10 (100)
	S44	<i>A. salmonicida</i>	NZ_CP022181.1	<i>A. salmonicida</i>	Yes	
	S121	<i>A. salmonicida</i>	NZ_CP022175.1	<i>A. salmonicida</i>	Yes	
	A449	<i>A. salmonicida</i>	NZ_CP000644.1	<i>A. salmonicida</i>	Yes	
A527	<i>A. salmonicida</i>	NZ_CP022550.1	<i>A. salmonicida</i>	Yes		
<i>A. schubertii</i>	CECT 4240 <sup>T</sup>	<i>A. schubertii</i>	NZ_CP013067.1	-	No	
	LF1708	<i>A. schubertii</i>	NZ_CP039611.1	<i>A. schubertii</i>	No	1/3 (33)
	WL1483	<i>A. schubertii</i>	NZ_CP013067.1	<i>A. schubertii</i>	Yes	
<i>A. sobria</i>	CECT 4245 <sup>T</sup>	<i>A. sobria</i>	NZ_CDBW00000000.1	-	yes	
	CU5	<i>Aeromonas sp.</i>	NZ_CP023817.1	<i>A. sobria</i>	Yes	2/2 (100)

Species	Strain	Identified (NCBI)	Accession number (genome)	Re-identification	HypA Presence	Rate of hypA presence (%)
<i>A. taiwanensis</i>	CECT 7403 <sup>†</sup>	<i>A. taiwanensis</i>	NZ_CDDD00000000.1	-	No	0/4 (0)
	186	<i>A. taiwanensis</i>	NZ_QORJ00000000.1	<i>A. taiwanensis</i>	No	
	198	<i>A. taiwanensis</i>	NZ_QORK00000000.1	<i>A. taiwanensis</i>	No	
	1713	<i>A. taiwanensis</i>	NZ_QORL00000000.1	<i>A. taiwanensis</i>	No	
<i>A. veronii</i>	CECT 4257 <sup>†</sup>	<i>A. veronii</i>	NC_015424.1	-	yes	18/18 (100)
	AER39	<i>A. veronii</i>	NZ_AGWT00000000.1	<i>A. veronii</i>	Yes	
	AMC34	<i>A. veronii</i>	NZ_AGWU00000000.1	<i>A. veronii</i>	Yes	
	AMC35	<i>A. veronii</i>	NZ_AGWW00000000.1	<i>A. veronii</i>	Yes	
	A134	<i>A. veronii</i>	NZ_RSFC00000000.1	<i>A. veronii</i>	Yes	
	Hm21	<i>A. veronii</i>	NZ_ATFB00000000.1	<i>A. veronii</i>	Yes	
	Aer 397	<i>A. veronii</i>	NZ_AGWV00000000.1	<i>A. veronii</i>	Yes	
	Hm22	<i>A. veronii</i>	NZ_NKWH00000000.1	<i>A. veronii</i>	Yes	
	TTU2014-	<i>A. veronii</i>	NZ_LKKB00000000.1	<i>A. veronii</i>	Yes	
	X11	<i>A. veronii</i>	NZ_CP024930.1	<i>A. veronii</i>	Yes	
	B565	<i>A. veronii</i>	NC_015424.1	<i>A. veronii</i>	Yes	
	TH0426	<i>A. veronii</i>	NZ_CP012504.1	<i>A. veronii</i>	Yes	
	AVNIH1	<i>A. veronii</i>	NZ_CP014774.1	<i>A. veronii</i>	Yes	
	CB51	<i>A. veronii</i>	NZ_CP015448.1	<i>A. veronii</i>	Yes	
	17ISAe	<i>A. veronii</i>	NZ_CP028133.1	<i>A. veronii</i>	Yes	
	X12	<i>A. veronii</i>	NZ_CP024933.1	<i>A. veronii</i>	Yes	
	Hm22	<i>A. veronii</i>	NZ_NKWH00000000.1	<i>A. veronii</i>	Yes	
	E20102	<i>A. veronii</i>	NZ_QIMH00000000.1	<i>A. veronii</i>	Yes	
<i>A. trota</i>	CECT 4255 <sup>†</sup>	<i>A. enteropelogenes</i> <sup>b</sup>	NZ_CDDE00000000.1	<i>A. trota</i>	Yes	4/4 (100)
