

Supplementary Table 2. P3A H+-ATPase-like proteins in selected organisms

			Synapomorphies		
Taxonomy	Species	Acc. Nr.	TM4	TM5	TM6
Eukaryota					
Opisthokonta					
Metazoa					
Bilateria					
Deuterostomia					
Chordata					
	<i>Homo sapiens</i>	-			
	<i>Danio rerio</i>	-			
	<i>Branchiostoma floridae</i>	-			
	<i>Ciona intestinalis</i>	-			
Hemichordata					
	<i>Saccoglossus kowalevskii</i>	-			
Echinodermata					
	<i>Strongylocentrotus purpuratus</i>	-			
	<i>Acanthaster planci</i>	-			
Protostomia					
Nematoda					
	<i>Caenorhabditis elegans</i>	-			
	<i>Toxocara canis</i>	-			
Arthropoda					
	<i>Drosophila melanogaster</i>	-			
Mollusca					
	<i>Octopus bimaculoides</i>	-			
Brachiopoda;					
	<i>Lingula anatina</i>	-			
Platyhelminthes					
	<i>Schistosoma mansoni</i>	-			
Cnidaria					
	<i>Nematostella vectensis</i>	-			
Placozoa					
	<i>Trichoplax adhaerens</i>	-			
Porifera					
	<i>Amphimedon queenslandica</i>	-			
Choanoflagellata					
	<i>Salpingoeca rosetta</i>	-			
	<i>Monosiga brevicollis MX1</i>	-			
Ichthyospora					
	<i>Capsaspora owczarzakii</i> ATCC 30864	XP_004344245.1	GGIPVAMPT	YSIASTVRI	ALLNDGTV
	<i>Sphaeroforma arctica</i> JP610	XP_014154558.1	GGIPIAMPT	YTVAMTFRI	AIFNDGAM
		XP_014159606.1	GGIPIAMPT	YTIAMTFRI	AIFNDGAM
		XP_014146981.1 partial	GGIPIAMPT	YTVAMTFRI	AIFNDGAM
		XP_014151490.1	ASIPIAIEI	YRIAATLQL	TVLNDGTL
		XP_014156974.1	ASIPIAIEI	YRIAATLQL	TVLNDGTL
		XP_014153773.1	ASTPIAIEI	YRIATTLQL	TVLNDGTL
Fungi					
Ascomycota					
Saccharomycetes					
	<i>Saccharomyces cerevisiae</i> S288c	NP_011507.1	IGVVPVGLPA	YRIALS LHL	AIFADVAT
		NP_015289.1	IGVVPVGLPA	YRIALS LHL	AIFADVAT
Eurotiomycetes					
	<i>Aspergillus nidulans</i> FGSC A4	XP_657922.1	IGVVPVGLPA	YRIALS LHL	AIFADIAT
		XP_662463.1	IGVVPVGLPV	YRIALCIHL	ALFADLAT
Leotiomycetes					
	<i>Pseudogymnoascus</i> sp. VKM F-3557	KFY01207.1	IGVVPVGLPA	YRIALS IHL	AIFADVAT
		KFX86035.1 partial	VGVPVGLPV	YRIALCLHL	ALFADLAT
Sordariomycetes					
	<i>Fusarium oxysporum</i> Fo47	EWZ49743.1	VGVPVGLPA	YRIALS LHM	AIFADIAT
		EWZ39464.1	IGVVPVGLPV	YRIALCLHL	ALFADLAT
		EWZ39463.1	IGVVPVGLPV	YRIALCLHL	ALFADLAT
Schizosaccharomycetes					
	<i>Schizosaccharomyces pombe</i> 972h-	P09627.1	IGVVPVGLPA	YRIALS LHL	AIFADVAT
		P28876.1	IGVVPVGLPA	YRIALS LHL	AIFADVAT
Basidiomycota					
Agaricomycetes					
	<i>Agaricus bisporus</i> var. <i>bisporus</i> H97	XP_006463506.1	GGIPIAMPT	YACAVTIRI	ALLNDGTI
	<i>Coprinopsis cinerea</i> okayama7#130	XP_001832503.1	GGIPIAMPT	YACAVTIRI	ALLNDGTI
		XP_002910572.1	GGIPIAMPT	YACAVTIRI	ALLNDGTI
Tremellomycetes					
	<i>Tremella mesenterica</i> DSM 1558	XP_007005709.1	IGVVPVGLPV	YRIALCVHL	AIFADVAT
		XP_007006406.1	GGIPIAMPT	YACAVTIRI	AVLNDGTI
Ustilaginomycetes					
	<i>Ustilago maydis</i> 521	XP_011388984.1	VGVPVGLPC	YRISLCLHL	ALFADVAT
		XP_011387142.1	GGIPIAMPC	YAAAITIRV	APLNDGSI
	<i>Moesziomyces antarcticus</i>	XP_014657452.1	VGVPVGLPC	YRISLCLHL	ALFADVAT
