apoptosis and that protein kinase C is not an universal inhibitor of apoptosis. There is an index.

The authorship is well balanced geographically. In conclusion, Apoptosis II gives an interesting and up to date review about the physiology and the biochemical events involved in apoptosis and its regulation. It will be very useful introductory book for beginners in the field and a necessary reference for involved researchers. The only reservation I could have is the price which, as usual with this publisher, is rather high.

Jacque E. Dumont

Protein Kinase C - Current Concepts and Future Perspectives; Edited by D.S. Lester and R.M. Epand; Ellis Horwood, Chichester, 1992. xii + 365 pp. $ 100.50. ISBN 0-13-720186-9

Since its discovery in 1977 by Y. Nishizuka and coworkers, protein kinase C has become an extensively studied enzyme believed to play a central role in cell signalling processes. Despite the vast number of scientific publications on this enzyme and the effort that has been devoted to defining its role in cell regulation our understanding of the action and the contribution of protein kinase C in living systems is only fragmentary.

With this book the editors present a timely collection of 14 outstanding and provocative reviews on this pivotal enzyme. Rather than just providing a series of reviews on different aspects of protein kinase C emphasis has been laid on proposing models for the action of PKC based on existing evidence from in vitro and in vivo studies.

The book is divided into two parts, the first one dealing with biochemical and biophysical properties of PKC and the second one addressing the biological actions of PKC.

The first part starts with a discussion of the primary structure of the PKC family members followed by two chapters on the interaction of PKC with and activation by lipids and tumor promoters in vitro. The following chapters address biophysical aspects of the association of PKC and its activators with membranes and discuss the important consequences of electrostatic interactions within membranes and of lipid presentation as vesicles or as micelles. Although these chapters deal with topics biologists and cell biologists are often not too familiar with the authors have succeeded in writing comprehensible reviews which emphasize the necessity to understand lipid protein interactions in order to evaluate the models for PKC activation in vitro and in vivo. The first part also includes a chapter on the mechanisms of the phosphotransferase reaction catalysed by PKC.

The second part of the book tackles the heroic task of reviewing a wealth of data collected in a number of different systems to elucidate PKC function in vivo. The reviews address cross-talk between signalling systems and regulation of ion channels by PKC. The history and function of the PKC substrate MARCKS is covered as well as the interaction of PKC with the cytoskeleton and the nucleus. The final chapter then tries to integrate a vast number of observations into a model how PKC may participate in the processes of normal cell growth regulation and in the process of cell transformation.

In particular, it is the combination of extensive coverage of the biochemical/biophysical aspects of PKC together with the observations in cellular systems that make this book unique in its kind. I would even go as far as to propose that reading of this book should be obligatory for everyone seriously trying to understand the role of PKC in cellular communication.

Silvia Stabel

RNA Editing: The Alteration of Protein Coding Sequences of RNA; Edited by R. Benne; Ellis Horwood, Chichester, 1993. 196 pp. $ 67.95. ISBN 0-13-782558-7

RNA editing involves the alteration of gene transcripts by addition and/or deletion of nucleotides or substitution of encoded nucleotides. Novel amino acid codons can be formed, initiation and termination codons can be introduced, and internal frameshifts can be eliminated. Thus, RNA editing can be added to the growing list of phenomena including splicing, trans-splicing, translational frameshifting and protein-splicing which makes it impossible to deduce, with certainty, correct amino acid sequences from their corresponding gene sequences.

This novel kind of RNA processing appears to occur widely within the eukaryotic domain, and the rapid development in characterization of diverse editing mechanisms is a good reason for summarizing the developments in book form.

The book contains eight chapters written by experts who present their particular RNA editing system. It starts with an introduction providing a concise summary of RNA editing mechanisms, written by Rob Benne, who also edits the book. The next two chapters, by Stuart and Simpson et al., respectively, deal with RNA editing in trypanosome mitochondria. Editing occurs in a 3' to 5' direction along the mRNA, directed by gRNAs encoded by the minicircles of kinetoplast DNA, and is limited to altering the uridine composition. The former chapter provides a comprehensive review of the field while the latter, which overlaps considerably on the mechanistic details, provides a more detailed description of some of the edited gene transcripts. The next chapter, by Miller et al., summarizes the diverse types of editing characterized in both mRNAs and stable RNAs of the slime mold Physarum polycephalum. They describe the failure to detect gRNAs in this organism and provide no insight into the editing mechanism(s). Much of the work described is unpublished (judging by the reference list) and is, therefore, difficult to evaluate, especially the data on the stable RNAs.

Kolakofsky et al. provide an entertaining account of the discovery of transcriptional frameshifting on the P gene of paramyxoviruses, which produces more than one gene product, and complement this with a thoughtful discussion of the pauses, stuttering and slippery sequences that contribute to this process.