	Aer371	<i>A. enteropelogenes</i> <sup>b</sup>	NZ_RQKA00000000.1	<i>A. trota</i>	Yes	
	LK14	<i>A. enteropelogenes</i> <sup>b</sup>	NZ_LDWG00000000.1	<i>A. trota</i>	Yes	
	CECT 4487	<i>A. enteropelogenes</i> <sup>b</sup>	NZ_CDCG00000000.1	<i>A. trota</i>	Yes	
<i>A. encheleia</i>	CECT 4342 <sup>†</sup>	<i>A. encheleia</i>	NZ_LR134376.1	-	Yes	2/2 (100)
	NCTC12917	<i>A. encheleia</i>	NZ_LR134376.1	<i>A. encheleia</i>	Yes	
<i>A. aquatilis</i>	CECT 8026 <sup>†</sup>	<i>A. aquatilis</i>	c	-	Yes	-
<i>A. aquatica</i>	CECT 8025 <sup>†</sup>	<i>A. aquatica</i>	NZ_JRGL00000000.1	-	Yes	-
<i>A. enterica</i>	CECT 8981 <sup>†</sup>	<i>A. enterica</i>	c	-	Yes	-
<i>A. eucrenophila</i>	CECT 4224 <sup>†</sup>	<i>A. eucrenophila</i>	NZ_CDDF00000000.1	-	Yes	-
<i>A. intestinalis</i>	CECT 8980 <sup>†</sup>	<i>A. intestinalis</i>	c	-	Yes	-
<i>A. finlandensis</i>	CECT 8028 <sup>†</sup>	<i>A. finlandensis</i>	NZ_JRGK00000000.1	-	Yes	-
<i>A. lacus</i>	CECT 8024 <sup>†</sup>	<i>A. lacus</i>	NZ_JRGM00000000.1	-	Yes	-
<i>A. piscicola</i>	CECT 7443 <sup>†</sup>	<i>A. piscicola</i>	NZ_CDBL00000000.1	-	Yes	-
<i>A. popoffi</i>	CECT 5176 <sup>†</sup>	<i>A. popoffi</i>		-	Yes	-
<i>A. sanarelli</i>	CECT 7402 <sup>†</sup>	<i>A. sanarelli</i>	NZ_CDBN00000000.1	-	Yes	-
<i>A. tecta</i>	CECT 7082 <sup>†</sup>	<i>A. tecta</i>	NZ_CDCA00000000.1	-	Yes	-
<i>A. australiensis</i>	CECT 8023 <sup>†</sup>	<i>A. australiensis</i>	NZ_CDDH00000000.1	-	No	-
<i>A. cavernicola</i>	CECT 7862 <sup>†</sup>	<i>A. cavernicola</i>	NZ_PGGC00000000.1	-	No	-
<i>A. crassostreae</i>	CECT 8982 <sup>†</sup>	<i>A. crassostreae</i>	c	-	No	-
<i>A. diversa</i>	CECT 4254 <sup>†</sup>	<i>A. diversa</i>	NZ_APVG00000000.1;	-	No	-
<i>A. fluvialis</i>	CECT 7401 <sup>†</sup>	<i>A. fluvialis</i>	NZ_CDBO00000000.1	-	No	-
<i>A. molluscorum</i>	CECT 5864 <sup>†</sup>	<i>A. molluscorum</i>	NZ_AQGQ00000000.1;	-	No	-
<i>A. rivuli</i>	CECT 7518 <sup>†</sup>	<i>A. rivuli</i>	NZ_CDBJ00000000.1	-	No	-
<i>A. simiae</i>	IBS S-6874 <sup>†</sup>	<i>A. simiae</i>	NZ_CDBY00000000.1	-	No	-

a Two different sequences with the same name.

b. *A. enteropelogenes* is a synonym of *A. trota*.

c. Draft genomes not freely available.

**Table S2.** A total of 95 true positives protein sequences of HypA from 60 genus and 77 species of bacteria obtained from Prosite and Uniprot databases.

