Membranes and their Cellular Functions

by J. B. Finean, R. Coleman and R. H. Mitchell
Halstead Press; New York; Blackwell Scientific Publications; Oxford, London, Edinburgh, Victoria, 1974
vii + 123 pages. £ 2.80

At a time when membrane research is expanding rapidly and is attracting scientists from various disciplines and with different backgrounds a book like the present one is highly welcome.

The authors have endeavoured to write a readable compact introductory text to the benefit, primarily, of students of biological sciences, and have indeed attained their goal. They cover the essentials in membrane structure and function, including transport of matter or information, turnover etc.

The authors provide the reader – no matter how unprepared he may be at the start – with a clear outline of the fundamentals and of the problem in the field. Fact and fancy are clearly kept apart – a particularly important point for an introductory book dealing with a rapidly expanding field. Although the text was writ very recently a few statements do not hold quite true any more: e.g. the formula of alamethicin (p. 26), th phosphorylation of Na,K-ATPase at a Glu (it should now be Asp) residue (p. 40), and some readers may b less sure of the role of shockable proteins in membrar transport (p. 38). Imperfections and disagreements ar only too natural at the present pace of membrane research and should not detract from an unusually cl and up-to-date text. To sum up: a right book, written by the right people, at the right time, in the right wa with the right illustrations.

G. Seme

Nitrogen Fixation in Bacteria and Higher Plants

by R. C. Burns and R. W. F. Hardy
Springer Verlag; Berlin, Heidelberg, New York, 1975
x + 189 pages. DM 59.80; $25.80

Nitrogen fixation is a topic which has yielded spectacularly to the skills of investigators from many disciplines, ranging from chemists and spectroscopists to physiologists and agronomists. Notable discoveries in this research during the last fifteen years include ferredoxins and flavodoxins, the reduction of acetylene to ethylene by nitrogenase, the purification and characterisation of the enzyme, the synthesis of organometallic complexes which bind dinitrogen in a way in which it can be reduced to ammonia under mild conditions an the transfer of the genes which determine nitrogenase from a nitrogen-fixing organism into organisms that previously did not fix. Burns and Hardy set out to describe these advances with a strong bias towards biological nitrogen fixation.

Chapters 1 to 3 of this book cover ecological,

physiological and evolutionary aspects while Chapters 4 to 8 give a detailed description of nitrogenase and its properties. Chapter 1 traces the historical background of the recognition of nitrogen fixation and describes present methods of measurement. Chapter 2 deals with the physiology and taxonomy of nitrogen-fixing organisms including descriptions of obligatory and non-obligatory symbioses. In Chapter 3 the authors speculate on the evolution of nitrogenase and give a detailed analysis of the nitrogen cycle and global nitrogen fixation. Chapter 4 is a relatively short description of the requirements for nitrogenase activity and it is followed by three chapters, comprising almost half the book, on the physical and chemical properties of nitrogenase, the catalysis and an intriguing, though speculative, discussion on the possible mechanism of nitrogenase action. I think that this chapter on the mechanism is the most interesting in the book but it dismisses too shortly the view, widely held and based upon electron paramagnetic resonance spectroscopy and other data obtained in several laboratories, that the Fe-protein acts as an electron carrier from the reductant to the Mo–Fe-protein which contains the active site. Chapter 8 is entitled the cellular accommodation of nitrogenase but describes evidence for the biological electron-donating systems to nitrogenase, assimilation of ammonia and the biological role of hydrogenase and leghaemoglobin.

This book will make a useful reference source for laboratories researching nitrogen fixation. The first three chapters are suitable for the general reader. In common with books of its kind, aimed at stimulating research, it reflects the authors' bias, which naturally, is different from that of other researchers. To me they gave a dangerous impression that they favoured purifying nitrogenase as a complex rather than as individ proteins although they did admit the difficulties of t approach. They were dismissive of the considerable effort invested in the e.p.r. examination of nitrogena action and they ignore the possibility of advancemen by investigating the reactions of the individual comp nent proteins. They also fail to impress the importan of the effect of oxygen on the function of nitrogenas in acrobes. More specifically, they have missed the di evidence for complex formation between the compo-nent proteins of the enzyme, they ignore the opinion that 'vanadium nitrogenase' reflects a sparing effect o Mo and they do not report the evidence that *Chloro-pseudomonas ethylicum* is a mixture of two organism There are a few typing errors, the only serious one occurring on page 67 (line 16, N_2 for H_2).

The book suffers from the progress of events in a rapidly moving topic. Several significant advances hav been made in the last two years: the realisation of the possible agricultural and ecological importance of loo symbiotic associations between free-living nitrogen-fi bacteria and plants; the advances in the genetics of nitrogen fixation in free-living bacteria and the prospe offered by this approach; the manner in which gluta-mine synthetase regulates nitrogenase synthesis; the f that free-living rhizobia can fix nitrogen and the quantitative reduction of dinitrogen to NH_3 in Mo- a W-containing organometallic complexes.

Despite these drawbacks the authors are to be credited with hard work and considerable thought an it is to be hoped that the book will achieve their ambition of stimulating research in the topic.

M. G. Ya

Functions of membrane proteins can also include cellâ€“cell contact, surface recognition, cytoskeleton contact, signaling, enzymatic activity, or transporting substances across the membrane. Most membrane proteins must be inserted in some way into the membrane. [26] For this to occur, an N-terminus "signal sequence" of amino acids directs proteins to the endoplasmic reticulum, which inserts the proteins into a lipid bilayer. Once inserted, the proteins are then transported to their final destination in vesicles, where the vesicle fuses with the target membrane. Function.Â A detailed diagram of the cell membrane. Illustration depicting cellular diffusion.