

Preface

This book is aimed at students in science and medicine with some background knowledge of chemistry who are taking their first substantial university course in biochemistry and molecular biology.

The molecular processes of life present us with a seemingly never-ending succession of chemical mechanisms of almost incredible fascination but the subject can be a daunting one for many students. To a considerable degree this is due to the vast amount of detail that is now available and is often presented. This can effectively obscure the fascination of the subject and may sometimes result in students falling back on to rote learning.

Much of the detail is not essential for the understanding of the basic principles that have dictated the molecular processes of the cell that have been adopted to permit life to exist. Nor, for that matter, is much of the detail outside of their specialist fields of interest usually carried in the heads of professional biochemists.

We have designed this book to be 'student-friendly'—to be understood and enjoyed by students, in a self-learning capacity if necessary, but without treating the subject superficially. It is necessary for students, in the face of the avalanche of information available, to know what is expected of them and, indeed, in introductory courses an important role of lectures can be to define which parts of the comprehensive texts are to be learned. The problem of whether complex structures and other material should be learnt in detail can be a worrying one to students new to the subject. To help in this point we have given suggestions as to which parts of the material should be looked at but not memorized, though no doubt this may be modified by teachers of the subject to suit the particular requirements of individual courses. The method we have adopted permits the presentation of complex material which students should see without raising the frequent, and understandable, 'what do we have to know?' question with which most teachers of the subject will be familiar.

The chapters are arranged to flow on, one to another, in an easily understood classification of topics based on biological function. In arranging the sequence of material, we have as far as possible avoided giving information before it is relevant to a biological function. This saves the reader having to cope with a mass of structures and other information prematurely.

We have, in the metabolic sections, largely confined ourselves to animals (photosynthesis excepted) on the grounds that the same systems in prokaryotes and other organisms, however intrinsically interesting and important, are often variations in detail. Where the differences are of major importance, such as in the genome and gene expression areas, we have dealt with both prokaryotes and eukaryotes. The same is true for those areas where much of the information has been derived from prokaryotes.

We have attempted to include more explanation of concepts than is customary and also to give biological context to the molecular systems being discussed. We feel that the latter is valuable in enabling students to appreciate the purpose of the biochemical systems. Metabolic pathways for the transport, storage, and release of energy supplies are more interesting and acceptable to students when viewed against the physiological need for such processes; the same is true for the details of the immune system. We have also preferred to present topics as biological entities wherever possible. Thus blood clotting, superoxide dismutases, the cytochrome P450 system, etc., are collected into a chapter on life-saving protective systems rather than scattered around as isolated examples of specific protein functions. Similarly, hemoglobin is dealt with in a chapter on gas transport in blood rather than as an example in the protein section.

We have adopted the policy of dealing with metabolism in the first half of the book. This permits a progressive increase in complexity and provides groundwork for the subsequent molecular biology sections, which may facilitate learning by students. The extensive use of cross-referencing will, we hope, make it possible for students to return to individual sections of the book for revision purposes without difficulty.

Our hope is that the use of this book will put students in a position from which they can read more widely and deeply on aspects of the subject without too much difficulty, whether their main interest lies in the biological, chemical, or medical aspects of the subject. Just as importantly we hope that it will make them eager to do so. Biochemistry and molecular biology has exploded with new information during the past years and the pace increases. This situation has resulted in a wealth of journals specializing in short, exceptionally clear, and readable reviews on almost every topic, and regular scientific journals

sometimes provide similar 'mini reviews'. These would form an excellent extension of this book for students wishing to go more deeply into particular aspects of the subject. To this end we have provided with each chapter (other than preliminary overview ones) lists of references, mainly to such reviews, classified under different topics within the chapter and with a brief description of the contents of each. The majority of the references are likely to be readily available in most libraries. The lists are more extensive in the molecular biology chapters, reflecting the

current intense activity in these areas. Many of the articles have intriguing, informative, and stimulating titles. We suggest that even just browsing through the lists themselves would expand the reader's view of the subject and convey some of its excitement.

We also hope that the availability of a basic text with perhaps more explanation than is customary might to some degree permit teachers to concentrate more on areas of the subject that they judge to be particularly relevant to their individual courses.

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