

Shalchian-Tabrizi et al. 2006

Supplemental material

Table S1

Species names and accession numbers of SSU sequences other than used by Berney et al. (2004) and Hsp90, alpha-tubulin and beta-tubulin protein sequences used in the phylogenetic analyses.

SPECIES	SSU	Hsp90	Alpha-tubulin	Beta-tubulin
<i>Achlya ambisexualis</i> (1)		AAM90674		
<i>Achlya klebsiana</i> (1)				A35885
<i>Amastigomonas marina</i> (2)		AAP72156		
<i>Arabidopsis thaliana</i>		BAB09283	AAL16174	AAM10035
<i>Cercomonas ATCC50319</i> (3)			AAC67375	
<i>Cercomonas ATCC50316</i> (3)				AAD55354
<i>Chaunacanthid 217</i>	AF063241			
<i>Chlamydomonas stercoraria</i>	AY268042			
<i>Cryptothecodinium cohnii</i>		AAM02974		AAM02970
<i>Cryptosporidium parvum</i>		AAR83923	BAC07246	
<i>Cyanoptyche gloeocystis</i>	AJ007275			
<i>Dictostelium discoideum</i>		AAA69917		
<i>Diphylleia rotans</i>	AF420478			
<i>Diplonema papillatum</i> (4)		AAM93745		
<i>Danio rerio</i>		AAH65359	NP 919369	AAN33030
<i>Drosophila melanogaster</i>	M21017	AAF47734	P06604	B27810
<i>Euglena gracilis</i>		AAQ24862	CAA80497	AAK37834
<i>Glaucocystis nostochinearum</i>	X70803			
<i>Goniomonas sp</i> (5)		AAP72158		
<i>Goniomonas truncata</i> (5)			AAD02566	AAD02567
<i>Guillardia theta</i>		AAX10949		
<i>Hartmannella vermiformis</i>	AF426157			
<i>Heterocapsa triquetra</i>		AAR27541	AAO49341	AAO49343
<i>Homo sapiens</i>		XP084514	NP 006073	AAH24038
<i>Imantonia rotunda</i> (6)			XXXXXX	XXXXXX
<i>Isochrysis galbana</i>		AAX10942		
<i>Leishmania donovani</i> (7)		AAA29252	AAA58321	
<i>Leishmania major</i> (7)				CAA63780
<i>Marine microheliozoan TCS 2002</i>	AF534711			
<i>Monosiga brevicollis</i>	AF174375	AAP51213	AAK27410	AAK27411
<i>Naegleria gruberi</i>		AAM93756	P11237	CAA78362
<i>Ochromonas sp.</i>		AAP72159		
<i>Oryza sativa</i>		BAD04054	CAA62916	BAC82429
<i>Oxyrrhis marina</i>		AAR27544	AAO49332	AAO49333
<i>Paramecium tetraurelia</i>		AAG00569	CAA67847	CAE75646
<i>Pavlova lutheri</i> (8)		AAX10944		
<i>Perkinsus marinus</i>		AAR27545	AAO49328	AAO49330
<i>Phalansterium solitarium</i>	AF280078			
<i>Plasmodium falciparum</i>		CAA82765	NP704579	A44949
<i>Prymnesium parvum</i>		AAX10951		
<i>Prymnesium patelliferum</i> (6)		AAP72161		
<i>Raphidiophrys ambigua</i>	AY305008			

<i>Schizosaccharomyces pombe</i>		NP 594365	NP 596774	
<i>Streblomastix strix</i>		AAO46121		
<i>Spumella danica</i> (9)	AJ236861			
<i>Spumella uniguttata</i> (9)		AAR27540		
<i>Telonema antarcticum</i>	AJ564773	XXXXXX	XXXXXX	XXXXXX
<i>Telonema subtilis</i> (RCC358.7)	AJ564772			
<i>Telonema subtilis</i> (RCC404.5)	AJ564771	XXXXXX	XXXXXX	XXXXXX
<i>Tetrahymena pyriformis</i>		AAG00567	CAA31256	CAA31258
<i>Thaumatomonas sp.</i> (3)	U42446	AAP72162		
<i>Toxoplasma gondii</i>		AAQ24837	M20024	S16340
<i>Trimastix pyriformis</i> ATCC50598	AF244904			
Uncultured eukaryotic clone CCA32	AY179990			
<i>Trypanosoma cruzi</i>		A26125	AAL75955	AAL75957
Uncultured <i>Telonema</i> (RA001219.10)	AJ564769			
Uncultured <i>Telonema</i> (RA010412.17)	AJ564767			
Uncultured <i>Telonema</i> (RA000412.136)	AJ564768			
Uncultured <i>Telonema</i> (BL010625.25)	AJ564770			
Uncultured <i>Oxymonas sp.</i>	AB092932			
<i>Zea maize</i>		AAB26482	CAA44862	CAA37060