Species	Protein ID	Species	Protein ID
<i>Actinobacillus succinogenes</i>	<a href="#">HYPA_ACTSZ (A6VPH7)</a>	<i>Legionella pneumophila</i>	<a href="#">HYPA_LEGPH (Q5ZSP1)</a>
<i>Aeromonas hydrophila</i>	<a href="#">HYPA_AERHH (A0KL76)</a>	<i>Legionella pneumophila</i>	<a href="#">HYPA_LEGPA (Q5X252)</a>
<i>Aeromonas salmonicida</i>	<a href="#">HYPA_AERS4 (A4SLV6)</a>	<i>Legionella pneumophila</i>	<a href="#">HYPA_LEGPL (Q5WTX7)</a>
<i>Anabaena variabilis</i>	<a href="#">HYPA_ANAVT (Q3M482)</a>	<i>Legionella pneumophila</i>	<a href="#">HYPA_LEGPC (A5IEY2)</a>
<i>Aquifex aeolicus</i>	<a href="#">HYPA_AQUAE (O67133)</a>	<i>Methanococcus jannaschii</i>	<a href="#">HYPA_METJA (Q57667)</a>
<i>Anacystis nidulans</i>	<a href="#">HYPA_SYNP6 (P94160)</a>	<i>Methanosarcina barkeri</i>	<a href="#">HYPA_METBF (Q46BF1)</a>
<i>Archaeoglobus fulgidus</i>	<a href="#">HYPA_ARCFU (O28904)</a>	<i>Methanosarcina acetivorans</i>	<a href="#">HYPA_METAC (Q8TRN7)</a>
<i>Azotobacter chroococcum</i>	<a href="#">HYPA_AZOCH (Q43948)</a>	<i>Methanospaera stadmanae</i>	<a href="#">HYPA_METST (Q2NEZ5)</a>
<i>Azoarcus sp.</i>	<a href="#">HYPA_AZOSB (A1KC59)</a>	<i>Methanothermobacter</i>	<a href="#">HYPA_METTH (O26876)</a>
<i>Azotobacter vinelandii</i>	<a href="#">HYPA_AZOVI (P31879)</a>	<i>Methylacidiphilum infernorum</i>	<a href="#">HYPA_METI4 (B3DWG1)</a>
<i>Beijerinckia indica</i>	<a href="#">HYPA_BEI19 (B2IJ38)</a>	<i>Methanobrevibacter smithii</i>	<a href="#">HYPA_METS3 (A5UJD5)</a>
<i>Bradyrhizobium diazoefficiens</i>	<a href="#">HYPA2_BRADU (Q45256)</a>	<i>Methanopyrus kandleri</i>	<a href="#">HYPA_METKA (Q8TV53)</a>
<i>Bradyrhizobium sp.</i>	<a href="#">HYPA_BRASO (A4YNU5)</a>	<i>Methanosarcina Frisia</i>	<a href="#">HYPA_METMA (Q8PUL7)</a>
<i>Campylobacter jejuni</i>	<a href="#">HYPA_CAMJE (Q9PHP0)</a>	<i>Nitratiruptor sp.</i>	<a href="#">HYPA_NITSB (A6Q3N0)</a>
<i>Chloroflexus aurantiacus</i>	<a href="#">HYPA_CHLSY (B9LLZ7)</a>	<i>Nostoc punctiforme</i>	<a href="#">HYPA_NOSP7 (Q9EYH3)</a>
<i>Chloroflexus aurantiacus</i>	<a href="#">HYPA_CHLAA (A9WK98)</a>	<i>Nostoc sp.</i>	<a href="#">HYPA_NOSS1 (O30461)</a>
<i>Chloroflexus aggregans</i>	<a href="#">HYPA_CHLAD (B8G3M6)</a>	<i>Paracoccus denitrificans</i>	<a href="#">HYPA_PARDP (A1B6P4)</a>
<i>Chlorobaculum tepidum</i>	<a href="#">HYPA_CHLTE (Q8KB18)</a>	<i>Pectobacterium atrosepticum</i>	<a href="#">HYPA_PECAS (Q6D7U0)</a>
<i>Chlorobium limicola</i>	<a href="#">HYPA_CHLL2 (B3EEL6)</a>	<i>Pelodictyon phaeoclathratiforme</i>	<a href="#">HYPA_PELPB (B4SCQ5)</a>
<i>Chlorobium luteolum</i>	<a href="#">HYPA_CHLL7 (Q3B2W3)</a>	<i>Polaromonas naphthalenivorans</i>	<a href="#">HYPA_POLNA (A1VNP5)</a>
<i>Chlorobium vibrioforme</i>	<a href="#">HYPA_CHLP8 (B3QQ33)</a>	<i>Pyrococcus furiosus</i>	<a href="#">HYPA_PYRFU (Q8U357)</a>
<i>Chlorobium phaeobacteroides</i>	<a href="#">HYPA_CHLPB (B3EL96)</a>	<i>Pyrococcus horikoshii</i>	<a href="#">HYPA_PYRHO (O59267)</a>
<i>Cupriavidus necator</i>	<a href="#">HYPA_CUPNH (P31901)</a>	<i>Prosthecochloris aestuarii</i>	<a href="#">HYPA_PROA2 (B4S9J3)</a>
<i>Dechloromonas aromatica</i>	<a href="#">HYPA_DECAR (Q478M5)</a>	<i>Psychromonas ingrahamii</i>	<a href="#">HYPA_PSYIN (A1SU80)</a>