		XP_014658969.1	GGIPIAMPC	YAAAITIRV	APLNDGSI
Mucoromycota					
Glomeromycotina					
	<i>Rhizophagus irregularis</i> DAOM 181602=DAOI	XP_025164402.1	AAIPVGLPT	YRITSTVHF	ALLNDAAT
		XP_025189517.1	AAIPVGLPT	YRITSTIHF	AILNDAAT
Mortierellomycotina					
	<i>Lobosporangium transversale</i>	XP_021885117.1	AAIPVGLPT	YRITSTVHF	CILNDLAT
		XP_021885431.1	AAIPVGLPT	YRITSTVHF	CILNDLAT
		XP_021877379.1	AAIPVGLPT	YRITSTVHF	CILNDAAT
		XP_021878950.1	AAIPVGLPT	YRITSTVHF	CILNDAAT
		XP_021880437.1	AAIPVGLPT	YRITSTVHF	CILNDAAT
		XP_021880984.1	AAIPVGLPT	YRITSTVHF	CILNDAAT

		XP_021884630.1	GGIPIAMPT	YTCSITIRV	AILNDGTT
	Mucoromycotina				
	<i>Rhizopus microsporus</i> ATCC 52813	XP_023466301.1	AAIPVGLPT	YRITSTIHF	CVLNDAAT
		XP_023466973.1	AAIPVGLPT	YRISSTIHF	SVLNDAAT
		XP_023468080.1	AAIPVGLPT	YRITSTIHF	SLLNDAAT
		XP_023471391.1	GGIPIAMPT	YTCSVTIRI	AMLNDGTT
	Zoopagomycota				
	Zoopagomycotina				
	<i>Syncephalis pseudoplumigaleata</i>	RKP27234.1	SAVPIALPA	YRIALSJHL	AIFSDIAV
	Entomophthoromycotina				
	<i>Basidiobolus meristosporus</i> CBS 931.73	ORX92534.1	AAIPVGLPT	YRITSTIHF	AVLNDAAT
		ORY05772.1	AAIPVGLPT	YRITSTIHF	AVLNDGAT
		ORY05773.1	AAIPVGLPT	YRITSTIHF	AVLNDAAT
		ORX81304.1	IGVPVGLPA	YRIALSJHL	AIFADIAT
		ORX92659.1	IGVPVGLPA	YRIALSJHL	AIFADVAT
		ORX64691.1	VGVPVGLPA	YRIALSJHL	AIFADIAT
		ORX92664.1	VGVPVGLPA	YRIALSJHL	AIFADVAT
		ORX92665.1	VGVPVGLPA	YRIALSJHL	AIFADVAT
		ORX92666.1	VGVPVGLPA	YRIALSJHL	AIFADVAT
	Kickxellomycotina				
	<i>Dimargaris cristalligena</i>	RKP39731.1	GGIPIAMPT	YTCSVTIRI	AILNDGTT
		RKP39492.1	AAIPVGLPT	YRITSTIHF	AVLNDAAT
	Blastocladiomycota				
	<i>Allomyces macrogynus</i> ATCC 38327	KNE65274.1	AAIPVGLPT	YRITSTIHF	AVLNDAAT
	Chytridiomycota				
	Chytridiomycetes				
	<i>Spizellomyces punctatus</i> DAOM BR117	XP_016610781.1	IGVPVGLPA	YRIALSJHL	AIFADIAT
		XP_016611460.1	AAIPVGLPT	YRIASTIHF	AVLNDAAT
	Monoblepharidomycetes				
	<i>Gonapodya prolifera</i> JEL478	KXS21079.1	AAIPVGLPT	YRIASTIHF	AVMNDAAAT
		KXS21078.1	AAIPVGLPT	YRIASTIHF	AVMNDAAAT
	Cryptomycota				
	<i>Rozella allomyces</i>	-			
	Nucleariidae and Fonticula group				
	Fonticulida				
	<i>Fonticula alba</i>	XP_009495892.1	GGIPIAMPT	YAVATTVRI	AILNDGTM

Viridiplantae

	Streptophyta				
	Embryophyta				
	Magnoliophyta				
	Eudicotyledons				
	<i>Arabidopsis thaliana</i>	P20649	GGIPIAMPT	YAVSITIRI	AILNDGTT
		P19456	GGIPIAMPT	YAVSITIRI	AILNDGTT
		P20431	GGIPIAMPT	YAVSITIRI	AILNDGTT
		Q9SU58	GGIPIAMPT	YAVSITIRI	AILNDGTT
		Q9SJB3	GGIPIAMPS	YAVSITIRI	AILNDGTT
		Q9SH76	GGIPIAMPT	YAVSITIRI	AILNDGTT
		Q9LY32	GGIPIAMPT	YAVSITIRI	AILNDGTT
		Q9M2A0	GGIPIAMPT	YAVSITIRI	AILNDGTT
		Q42556	GGIPIAMPT	YAVSITIRI	AILNDGTT
		Q43128	GGIPIAMPT	YAVSITIRI	AILNDGTT
		Q9LV11	GGIPIAMPT	YAVSITIRI	AILNDGTT
	<i>Oryza sativa japonica</i>	osa:4333770	GGIPIAMPT	YAVSITIRI	AILNDGTT
		osa:4342621	GGIPIAMPT	YAVSITIRI	AILNDGTT
		osa:4352910	GGIPIAMPT	YAVSITIRI	AILNDGTT
