

which to examine diversity and adaptation. However in many cases the treatment is more extensive than appears necessary and, while this may be aimed at the zoologist reader, it is presented much less clearly and pictorially than one can find in many excellent modern texts. Moreover, while the author goes on to present up-to-date views on biochemical mechanisms in a balanced way (at least in those cases where this reviewer is competent to judge), space limitations dictate that the treatment is mostly somewhat terse and the reader would need more than a basic knowledge of biochemistry to appreciate it fully.

While, at first, molecular diversity was seen as a methodological impediment to biochemical studies, the increasing appreciation of the existence of homologous domains and of proteins belonging to superfamilies makes it easier to comprehend variations on a theme. The

author's belief is that the comparative approach at the molecular level will increasingly provide a valuable tool for examining both biological adaptation to environmental conditions as well as the basis of phylogenetic diversification. In this book he has provided a valuable reference text to the basic literature across the spectrum of research on the comparative biochemistry of animals. While it may not provide the complete answer to anyone searching to apply the principle promulgated by the great Danish physiologist August Krogh that for solving every biological problem there exists an ideal animal model, there is much fascinating information packed into the pages of this book to inform and stimulate the biochemical browser.

J. Mowbray

Cell Biology: A Laboratory Handbook, Volumes 1, 2, 3; Edited by Julio E. Celis, Academic Press; San Diego, New York, Boston, London, Sydney, Tokyo, Toronto, 1994; 1714 pp. \$ 120.00 (pb). ISBN 0-12-164714-5 (set).

To try or not to try? This must have been a haunting question for the editor before committing himself to work on a 'recipe-book' of modern biology. Cell biology is no doubt one of the most dynamic areas of contemporary biomedical sciences. The recent stunning discoveries made by the quickly expanding crowd of cell biologists have been made possible, at least to some extent, by a plethora of newly modified or entirely novel techniques and approaches. Unlike their luckier colleagues working in molecular biology, whose methods 'bible' by Maniatis and Sambrook was first published more than a decade ago and later updated, the cell biologists have been waiting for their laboratory manual until now. The *Cell Biology: A Laboratory Handbook* represents a highly desirable, brave attempt to fill this major gap in the scientific literature. The enormous diversity of the biological methods covered by this comprehensive manual made its preparation an extremely demanding task. Fortunately for the reader, the book was edited by a highly respected cell biologist and at the same time a very experienced organizer of numerous international laboratory courses, who was supported by a team of dedicated coworkers.

The three volumes of the manual are organised in 15 parts subdivided into sections, which together contain almost 200 chapters contributed by leading experts in their fields, covering a broad range of model organisms and cell types, and including protocols for techniques from diverse branches of cell biology.

Volume 1 begins with tissue culture and associated techniques, starting with general procedures related to tissue culture media, testing cell cultures for various contaminants, and detailed practical advice on cultures of specific cell types derived from various tissues. The first volume then continues with timely descriptions on cell separation techniques, model systems applicable in analysis of cell differentiation, cellular immortalization, progression through the cell cycle, cellular senescence and cell death. While the book primarily focuses on animal cells, it also contains useful chapters devoted to cultures of cells from organisms as diverse as *Drosophila*, nematodes, protozoa, fungi, plants, and viruses, i.e. a selection of organisms which are proving extremely useful in contemporary research and/or biotechnology industry. The last part of Volume one describes biochemical methods of isolation and purification of cellular organelles, nuclear structures, and contains optimized protocols for isolation of DNA and total RNA.

Volume 2 provides solid, informative descriptions of presently used microscopy techniques, including light microscopy, fluorescence, video-enhanced and confocal microscopy, and a number of electron microscopy procedures. This book also deals with several micro-

dissection methods, and basic techniques of histochemical staining, followed by several chapters describing production, purification, labeling, characterization, and application of antibodies. The second Volume ends by a series of protocols used in cytogenetics and topological analysis of gene expression by various modifications of *in situ* hybridization.

The third and last volume integrates modern methods of gene and protein transfer into living cells, covering approaches such as microinjection, electroporation, lipofection, etc. A separate section is devoted to genetic manipulation at the level of the whole organisms, including production of transgenic animals, embryo cloning, and gene targeting. The widely used Baculovirus and Vaccinia virus expression systems are also included, followed by detailed presentation of a wide range of protein analysis techniques. The latter include protocols on protein determination, preparation of tagged proteins, gel electrophoresis and staining, various overlay techniques, protein microsequencing, and amino acid analysis.

