

the various strategies adopted in the isolation of cDNAs of interest to the characterization of a novel human myelin basic protein sequence and the regulation of diverse brain-specific genes. However, a few of the reports are preliminary in nature, pointing to avenues of future research rather than presenting a full story. One of the strengths of this volume is its inclusion of detailed experimental protocols. The book serves to illustrate the applications of several standard molecular biological techniques, most notably in situ hybridization, and since potential difficulties are often pin-pointed, it may prove quite useful to other researchers.

As an overview of molecular biology in neuro-

science research the book is perhaps a little too technical and rather restricted in its coverage. Although all contributors have provided clear introductory sections, it is a pity that more general background information was not included in the book as a whole.

In summary, 'Molecular Biology in Basic and Clinical Neuroscience Research' is a useful volume, which provides some pointers to the promise and potential pitfalls of in situ hybridization and other molecular biological techniques in the investigation of gene expression in the brain.

Christine Hall

The Vital Force; A Study of Bioenergetics

By Franklin M. Harold

W.H. Freeman; New York, 1986

xviii + 577 pages. £19.95

As an undergraduate, I searched in vain for a book that would expand my knowledge of biochemistry without simultaneously diminishing my enthusiasm for the subject. Subsequently, such books have been written, Watson's *Molecular Biology of the Gene* being an outstanding example. Harold's book is the equivalent for those interested in any aspect of bioenergetics. He points out that "bioenergetics has recently attained a degree of integration comparable to that of molecular genetics", and that "the principle of energy coupling by ion currents, given a clear and general expression in Mitchell's chemiosmotic hypothesis, together with the Huxleys' sliding-filament model of muscle contraction, has provided the possibility of giving a reasonably coherent account of how cells generate useful energy and perform work". "That is the object of this book" which is "chiefly addressed to students and researchers in biochemistry, physiology, microbiology and cell biology who seek the wider perspective on their particular subject that may come from an appreciation of biological energetics".

I consider that this book has achieved its object. It has done so by way of its content, structure, excellent quality of illustration and, most of all, by the clarity of thought and presentation of its author.

Chapter headings include: Energy, Work, and Order; The Metabolic Web; Energy Coupling by Ion Currents; The Bacterial Paradigm/Energy Transduction; The Bacterial Paradigm/Useful Work; Vestiges of Evolution; Mitochondria and Oxidative Phosphorylation; Harvesting the Light; Carriers, Channels and Pumps; Transport Mediators and Mechanisms; The Major Organs of Movement; Filaments, Tubules, and Vesicles/Topics in Cellular Motility; Signals for Communication and Control; Morphogenesis and Biological Order.

On the whole, explanations of experiments and ideas are given more comprehensive treatment than is possible in general textbooks or learned reviews and it is unlikely that a student will need to go elsewhere for a fuller explanation; it is all here, written in a stimulating, lucid style. One (small) ex-

ception is the experimental evidence for the Q-cycle, where Harold says that "one can intuitively work out how the configuration of a Q-cycle explains the peculiar redox interplay between cytochrome c_1 and $b-566$ ". Intuition, however, comes from experience of related phenomena (and experiments) and is not a reliable guide when trying to understand bioenergetics and, on the whole, Harold provides a superb text to help us in avoiding it.

The lists of references (with titles) at the end of each chapter are excellent, but there is no contents list, which, together with the limited index makes the book inconvenient for rapid reference. A more important flaw is the lack of information about structures. Other texts must be consulted to find the structure of ATP, NAD, FAD, haem, ferredoxin, phospholipids, proteins, etc. There is no doubt that many of the remaining questions of bioenergetics await, for their answer, a better

understanding of the relationship between structure and function of the electron transport and proton-translocating proteins. It would be a pity if such matters were to be disclaimed as irrelevant by those whose enthusiasm for bioenergetics is stimulated by this book.

It sometimes appears that those having an affinity for bioenergetics also have an affinity for the mystical or mysterious and, indeed, Harold's book concludes with this remarkable discourse: "What is the Buddha?" The Master replies, "go eat your gruel". "I don't understand," says the perplexed student. "If you don't understand, when you have eaten, wash your bowl" (The End).

Fortunately, this is not typical; Harold successfully demystifies bioenergetics, thus giving hope and inspiration to those perplexed students who have remained unenlightened even after washing their bowls.

Chris Anthony

Bioluminescence and Chemiluminescence: New Perspectives

Edited by J. Scholmerich, R. Andreesen, A. Kapp, M. Ernst and W.G. Woods

John Wiley & Sons; Chichester, 1987

xvi + 600 pages. £55.00

This large book, with its attractive pale-blue cover, reports the proceedings of the Fourth International Symposium on Bioluminescence and Chemiluminescence, held in Freiburg during September 1986. Camera-ready copy was used, although the final appearance of the text is better than average for this kind of reproduction. Unfortunately, several glaring typographical errors were left uncorrected.

The book is divided into four parts, part 1 being devoted to cell-dependent chemiluminescence. It contains useful reviews of phagocyte luminescence and the low-level chemiluminescence of biological systems, plus a number of short papers reporting the use of luminescence methods (presumably based on posters or short communications at the

meeting). I found these to be less useful, since the authors did not have space to present or discuss their work in detail.

The pattern is repeated in part two, which is devoted to immunoassays. It begins with interesting reviews of enhanced chemiluminescent assays for peroxidase, and of photodetectors and solid supports suitable for use in immunoassays employing enhanced chemiluminescence. The short papers that follow are generally less informative, although some raise interesting points, such as that of Stott and Kricka on the purity of commercial luminol.

Part three of the book is devoted to luminescence biotechnology and biochemistry. J.W. Hastings gives an interesting account of

Bioenergetics is a field in biochemistry and cell biology that concerns energy flow through living systems. This is an active area of biological research that includes the study of the transformation of energy in living organisms and the study of thousands of different cellular processes such as cellular respiration and the many other metabolic and enzymatic processes that lead to production and utilization of energy in forms such as adenosine triphosphate (ATP) molecules. That is, the goal of Interests in the study of membrane bioenergetics transitioned to study of molecular bioenergetics during the closing decades of the last millennium. This paradigm shift primarily resulted from development and wide availability of new experimental and computational technologies useful for examination of the static and dynamic structure of molecules as well as their biological functions. Yet, despite modern technological innovations, a surprising lack of knowledge pervades the discipline of bioenergetics, ranging from the exact structure and conformational changes of mitochondrial ion channels (O'Rourke, 2007) to how mutations and epigenetic

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