		osa:4338405	GGIPIAMPT	YAVSITIRV	AILNDGTT
		osa:4345039	GGIPIAMPT	YAVSITIRI	AILNDGTT
		osa:4331015	GGIPIAMPT	YAVSITIRI	AILNDGTT
		osa:4337257	GGIPIAMPT	YAVSITIRI	AILNDGTT
		osa:4331281	GGIPIAMPT	YAVSITVRI	AILNDGTT
		osa:4331853	GGIPIAMPT	YAVSITIRI	AILNDGTT
		osa:4340312	GGIPIAMPT	YAVSITIRI	AILNDGTT
		osa:107276159	GLIPMSMPA	YAVSSTVHA	AACNYCTS
		osa:4350530	GLIPMSIPA	YAVSSTVHA	AACNYCTS
	<i>Amborella trichopoda</i>	atr:18438505	GGIPIAMPT	YAVSITIRM	AILNDGTT
		atr:18438507	GGIPIAMPT	YAVSITIRI	AILNDGTT
		atr:18435577	GGIPIAMPT	YAVSITIRI	AILNDGTT
		atr:18429448	GGIPIAMPT	YAVSITIRI	AILNDGTT
		atr:18428264	GGIPIAMPT	YAVSITIRI	AILNDGTT
		atr:18427458	GGIPIAMPT	YAVSITIRI	AILNDGTT
	Lycopodiopsida (club mosses)				
	<i>Selaginella moellendorffii</i>	smo:SELMODRAFT_430150	GGIPIAMPT	YAVSITIRI	-----
		smo:SELMODRAFT_419690	GGIPIAMPT	YAVSITIRI	-----
		smo:SELMODRAFT_76771	GGIPIAMPT	YAVSITIRI	AILNDGTT
		smo:SELMODRAFT_83063	GGIPIAMPT	YAVSITIRI	AILNDGTT
	Bryophyta (mosses)				
	<i>Physcomitrella patens</i>	ppp:112277771	GGIPIAMPT	YAVSITIRI	AILNDGTT
		ppp:112290448	GGIPIAMPT	YAVSITIRI	AILNDGTT
		ppp:112280278	GGIPIAMPT	YAVSITIRI	AILNDGTT
		ppp:112275718	GGIPIAMPT	YAVSITIRI	AILNDGTT
		ppp:112280191	GGIPIAMPT	YAVSITIRI	AILNDGTT
		ppp:112286501	GGIPIAMPT	YAVSITIRI	AILNDGTT
		ppp:112289376	GGIPIAMPT	YAVSITVRI	AILNDGTM
	Charophyceae				
	<i>Chara braunii</i>	GBG79770.1	ASVPLAIEI	YRIAAATLQL	TLNDGTL
		GBG70142.1	ASVPLAIEI	YRIAAATLQL	TLNDGTL
		GBG66655.1	SVVPTGMPV	YRLASSILV	SLVNDFTV
	Klebsormidiophyceae				
	<i>Klebsormidium nitens</i>	GAQ79028.1	GGIPIAMPT	YAVSITIRI	AILNDGTT
		GAQ88599.1	SVVPTGMPV	YRMASSILI	SLFNDSL
		GAQ82298.1	ASIPIAIEI	YRVAATLQL	TLNDGTL

Chlorophyta		GAQ86610.1	-----	YRMASILI	SLFNDSLVS
Chlorophyceae					
	<i>Chlamydomonas reinhardtii</i>	XP_001698580.1	GGIPIAMPT	YTVAMTFRI	AVFNDGAM
		PNW84942.1	ASIPIAIEI	YRIAATLQL	TLNDGTL
		XP_001703372.1	ASIPIAIEI	YRIAATLQL	TLNDGTL
	<i>Volvox carteri f. nagariensis</i>	XP_002947352.1	GGIPIAMPT	YTVAMTFRI	AVFNDGAM
		XP_002951653.1	ASIPIAIEI	YRIAATLQL	TLNDGTL
		XP_002951750.1	ASIPIAIEI	YRIAATLQL	TLNDGTL
	<i>Coccomyxa subellipsoidea</i> C-169	XP_005647875.1	GGIPIAMPT	YTVAMTFRI	AVFNDGAM
		XP_005643733.1	GGIPIAMPT	YTVAMTFRI	AVFNDGAM
		XP_005646665.1	SAMPVGMFV	YRIASSLLI	NITNDASV
		XP_005646664.1	STVPVGMFV	YRIASSLLI	NITNDASV
		XP_005648232.1	ASIPIAIEI	YRIAATLQL	TLNDGTL
	<i>Monoraphidium neglectum</i>	XP_013899713.1	GGIPIAMPT	YTVAMTFRI	AVFNDGAM
		XP_013896930.1	ASIPIAIEI	YRCV-----	-----
	<i>Dunaliella bioculata</i>	P54211.1	GGIPIAMPT	YTIAMTFRI	AVFNDGAM
	<i>Dunaliella acidophila</i>	P54210.1	GAIPIAMPT	YTIAMTFRI	AVFNDGAM
	<i>Dunaliella salina</i>	ABB88698.1	SVVPIGMFV	YRMASVLI	SMLNDASV
	<i>Raphidocelis subcapitata</i>	GBF93844.1	GGIPIAMPT	YTVAMTFRV	AVFNDGAM
		GBF93619.1	ASIPIAIEI	YRIACTLQL	TVLNDGTL
		GBF97849.1	ASIPIAIEI	YRIACTLQL	TVLNDGTL
Trebouxiophyceae					