1. The *Achlya ambisexualis* and *A. klebsiana* sequences were concatenated, named as *Achlya* in Fig. S1.
2. The *Amastigomonas marina* and the *Amastigomonas debruynei* were concatenated and named *Amastigomonas* in Fig. 3
3. The *Cercomonas* and *Thaumatomonas sp.* sequences were concatenated and denoted as *Cercozoa* in Fig S1.
4. The *Diplonema papillatum* and *Diplonema ambulator* were concatenated and named *Diplonema* in Fig. 3.
5. The *Goniomonas sp.* and *G. truncata* were concatenated and named *Goniomonas* in Fig.S1 and Fig. 3.
6. The *Prymnesium patelliferum* and *Imantonia* sequences were concatenated and named as *Prymnesium* in Fig S1.
7. The *Leishmania donovani* and *L. major* were concatenated and named *Leishmania* in Fig. S1.
8. The *Pavlova lutheri* and *Pavlova salina* were concatenated and named *Pavlova* in Fig. 3.
9. The *Spumella danica* and *Spumella uniguttata* were concatenated and named *Spumella* in Fig. 3

Table S2

Comparison of significant ultrastructures in katablepharids / *Leucocryptos* and *Telonema*.

Structure	Kathablepharids/ Leucocryptos	Telonemia	References and comments
General cell morphology	Droplet or sausage, flagella with parallel bases close to broad end, where cytostome is located	Droplet, flagella with non-parallel bases at narrow end. Cytopharyngeal area at ventral side close to broad end	Vörs 1992, Kugrens & Clay 2003, Klaveness et al. 2005
Glycocalyx (stainable polysaccharide coating <i>outside</i> cell membrane)	Present	Absent	Vörs 1992, Kugrens & Clay 2003, Klaveness et al. 2005.
Peripheral vacuoles (or cortical alveoli)	Probably absent, due to presence of ribosomes on similar structure	Likely present	Kugrens & Clay 2003, Klaveness et al. 2005.
Subcortical microtubuli and cytostome/cytopharyngeal structure	Present in intracellular bundles trailing the entire length of cell, particularly directed towards and part of the cytopharyngeal structure	Present as part of the intracellular and highly dynamic subcortical lamina. No highly differentiated cytopharyngeal structure related to that of Kathablepharids/Leucocryptos detected	Subcortical microtubuli in bundles and sheets are generally present in many groups, like the euglenoids and particularly in trypanosomes.
Rigid flagellar hairs	Unknown	Present on large member of genus	Klaveness et al. 2005, see Cavalier-Smith 1993 on the significance of this structure for classification
Ejectisomes	Single roll of flat tape, related to those of crypto- and prasinomonads	Unknown or very different	See Lee & Kugrens 1991, and Vörs 1992 for details. Klaveness et al. 2005 only refer briefly to very different "small spherical structures".

References:

- Cavalier-Smith, T. 1993 The protozoan phylum Opalozoa. *J. Eukaryot. Microbiol.* 40, 609-615.
- Klaveness, D., Shalchian-Tabrizi, K., Thomsen, H. A., Eikrem, W. & Jakobsen, K. S. 2005 *Telonema antarcticum* sp.nov., a common marine phagotrophic flagellate. *Int. J. Syst. Evol. Micr.* 55, 2595-2604.
- Kugrens, P. & Clay, B.L. 2003 Cryptomonads. In: Wehr, J.D. & Sheath, R.G. (eds.) 2003. *Freshwater algae of North America. Ecology and Classification*, pp. 715-755. San Diego: Academic Press.
- Lee, R.E. & Kugrens, P. 1991 *Katablepharis ovalis*, a colorless flagellate with interesting cytological characteristics. *J. Phycol.* 27, 505-513.
- Vørs, N. 1992. Ultrastructure and autecology of the marine, heterotrophic flagellate *Leucocryptos marina* (Braarud) Butcher 1967 (Katablepharidaceae/Kathablepharidae), with a discussion of the genera *Leucocryptos* and *Katablepharis*/ *Kathablepharis*. *Eur. J. Protistol.* 28, 369-389.

