

Preface

Prescott's Principles of Microbiology continues in the tradition of *Prescott, Harley, and Klein's Microbiology* by covering the broad discipline of microbiology at a depth not found in any other textbook. In using the 7th edition of *PHK's Microbiology* as the foundation for the development of *Principles*, we identified two overarching goals. First, we sought to present material likely to be covered in a single semester microbiology course, with the knowledge that not all introductory microbiology courses cover the same topics. Therefore, each chapter in *Prescott's Principles of Microbiology* was revised from the 7th edition of *PHK's Microbiology* to provide a streamlined, briefer discussion of key concepts that include only the most relevant, up-to-date examples. Secondly, we strove to further extend the student-friendly approach used in the 7th edition by enhancing readability and adding tools designed to promote learning.

OUR STRENGTHS

Connecting with Students

We have retained the relatively simple and direct writing style used in *PHK's Microbiology*, but have added style elements designed to further engage students. For example, we frequently use the first person voice to describe important concepts—especially those that our students find most difficult. Each chapter is divided into numbered section headings and organized in an outline format—the same outline format that is presented in the end-of-chapter summaries. Key terminology is boldfaced and clearly defined. We have introduced a glossary of essential terms at the beginning of each chapter to serve as an easy reference for students, while retaining the full glossary in the back of the book. Our belief that concepts are just as important as facts, if not more, is also reflected in the questions for review and reflection that appear throughout each chapter. These questions are of two types: those that quiz student retention of key facts and vocabulary and those designed to foster critical thinking.

Instructive Artwork

To truly engage students, a textbook must do more than offer words and images that just adequately describe the topic at hand. We view the artwork of a text as a critical tool in enticing students to read the text. *Principles* features the art program introduced in the 7th edition of *PHK's Microbiology*. The three-dimensional renderings help students appreciate the beauty and elegance of the cell, while at the same time make the material more comprehensible. Of course we also believe that figures should be content-rich, not just pretty to look at. Therefore, the art program also includes pedagogical features such as concept maps (e.g., see figures 9.1 and 13.1) and annotation of key pathways and processes (e.g., see figures 10.8 and 12.12).

Unique Organization Around Key Themes

With the advent of genomics, proteomics, metabolomics and the increased reach of cell biology, the divisions among microbiology subdisciplines have become blurred. This is reflected in the emergence of fields like disease ecology and metagenomics. In addition, today's microbiologist must be acquainted with all members of the microbial world: viruses, bacteria, archaea, protists, and fungi. It follows that students new to microbiology are asked to assimilate vocabulary, facts, and most importantly, concepts, from a seemingly vast array of subjects. The challenge to the professor of microbiology is to effectively communicate essential concepts while conveying the ingenuity of microbes and excitement of this dynamic field.

Microbial Evolution and Ecology

Because microbial evolution and ecology are no longer subdisciplines to be ignored by those interested in microbial genetics, physiology, or pathogenesis, *Principles* strives to integrate these themes throughout the text. We begin in chapter 1 with a discussion of the universal tree of life and whenever possible, discuss diverse microbial species so that students can begin to appreciate the tremendous variation in the microbial world. In addition, *Principles* uses the topics of intercellular communication (chapters 6 and 13), biofilms (throughout the text, but specifically in chapters 6, 13, and 29), microbial evolution (chapter 17), and polymicrobial diseases (chapter 33) to emphasize that evolution must be linked to genetics, physiology to diversity, and ecology to pathogenesis.

Microbial Pathogenicity and Diversity

Unique to *Principles* is the inclusion of microbial pathogens into the diversity chapters (chapters 19–24). Thus when students read about the metabolic and genetic diversity of each bacterial, protist, and viral taxon, they are also presented with the important pathogens. In this way, the physiological adaptations that make a given organism successful can be immediately related to its role as a pathogen and pathogens can be readily compared to phylogenetically related nonpathogenic microbes.

In addition, *Principles* introduces viruses and other acellular agents in chapter 5, following the chapters of Prokaryotic and Eukaryotic Cell Structure and Function (chapters 3 and 4, respectively). By placing a similarly themed chapter on viruses here, professors can introduce all divisions of the microbial world to their students early in the term. For those professors who include more in-depth coverage of viruses, chapter 24 explores the molecular genetics of bacteriophages and other viruses as well as the pathogenicity of important animal and plant viruses. As in *PHK's Microbiology*, we use the classification schemes set forth in the second edition of *Bergey's Manual of Systematic Bacteriology*, the Baltimore System of virus classification (chapters 5 and 24), and the International Society of Protistologists' new classification scheme for eucaryotes (chapter 23).