

## CURRICULUM VITAE

### **1. Personal Data:**

Dr. Mitchell Loyd Sogin  
Distinguished Scientist  
Josephine Bay Paul Center for Comparative Molecular Biology  
and Evolution  
The Marine Biological Laboratory  
Woods Hole, MA 02543

### **2. Education:**

1963-1967 University of Illinois, Urbana, Illinois B.S. in Chemistry and Microbiology  
1967-1969 University of Illinois, Urbana, Illinois under Z. John Ordal, M.S. in Industrial Microbiology  
Research Activities: Bacterial endospore germination  
1969-1972 University of Illinois, Urbana, Illinois under Carl R. Woese, Ph.D. in Microbiology and Molecular Biology  
NIH Predoctoral fellowship  
Sigma Xi Research Award  
Research Activities: Ribosomal RNA processing, Molecular evolution  
1972-1976 National Jewish Center, Denver, Colorado with Norman R. Pace, NIH Postdoctoral Fellowship  
Research Activities: in vitro rRNA processing

### **3. Professional Appointments:**

1976-1989 National Jewish Center, Denver, Colorado, Senior Staff Scientist in the Department of Molecular and Cellular Biology.  
1980-1986 Assistant Professor, University of Colorado Health Sciences Center, Department of Biochemistry and Biophysics  
1986-1999 Associate Fellow of the Canadian Institute for Advanced Research  
1987-1989 Associate Professor, University of Colorado Health Sciences Center, Department of Microbiology  
1989-present Senior Scientist, Marine Biological Laboratory at Woods Hole  
1997-1998 Visiting Miller Research Professor, University of California at Berkeley  
1997-2013 Founding Director, Josephine Bay Paul Center for Comparative Molecular Biology and Evolution, Marine Biological Laboratory at Woods Hole  
2004-present Professor (MBL), Department of Molecular Biology, Cell Biology and Biochemistry, Brown University, Providence, RI  
2013-present Distinguished Scientist, Marine Biological Laboratory

#### **4. Service**

##### **(i) Institutional**

1994-2000

Science Advisory Council: Marine Biological Laboratory at Woods Hole.

1997-2013

Director, Josephine Bay Paul Center for Comparative Molecular Biology and Evolution

##### **(ii) Professional**

Society Memberships

American Society of Microbiology

Society of Protozoologists

International Society of Evolutionary Protozoologists

Society for Molecular Biology and Evolution

American Association for the Advancement of Science

American Society for Cell Biology

##### **(ii) Community**

1989-1990

National Science Foundation Minority Post Doctoral Fellowship Program

1994-1996

National Science Foundation/Sloan Foundation Molecular Evolution Post-Doctoral Program

1999-2004

National Research Council- Space Studies Board.

2001-2015

Sloan Research Fellowship in Marine Biology Selection Committee

2016- current

American Academy of Microbiology Fellows Selection Committee

Current

Editorial Board: Journal of Eukaryotic Microbiology: (Journal of Protozoology)

Current

Editorial Board: Molecular Phylogenetics and Evolution

Current

Editorial Board: Protist (Formerly Archiv fur Protistenkunde)