	<i>Chlorella variabilis</i>	XP_005843347.1	ASIPIAIEI	YRIAATLQL	TLNDGTL
Ulvophyceae					
	<i>Flabellia petiolata</i> (genome not complete)	-			
Chloropicophyceae					
	<i>Chloropicon primus</i>	QDZ19246.1	ASIPIAMQV	YRIACTLQL	TILNDGCI
		QDZ23938.1	ATLPVAMPL	YRMASVLI	SLVNDFTA
Mamiellophyceae					
	<i>Micromonas pusilla</i> CCMP1545	XP_003059178.1	ASIPIALRV	YRVACTQQL	TILNDGTI
	<i>Micromonas commoda</i>	XP_002501837.1	ASIPIALRV	YRIACTEQL	TILNDGTI
	<i>Ostreococcus tauri</i>	XP_022839186.1	ASIPIALRV	YRVACTEQL	TILNDGTI
	<i>Ostreococcus lucimarinus</i> CCE9901	XP_001418414.1	ASIPIALRV	YRIACTEQL	TILNDGTI
	<i>Bathycoccus prasinos</i>	XP_007513114.1	ASIPIALRV	YRVACTEQL	TILNDGTI
Rhodophyta					
Florideophyceae					
	<i>Chondrus crispus</i>	-			
	<i>Gracilaria chorda</i>	-			
Bangiophyceae					
	<i>Porphyridium purpureum</i>	evm.model.contig_4410.18	GGIPIAMPT	YTIATTFRI	AICNDGAM
		evm.model.contig_3409.10	AGAPVTLFV	YRIWASAYN	SLFKDIVI
	<i>Cyanidium caldarium</i>	BAA20486.1	GGVPIAMPV	YACSVTVRI	AVLNDGTI
	<i>Cyanidioschyzon merolae</i> strain 10D	XP_005538169.1	GGVPIAMPV	YACSVTVRI	AVLNDGTI
	<i>Porphyra umbilicalis</i>	OSX77916.1	GGVPIAMPPT	YAVAITVRI	VLLNDGGM
	<i>Pyropia yezoensis</i>	-			
SAR					
Stramenopiles					
Oomycetes					
	<i>Pythium oligandrum</i>	TMW57784.1	GGIPVAMPT	YSIAMTVRI	AILNDGTI
	<i>Albugo laibachii</i> Nc14	CCA24964.1	GGIPVAMPT	YSIAMTVRI	AILNDGTI
		CCA15042.1	ASIPIAMQV	YRVACTIQL	TILNDGTI
		CCA26167.1	GGIPVAMPT	YSVAMTVRI	AILNDGTI
	<i>Saprolegnia diclina</i> VS20	XP_008617259.1	GGIPVAMPT	YSIAMTVRI	AILNDGTI
		XP_008617838.1	GGIPVAMPT	YSIAMTVRI	AILNDGTI
		XP_008613101.1	GGIPVAMPT	YSVAMTVRI	AILNDGTI
		XP_008611389.1	AAVPLTLRS	YRVATGLHV	LLLNDGAI
	<i>Achlya hypogyna</i>	OQR99941.1	GGIPVAMPT	YSIAMTVRI	AILNDGTI
		OQR86857.1	GGIPVAMPT	YSIAMTVRI	AILNDGTI
		OQS01242.1	GGIPVAMPT	YSIAMTVRI	AILNDGTI
		OQR86861.1	GGIPVAMPT	YSIAMTVRI	AILNDGTI
	<i>Aphanomyces astaci</i>	XP_009842733.1	GGIPVAMPT	YSIAMTVRI	AILNDGTI
		XP_009842734.1	GGIPVAMPT	YSIAMTVRI	AILNDGTI
		XP_009843977.1	LSIPLSSSQ	YRVASSLHL	SLLNDGLL
	<i>Plasmopara halstedii</i>	XP_024574402.1	GGIPVAMPT	YSIAMTVRI	AILNDGTI
		XP_024577133.1	ASIPIAMQV	YRIACTIQL	TILNDGTI
	<i>Phytophthora parasitica</i> INRA-310	XP_008901230.1	ASIPIAMQV	YRIACTIQL	TILNDGTI
	<i>Peronospora effusa</i>	RMX68118.1	GGIPVAMPT	YSIAMTVRI	AILNDGTI
		RMX66309.1	ASIPIAMQV	YRIACTIQL	TILNDGTI
	<i>Bremia lactucae</i>	TDH66910.1	GGIPVAMPT	YSIAMTVRI	AILNDGTI
		TDH67938.1	ASIPIAMQV	YRIACTIQL	TILNDGTI
Bacillariophyta (diatoms)					
	<i>Fistulifera solaris</i>	GAX27627.1	ASIPLAIEI	YRIAATLQL	TLNDGTL
		GAX27167.1	ASIPLAIEI	YRIAATLQL	TLNDGTL
	<i>Thalassiosira pseudonana</i> CCMP1335	XP_002295972.1	ASIPLAIEI	YRIAATLQL	TLNDGTL
	<i>Phaeodactylum tricornutum</i> CCAP 1055/1	XP_002185425.1	ASIPVALPL	YRVAASIM	ALLNDISM
		XP_002180325.1	ASIPLAIEI	YRISATLQL	TLNDGTL
	<i>Fragilariopsis cylindrus</i> CCMP1102	OEU16091.1	ASIPIALPL	YRMAASAIL	ALLNDISM