A large number of illustrative diagrams, photographs, colour plates, and an index with surprisingly few omissions (considering the vast range of topics covered by the manual) contribute to the overall impressive design and general usefulness of this book. Another helpful feature of the manual are the three appendices, devoted to tissue culture media, most frequently used cell lines, and safety recommendations for working with radioactivity, respectively. Perhaps inevitably, due to time required to put together a book covering such enormous area of biology, and due to fast progress in the field, some of the chapters would benefit from updating or extending to the most recent modifications of several techniques, a task for the future edition already under consideration by both the editor and the publisher. The spectrum of methods, their clear and uniform style, sense for important practical detail, and thoughtful editing make this manual a unique laboratory handbook which should be of great help for the large and still rapidly growing flock of scientists using techniques of cell and molecular biology.

In summary, '*Cell Biology: A Laboratory Handbook*' is the type of essential manual that is easily accessible to potential users among students, as well as scientists from both research laboratories and biotechnology companies. This book, if updated and expanded in the future to reflect the trends in the field, may well become the practical 'bible' of modern cell biology.

Jiri Bartek

Biochemistry of Cell Membranes; Edited by S. Papa and J.M. Tager, Birkhäuser Verlag, Basel, Boston, Berlin, 1995; x + 365 pp. \$ 149.00 (hb). ISBN 3-7643-5056-3.

This collection of 24 short reviews does not, as its rather heterogeneous content might suggest, derive from a symposium, but is part of a series entitled 'Molecular and Cell Biology Updates', and contains invited contributions on selected topics, deemed by the editors and their advisory panel to represent areas in which recent progress has been

particularly rapid. The coverage indicates a fairly relaxed interpretation of the title, as some of the topics have only a tenuous connection with membranes – in the last resort, any and every biochemical topic is membrane-related in some way – but this imparts a welcome breadth to the book. The collection is definitely aimed at a post-doctoral

readership, and would probably be found excessively detailed and specialized by even final-year undergraduates. Most of the reviews cite 50–100 references, dated up to 1994.

The first section, on signal transduction, covers the cellular roles of RAS proteins, casein kinase-2, and G-protein coupled P_2 purinoreceptors. The next section contains six reviews on membrane traffic, including the import of proteins into mitochondria and of bacterial toxins into eukaryotic cells, the functions of non-clathrin coat proteins in vesicular traffic and of rab5 in endocytosis, the control of autophagy, and the intracellular traffic of glycosphingolipids. The book's stated emphasis on structure-function relationships is rather less obvious in these two sections than in later ones. Rather surprisingly, vesicle targeting and fusion, currently a very hot topic, is not covered – perhaps it was decided that the area is already sufficiently reviewed.

There follow four contributions on bioenergetics (H^+ -translocation by the mitochondrial electron-transport chain, the assembly, control and mechanism of ATP synthase, and structures of mitochondrial transporters). The mechanistic controversies that continue to attend the mechanism and stoichiometry of proton-pumping by the electron-transport chain are explored, but are only touched on for F_1F_0 .

The next sections cover some relatively unfamiliar topics – cyclic ADP-ribose in erythrocytes, Mg^{2+} homeostasis in the heart and the role

of mucins in cell adhesion – as well as signal transduction by growth-factor receptors and by β_1 -integrin.

Three contributions on the structures of membrane proteins (intra-membrane helix interactions; annexin V; and porin) are preceded by a brief overview of the topic. Finally, a single review in the section on membranes and disease covers the possible involvement in ageing and disease of damage to mitochondrial DNA.

In general the clarity and organization of these reviews are excellent. The figures, mostly line-drawings and monochrome of course, are adequate without being beautiful. The editors have done a fine job in achieving balance, breadth and a consistently high quality of content, although there are minor criticisms: the three-page comparison of 65 amino-acid sequences of transporters, for which readers with average vision will need a magnifying glass, could surely have been omitted; the index adds little to the usefulness of the book; and the basis for assigning topics to particular sections is not obvious – as is the reason for division into sections at all, as with one exception there are no overviews, and there is no inter-referencing between reviews. Never mind: each topic covered fulfils the criteria of intrinsic interest and recent progress, and each review contributes handsomely to a very worthwhile collection.