Current

Editorial Board: Applied and Environmental Microbiology

Current

Editorial Board: Environmental Microbiology

#### **5. Academic Honors:**

1992

Division Lecturer - American Society for Microbiology

1993

Stoll Stunkard Award - American Society of Parasitologists

1995

Elected Chairman - Division R, American Society of Microbiologists

1996

Elected - Fellow of the American Academy of Microbiology

1998

Elected - Fellow of the American Academy of Arts and Sciences

1998

Elected - Fellow of the American Association for the Advancement of Science

#### **6. Publications:**

##### **a. Books/Monographs**

1. Sogin, M.L. Relationships among precursor and Mature Ribosomal RNAs. Ph.D. Thesis, University of Illinois (1972).

## **b. Chapters in Books**

1. Sogin, M.L., W.A. McCall and Z.J. Ordal. Effect of heat activation conditions on the germinal response of *Bacillus cereus*-T spores. In: "Spores V", p 363, American Society for Microbiologists (1972).
2. Pace, N.R., B. Meyhack, B. Pace and M.L. Sogin. The Interaction of RNase M5 with a 5S rRNA Precursor. In: "tRNA: Biological Aspects", eds. Abelson, J., P. Schimmel and D. Soll. (Cold Spring Harbor Laboratory, Cold Spring Harbor, New York) (1980).
3. Pace, N.R., K. Gardiner, B. Meyhack, B. Pace, M.L. Sogin and D.A. Stahl. RNA Processing in *Bacillus subtilis*. In: "Microbiology, 1982", ed. Schlessinger, D., p. 32 (1983).
4. Sogin, M.L., U. Edman and H.J. Elwood. A single kingdom of eukaryotes in: "The Hierarchy of Life". Molecules and Morphology in Phylogenetic Analysis, p. 133, Eds. B. Fernholm, K. Bremer, H. Jornvall. Elsevier Press. (1989).
5. Sogin, M.L. Evolution of Eukaryotic Ribosomal RNA Genes in: "McGraw-Hill Yearbook of Science and Technology", p. 260-262, Ed. Sybil Parker, McGraw-Hill, New York (1989).
6. Sogin, M.L. Amplification of Ribosomal RNA Genes for Molecular Evolution Studies in: "PCR-Protocols: A Guide to Methods and Applications", p. 307. Academic Press, Inc. (1990).
7. Sogin, M.L. The Phylogenetic Significance of Sequence Diversity and Length Variations in Eukaryotic Small Subunit Ribosomal RNA Coding Regions in: "New Perspectives on Evolution", Plenum Press, p. 175-188, Wiley-Liss, Inc. (1991).
8. Patterson, D.J. and Sogin, M.L. Eukaryote origins and protistan diversity in "The Origin and Evolution of Prokaryotic and Eukaryotic Cells". Ed. H. Hartman and K. Matsuno. World Scientific Pub. Co. NJ, p. 13-46 (1992).
9. Sogin, M.L. Molecular Biology and Protoctist Phylogeny. in "Illustrated Glossary of Protoctista". Ed. L. Margulis, H. McKhann and L. Olendzenski, p. xlv-xlvi, Jones and Bartlett Publishers, Boston (1993).
10. Edman, J.C., and Sogin, M.L. Molecular Phylogeny of *Pneumocystis carinii* in: "Pneumocystis carinii". Ed. P.D. Walzer. Marcel Dekker. (1993).
11. Sogin, M.L. The Origin of Eukaryotes and Evolution into Major Kingdoms in: "Early Life on Earth. Nobel Symposium No. 84". Ed. S. Bengtson, p.181-192, Columbia U.P., New York (1994).
12. Wainright, P.O., Patterson, D.J., and Sogin, M.L. Monophyletic Origin of Animals: A Shared Ancestry with the Fungi. in "Molecular Evolution of Physiological Processes". 47th Symposium Society of General Physiologists. ed. D.M. Fambrough. The Rockefeller University Press. 39-54. (1994).

13. Clark, C.G., J.D. Silberman, L.S. Diamond, M.L. Sogin. Molecular systematics of the intestinal amoebae in "Evolutionary Relationships Among Protozoa", eds. G. H. Coombs, K. Vickerman, M. A. Sleight and A. Warren, Systematics Association Special Volume **56**:169-180 (1998).
14. Patterson, D.J. and M.L. Sogin. The micro\*scope web tool. pp 579-584 in Sullivan W. T., Baross, J. A., (eds) Planets and Life: The emerging Science of Astrobiology. Cambridge University Press, Cambridge (2007).
15. Sogin, M.L. Characterizing Microbial Population Structures through Massively Parallel Sequencing in: "Uncultivated Microorganisms", p. 19-34, Ed. S. S. Epstein. Springer Press Dordrecht Heidelberg London New York (2009).
16. Amaral-Zettler, L., Artigas, L.F., J.A. Baross, L. Bharathi, A, Boetius, D. Chandramohan, G. Herndl, K. Kogure, P.R. Neal, C. Pedros-Alio, A. Ramette, S. Schouten, L. Stal, A. Thessen, J. de Leeuw, M.L. Sogin. A global census of marine microbes, In: Life in the World's Oceans: Diversity, Distribution and Abundance, Blackwell Publishing Ltd., Oxford, (eds), pp. 223-45 (2010).
17. Sogin, M.L. Trying to Make Sense of the Microbial Census. In: Microbes and Evolution: The World That Darwin Never Saw. Eds. S. Maloy, R. Kolter. ASM Press, Washington DC (2012).

