

Preface

Biology has undergone tremendous changes since the seminal contributions of Watson and Crick inaugurated the era of molecular biology (1953). The more descriptive aspects of the field, long associated with the older notion of biology as natural history, have been complemented by investigative insights that afford an understanding of life in terms of the precise characteristics of macromolecules such as DNA, RNA, and protein. To a marked extent, heredity, development, the control of cell function and even evolution have become better understood by applying the probes of molecular biology.

However, the drama of life and its evolving diversity and scope requires a perspective of time and an appreciation of meticulous descriptive detail to be truly appreciated. To cover these descriptive and historical aspects while elucidating with thoroughness the biochemical and molecular approaches imposes a daunting challenge to anyone undertaking a concise treatment of modern biology. Maintaining such a balance has been a continuing aim here.

In the outline format, each chapter independently summarizes the material of its major theme and is followed by a series of solved problems which provides both greater depth and an opportunity to clarify material which the student has not completely understood. All of the major themes expected in a one-year biology course at the introductory level are covered in the thirty-three chapters.

Although this book could serve as a primary text in elementary college biology, it is primarily intended as a supplementary text to improve the student's understanding and achievement in the course. In providing solutions to the problems in the latter part of each chapter, emphasis has been placed on clarity and the importance of mastering fundamentals. Many of the problems used here are derived from actual classroom situations.

Biology need not demand relevance. Our very aliveness underscores the intimacy of the connection between the discipline of biology and our everyday concerns. I trust that the material which has been gathered here will inspire understanding in its readers and promote an excitement and reverence for life as well as responsible conserving citizenship.

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UNIT II *Biology of the Cell*

CHAPTER 4 *The Cellular Organization of Life*

4.1 The Cell Doctrine 4.2 Cellular Organization 4.3 Cellular Organelles
4.4 Plant and Animal Cells: Tissue Organization 4.5 Cell Size and Its
Constraints 4.6 Movement Into and Out of the Cell

Chapter Quiz

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CHAPTER 5 *Energy Transformations*

5.1 Energy and Life 5.2 Thermodynamics 5.3 Cell Metabolism
5.4 Bioenergetics

Chapter Quiz

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