Eustigmatophyceae					
	<i>Nannochloropsis salina</i>	TFJ85011.1	ASIPIAIEI	YRIAATLQL	TLNDGTL
		TFJ85012.1	ASIPIAIEI	YRIAATLQL	TLNDGTL
		TFJ80221.1	ASIPIAIEI	YRIAATLQL	TLNDGTL
Raphidophyceae					
	<i>Heterosigma akashiwo</i>	-			
Phaeophyceae					
	<i>Ectocarpus siliculosus</i>	-			
Pelagophyceae					
	<i>Aureococcus anophagefferens</i>	XP_009039067.1	ASIPIALFV	YRVACTQQL	TILNDGTI
		XP_009032911.1	ACIPIAMQI	YRIACTLQI	TILNDGCM

		XP_009038207.1	AAV P VAL FV	YRISATI QI	ALF N DL TM
		XP_009032517.1	ACI P IAM QI	-----	TI L ND G CM
	<i>Pelagophyceae</i> sp. CCMP2097	jgi Pelago2097_1 436352	AS I P I AL FV	YR V ACT Q L	TI L ND G TI
		jgi Pelago2097_1 531693	GA V P I AL FL	YR V AAT V Q I	AL V ND AT M
	Synurophyceae				
	<i>Ochromonadaceae</i> sp. CCMP2298	jgi Ochro2298_1 332421	AS I P I A I E I	YR I AAT L Q L	TL L ND G T L
		jgi Ochro2298_1 344720	AS I P V A I E I	YR I AAT L Q L	TL L ND G T L
	Blastocystidae				
	<i>Blastocystis hominis</i>	-			
	Labyrinthulomycetes				
	<i>Hondaea fermentalgiana</i>	GBG30539.1	GG I P I AM P T	YACAT T V R I	AY L ND G T I
	<i>Aplanochytrium kerguelense</i>	jgi Aplke1 49342	GG I P I AM P V	YAA V T T I R I	VY L ND G T I
	<i>Aurantiochytrium limacinum</i> ATCC MYA-1381	jgi Auri1 83660	GG I P I AM P T	YACAT T V R I	AY L ND G T I
	<i>Schizochytrium aggregatum</i> ATCC 28209	jgi Schag1 86033	GG I P I AM P T	YASAT T I R I	AY L ND G T I
Alveolata					
	Chromerida				
	<i>Vitrella brassicaformis</i> CCMP3155	CEL95389.1	AIV P SAM FV	YR I EAS I M I	SI I ND F T L
		CEM13152.1	AV V P I AM FV	YR M ASS S L I	SL I ND F T I
	Ciliophora				
	<i>Stentor coeruleus</i>	OMJ70780.1	AS I P I AM Q V	YR I ACT F Q L	TL L ND G T I
		OMJ72870.1	AS I P I AM Q V	YR I ACT F Q L	TL L ND G T I
		OMJ69746.1	AS I P V AM Q V	YR I ACT I Q L	TV L ND G T I
		OMJ78748.1	AS I P V AM Q V	YR I ACT I Q L	TV L ND G T I
		OMJ71214.1	AS V P I AM K A	YR I ACS F Q L	ALL N D F I I
		OMJ86538.1	IS L P I AM Q V	YR I YCS F Q L	ALL N N G I I
	<i>Oxytricha trifallax</i>	-			
	<i>Stylonychia lemnae</i>	-			
	<i>Paramecium tetraurelia</i> strain d4-2	-			
	<i>Halteria grandinella</i>	-			
	Perkinsida				
	<i>Perkinsus marinus</i> ATCC 50983	-			
	Apicomplexa				
	<i>Toxoplasma gondii</i> ME49	XP_002369362.2	SV A P A AM FV	F R IY T SL I I	SM I ND F V L
		XP_018637724.1 partial	-----	F R V A T S L L L	K V L N D V S M
	<i>Babesia microti</i> strain RI	-			
	<i>Plasmodium knowlesi</i> strain H	-			
	<i>Gregarina niphandrodes</i>	-			
	<i>Hammondia hammondi</i>	-			
	<i>Neospora caninum</i> Liverpool	XP_003882467.1	SV A P A AM FV	F R I F T S L I I	SM I ND F V L
		CEL65672.1	C I L P SAM P L	F R V A T S L L L	K V L N D V S M
	Dinophyceae				
	<i>Symbiodinium microadriaticum</i> CCMP2467	OLP91352.1	AS V P V AL FM	YR I C I T V Q V	AL F H D L Q I
Rhizaria					
	Cercozoa				
	<i>Plasmodiophora brassicae</i>	CEP02089.1	AS I P I AM E V	YR I AAT I Q L	TV L ND G T