### **c. Refereed Journal Articles**

1. Sogin, M.L., B. Pace, N.R. Pace and C.R. Woese. The Primary Structural Relationship of p16 to m16 Ribosomal RNA. *Nature New Biology* **232**:48-49 (1971).
2. Schaup, H., M.L. Sogin, C.R. Woese and C.G. Kurland. Characterization of an RNA "Binding Site" for a Specific Ribosomal Protein of *Escherichia coli*. *Molec. Gen. Genetics* **114**:1-8 (1971).
3. Sogin, S.J., M.L. Sogin and C.R. Woese. Phylogenetic Measurement in Procaryotes by Primary Structural Characterization. *J. Molec. Evoution* **1**:173-184 (1972).
4. Sogin, M.L., K.J. Pechman, L. Zablen, B.J. Lewis and C.R. Woese. Observations on the Post-Transcriptionally Modified Nucleotides in the 16S Ribosomal Ribonucleic Acid. *J. Bacteriol.* **112**:13-16 (1972).
5. Schaup, H.W., M.L. Sogin, C.G. Kurland and C.R. Woese. Localization of a Binding Site for Ribosomal Protein S8 Within the 16S Ribosomal Ribonucleic Acid of *Escherichia coli*. *J. Bacteriol.* **115**:82 (1973).
6. Sogin, M.L., C.R. Woese, B. Pace and N.R. Pace. The Relationship between Precursor and Mature Forms of the 23S Ribosomal RNA. *J. Mol. Evol.* **2**:167-174 (1973).
7. Dobson, P.R., W.F. Doolittle and M.L. Sogin. Precursor of 5S Ribosomal Ribonucleic Acid in the Blue-Green Alga *Anacystis nidulans*. *J. Bacteriol.* **117**:660-666 (1974).
8. Woese, C.R., M.L. Sogin and L. Sutton. Procaryote Phylogeny I: Concerning the Relatedness of *Aerobacter aerogenes* to *Escherichia coli*. *J. Mol. Evol.* **3**:293-299 (1974).

9. Pribula, C.D., G.E. Fox, C.R. Woese, M.L. Sogin and N.R. Pace. Nucleotide Sequence of *Bacillus megaterium* 5S RNA. *FEBS Letters* **44**:322-323 (1974).
10. Sogin, M.L. and N.R. Pace. *In vitro* maturation of precursors of 5S ribosomal RNA from *Bacillus subtilis*. *Nature* **252**:598-600 (1974).
11. Doolittle, W.F, C.R. Woese, M.L. Sogin, L. Bonen and D. Stahl. Sequence studies on 16S Ribosomal RNA from a Blue-Green Alga. *J. Mol. Evol.* **4**:307-315 (1975).
12. Woese, C.R., M.L. Sogin, D. Stahl, B.J. Lewis and L. Bonen. A comparison of the 16S ribosomal RNA from mesophilic and thermophilic Bacilli: some modifications in the Sanger Method for RNA sequencing. *J. Mol. Evol.* **7**:97 (1976).
13. Marotta, C., S.M. Weissman, M.L. Sogin and N.R. Pace. The primary structure of *Bacillus stearothermophilus* and *Bacillus subtilis* 5S RNAs. *J. Biol. Chem.* **251**:3122 (1976).
14. Sogin, M.L., N.R. Pace, M. Rosenberg and S.M. Weissman. Nucleotide sequence of a 5S ribosomal RNA precursor from *Bacillus subtilis*. *J. Biol. Chemistry* **251**:3480 (1976).
15. Sogin, M.L., B. Pace and N.R. Pace. Partial purification and properties of a ribosomal RNA maturation nuclease from *Bacillus subtilis*. *J. Biol. Chemistry* **252**:1350 (1977).
16. Schroeder, E., J. McKibbin, M.L. Sogin and N.R. Pace. The mode of degradation of precursor-specific RNA fragments by *Bacillus subtilis*. *J. Bacteriol.* **130**:1000 (1977).
17. Sogin, M.L. and G.J. Olsen. Identification and mapping of a 60 bp EcoRI fragment in the *Dictyostelium discoideum* ribosomal DNA. *Gene* **8**:231 (1980).
18. Peffley, D.M. and M.L. Sogin. A Putative tRNA<sup>Trp</sup> Gene Cloned from *Dictyostelium discoideum*: Its Nucleotide Sequence and Association with Repetitive Deoxyribonucleic Acid. *Biochemistry* **20**:4015-4021 (1981).
19. Olsen, G.J. and M.L. Sogin. Nucleotide Sequence of *Dictyostelium discoideum* 5.8S Ribosomal Ribonucleic Acid: Evolutionary and Secondary Structural Implications. *Biochemistry* **21**:2335-2343 (1982).
20. McCarroll, R., G.J. Olsen, Y.D. Stahl, C.R. Woese and M.L. Sogin. Nucleotide Sequence of the *Dictyostelium discoideum* Small-Subunit Ribosomal Ribonucleic Acid Inferred from the Gene Sequence: Evolutionary Implications. *Biochemistry* **22**:5858-5868 (1983).
21. Olsen, G.J., R. McCarroll and M.L. Sogin. Secondary Structure of the *Dictyostelium discoideum* small subunit ribosomal RNA. *Nucleic Acids Res.* **11**:8037-8049 (1983).
22. Elwood, H.J., G.J. Olsen and M.L. Sogin. The Small-Subunit Ribosomal RNA Gene Sequences from the Hypotrichous Ciliates *Oxytricha nova* and *Stylonychia pustulata*. *Mol. Biol. and Evol.* **2**:399-410 (1985).
23. Lane, D.J., B. Pace, G.J. Olsen, D.A. Stahl, M.L. Sogin and N.R. Pace. Rapid determination of 16S ribosomal RNA sequences for phylogenetic analyses. *Proc. Natl. Acad. Sci. USA* **82**:6955-6959 (1985).

