Introduction to Biological Membranes (Second Edition)

By M.K. Jain

John Wiley & Sons; New York, 1988

423 pages. £47.50

The amount of information generated by intensive studies of biological membranes over the past years is such that a comprehensive treatise is now a major undertaking. This new edition has been updated with much recent material and the author is to be commended on his efforts to provide a reasonably complete account of both more traditional material and the topics which are currently of prime concern to membranologists. The first part of the book deals with membrane lipids where the physico-chemical properties of the lipid bilayer are treated in some detail. Membrane proteins are more summarily introduced in a chapter headed 'Lipid-Protein Interactions in Membranes'. However, most of the latter part of the volume is concerned with the various functions which proteins mediate. Topics covered include transport, gated channels, energy transduction, receptor mediated responses and membrane fusion.

A weakness of the book in my view is that it is not targetted on any particular group of readers. The experienced membranologist will be unlikely to demur from the author's own disclaimer that it is neither an authorative treatise nor a critical review. For the novice, the book lacks the lucidity which we have perhaps come to expect from the superb general biochemistry texts which are now available. In part this is due to insufficient attention to detail. What, for example, is one supposed to make of the figure on p.170 where the glucose transporter of erythrocytes is identified as band 4 in a table, a remarkably poor SDS-PAGE shows bands labelled 4.1, 4.2 and 4.5 and a diagrammatic representation of the erythrocyte membrane shows the peripheral proteins bands 4.1 and 4.2 but omits band 4.5? The same figure incorrectly identifies glycophorin with band 7 and fails to identify this protein in the diagram. The anion transporter, band 3, is shown as a dimer in the diagram but in a five page discussion of this protein in a later chapter, no mention is made of its oligomeric state until the final paragraph. Without this information, the preceding description of inhibitor stoichiometry makes little sense. Similar examples occur elsewhere in the text and detract from the value of the book. Nevertheless, its comprehensive coverage may make it a useful source of reference for the more experienced researcher.

R.J. Cherry

Protein Structure, Folding and Design 2

UCLA Symposia on Molecular and Cellular Biology, Volume 69

Edited by D.L. Oxender

A.R. Liss; New York, 1987

576 pages. $110.00

The design of novel proteins provides a multidisciplinary challenge that has excited chemists, crystallographers and cloners alike. There are opportunities for optimising various protein func-

tionalities such as enzyme efficiency; these may have been restrained by the balance of evolutionary pressures in the natural organism. We can also design new proteins that could be useful to mankind. Protein engineering has extended biochemistry from a science to engineering. Thus I approached the reading of 'Protein Structure, Folding and Design' with anticipation of a stimulating tour along these new frontiers, no doubt enhanced when I discovered others would pay $110 for the same experience!

All good tour guides begin with an advertisement of the main attractions. This may explain the choice of DNA-protein interactions in the first section which describes how knowledge of the structure of *Eco*RI endonuclease allows rationalisation of the results of null mutant analyses. For example, changes in a small region of the sequence (between residues 139 and 144) affect the DNA binding and the intersubunit interface. In this article there was plenty of evidence of a thoughtful collaboration between crystallographers and cloners. Similar interdisciplinary interactions are also evident in the study of cro repressor binding to a new operator. A combination of modelling based on the crystal structure of cro, site-directed mutagenesis of cro and the synthesis of novel operator DNA duplexes demonstrates unequivocally that the thymine 5-methyl group is an important contact site for these DNA-binding proteins. The authors also show that hydrophobic interactions with a small non-polar residue such as cysteine can replace a hydrogen bond between an adenine and a glutamine.

This UCLA symposium attracted a distinguished multi-disciplinary group of scientists. However, the usefulness of their contributions is not everywhere as evident as it is in the opening articles. The descriptions of an assortment of crystal structures and modelling exercises convey no coherent message to the inquiring tourist; nor do they engender any excitement. Maybe the discussion at the meeting on these topics was better but it is not reported here. The editor appears to have contented himself by grouping the contributions and has missed the opportunity of providing a synthesis and comparison of complementary techniques.

In many ways I obtained most pleasure from two contributions exploiting organic chemistry. In one of these Richard Lerner and his colleagues discuss the synthesis of structured peptides using covalent hydrogen-bond mimics. In the other Tom Kaiser reviews the design of peptides based on model amphipathic helices and β-strands. At this time of computer-aided modelling and site-directed mutagenesis it is good to find that traditional technologies intelligently used still have much to offer.

Tom Blundell

In Focus: Enzyme Kinetics

By A. Cornish-Bowden and C.W. Wharton
Edited by D. Rickwood

IRL Press; Oxford, Washington, 1988

77 pages. £5.95

This book forms part of a new series (In Focus, edited by D. Rickwood and D. Male) which aims to present undergraduate and graduate students with the latest ideas in selected areas of biology and medicine. 'Enzyme Kinetics' is a slim volume dealing with basic steady-state enzyme kinetics and, in the final chapter, outlining selected enzyme mechanisms. With such limited space the authors opt for the straightforward approach of a 'no-frills' account of the core of the subject. The book charts a logical course from Michaelis-Menten, through the King and Altman method, two-substrate reactions, types of inhibition, pH-dependency studies and ends with enzyme mechanisms. The book is well written in a style that makes the reader feel he is getting under the

This new edition of "Introduction to Biological Membranes" covers the basic properties of biological membranes in terms of the underlying biophysical properties. The organization of the text emphasizes the intrinsic molecular logic and intermolecular interactions that underlie the functions of biomembranes. Chapter coverage includes a working model for the structure of a b This new edition of "Introduction to Biological Membranes" covers the basic properties of biological membranes in terms of the underlying biophysical properties. The organization of the text emphasizes th Start studying (L12) Introduction to Biological Membranes. Learn vocabulary, terms and more with flashcards, games and other study tools.Â In the E. coli membrane, the composition is 75% protein and 25% lipid by weight. Assuming an average molecular weight of 50,000 for each protein and 750 for each lipid, what is the protein to lipid ratio? What are the seven functions of biological membranes? 1. define external boundaries of the cell 2. control molecular traffic across the boundary 3. divide cells (eukaryotes) into compartments 4. organize reaction sequences 5. cell-to-cell communication 6. a matrix for transporters, receptors, adhesion molecules 7. E transduction (mitochondria, chloroplasts) within the cell. Biological membranes, together with cytoskeleton, form the structure of living cell. Cell or cytoplasmic membrane surrounds every cell. The nucleus is surrounded by two nucleus membranes - external and internal.Â Introduction. Studying an electronic microscopic picture of the ultrafine section of living tissue, after its fixation and proper staining, fine double lines can be clearly seen that Â«patternÂ» the shape of cell and intracellular organelles (See Fig. 1). These are sections through biological membranes - finest films consisting of a double layer of lipid molecules and proteins built in to this layer. As a matter of fact, it is membranes, together with cytoskeleton, who forms the structure of living cells. Cellular or cytoplasmic membrane surrounds each cell.