

Preface

Biochemistry is the investigation of the molecular basis of life. Throughout the history of this scientific discipline, biochemists have worked to reveal the fundamental chemical and physical principles that underlie living processes. Their success is demonstrated in the enormous impact that the biochemical approach has had on the life sciences. At the beginning of the twenty-first century, the depth and breadth of this influence is astonishing. The progress in our understanding of living organisms, already enormous by the early 1990s, is currently being exceeded, in no small measure, because of the spectacular advances in DNA-based technologies that are based on biochemical research. The access that life scientists now have to the genetic information of entire organisms has resulted in previously unimaginable insights into the inner workings of living organisms and the causes of disease. The challenge in life and physical science; education is how to prepare students for careers in diverse fields in which the pace of knowledge accumulation will only accelerate in the foreseeable future. The most important tool that teachers can offer these students is a coherent understanding of biochemistry. The third edition of *Biochemistry: The Molecular Basis of Life* has been revised and updated to provide a logical and accessible introduction to biochemical principles.

ORGANIZATION AND APPROACH

This textbook is designed for life science students and chemistry and other physical science majors. Few assumptions have been made about the chemistry and biology backgrounds the students have. To ensure that all students are sufficiently prepared for acquiring a meaningful understanding of biochemistry, the first four chapters review the principles of relevant topics, such as organic functional groups, noncovalent bonding, thermodynamics, and cell structure. Several themes are introduced in these early chapters and continued throughout the book. Emphasis is placed on the relationship between molecular architecture and the functional properties of biomolecules, and the dynamic, unceasing, and self-regulating nature of living processes. Students are also provided with overviews of the major physical and chemical techniques that biochemists have used to explore life at the molecular level.

WHAT IS NEW IN THIS EDITION

The rapid pace of discovery in the life sciences has necessitated several notable changes and improvements in this edition. Among these are the following:

- Biochemical Methods Boxes are now integrated within chapters. Materials from Appendix B in the 2nd edition have been updated, rewritten, and inserted at appropriate places within the text. These essays focus on the most important classical and current laboratory techniques (see examples on pages 152, 358, and 630).
- The emerging understanding that the coding of information into the three-dimensional structure of *all* biomolecules is emphasized in this edition (see page 229). This approach introduces students to the most basic and accessible features of biological information theory and makes several topics (e.g., cell signaling mechanisms) more comprehensible.
- A variety of new Special Interest Boxes have been added that introduce students to up-to-date biochemical topics. Examples include "Protein Folding and Human Disease," "The Origin of Life," and "Biological Information and the Sugar Code."
- The art program has been completely reevaluated. More than half of the 700 figures are new or have been substantially modified in order to improve clarity and information content (see examples on pages 24, 40, 109, 311, 359).
- The design of the book has been completely revised in order to make it more visually interesting, easier to read, and contemporary in appearance.



SUPPLEMENTARY AIDS

The third edition of *Biochemistry: The Molecular Basis of Life* has a variety of ancillary materials, including the following:

- **Digital Content Manager:** This is the primary instructor supplement and offers over 300 text images and nearly 1000 PowerPoint lecture slides prepared by Patrick Flash of Kent State University-Ashtabula Campus. The text images are full color and can be readily incorporated into lecture presentations, exams, or classroom materials. The sets of PowerPoint slides cover all 19 chapters. These slides, which combine art and lecture notes, can be used as is or tailored by instructor preferences.
- **Online Learning Center:** The Online Learning Center offers students a variety of resources and can be found at www.mhhe.com/mckee. At this web site students will be able to take quizzes written by Dan Sullivan of the University of Nebraska-Omaha, and study the structure of many of the most significant biochemical molecules with the interactive Chime plug-in prepared by Todd Carlson of Grand Valley State University.
- **Instructor's Manual/Test Item File:** Written by the authors, this manual is designed to help instructors plan and prepare for classes using *Biochemistry: The Molecular Basis of Life*. For each chapter in the text, this manual provides a chapter outline and an extended lecture outline. Answers for the even-numbered questions appear at the end of each part. The test item file contains approximately thirty-five multiple choice and critical thinking problems per chapter.
- **Student Study Guide/Solutions Manual:** This guide accompanies the text and was written by Patricia Depra of Westfield State College. For each text chapter, a corresponding study guide chapter offers comprehensive reviews, study tips, and additional questions for biochemistry students.
- **Transparencies:** Accompanying this text, 100 transparencies of key illustrations in the text help the instructor coordinate the lecture to the text.
- **Brownstone Diploma computerized classroom management system:** This service includes a database of test questions, reproducible student self-quizzes, and a grade-recording program.

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