24. Sogin, M.L., H.J. Elwood and J.H. Gunderson. Evolutionary diversity of eukaryotic small subunit rRNA genes. *Proc. Natl. Acad. Sci. USA* **83**:1383-1387 (1986).
25. Sogin, M.L., M.T. Swanton, J.H. Gunderson and H.J. Elwood. Sequence of the Small Subunit Ribosomal RNA Gene from the Hypotrichous Ciliate *Euplotes aediculatus*. *J. Protozool.* **33**:26-29 (1986).
26. Sogin, M.L. and H.J. Elwood. Primary Structure of the *Paramecium tetraurelia* Small-Subunit rRNA Coding Region: Phylogenetic Relationships Within the Ciliophora. *J. Mol. Evol.* **23**:53-60 (1986).
27. Dingerman, T., W. Bertling, T. Brechner, K. Nerke, D.M. Peffley and M.L. Sogin. Structure of two tRNA genes from *Dictyostelium discoideum*. *Nucl. Acids Res.* **14**:1127 (1986).
28. Gunderson, J.H. and M.L. Sogin. Length variation in eukaryotic rRNAs: small subunit rRNAs from the protists *Acanthamoeba castellanii* and *Euglena gracilis*. *Gene* **44**:63-70 (1986).
29. Gunderson, J.H., T.F. McCutchan and M.L. Sogin. Sequence of the Small Subunit Ribosomal RNA Gene Expressed in the Bloodstream Stages of *Plasmodium berghei*: Evolutionary Implications. *J. Protozool.* **33**:525-529 (1986).
30. Sogin, M.L., A. Ingold, M. Karlok, H. Nielsen and J. Engberg. Phylogenetic evidence for the acquisition of ribosomal RNA introns subsequent to the divergence of some of the major *Tetrahymena* groups. *EMBO J.* **5**:3625-3630 (1986).
31. Sogin, M.L., K. Miotto and L. Miller. Primary structure of the *Neurospora crassa* small subunit ribosomal RNA coding region. *Nucleic Acids Res.* **14**:9540 (1986).
32. Sogin, M.L., and J.H. Gunderson. Structural diversity of Eukaryotic Small Subunit Ribosomal RNAs: Evolutionary Implications. *Ann. N.Y. Acad. Sci.* **503**:125-139 (1987).
33. Lau, P.P., B. Degrunner-Vossbrinck, B. Dunn, K. Miotto, M.T. MacDonell, D.M. Rollins, C.J. Pillidge, R.B. Hespell, R.R. Colwell, M.L. Sogin, and G.E. Fox. Phylogenetic Diversity and Position of the Genus *Campylobacter*. *System Appl. Microbiol.* **9**:231-238 (1987).
34. Gunderson, J.H., H.J. Elwood, A. Ingold, K. Kindle and M.L. Sogin. Phylogenetic relationships between chlorophytes, chrysophytes and oomycetes. *Proc. Natl. Acad. Sci. USA* **84**:5823-5827 (1987).
35. Gunderson, J.H., M.L. Sogin, G. Wollett, M. Hollingdale, V.F. De La Cruz, A.P. Waters, and T.F. McCutchan. Structurally Distinct, Stage Specific Ribosomes Occur in *Plasmodium*. *Science* **238**:933-937 (1987).
36. McCutchan, T.F., V.F. de la Cruz, A.A. Lal, J.H. Gunderson, H.J. Elwood and M.L. Sogin. Primary sequences of two small subunit ribosomal RNA genes from *Plasmodium falciparum*. *Mol. and Biochem. Parasito.* **28**:63-68 (1988).
37. Lynn, D.H. and M.L. Sogin. Assessment of phylogenetic relationships among ciliated protists using partial ribosomal RNA sequences derived from reverse transcripts. *BioSystems* **21**:249-254 (1988).

