

Preface

The original authors of this book, William and Daphne Elliott, described it as 'designed for undergraduates taking science and health-related courses in biochemistry and molecular biology' and said that their aim was 'to provide a text suitable for students meeting those subjects for the first time, but of sufficient depth to be intellectually satisfying... written in an approachable style, but with lots of explanation to promote understanding.' Our experience of using this book for undergraduate courses was that they succeeded in their aim, achieving what one reviewer has described as a style that is 'refreshingly different; more personal and more direct' that 'seems to take the reader on a one-to-one tutorial'. It is this admirable quality of the earlier editions that we have sought to retain in the fifth, and now the sixth edition. The book is aimed at students in the early years of their undergraduate programmes. It assumes little prior knowledge, and seeks to provide accessible explanations of terms and concepts that may be unfamiliar, while building up to a level that should enable students to tackle short review articles of the kind found in many journals. It also avoids giving the impression that biochemistry and molecular biology are closed subjects. Undergraduates at the beginning of their course are sometimes uncomfortable with the notion of uncertainty and ask to be given 'just the facts'. However, by emphasizing the relevance of this material to current medical and biological research and pointing out areas where our knowledge is still imperfect, we hope to give students an appreciation of the interest and importance of continuing developments and to inspire some of them to pursue their studies to a higher level.

It has been noted many times that adding new material to a textbook creates the dilemma of which older material should be discarded in order to keep the size of the book manageable. While we have tried to be up to date we have been relatively cautious about leaving anything out that was covered in previous editions, recent developments in metabolomics and cancer research having shown that those who suggested that certain metabolic topics or even the whole of metabolism were no longer worth learning were speaking prematurely. In genomics and molecular biology the vast quantity of new data and novel methodology presents particular challenges, and we have included new material in that area. However, we have considered it worthwhile to retain coverage of techniques such as Southern blotting and library screening for now, even though they may be rarely used in modern laboratories, because we feel that knowledge of these methods provides an historic framework that allows students to build up a thorough understanding of our present position.

About the book

The book is organized into six main parts:

- 1 Basic concepts of life;
- 2 Structure and function of proteins and membranes;
- 3 Metabolism and nutrition;
- 4 Information storage and utilization;
- 5 Cells and tissues;
- 6 Protective mechanisms against disease.

The chapters are arranged to give a seamless progression through the subject but we recognize that the order in which topics are taught varies with the teacher. There is, therefore, extensive cross-referencing between chapters in order to help students with their learning.

What is new in this edition?

- The figure design has been substantially updated, with new figures added to a number of chapters.
- Following student feedback, end of chapter summaries have been revised and are presented as bullet pointed lists.
- Selected end of chapter recommendations for further reading have been added to the print version of the book, with expanded reading lists available on the companion website.
- End of chapter problems have been reviewed and re-organized, with questions categorized into those that review basic concepts, more challenging questions, and questions that encourage critical thinking. New multiple choice questions have been added on the companion website.
- Boxes have been redesigned to help them stand out from the main text, and each box on a topic of medical interest includes a 'Find out more' recommendation for further reading.
- All the chapters have been reviewed to update them. The extent of the update varies in the different chapters from extensive rewriting and major additions to minor changes.
- Following the suggestion of some reviewers, Chapter 1 (The basic molecular themes of life) has been expanded to include greater coverage of chemical bonding and of

functional groups that are found in biological molecules. As a consequence, the material on pH and buffers has been moved from Chapter 3 into this chapter.

- In Chapter 4 and 5 (The structure of proteins and Methods in protein investigation) additional figures have been added to illustrate the Ramachandran plot, affinity chromatography, X-ray crystallography, Nuclear Magnetic Resonance and homology modelling of protein structure. The section on websites and databases in Chapter 5 has been updated and includes links to training and education resources provided by the sites.
- In Chapter 10 (Food digestion, absorption and distribution to the tissues) there is a new section on the fed and fasting state in different organs.
- In Chapter 11 (Mechanisms of transport, storage and mobilization of dietary components), there is extended coverage of links between lipid metabolism and heart disease.
- Chapter 28 (Manipulating DNA and genes) has been updated with new figures to illustrate qPCR and Next Generation Sequencing, and a new section and figure have been added on Genome editing using CRISPR.
- Material on the cell cycle, cell division, cell death, and cancer, formerly split across two chapters, has been integrated into a single chapter (Chapter 30) for greater coherence. New figures have been added.

Using the book

This book includes a number of features to help make it easy to use, and to make learning from it as effective as possible.

- **Index of diseases.** A separate index of diseases and medically relevant topics helps students on health-related courses to identify relevant topics.
- **Medical boxes.** These illustrate the direct relevance of biochemistry and molecular biology to medicine and health-related issues. A separate list of these boxes is shown on the Contents pages.
- **Questions and answers.** Questions at the end of each chapter (with answers at the back of the book) are designed to support student learning.
- **Chapter summaries.** Summaries at the end of each chapter highlight the key concepts presented and aid revision.
- **Further reading references.** References online direct the reader mainly to review articles of the shorter type found in Trends journals.