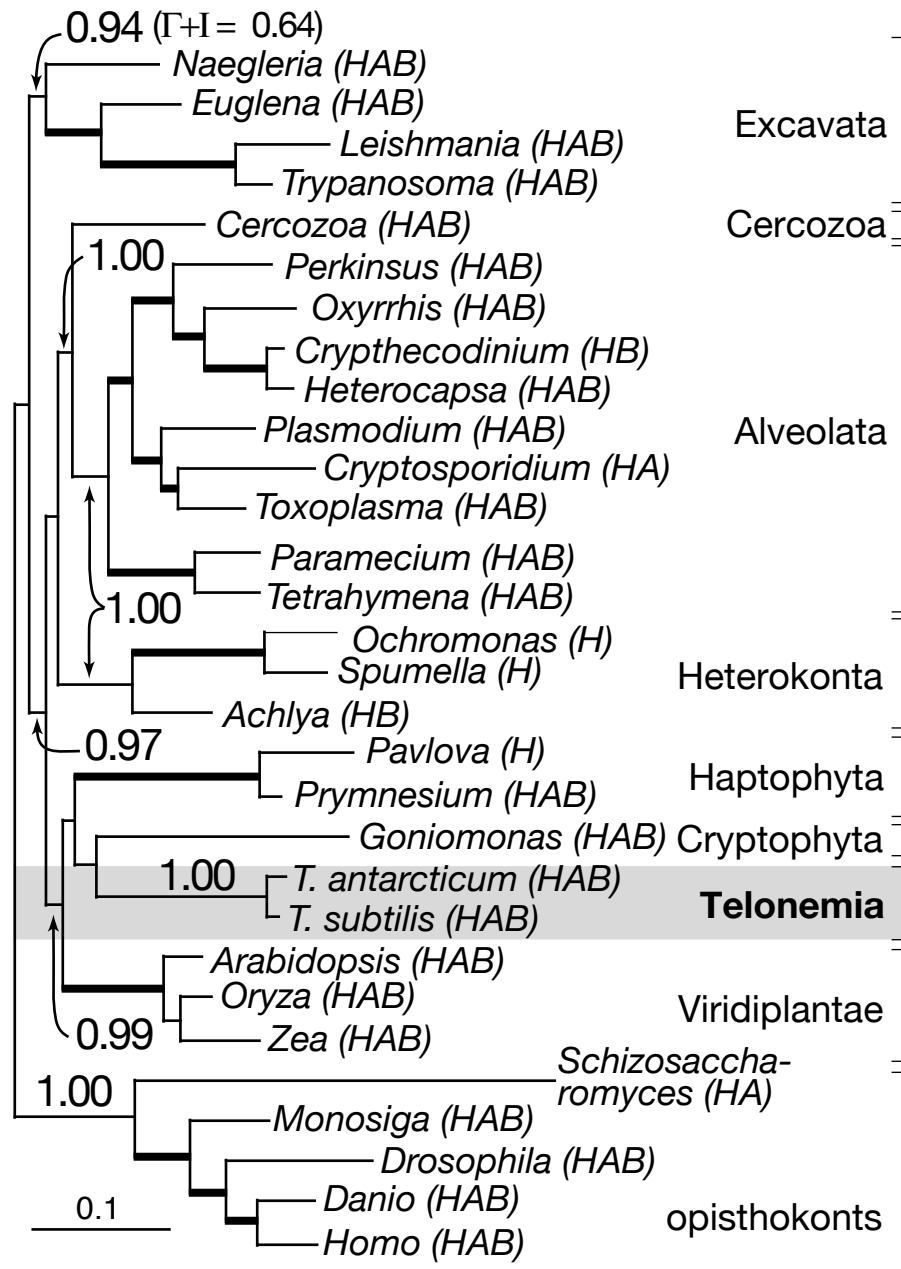


Fig. S1.

Phylogeny of *Telonema* inferred from concatenated HSP90+alpha+beta-tubulin sequences. Tree reconstructed using Bayesian inference and Γ +COV model. Posterior probability (PP) values > 0.9 are depicted as numbers or thick branches. The monophyly of Excavata received substantially lower PP values from analyses using Γ +I substitution model: PP=0.64. Some of the taxa are chimeric, assembled from different species (see supplementary Table S1). Genes included in the concatenated sequences are written in parentheses, where H=HSP90, A=alpha-tubulin, B=beta-tubulin.