38. Edman, J.C., J.A. Kovacs, H. Masur, D.V. Santi, H.J. Elwood, and M.L. Sogin. Ribosomal RNA sequence shows *Pneumocystis carinii* to be a member of the Fungi. *Nature* **334**:519-522 (1988).
39. Looker, D., L.A. Miller, H.J. Elwood, S. Stickel and M.L. Sogin. Primary structure of the *Leishmania donovani* small subunit ribosomal RNA coding region. *Nucleic Acids Res.* **16**:7198 (1988).
40. Medlin, L., H.J. Elwood, S. Stickel and M.L. Sogin. The characterization of enzymatically amplified eukaryotic 16S-like rRNA coding regions. *Gene* **71**:491-499 (1988).
41. Sogin, M.L., J.H. Gunderson, H.J. Elwood, R.A. Alonso and D.A. Peattie. Phylogenetic Meaning of the Kingdom Concept: An Unusual Ribosomal RNA from *Giardia lamblia*. *Science* **243**:75-77 (1989).
42. Cummings, D.J., J. Domenico, J. Nelson and M.L. Sogin. DNA Sequence, Structure and Phylogenetic Relationship of the Small Subunit rRNA coding Region of Mitochondrial DNA from *Podospira anserina*. *J. Mol. Evol.* **28**:232-241 (1989).
43. Edman, J.C., J.A. Kovacs, H. Masur, D.V. Santi, H.J. Elwood and M.L. Sogin. Ribosomal RNA Genes of *Pneumocystis carinii*. *J. Protozool.* **36**:18S-20S (1989).
44. Huss, V.A.R. and M.L. Sogin. Primary structure of the *Chlorella vulgaris* small subunit ribosomal RNA coding region. *Nucleic Acids Res.* **17**:1255 (1989).
45. Sogin, M.L. Evolution of Eukaryotic Microorganisms and their Small Subunit Ribosomal RNAs. *Amer. Zool.* **29**:487-499 (1989).
46. Sogin, M.L. and J.C. Edman. A self-splicing intron in the small subunit rRNA gene of *Pneumocystis carinii*. *Nucleic Acids Res.* **17**:5349-5359 (1989).
47. Bhattacharya, D., H.J. Elwood, L.J., Goff and M.L. Sogin. The Phylogeny of *Gracilaria lemaneiformis* (Rhodophyta) Based on Sequence Analysis of its Small Subunit Ribosomal RNA Coding Region. *J. Phycol.* **26**:181-186 (1990).
48. Forster, H., H.J. Elwood, M.D. Coffey and M.L. Sogin. Sequence Analysis of the Small Subunit Ribosomal RNAs of Three Zoosporic Fungi And Implications For Fungal Evolution. *Mycologia* **82**:306-312 (1990).
49. Huss, V.A.R., and M.L. Sogin. Phylogenetic Position of Some *Chlorella* Species within the Chlorococcales based upon Complete Small-Subunit Ribosomal RNA Sequences. *J. Mol. Evol.* **31**:432-442 (1990).
50. Wit, D.D., L. Steyn, S. Shoemaker and M.L. Sogin. Direct Detection of *Mycobacterium tuberculosis* in Clinical Specimens. *J. Clin. Microbiol.* **28**:2437-2441 (1990).