<i>Dehalococcoides ethenogenes</i>	<a href="#">HYPA_DEHM1 (Q3Z6L1)</a>	<i>Pyrococcus abyssi</i>	<a href="#">HYPA_PYRAB (Q9V148)</a>
<i>Dehalococcoides mccartyi</i>	<a href="#">HYPA_DEHMC (Q3ZYW6)</a>	<i>Rhizobium leguminosarum</i>	<a href="#">HYPA_RHILV (P28154)</a>
<i>Dehalococcoides mccartyi</i>	<a href="#">HYPA_DEHMB (A5FPQ5)</a>	<i>Rhodobacter capsulatus</i>	<a href="#">HYPA_RHOCA (P26409)</a>
<i>Deinococcus radiodurans</i>	<a href="#">HYPA_DEIRA (Q9RYJ6)</a>	<i>Rhodoferrax ferrireducens</i>	<a href="#">HYPA_RHOFT (Q21R10)</a>
<i>Desulfococcus oleovorans</i>	<a href="#">HYPA_DESOH (A8ZZG8)</a>	<i>Rhodopseudomonas palustris</i>	<a href="#">HYPA_RHOP5 (Q07S91)</a>
<i>Desulfatibacillum aliphaticivorans</i>	<a href="#">HYPA_DESAL (B8FH08)</a>	<i>Rhodobacter sphaeroides</i>	<a href="#">HYPA_RHOSK (B9KKQ0)</a>
<i>Desulfovibrio magneticus</i>	<a href="#">HYPA_DESMR (C4XS28)</a>	<i>Rhodobacter sphaeroides</i>	<a href="#">HYPA_RHOS1 (A3PLP3)</a>
<i>Desulfovibrio vulgaris</i>	<a href="#">HYPA1_DESVH (Q729M2)</a>	<i>Rhodobacter sphaeroides</i>	<a href="#">HYPA_RHOS4 (Q3J0K8)</a>
<i>Desulfovibrio vulgaris</i>	<a href="#">HYPA2_DESVH (Q729Q7)</a>	<i>Rhodobacter sphaeroides</i>	<a href="#">HYPA_RHOSH (Q9REM0)</a>
<i>Escherichia coli</i>	<a href="#">HYPA_ECOL6 (Q8FEL9)</a>	<i>Rippkaea orientalis</i>	<a href="#">HYPA_RIPO1 (B7JUE3)</a>
<i>Escherichia coli</i>	<a href="#">HYPA_ECOLI (P0A700)</a>	<i>Salmonella typhi</i>	<a href="#">HYPA_SALTI (P64420)</a>
<i>Escherichia coli</i>	<a href="#">HYPA_ECO57 (P0A701)</a>	<i>Salmonella typhimurium</i>	<a href="#">HYPA_SALTY (P64419)</a>
<i>Geobacter daltonii</i>	<a href="#">HYPA_GEODF (B9M4A8)</a>	<i>Shewanella baltica</i>	<a href="#">HYPA_SHEB8 (A6WMK8)</a>
<i>Geobacter metallireducens</i>	<a href="#">HYPA_GEOMG (Q39QV5)</a>	<i>Shigella flexneri</i>	<a href="#">HYPA_SHIFL (P0A702)</a>
<i>Geobacter sulfurreducens</i>	<a href="#">HYPA_GEOSL (Q74G73)</a>	<i>Syntrophus aciditrophicus</i>	<a href="#">HYPA_SYNAS (Q2LVX4)</a>
<i>Geobacter sp.</i>	<a href="#">HYPA_GEOSM (C6E310)</a>	<i>Synechococcus elongatus</i>	<a href="#">HYPA_SYNE7 (Q31K36)</a>
<i>Geobacter uraniireducens</i>	<a href="#">HYPA_GEOUR (A5GFC7)</a>	<i>Synechococcus sp.</i>	<a href="#">HYPA_SYNP2 (Q8KX22)</a>
<i>Helicobacter pylori</i>	<a href="#">HYPA_HELPJ (P0A0U5)</a>	<i>Synechocystis sp.</i>	<a href="#">HYPA1_SYNY3 (P74263)</a>
<i>Helicobacter pylori</i>	<a href="#">HYPA_HELPY (P0A0U4)</a>	<i>Synechocystis sp.</i>	<a href="#">HYPA2_SYNY3 (P73269)</a>
<i>Ignicoccus hospitalis</i>	<a href="#">HYPA_IGNH4 (A8AAQ5)</a>	<i>Thermococcus gammatolerans</i>	<a href="#">HYPA_THEGJ (C5A3C3)</a>
<i>Klebsiella pneumoniae</i>	<a href="#">HYPA_KLEP3 (B5XV79)</a>	<i>Thermococcus kodakaraensis</i>	<a href="#">HYPA_THEKO (Q5JIH3)</a>
<i>Klebsiella pneumoniae</i>	<a href="#">HYPA_KLEP7 (A6TCZ3)</a>	<i>Thermococcus onnurineus</i>	<a href="#">HYPA_THEON (B6YT59)</a>
<i>Lawsonia intracellularis</i>	<a href="#">HYPA_LAWIP (Q1MRS4)</a>	<i>Thermomicrobium roseum</i>	<a href="#">HYPA_THERP (B9L1X1)</a>
		<i>Trichodesmium erythraeum</i>	<a href="#">HYPA_TRIEI (Q117V9)</a>