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Microbial Diversity: A Journey through Carl Woese's Tree of Life

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Review of: *Microbial Diversity*; James W. Brown; (2015). American Society for Microbiology Press, Washington, DC. 416 pages.

What inspired you as an undergraduate student? For me, it was a microbial diversity course. Learning about microbes in the context of the great Carl Woese's work solidified my love of microbes and ignited my desire to get into research. *Microbial Diversity* by James Brown may be just the right textbook to help guide students into our microbial world.

Microbial Diversity is based on a microbial diversity course Dr. Brown has been teaching at North Carolina State University. As a disciple of the "Woese School," the author based his course on the classic 1987 review of bacterial evolution by Woese (1). This should give you some insight into the perspective of his book. First and foremost, this book is all about the "bugs." It is not about where they are found or what disease they may cause. Instead, it is about the evolutionary relationship between the different groups and how that may have influenced their roles in these processes. It does not try to present a comprehensive list of microbes but serves as a guide to the major phylogenetic groups and empowers the reader with the tools to make their own discoveries. In the age of the microbiome, this kind of knowledge is invaluable in understanding the incredible diversity that is being discovered. With the competencies developed through this book, the student will be well prepared to delve into the robust data being generated in today's microbiome research. The book also provides a much needed link between the genetic data, ecology, and evolution.

Microbial Diversity is written in four major sections. The first section introduces the reader to sequence analysis, with a focus on the various methods. The second, and by far the largest, section introduces the major phylogenetic groups through descriptions of representative genera and species. Accurately subtitled "The Microbial Zoo" this section is like a well-curated museum that couldn't possibly exhibit all works of art but presents strong examples of the various periods and regions. The selection of representative genera and species provides a good feel for the characteristics of each major phylogenetic group. Since the book's intended

audience is advanced students with prior microbiology courses, the text is light on explanations of the many details of structure, function, and metabolism. The third section is about microbial populations and does a great job of integrating the first two sections. Selected articles from the primary literature illustrate the application of the tools introduced in the first section and utilize the information from the second section to provide an understanding of the microorganisms that make up a population. The last section brings the book full circle and describes sequence analysis from the genomic perspective and how this impacts our understanding of the origins and evolution of microbial life.

The strength of *Microbial Diversity* is its emphasis on the science of microbial diversity and the source of our knowledge about the microbial world. Questions presented within each chapter, end-of-chapter questions, and suggested activities help the reader grasp the key concepts and see how to work with the data. The author presents the concepts in an approachable manner for readers with limited experience working with sequence data. The book does a great job of presenting the various alternative strategies and the strengths and weaknesses of each approach. Overall, this book is great for teaching upper-level microbiology and fills an important gap. It is a great resource for teaching microbial diversity to undergraduates and I look forward to giving it a spin in the classroom.

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