51. Schlegel, M., H.J. Elwood and M.L. Sogin. Molecular Evolution in Hypotrichous Ciliates: Sequence of the Small Subunit Ribosomal RNA Genes from *Onychodromus quadricornutus* and *Oxytricha granulifera*. *J. Mol. Evol.* **32**:64-69 (1991).
52. Greenwood, S.J., M. Schlegel, M.L. Sogin and D.H. Lynn. Phylogenetic Relationships of *Blepharisma americanum* and *Colpoda inflata* Within the Phylum Ciliophora Inferred from Complete Small Subunit rRNA Gene Sequences. *J. Protozool.* **38**:1-6 (1991).
53. Barns, S.M., D.J. Lane, M.L. Sogin, C. Bibeau and W.G. Weisburg. Evolutionary Relationships among Pathogenic *Candida* Species and Relatives. *J. Bact.* **173**:2250-2255 (1991).
54. Gajadhar, A.A., W.C. Marquardt, R. Hall, J. Gunderson, E.V.A. Carmona and M.L. Sogin. Ribosomal RNA sequences of *Sarcocystis muris*, *Theileria annulata*, and *Cryptosporidium parvum* reveal evolutionary relationships among apicomplexans, dinoflagellates, and ciliates. *Molecular and Biochemical Parasitology* **45**:147-154 (1991).
55. Illingworth, C.A., J.H. Andrews, C. Bibeau and M.L. Sogin. Phylogenetic Placement of *Athelia bombacina*, *Aureobasidium pullulans* and *Colletotrichum gloeosporioides* Inferred from Sequence Comparisons of Small Subunit Ribosomal RNAs. *Experimental Mycology* **15**:65-75 (1991).
56. Ariztia, E.V., R.A. Andersen and M.L. Sogin. A New Phylogeny for Chromophyte Algae Using 16S-like rRNA Sequences from *Mallomonas papillosa* (Synurophyceae) and *Tribonema aequale* (Xanthophyceae). *J. Phycol.* **27**:428-436 (1991).
57. Greenwood, S.J., M.L. Sogin and D.H. Lynn. Phylogenetic Relationships within the Class Oligohymenophorea, Phylum Ciliophora Inferred from the Complete Small Subunit rRNA Gene Sequences of *Colpidium campylum*, *Glaucocystis* *Chattoni* and *Opisthoxena henneguyi*. *J. Mol. Evol.* **33**:163-174 (1991).
58. Davila-Aponte, J.A., VAR. Huss, M.L. Sogin and T.R. Cech. A self-splicing group I intron in the nuclear pre-rRNA of the green alga, *Ankistrodesmus stipitatus*. *Nucl. Acids. Res.* **19**:4429-4436 (1991).
59. Medlin, L.K., H.J. Elwood, S. Stickel and M.L. Sogin. Morphological and Genetic Variation within the Diatom *Skeletonema costatum* (Bacillariophyta): Evidence for a New Species, *Skeletonema pseudocostatum*. *J. Phycol.* **27**: 514-524 (1991).
60. Bhattacharya, D., S.K. Stickel and M.L. Sogin. Molecular Phylogenetic Analysis of Actin Genic Regions from *Achlya bisexualis* (Oomycota) and *Costaria costata* (Chromophyta). *J. Mol. Evol.* **33**: 4275-4286 (1991).
61. Bhattacharya, D., Medlin, L., Wainright, P.O., Ariztia, E.V., Bibeau C., Stickel, S.K. and Sogin, M.L. Algae Containing Chlorophyll *a+c* are Paraphyletic: Molecular Evolutionary Analysis of the Chromophyta. *Evolution* **46**:1801-1817 (1992).



