This book is a compilation of 22 articles by leading researchers in the field that brings the reader up to date on current thinking about the phylogenetics of protozoa. It covers free-living and parasitic protozoa and should therefore appeal to a wide audience. Contributions include up-to-date information on groups such as amitochondriate (anaerobic) protists, intestinal amoebae, Microsporidia, amoeboflagellates, apicomplexans, ciliates, Myxozoa, and kinetoplastid flagellates including bodonids and trypanosomes. In two separate contributions, Beakes and Cavalier-Smith go further; Beakes discusses the relationship between lower fungi and protozoa while Cavalier-Smith discusses the Neomonada, his most recently proposed zooflagellate assemblage, and how they relate to the origin of animals and fungi.

The book is an outcome of a recent meeting on the evolutionary relationships of protozoa held by the British Section of the Society of Protozoologists, the Systematics Association and the Linnean Society. Some readers, long comfortable with textbook classification schemes, will be amazed (even concerned) about the speed of changes in protozoan/protistan classification. While the definitive classification system still eludes us, the book is invaluable since it (1) provides full summaries of current classification systems and (2) clearly sets out a path leading towards the “ideal” classification system that reflects known phylogenetic interrelationships. As Keith Vickerman, an editor and contributor, states “a natural classification of the Protozoa is still some way off — but that a revolution in protozoan systematics is in full swing cannot be doubted”.

In just ten short years, the phylogeny of protozoa (and protists) has undergone massive revision due to inputs from a wealth of molecular studies. Techniques for the rapid sequencing of DNA, together with powerful computers and refined algorithms, allow the construction of molecular taxonomic phylogenetic trees. Taxonomic arrangements based on molecular phylogenetic data (with inputs from ultrastructural and biochemical investigations) permit the hierarchial arrangement of taxa into classification schemes. It is not a criticism of the book that no ideal scheme has yet emerged. Rather it is one of the book’s strengths and this is highlighted in the final chapter where some of the major dissimilar schemes are clearly compared and contrasted.

The book opens with a most enlightening chapter by Kieth Vickerman who provides us with an excellent overview of the history of protozoan phylogeny. He points out the
move from phylogenies based on microanatomical, behavioural and biochemical characters to the concept of homology at the molecular level and correctly concludes that interest in the protozoa has been hindered by unsatisfactory systematics. Most of the phylogenetic studies featured compare small subunit (18S) ribosomal RNA gene sequences although Philippe and Adoutte in Chapter 2 expand on the pitfalls of molecular phylogeny and question the reliability of this focus.

Specific contributions will be of particular interest to workers in those fields. For example, Canning discusses the evolutionary relationships of Microsporidia. Clark et al. cover the molecular systematics of intestinal amoebae, DeJonekeheere reviews the relationship between amoeboflagellates, Hide considers the evolutionary relationships among African trypanosomes and Ellis et al. give an update on the molecular phylogeny of the phylum Apicomplexa. Two contributions by Foissner and by Hirt et al. use molecular approaches to handle the complexities within the Ciliophora.

Many of the chapters consider the evolution of the eukaryotic cell and focus on the evolution of organelles such as mitochondria, plastids and hydrogenosomes that are centrally important when considering protozoan phylogenetics. Horner et al. use molecular phylogeny to consider aspects of the timing of mitochondrial endosymbiosis while Howe et al. specifically address the debate over whether plastids originate from a single endosymbiotic event (monophyletic origin) or from multiple endosymbioses (polyphyletic). Müller addresses the evolution of amitochondriate eukaryotes and argues that the rRNA data suggest that most, if not all, antmitochondriate protists arose from mitochondriate ones. On a related note, Hackstcin et al. point out that those protists and fungi with hydrogenosomes are of polyphyletic origin.

Perhaps most appealing to readers are the general chapters providing broad overviews of the subject. Noteworthy in this regard are the three chapters by Vickerman, Cavalier-Smith and Corliss. Vickerman sets the stage at the start of this book with his chapter entitled “Revolution among the Protozoa”. Cavalier-Smith explains his view of protozoan systematics and reviews his most recent classification scheme comprising 13 phyla and 26 subphyla. Corliss ties the book together with the perfect “capstone paper” on the current status of the classification of protozoa and protists. He singles out a trio of workers who have contributed much to modern protozoan phylogenetics and systematics, namely Lynn Margulis, Tom Cavalier-Smith and David Patterson. Corliss gives us much needed hope for the future by eloquently pointing out that protozoan systematics is in a “state of flux” rather than a “state of chaos”. As we wait for the utilitarian systematics of Protozoa to be replaced by a more natural one based on evolutionary relationships, it is easy to become frustrated and impatient. This book does much to ease the pain of waiting and is essential prescribed medicine for all “protozoologists”. You will not be disappointed.

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