Preface to the Fifth Edition

Before I began work on the *first* edition of this text, I drew up a number of basic guidelines regarding the type of book I planned to write.

- I wanted a text suited for an introductory course in cell and molecular biology that ran either a single semester or 1–2 quarters. I set out to draft a text of about 800 pages that would not overwhelm or discourage students at this level.

- I wanted a text that elaborated on fundamental concepts, such as the relationship between molecular structure and function, the dynamic character of cellular organelles, the use of chemical energy in running cellular activities and ensuring accurate macromolecular biosynthesis, unity and diversity at the macromolecular and cellular levels, and the mechanisms that regulate cellular activities.

- I wanted a text that was grounded in the experimental approach. Cell and molecular biology is an experimental science and, like most instructors, I believe students should gain some knowledge of how we know what we know. With this in mind, I decided to approach the experimental nature of the subject in two ways. As I wrote each chapter, I included enough experimental evidence to justify many of the conclusions that were being made. Along the way, I described the salient features of key experimental approaches and research methodologies. Chapters 8 and 9, for example, contain introductory sections on techniques that have proven most important in the analysis of cytomembranes and the cytoskeleton, respectively. I included brief discussions of selected experiments of major importance in the body of the chapters to reinforce the experimental basis of our knowledge. I placed the more detailed aspects of methodologies in a final "techniques chapter" because (1) I did not want to interrupt the flow of discussion of a subject with a large tangential section on technology and (2) I realized that different instructors prefer to discuss a particular technology in connection with different subjects.

For students and instructors who wanted to explore the experimental approach in greater depth, I included an Experimental Pathways at the end of most chapters. Each of these narratives describes some of the key experimental findings that have led to our current understanding of a particular subject that is relevant to the chapter at hand. Because the scope of the narrative is limited, the design of the experiments can be considered in some detail. The figures and tables provided in these sections are often those that appeared in the original research article, which provides the reader an opportunity to examine original data and to realize that its analysis is not beyond their means. The Experimental Pathways also illustrate the stepwise nature of scientific discovery, showing how the result of one study raises questions that provide the basis for subsequent studies.

- I wanted a text that was interesting and readable. To make the text more relevant to undergraduate readers, particularly premedical students, I included The Human Perspective. These sections illustrate that virtually all human disorders can be traced to disruption of activities at the cellular and molecular level. Furthermore, they reveal the importance of basic research as the pathway to understanding and eventually treating most disorders. In Chapter 11, for example, The Human Perspective describes how small synthetic siRNAs may prove to be an important new tool in the treatment of cancer and viral diseases, including AIDS. In this same chapter, the reader will learn how the action of such RNAs were first revealed in studies on plants and nematodes. It becomes evident that one can never predict the practical importance of basic research in cell and molecular biology. I have also tried to include relevant information about human biology and clinical applications throughout the body of the text.

- I wanted a high-quality illustration program that helped students visualize complex cellular and molecular processes. To meet this goal, many of the illustrations have been "stepped-out" so that information can be more easily broken down into manageable parts. Events occurring at each step are described in the figure legend and/or in the corresponding text. I also sought to include a large number of micrographs to enable students to see actual representations of most subjects being discussed. Included among the photographs are many fluorescence micrographs that illustrate either the dynamic properties of cells or provide a means to localize a specific protein or nucleic acid sequence. Wherever possible, I have tried to pair line art drawings with micrographs to help students compare idealized and actual versions of a structure.

The most important changes in the fifth edition can be delineated as follows:

- The body of information in cell and molecular biology is continually changing, which provides much of the excitement we all feel about our selected field. Even though only three years have passed since the publication of the fourth edition, nearly every discussion in the text has been modified to a greater or lesser degree. This has been done without allowing the chapters to increase significantly in length.

- Every illustration in the fourth edition has been scrutinized and many of those that were reutilized in the

fifth edition have been modified to some extent. Many of the drawings from the fourth edition have been deleted to make room for new pieces. Instructors have expressed particular approval for figures that juxtapose line art and micrographs, and this style of illustration has been expanded in the fifth edition. Altogether, the fifth edition contains more than 60 new micrographs and computer-derived images, all of which were provided by the original source.

Supplements

Student Web Site (www.wiley.com/college/karp)
This text-specific web site provides students with additional resources and extends the chapters of the text to the resources of the World Wide Web.

Resources include:

- Animations of key concepts based on illustrations in the text.

- Video library of clips from leading journals.

- Weblinks to some of the best cell biology sites currently available.
- Answers to the end-of-chapter analytic questions for students to check their understanding of the material.

Student Problems Book and Study Guide
Written by Nancy L. Pruitt of Colgate University, the study guide offers students a great way to review materials from the text and test their knowledge. The following six tools have been included to help students master the material: Learning Objectives, Key Terms and Phrases, Reviewing the Chapter, Key Figures, Questions for Thought, Review Problems.