62. Bruns, T.D., Vilgalys, R., Barns, S.M., Gonzalez, D., Hibbett, D.S., Lane, D.J., Simon, L., Stickel, S., Szaro, T.M., Weisburg, W.G. and Sogin, M.L. Evolutionary relationships within the Fungi: analyses of nuclear small subunit rRNA sequences. *Molecular Phylogenetics and Evolution* **1**:231-241 (1992).
63. Wainright, P.O., Hinkle, G., Sogin, M.L. and Stickel, S.K. The Monophyletic Origins of the Metazoa; An unexpected evolutionary link with Fungi. *Science* **260**:340-243 (1993).
64. Bhattacharya, D., Stickel, S. and Sogin M.L. Isolation and Molecular Phylogenetic Analysis of Actin Coding Regions from *Emiliania huxleyi*, a Prymnesiophyte Alga, using Reverse Transcriptase and PCR Methods. *Mol. Biol. Evol.* **10**:689-703 (1993).
65. Leipe, D.D., Gunderson, J.H., Nerad, T.A., and Sogin, M.L. Small subunit Ribosomal RNA of *Hexamita inflata* and the quest for the first branch in the eukaryotic tree. *Molecular and Biochemical Parasitology* **59**:41-48 (1993).
66. Sogin, M.L., Hinkle, G. and Leipe, D.D. Universal Tree of Life. *Nature* **362**:795 (1993).
67. Scholin, C.A., D. M. Anderson and M.L. Sogin. The Existence of Two Distinct Small-Subunit rRNA Genes in the North American Toxic Dinoflagellate *Alexandrium fundyense* (Dinophyceae). *J. Phycology* **29**:209-216 (1993)
68. Hinkle, G. and M.L. Sogin. The Evolution of the Vahlkampfiidae as Deduced from 16S-like Ribosomal RNA Analysis. *J. Eukaryotic Micro.* **40**:599-603 (1993).
69. Gagnon, S., R. C. Levesque, M. L. Sogin, and A. A. Gajadhar. Molecular Cloning, Complete Sequence of the Small subunit Ribosomal RNA Coding Region and Phylogeny of *Toxoplasma gondii*. *Molecular and Biochemical Parasitology* **60**:145-148 (1993).
70. Fong, D., Rodriguez, K.K., Sun, J., Sogin, M.L., Bushek, D., Littlewood, D.T.J. and Ford, S.E. Small subunit ribosomal RNA gene sequence of the oyster parasite *Perkinsus marinus*. *Molecular Marine Biology and Biotechnology* **2**:346-350 (1993).
71. Hinkle, G., Leipe, D.D., Nerad, T.A., and Sogin, M.L. The Unusually Long Small Subunit Ribosomal RNA of *Phreatamoeba balamuthi*. *Nucleic Acids Res.* **22**:465-469. (1994).
72. Leipe, D.D., Bernhard, D., Schlegel, M. and Sogin, M.L. Evolution of 16S-like ribosomal RNA genes in the ciliophoran taxa Litostomatea and Phyllopharyngea. *European Journal of Protistology* **30**: 354-361 (1994).
73. Leipe, D.D., Wainright, P.O., Gunderson, J.H., Porter, D., Patterson, D.J., Valois, F., Himmerich, S. and Sogin, M.L. The stramenopiles from a molecular perspective: 16S-like rRNA sequences from *Labyrinthuloides minuta* and *Cafeteria roenbergensis*. *Phycologia*. **33**:369-377. (1994).
74. Gunderson, J.H., Goss, S.J. and Sogin, M.L. The Sequence of the Hartmanella vermiformis Small Subunit rRNA Coding Region. *J. Euk. Microbiol.* **41**:481-482. (1994).

75. Hinkle, G., Wetterer, J.K., Schultz, T. and Sogin, M.L. Phylogeny of the Attine Ant Fungi Based on Analysis of Small Subunit Ribosomal RNA Gene Sequences. *Science* **266**:1695-1697 (1994).
76. Scholin, C.A., M. Herzog, M.L. Sogin and D.M. Anderson. Identification of group and strain-specific genetic markers for globally distributed *Alexandrium* (Dinophyceae). II. Sequence analysis of a fragment of the LSU rRNA gene. *J. Phycology* **30**:999-1011. (1994).
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