		CEO99462.1	AS I P I A I E V	YR V AAT L Q L	TV L ND G T
		CEO96305.1	AS I P V AM E V	YR I AAT L Q L	TV L ND G T
		CEO99835.1	AS I P I AM E V	YR I AAT F Q L	TV L ND G T
		SPQ97468.1	AS I P I A I Q V	YR V AAT L Q L	TV L ND G N
		SPQ97470.1	AS I P I A I E V	YR V AAT L Q L	TV L ND G T
		CEO99447.1 partial	AS I P I A I E V	YR V AAT L Q L	TV L ND G T
		SPQ95795.1	SG I P I AL PA	N K I I K T C Q Q	L F L V D F V
	<i>Reticulomyxa filosa</i>	-			
Cryptophyta					
	Pyrenomonadales				
	<i>Guillardia theta</i> CCMP2712	XP_005828008.1	AS I P L A I E I	YR I AAT L Q L	TL L ND G S
		XP_005819019.1	AS I P L A I E I	YR I AAT L Q L	TL L ND G A
Haptophyta					
	Isochrysidales				
	<i>Emiliania huxleyi</i> CCMP1516	XP_005793796.1	AS V P V AL FM	YR I C C T V Q V	AL F H D L T
		XP_005791681.1	AS I P I AM Q V	YR V ACT F Q L	V I L N D A T
		XP_005768319.1 partial	AS V P I AL FM	YR I C V T V Q V	-----
	Prymnesiales				
	<i>Chrysochromulina</i> sp. CCMP291	KOO30309.1	AS I P I AM Q V	YR V ACT V Q L	V I L N D A T
		KOO32369.1	AV V P I AN Q V	YR V ASS L M L	IM F N D I C
		KOO34192.1	AS I P I AM Q V	YR V ACT I Q L	V I L N D A T
Apusozoa					
	Apusomonadidae				
	<i>Thecamonas trahens</i> ATCC 50062	XP_013753677.1	AS I P I AL PA	YR V ASS L Y V	TL L ND G T I
		XP_013759271.1	AA I P V AM P T	F R I V D S F H V	AI L ND V S L
Amoebozoa					
	Discosea				
	<i>Acanthamoeba castellanii</i> str. Neff	XP_004333016.1	GG L P I AM P T	Y S I S V C V R I	A I F N D G S M
	Mycetozoa				
	<i>Heterostelium album</i> PN500	XP_020436662.1	GG I P I AM P T	Y S V S A T V R I	AI L ND G T M
	<i>Acytostelium subglobosum</i> LB1	XP_012757040.1	GG I P I AM P T	Y S V S A T V R I	AI L ND G T M
		XP_012753723.1	GG I P I AM P T	Y S V S A T V R I	AI L ND G T M
		XP_012759216.1	GG I P I AM P T	Y S V S A T V R I	AI L ND G T M
	<i>Cavenderia fasciculata</i>	XP_004361006.1	GG I P I AM P T	Y S V S A T V R I	AI L ND G T M
	<i>Dictyostelium purpureum</i>	XP_003284057.1	GG I P I AM P T	Y S V S A T V R I	AI L ND G T M
Discoba					
	Euglenozoa				
	Kinetoplastida				
	<i>Bodo saltans</i>	CUF89536.1	VS I P I A I E I	YR V SAT L Q L	TL L ND G T L
		CUE96291.1	VS I P I A I E I	YR V AAT L R	-----
		CUG93436.1	LL L P T G V AM	Y Q AV S T M Y L	ALL N S A T M
		CUG86498.1	VS I P I A I E I	YR V AAT L Q L	TL L ND G T L

Heterolobosea	<i>Trypanosoma cruzi</i> strain CL Brener	XP_812631.1	VSIP P IALEI	YRISATLQL	TL L NDGTL
		XP_804256.1 partial	VSIP P IALEI	YRISATLQL	-----
	<i>Strigomonas culicis</i>	EPY19422.1	VSIP P IALEI	YRISATLQL	TL L NDGCL
	<i>Leishmania major</i> strain Friedlin	XP_001682560.1	VSIP P IALEI	YRISATLQL	TL L NDGCL
	Tetramitia				
	<i>Naegleria gruberi</i> strain NEG-M	-			
Metamonada					
Parabasalia	Trichomonadida				
	<i>Trichomonas vaginalis</i>	-			
Fornicata	Diplomonadida				
	<i>Giardia lamblia</i> ATCC 50803	-			
Taxonomy	Species	Acc. Nr.	TM4	TM5	TM6
Archaea					