Editing of the apolipoprotein B mRNA in mammals generates a translational stop codon UAA, resulting from a C to U change in some mRNA molecules which, in turn, produces protein products of different functions. Hodges and Scott review the extensive characterization of the RNA target-site sequence using the Morgan (reverse transcriptase) assay, and its recognition by a proteinaceous cytidine deaminase. They also speculate on the possible coupling of the editing and RNA polyadenylation processes. This detailed chapter was rendered unnecessarily long, in the reviewers' copy, by the duplication of 16 pages.

The broad subject, RNA editing in plant mitochondria and chloroplasts, is covered by Griebenberger, who provides a detailed review of the known examples of editing, primarily in the mRNAs of these organelles. Finally, Kim and Nishikura describe the double-stranded RNA adenosine deaminase which converts adenosines to...
inosines and consider its possible involvement in editing of RNA viral genomes and the transcript of the receptor subunit 2 which contributes to the glutamate gated ion channel, a hypothesis strongly supported by a recent article (Higuchi et al., Cell, 75, 1361–1370, 1993).

The general vagueness of the discussion on the evolutionary origin(s) of RNA editing mirrors similar discussions on introns prior to their discovery in archaea and bacteria; given the high incidence of editing in mitochondrial genes, a determined search for editing in the purple photosynthetic bacteria would seem especially worthwhile.

This is an advanced book, suitable for senior students and researchers, giving a comprehensive view of the RNA editing field. Benne does not elaborate on the difficulties that he, Snoof and their colleagues experienced in getting their seminal editing papers accepted by wary journals but, hopefully, ten years on, this book will be received in a more positive spirit.

Line Hartvig and Roger A. Garrett

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The development of microwave treatment in biology over the past 25 years has been ably treated by the authors of this monograph. The main focus of the book is on the uses of microwave energy for fixation in morphological studies.

The subjects covered include a brief historic overview of microwave fixation, additional applications of microwave energy in the laboratory, details of microwave stabilization, microwave-chemical fixation, and combinations of freezing and microwave irradiation. Further, a detailed review of the results of microwave fixation in morphologic studies is given followed by an evaluation of the supporting evidence for the various mechanisms postulated. A detailed discussion of the parameters of microwave fixation is given followed by a discussion of microwave equipment. Causes of nonuniform microwave irradiation are listed along with possible remedies. A short but admirable note on microwave sterilization is given as well as general safety considerations.

There are 29 monochrome figures and 4 in full colour. The quality of reproduction is excellent. The list of references is comprehensive and the subject index useful. Unfortunately, there are several misprints particularly in the legends to figures. However, none disturb the meaning to any significant degree.

I recommend this book to anyone working with microwaves in the histology department and particularly to those interested in fixation using microwave energy.

Hans Lyon

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Human Protein Data; Edited by A. Haeberli; VCH, Weinheim, New York, Brasil, Cambridge, Tokyo, 1993; Lasebl.-Ausg. ISBN 3-527-30015-5

Human protein data, is a timely compendium of a number of well characterised (mostly extracellular) human proteins. It is presented in a loose-leaf format that allows the reader to insert or add data sheets according to his preference. The entry for each protein includes a number of important parameters such as a general description, the protein structure, biophysical properties, function, purification methods and general references. Each of these items is uniformly organized in the book and therefore easily accessible. Often clear schematic illustrations replace lengthy and wordy descriptions. The book is accompanied by a computer disk that contains a search program that enables the reader to find the necessary information starting from other parameters such as pI, Mᵦ, etc.

The cell contains at least a few thousand different proteins. Combining their major properties in a catalogue is a major task. The Editor, together with the help of more than 200 outstanding specialists, have amassed a work that could be an important step in building a global data base interconnecting protein sequence data, 2 D-gel protein data and data from the human genome sequencing projects.

In its present form the book already provides a good resource of information. For the starting student or the scientist outside the field, this work offers a valuable introduction to an exploding research area. For the scientist actively working in the field, the book is a helpful tool to assess quickly molecules with which the researcher is not directly familiar. Can a simple literature search replace this book? To some extent this could be the case for the professional biologist. However it is still a comfortable feeling to have such diverse information within immediate reach.

In summary, Human Protein Data is a book that intends to be a catalogue of human proteins. Such a work needs frequent updating to be useful and it is the intention of the authors to add at least 60 proteins every year. Will this be sufficient to cope with the explosive increase of information? Ultimately, the editor will have to select for classes of proteins rather than trying to cover all known proteins. In this respect it might be worth considering those proteins linked with human diseases. With time and appropriate selection of topics and updating it may become an important work.

J. Vandekerckhove