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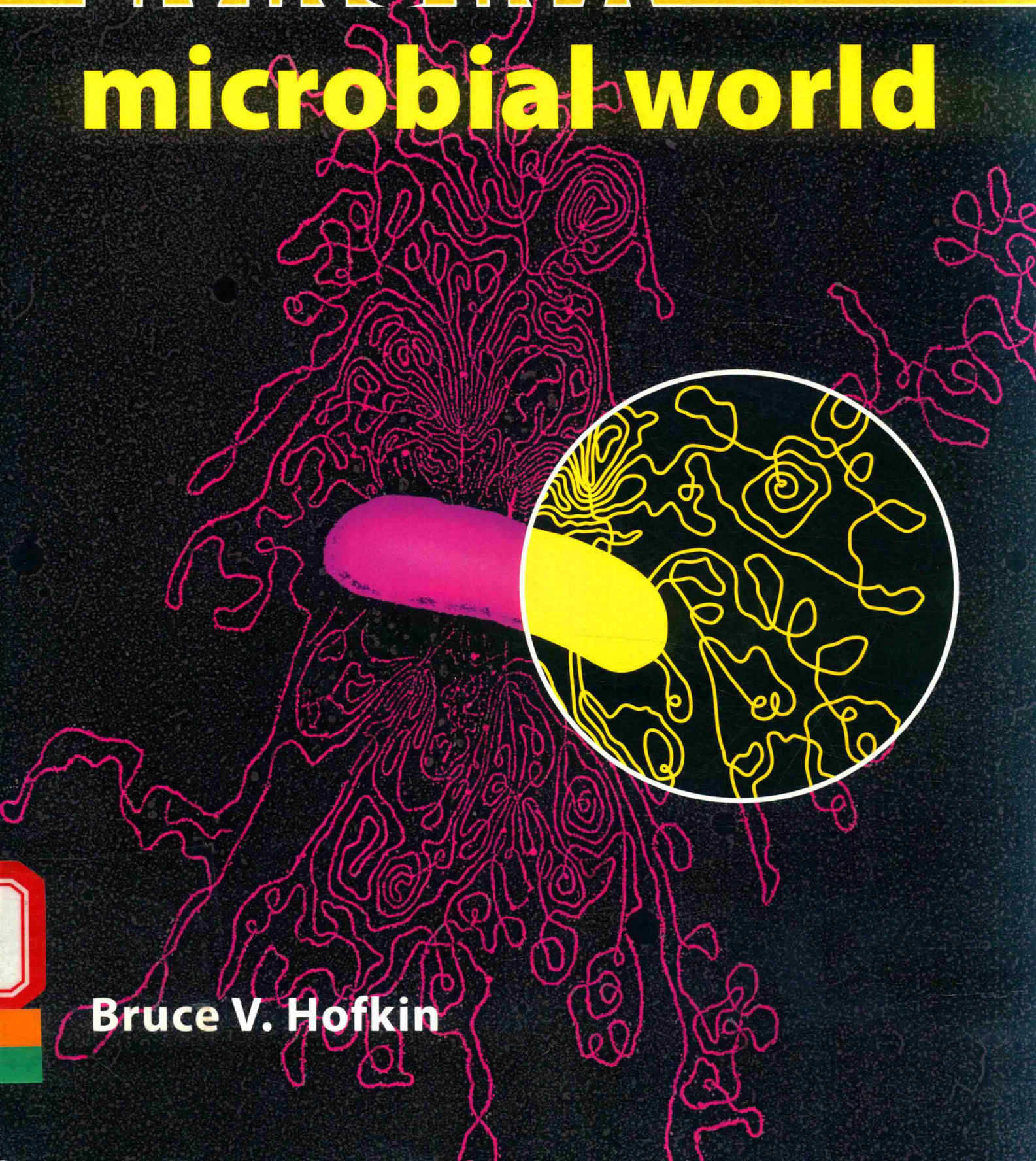
LIVING IN A microbial world



Bruce V. Hofkin

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Preface

In the era of the 24-hour news cycle, we are bombarded routinely with important stories about microorganisms. AIDS, SARS, "bird flu," *E. coli* outbreaks, meningitis, vaccines, antibiotic resistance, and most recently "swine flu," make alarming copy that scare the public, and in turn fuel greater media coverage from established news sources, columnists, and the blogosphere. With conflicting information swirling through the media, it has become increasingly important for people to understand the basic principles of microbiology, in order to separate rumor and conjecture from good science, and make rational decisions about potential microbial threats and their health.