Take Note!
An art notebook that contains noteworthy figures from the text, allowing students to take notes directly on the page during class or lecture. This is a perfect student companion to presentations using PowerPoint slides or Transparencies.

Instructor's Web Site (www.wiley.com/college/karp)
This web site is an essential tool for classroom presentation, lecture preparation, and assessment.

Resources include:

- Every text figure optimized for projection in PowerPoint and JPEG format.
- Animations of key concepts based on figures from the text.

- Video library of clips from leading journals.

- Computerized Test Bank using Diploma software.
- Personal Response System questions.
- Extended Additional Reading citations.

Wiley's Visual Library for Biochemistry and Molecular Life Sciences
Available only to qualified adopters, this new resource unites visual resources across disciplines. Access a simple portal to search for and download high quality images. from Genetics, Biochemistry, Microbiology, and Cell Biology.

Instructor's Manual and Test Bank
Written by Joel Piperberg of Millersville University, these tools make class preparation time more efficient. Instructor's manual includes objectives, lecture outlines, and lecture hints. Test bank includes critical thinking questions, Experimental Pathway questions, Human Perspective questions, and art questions.

Full-Color Transparencies
Full-color acetates for key illustrations are provided for classroom presentation. The images have been enlarged and fonts bolded for better projection and clarity in the classroom.

ACKNOWLEDGMENTS

I would first like to acknowledge Peter van der Geer of the Department of Chemistry and Biochemistry at San Diego State University and Helen Kreuzer Martin of the Pacific Northwest National Laboratory. Peter has been primarily responsible for revision of Chapter 15 for both the fourth and fifth editions. Helen was responsible for the reorganization and updating of Sections 12 through 18 of Chapter 18.

There are many people at John Wiley & Sons who have made important contributions to this text. I am especially grateful to Geraldine Osnato who served as an outstanding editor on the project. Whenever I needed advice, felt the urge to rant and rave, or had the occasion to ask Wiley for help, I turned to Geraldine. Thanks, Geraldine, for your sound advice and encouragement. Thanks also for directing the development of the diverse supplements that are now offered with this text. The print supplements authored by Nancy Pruitt and Joel Piperberg, and described above, have always been excellent resources for students and instructors and, under Geraldine's guidance, the Web supplements have also become an invaluable resource. I am particularly indebted to the Wiley production staff, who are simply the best. Barbara Russiello, the Production Editor, has served as the central nervous system for the last four editions. Barbara has been responsible for coordinating the information arriving from compositors, copy editors, proofreaders, illustrators, photo editors, designers, and dummiers, as well as a constant barrage of text changes ordered by the author. Always calm, organized, and meticulous, she made sure everything was done correctly. Hilary Newman and Anna Melhorn were responsible for the photo and line-art pro-

grams, respectively. It has been my good fortune to work with Hilary on all five editions of this text. Hilary is skillful and perseverant, and I have utmost confidence in her ability to obtain any image requested. It was also a great pleasure working with Anna for the third time. The book has a complex illustration program and Anna did a superb job in coordinating all of the many facets required to guide it to completion. The elegant design of the book is due to the efforts of Madelyn Lesure, whose talents are evident. I would also like to thank the artists at Imagineering for creating all of the new illustrations and Heidi Bertignoll for playing an important role in coordinating the art program. Thanks also to Professors David Asai and Ken Robinson of Purdue University for providing a number of interesting analytic questions in Chapters 2–5. Thanks to Stephen Reiss, who handled most of the editorial communications and graciously helped me in many ways during the course of this project. Thanks to Patrick Fitzgerald, who was the biology editor at the start of this revision, and to Kevin Witt, who succeeded him. Both have provided their strong support for this project. A special thanks is owed Laura Ierardi and Gloria Hamilton, who are both so good at their professions. Laura skillfully laid out the pages for each chapter and Gloria prepared a top-notch index. I am particularly grateful to Gloria for spending so much extra time and effort to markedly improve the quality of the manuscript.

I am especially thankful to the many biologists who have contributed micrographs for use in this book; more than any other element, these images bring the study of cell biology to life on a printed page. Finally, I would like to apologize, in advance, for any errors that may occur in the text, and express my heartfelt embarrassment. I am grateful for the constructive criticism and sound advice from the following reviewers:

Fifth edition reviewers:

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JOSE VAZQUEZ
New York University

GARY M. WESSEL
Brown University

ERIC V. WONG
University of Louisville

Thanks are still owed to the following reviewers of the previous two editions:

LINDA AMOS
MRC Laboratory of Molecular Biology

GERALD T. BABCOCK
Michigan State University

WILLIAM E. BALCH
The Scripps Research Institute

JAMES BARBER
Imperial College of Science—Wolfson Laboratories

JOHN D. BELL
Brigham Young University

WENDY A. BICKMORE
Medical Research Council, United Kingdom

DANIEL BRANTON
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THOMAS R. BREEN
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