David K. Apps

The Peroxisome: A Vital Organelle; Edited by C. Masters and D. Crane, Cambridge University Press, Cambridge, UK, 1995; xvii + 286 pp. \$ 69.95 (hb). ISBN 0521 482127.

The peroxisome has been the neglected child in text books of cell biology and there has been a void on informative up-to-date texts dealing with this organelle. The last review-book by Böck et al. was published in 1980 and there has been since an explosion of information, both in biology and medicine on this subject asserting the pressing need for an updated general text. The book by Masters and Crane fills this void extremely well. The authors are wellknown in the field and have contributed personally to its development.

The text consists of eleven chapters each comprising 20–30 pages. It contains numerous fullpage diagrams and many high quality illustrations, including immunoelectron micrographs. Each chapter closes with a one page summary and a short list of relevant references. In addition, there is a bibliographic appendage consisting of over 500 important references published until March 1994 with some of the older and many of the recent publications in the field.

After an introductory chapter covering most of the history, general properties and the nomenclature of peroxisomes, the chapters two through seven deal with the enzymology, intraparticle organization of proteins and the various metabolic pathways in peroxisomes. Their involvement in the catabolism of lipids via the β -oxidation pathway and their anabolic functions with the synthesis of cholesterol, ether lipids and dolichol are well-covered. This is followed by other diverse metabolic functions of peroxisomes in animal and plant cells, such as their participation in gluconeogenesis, glyoxylate cycle and purine metabolism. In an interesting and somewhat speculative chapter authors try to tie together the different metabolic functions of peroxisomes and their interactions with other organelles and the regulatory factors involved. They must admit however that 'the very broad substrate range and the wide-ranging metabolic involvement

pose many technical problems in defining the details of the regulatory relationship for this organelle'. Nevertheless, their ideas must inspire future investigators to try to develop the appropriate technology to unravel some of those still hidden secrets of peroxisomal function and regulation.

The chapters on '*Biogenesis and Turnover of Peroxisomes*', '*Peroxisome Proliferation*' and '*Peroxisomes and Human Disease*' are highly informative and up-to-date, without getting lost in details. This is very satisfactory since recently numerous reviews have been published dealing with those specific aspects of peroxisomal biology. The book closes with a review of the recent progress and the future perspectives in education and science from the viewpoint of peroxisomologists (or as a matter of fact peroxisomaniacs). A good example of the importance of investigation on peroxisomes and its effects on the community life is presented here by the description of 'Lorenzo's oil', a movie released in 1993 by Universal Studios. It deals with the life of a child suffering from adrenoleukodystrophy and the attempts of his parents to save him by self-education and development of a special diet lowering the level of his serum very long chain fatty acids.

The book is well-written and very enjoyable to read. It provides an excellent up-to-date reading material for graduate and even undergraduate students because the topic is poorly covered in almost all current textbooks of cellular and molecular biology. But also experts benefit from it immensely because it contains many interesting and unorthodox views on several aspects of investigation on peroxisomes.

H. Dariush Fahimi

Immune Reactions, Headlines, Overviews, Tables and Graphics; Edited by H.-H. Sedlacek and T. Mörry, Springer-Verlag, Berlin, Heidelberg, New York, 1995. xiii + 581 pp. DM 148.00 (hc). ISBN 3-540-58957-0.

'Immune reactions' is an overview of most aspects of mammalian immune reactions presented in the form of schematic diagrams, figures and tables. The content is based on the lectures of the two authors teaching at the Medical School at the Phillips University, Marburg, Germany. The goal has been to provide students, instructors and researchers in immunology a rapid access to the complicated structures and interactions in the immune system. The condensed presentation of the content allows a comprehensive and impressive compilation of data normally not included in text books on immunology. The first 12 chapters include the basic concepts and molecular systems in

immunology (antigen presentation, T- and B-cell differentiation, antibody formation, T-cell receptor, cytokines, cytokine receptors and complement activation) whereas the remaining 15 chapters cover more special topics as immune reactions in relation to the biology of endothelial cells, the clotting system, extracellular matrix, angiogenesis, CNS and various diseases including allergy, autoimmune diseases and cancer. Furthermore a chapter describes somatic gene therapy and another chapter is an update of the CD classification system.

The book is a good supplement to basic textbook in immunology and it may be beneficial for researchers and others who want to have a rapid