

Supplementary Table 1. Proteins included in the cladogram in Figure 1 in the main text (clockwise from top)

Clade	Protein	Accession #	Source organism	Taxon
Chlorophyte cation channelrhodopsins	CrChR1	AF508965	<i>Chlamydomonas reinhardtii</i>	Chlorophyta
	CrChR2	AF508966	<i>Chlamydomonas reinhardtii</i>	Chlorophyta
	PsChR2	JX983143	<i>Platymonas (Tetraselmis) subcordiformis</i>	Chlorophyta
	CaChR1	JN596951	<i>Chlamydomonas augustae</i>	Chlorophyta
	MvChR1	JF922293	<i>Mesostigma viride</i>	Streptophyta
Anion channelrhodopsins	GtACR1	KP171708	<i>Guillardia theta</i>	Cryptophyta
	GtACR2	KP171709	<i>Guillardia theta</i>	Cryptophyta
	PsuACR_973		<i>Proteomonas sulcata</i>	Cryptophyta
	R2ACR_142		<i>Rhodomonas</i> sp. CCAC1630	Cryptophyta
	PsuACR1	KF992074	<i>Proteomonas sulcata</i>	Cryptophyta
Enzymerhodopsins	BeGC	KF309499	<i>Blastocladiella emersonii</i>	Blastocladiomycota
		AMAG_07932	<i>Allomyces macrogynus</i>	Blastocladiomycota
		AMAG_13844	<i>Allomyces macrogynus</i>	Blastocladiomycota
	CrHKR1	AY272055	<i>Chlamydomonas reinhardtii</i>	Chlorophyta

		XP_002954798	<i>Volvox carteri</i>	Chlorophyta
Fungal rhodopsins	NR	AF135863	<i>Neurospora crassa</i>	Ascomycota
		KPA37379	<i>Fusarium langsethiae</i>	Ascomycota
	LR	AF290180	<i>Leptosphaeria maculans</i>	Ascomycota
Algal rhodopsin pumps	ARII	HM070408	<i>Acetabularia acetabulum</i>	Chlorophyta
	ARI	HM070407	<i>Acetabularia acetabulum</i>	Chlorophyta
	CsR	XP_005646688	<i>Coccomyxa subellipsoidea</i> C-169	Chlorophyta
Xenorhodopsins	ASR	BA000019	<i>Anabaena (Nostoc) sp.</i> PCC 7120	Cyanobacteria
		WP_015955888	<i>Cyanothece sp.</i> PCC 7424	Cyanobacteria
		EGQ43296	<i>Nanosalina sp.</i>	Nanohaloarchaea
		EGQ40596	<i>Nanosalinarum sp.</i>	Nanohaloarchaea
Bacteriorhodopsins	aR-3/Arch	GU045593	<i>Halorubrum sodomense</i>	Euryarchaeota
	aR-2	S56354	<i>Halobacterium sp.</i> aus-2	Euryarchaeota
	HsBR	V00474	<i>Halobacterium salinarum</i>	Euryarchaeota
	cR-1	D31880	<i>Haloarcula argentinensis</i>	Euryarchaeota
	HwBR I	CAJ51144	<i>Haloquadratum walsbyi</i> DSM 16790	Euryarchaeota
Halorhodopsins	HsHR	WP_010902090	<i>Halobacterium salinarum</i>	Euryarchaeota
	HwHR	CAJ53165	<i>Haloquadratum walsbyi</i> DSM 16790	Euryarchaeota

	<i>NpHR</i>	P15647	<i>Natronomonas pharaonis</i>	Euryarchaeota
		AB009622	<i>Halorubrum sodomense</i>	Euryarchaeota
Haloarchaeal sensory rhodopsins	<i>HsSRII</i>	WP_010903286	<i>Halobacterium salinarum</i>	Euryarchaeota
	<i>HhSRII</i>	CQH59952	<i>Halobacterium hubeiense</i>	Euryarchaeota
	<i>NpSRII</i>	CAI50508	<i>Natronomonas pharaonis</i>	Euryarchaeota
	<i>HsSRI</i>	AAA72316	<i>Halobacterium salinarum</i>	Euryarchaeota
Eubacterial rhodopsin Na⁺ and Cl⁻ pumps	<i>DeNaR</i>	BAN14808	<i>Dokdonia eikasta</i>	Bacteroidetes
	<i>GNaR</i>	WP_040506994	<i>Gillisia limnaea</i>	Bacteroidetes
	<i>IaNaR</i>	WP_009036080	<i>Indibacter alkaliphilus</i>	Bacteroidetes
	<i>CIR</i>	WP_052476770	<i>Nonlabens marinus</i>	Bacteroidetes
Proteorhodopsins	<i>XR</i>	WP_011404249	<i>Salinibacter ruber</i>	Bacteroidetes
	<i>GR</i>	BAC88139	<i>Gloeobacter violaceus</i> PCC 7421	Cyanobacteria
	<i>OR1</i>	ABV22426	<i>Oxyrrhis marina</i>	Dinoflagellata
	<i>BPR</i>	AF349981	uncultured bacterium	Proteobacteria
	<i>GPR</i>	AF279106	uncultured bacterium	Proteobacteria
Cryptophyte cation channelrhodopsins	<i>GtCCR1</i>	KU761994	<i>Guillardia theta</i>	Cryptophyta
	<i>GtCCR2</i>	KU761992	<i>Guillardia theta</i>	Cryptophyta
	<i>PsuCCR</i>	KF992056	<i>Proteomonas sulcata</i>	Cryptophyta
	<i>GtCCR3</i>	KU761993	<i>Guillardia theta</i>	Cryptophyta