Euryarchaeota	Methanobacteria				
	<i>Methanobacterium paludis</i>	WP_048187944.1	ASIP V ALPA	YRIAETIRV	ALLNDAPI
		WP_013825693.1	ASIP V AQPA	YRVAETIRI	ALLDDIPV
	<i>Methanothermobacter defluvii</i>	-			
	<i>Methanobrevibacter smithii</i>	-			
	Methanococci				
	<i>Methanothermococcus okinawensis</i> IH1	AEH06486.1	ASIP P AAMPA	YRICETIRI	ALLNDVPI
	Methanomicrobia				
	<i>Methanococcoides burtonii</i> DSM 6242	ABE51089.1	AAIP P AALPA	YRIAETIRI	ALLNDAPI
	<i>Methanosarcina acetivorans</i> C2A	AAM05085.1	AAIP P AALPA	YRITETIRV	ALLNDAPI
		AAM06212.1	AAIP P AALPA	YRIAETVRV	ALLNDAPI
	<i>Methanosalsum zhilinae</i>	-			
	<i>Methanolobus vulcani</i>	SDG28837.1	AAIP P AALPA	YRIAETVRV	ALFNDAPI
	<i>Methanohalophilus halophilus</i>	-			
	Thermoplasmata				
	<i>Picrophilus torridus</i> DSM 9790	AAT44067.1	TSIP V ALPA	NKIIKTIQV	LFANDFVT
	<i>Thermoplasma acidophilum</i>	WP_048161935.1	ASIP V ALPA	NKIVKTIQV	LFANDFVT
	Halobacteria				
	<i>Haloterrigena limicola</i>	-			
	<i>Halobacterium salinarum</i>	-			
	Methanococci				
	<i>Methanocaldococcus bathoardescens</i>	WP_048201651.1	SAIP P AAMPA	YRITETIRI	ALLNDIPI
	<i>Methanococcus vannielii</i>	-			
	Thermococci				
	<i>Pyrococcus woesei</i>	-			
Crenarchaeota	Thermoprotei				
	<i>Ignicoccus hospitalis</i>	-			
	<i>Pyrodictium delaneyi</i>	-			
	<i>Hyperthermus butylicus</i>	-			
	<i>Pyrobaculum fumarii</i>	-			
	<i>Metallosphaera yellowstonensis</i>	-			
	<i>Acidianus manzaensis</i>	ARM75175.1	ASV P ALPA	NKIIKTLQV	LFANDFVT
	<i>Sulfolobus tokodaii</i>	-			
	<i>Desulfurococcus mobilis</i>	-			
	unclassified				
	<i>Aciduliprofundum boonei</i> T469	ADD08967.1	AAIP P AALPA	YRITETIRV	ALLNDIPI
Taxonomy	Species	Acc. Nr.	TM4	TM5	TM6
Eubacteria					
	Pseudomonadota				
	Acidithiobacillia				
	<i>Acidithiobacillus ferridurans</i>	WP_113526968.1	ASIP V AMPA	YRIVETIRI	AFNDVPI
	Alphaproteobacteria				
	<i>Methyloceanibacter caenitepidi</i>	WP_082025528.1	AAIP V AMPA	YRIAETIRV	ALLNDGAI
	<i>Parvibaculum lavamentivorans</i>	-			
	<i>Rhodopseudomonas palustris</i>	WP_044414997.1	ASIP V ALPA	YRIAETIRL	ALLNDLPI
		WP_110786469.1	ASIP V ALPA	YRIAETIRL	ALLNDLPI
	<i>Boseongicola aestuarii</i>	-			
	<i>Aliiroseovarius pelagivivens</i>	-			
	Betaproteobacteria				
	<i>Chromobacterium violaceum</i>	-			
	<i>Chromobacterium subtsugae</i>	-			
	<i>Aquitaea magnusonii</i>	-			
	<i>Ralstonia pickettii</i>	-			
	<i>Sulfuritalea hydrogenivorans</i>	-			
	<i>Pseudogulbenkiania ferrooxidans</i>	-			
	Gammaproteobacteria				
	<i>Escherichia coli</i> K12	-			
	<i>Methylomarinum vadi</i>	WP_051906753.1	ASIP V AMPA	YRITETIRI	ALLNDLPI
	<i>Methylosarcina fibrata</i>	-			
	<i>Methylobacter luteus</i>	-			
	<i>Methylomonas denitrificans</i>	-			
	<i>Methylomicrobium buryatense</i>	-			
	<i>Nitrococcus mobilis</i>	-			
	<i>Psychromonas arctica</i>	WP_028870080.1	AAIP V AMPT	YRIAETLRV	ALLNDGAI
	<i>Photobacterium lipolyticum</i>	-			