Living in a Microbial World is a textbook written for students taking a general microbiology or microbiology-themed course for non-science majors. It teaches the essential concepts of microbiology through practical examples and a conversational writing style intended to make the material accessible to a wide audience. The book will enable non-scientists to understand important issues about microorganisms and disease that they will encounter throughout their lives, and I hope it will help them make informed decisions about health issues for themselves, their families, and communities. Learning the principles of microbiology pays other dividends as well. The core topics—such as cell structure and function, microbial genetics, metabolism, and microbial evolution—have broader application to the life sciences in general, and can help students understand the living world, as well as the basic science, in a more profound and rewarding manner. The reader will learn the role that microorganisms play not only in our health but also in ecosystem processes, our diet, industrial production, and human history. Topics that we hear about every day, from global warming to energy independence to bioterrorism, all have a microbial angle. This text is designed to provide the reader with the background needed to understand and discuss such topics with a genuine understanding rooted in science.

In order to make the science relevant to everyday life and the practical interests of a non-science audience, each chapter of the book contains a series of cases intended to motivate learning the microbiology concepts. The cases present microbiology in the news, in history, in literature, and in scenarios of everyday life. Each case ends with several questions intended to pique student interest, and the questions are then answered as the student reads the next section of the chapter. For example, to introduce the topic of pathogen transmission, the introductory case recalls the true story of how the Norwalk Virus was spread among players of opposing teams during a college football game. Similarly, microbial freshwater ecology is introduced

with a description of a recent outbreak of avian botulism in Lake Erie. And drug resistance is discussed in the context of a mother who does not follow the doctor's directions, and stops giving her son antibiotics immediately after he feels better.

In addition to the cases, there are other features that should make the text inviting to the non-scientist. To emphasize the human context, there is a separate chapter on "Microbiology in History and the History of Microbiology," and epidemiology has its own chapter as well. Due to its foundational role in biology as a whole, and microbiology in particular, there is a chapter devoted entirely to microbial evolution, and evolutionary concepts are emphasized throughout the book. To streamline the text and make it more accessible, several traditional microbiology topics, which often receive their own chapters, have been integrated throughout other parts of the book. For example, in lieu of having a chapter on microbiology techniques, topics such as the Gram stain and the acid-fast stain are introduced in the discussion of cell wall structure. And throughout the book, examples of specific diseases are integrated into discussions of appropriate topics.

In these ways I have attempted to provide the reader with a meaningful, relevant, and contemporary text, through which they can explore the many wonders of the microbial world. It is my hope that after reading the book, students will share my fascination with this remarkable and diverse assembly of living things.

Like all textbooks, *Living in a Microbial World* has been a collaborative effort. Many people helped bring it to fruition, and these individuals are recognized in the acknowledgments. Any remaining errors, however, are solely the responsibility of the author. Please help us with these errors by contacting science@garland.com so that corrections can be made in the next printing.

Student And Instructor Resources

The following supplements are available for students and instructors. They can be accessed at http://www.garlandscience.com/LMW

The Art of *Living in a Microbial World*

The images and tables from the book are available in two convenient formats: PowerPoint® and JPEG. The PowerPoint slides can be customized for lectures.

Microbiology Movies

Short movies have been developed to complement material in a select number of chapters, with a special emphasis on molecular genetics, virology, and immunology. Each movie has a voice-over narration, and the text of the narration is available for download.

Student Quizzes

Short online quizzes are available for each chapter to test basic reading comprehension.

Flashcards

Online flashcards are available to test mastery of the key terms listed at the end of each chapter.

Glossary

The glossary at the end of the book is available online for quick searching and browsing.

Acknowledgments

Multiple drafts of every chapter were reviewed by professors around the country, and I would like to thank them for their detailed comments and helpful suggestions. In a particular I would like to thank:

Suzanne Anglehart, University of Wisconsin; Jason Arnold, Hopkinsville Community College; Linda Bruslind, Oregon State University; Alyssa Bumbaugh, Penn State Altoona; Jean Cardinale, Alfred University; Edward Cluett, Ithaca College; Eileen Gregory, Rollins College; Juanita Leonhard, Illinois College; Sylvia Franke McDevitt, Skidmore College; Amy Medlock, University of Georgia; Roderick Morgan, Grand Valley State University; Carolyn Peters, Spoon River College; Mark Schneegurt, Wichita State University; Von Sigler, University of Toledo; Jeanne Weidner, San Diego State University; and Jamie Welling, South Suburban College.

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Contents

Detailed Contents