	<i>Pseudoalteromonas haloplanktis</i>	-			
	<i>Candidatus Thiomargarita nelsonii</i>	-			
	<i>Coxiella burnetii</i>	-			
	<i>Marinobacterium jannaschii</i>	-			
	Deltaproteobacteria				
	<i>Labilithrix luteola</i>	-			
	<i>Desulfomonile tiedjei</i>	WP_014809784.1	AAIP V AMPT	YRIAETVRV	ALLNDGPI
	<i>Vulgatibacter incomptus</i>	-			
	<i>Geobacter metallireducens</i>	EHP85803.1	AAIP V AMPT	YRISETIRV	ALLNDGAI
	<i>Geobacter bremensis</i>	-			

	<i>Cystobacter fuscus</i>	-			
	<i>Archangium gephyra</i>	-			
Spirochaetes					
Spirochaetia					
	<i>Treponema primitia</i>	-			
	<i>Leptospira inadai</i>	-			
	<i>Spirochaeta thermophila</i>	-			
	<i>Salinispira pacifica</i>	-			
Thermotogae					
Thermotogae					
	<i>Thermotoga maritima</i>	-			
Chlorobi/Bacteroidetes					
Chlorobi					
	<i>Chlorobi bacterium NICIL-2</i>	-			
Bacteroidetes					
	<i>Anaerophaga thermohalophila</i>	-			
	<i>Sphingobacterium</i> sp. PM2-P1-29	-			
	<i>Porphyromonas somerae</i>	-			
	<i>Bacteroides plebeius</i>	-			
Terrabacteria					
Actinobacteria					
	<i>Micrococcus luteus</i>	-			
	<i>Microbacterium testaceum</i>	-			
	<i>Rhodococcus fascians</i>	-			
	<i>Mycobacterium leprae</i> TN	-			
	<i>Mycobacterium bohemicum</i> DSM 44277	CPR07252.1	AAIPVAMP	YRIAETLRV	ALLNDGAI
		CPR05526.1	ASIPVALP	YRIAETIRV	ALLNDGAI
	<i>Mycolicibacterium aromaticivorans</i>	WP_051660314.1	AAIPVAMP	YRIAETLRV	ALLNDGAI
		WP_036343692.1	ASIPVALP	YRIAETIRV	ALLNDGAI
	<i>Streptomyces albus</i>	-			
	<i>Jonesia denitrificans</i>	-			
Firmicutes					
	<i>Peptoniphilus lacrimalis</i>	-			
	<i>Fingoldia magna</i>	-			
	<i>Lactobacillus ceti</i>	WP_035463574.1	ASIPVAMP	YRVALTITI	SLLDIPI
	<i>Lactobacillus mellis</i>	-			
	<i>Brevibacillus massiliensis</i>	-			
	<i>Acetobacterium woodii</i> DSM 1030	AFA47261.1	GAIPVALP	NKITKVVEV	VFANDFVT
		AFA49493.1	AAIPVAMP	YRVAETLRV	ALLNDGAI
	<i>Thermosinus carboxydivorans</i>	-			
	<i>Thermosediminibacter oceani</i>	-			
Planctomycetes					
	<i>Rhodopirellula sallentina</i> SM41	EM158256.1	AAIPVAMP	YRIAETIRV	ALLNDGAI
Deinococci					
	<i>Thermus thermophilus</i>	-			
Cyanobacteria					
	<i>Synechococcus</i> sp. NIES-970	-			
	<i>Synechococcus</i> sp. WH 5701	-			
	<i>Leptolyngbya</i> sp. PCC 7376	-			
	<i>Leptolyngbya boryana</i>	-			
	<i>Crinalium epipsammum</i> PCC 9333	-			
	<i>Moorea producens</i>	-			
	<i>Richelia intracellularis</i>	-			
	<i>Nostoc punctiforme</i>	-			
	<i>Acaryochloris marina</i>	-			
	<i>Trichormus azollae</i>	-			
	<i>Fischerella muscicola</i>	-			
	<i>Anabaena cylindrica</i>	-			
	<i>Phormidesmis priestleyi</i>	WP_068818899.1	ASIPVAMP	YRIAETLRV	ALLNDGAI
	<i>Microcystis aeruginosa</i> Ma_MB_F_20061100	-			
	<i>Crocospaera subtropica</i>	WP_009546079.1	ASIPLATP	YRVVETVRI	ALINDGSM
	<i>Cyanobacterium aponinum</i>	AFZ52990.1	ASIPVAMP	YRITATVQI	ALLNDGAI
	<i>Gloeomargarita lithophora</i>	-			
	<i>Nodularia spumigena</i>	-			