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BOOK REVIEWS

Vitamin D: chemical, biochemical and clinical update edited by A. W. Norman, K. Schaefer, H-G. Grigoleit and D. V. Herrath, P. Walter de Gruyter, P.O. Box 110240, D-1000 Berlin 30, 1985, pp. 1248, DM 340, $138.

The discovery, about two decades ago, that the hydroxylated derivatives of Vitamin D, have important endocrine functions evoked a surge of interest in the biochemistry of Vitamin D endocrine system. Consequently, periodic international workshops on this subject have been held at various places since 1973. The sixth in this series was held at Merano, Italy during March 17-22, 1985. This meeting was attended by a large number of delegates from 27 countries and the scientific deliberations consisted of 77 talks and 380 poster presentations. These proceedings are recorded in this book. A number of aspects of Vitamin D were discussed and these pertained to: 1. Its metabolism, 2. Biochemistry and regulation of Vitamin D hydroxylases (hepatic and renal), 3. Receptors for $1,25(OH)_2D_3$, 4. Biological actions of $24,25(OH)_2D_3$, 5. Chemistry, physiology and molecular biology of calcium-binding proteins, 6. Intestinal calcium and phosphorus transport, 7. Role of Vitamin D and its metabolites in cell differentiation, 8. Renal and skeletal actions of Vitamin D metabolites, 9. Vitamin D nutrition in humans and animals, 10. Vitamin D in pregnancy and neonatology, 11. D-binding proteins, 12. Photobiology and evolutionary aspects of Vitamin D, 13. Chemistry of Vitamin D seco-steroids, and 14. Vitamin D and insulin secretion, renal osteodystrophy, osteoporosis, sarcoidosis and other clinical topics. There are also sections on the role of Vitamin D in cancer and on assay methodology.

The proceedings contain up-to-date information on many aspects that would interest the chemists, biochemists, physiologists and clinicians. Among the highlights of the presentations are: 1. the cloning of mRNA for the D-binding protein and thus the determination of primary sequence for the rat and human DBP, 2. demonstration that DBP is related to the protein families of albumin and α-fetoprotein, 3. sequence determination of the principle intestinal Vitamin D-induced calcium binding protein, 4. the interesting observation that the chemically synthesized analog $1,25S,26(OH)_3$-22-D_3 is highly active in mediating cell differentiation but has diminished hypercalcemic action compared to $1,25(OH)_2D_3$, and 5. clear evidence for the production of $1,25(OH)_2D_3$ at extrarenal sites and that γ-interferon stimulates its production by macrophages. Among the clinical presentations, convincing evidence was provided on the usefulness of $1,25(OH)_2D_3$ in the treatment of post-menopausal osteoporosis and renal osteodystrophy. There are a very large number of reports on the $1,25(OH)_2D_3$ receptors and their participation in cell differentiation. Thus, this book is indeed an exhaustive update in this area and

would be very useful to any research worker interested in Vitamain D and its endocrine function.

Department of Biochemistry
Indian Institute of Science
Bangalore 560012.

P. S. SASTRY

Toxins as tools in neurochemistry edited by F. Hucho and Y. A. Ovchinnikov. Walter de Gruyter, P.O. Box 110240, D-1000 Berlin 30, 1983, pp. 368, DM 180.

This book records the proceedings of a symposium organised in March 1983 in West Berlin by the members of the USSR Academy of Sciences and the Free University of Berlin. The objective of the symposium was to review and report by then the latest research developments in the application of neurotoxins for the identification and molecular characterization of key functions of the membranes of the excitable cells—the nerve and muscle cells. There are 28 articles in this volume covering many aspects of the chemistry, biological effects and binding to the sodium channel, acetyl choline receptors and other components of the neural membranes. These have been grouped under four sections: 1. Sodium channels 2. Palytoxin 3. Acetylcholine receptors, and 4. Ca-channels, axonal toxins, pre-synaptic toxins, cardiotoxin, new venoms. The section on sodium channels contains very useful information on: a) the binding sites of *Anemonia sulcata* Toxin II, tetrodotoxin and saxitoxin to sodium channels of nodes of Ranvier, b) effects of the polypeptide scorpion toxins and the alkaloid toxins—aconitine and batrachotoxin on sodium channels, c) identification of sodium channel components interacting with neurotoxins, d) interaction of neurotoxins with the soluble proteins of the excitable tissues, and e) the synthesis of steroid alkaloids active on sodium channels. The second section contains three articles on palytoxin, its physiological and morphological effects on skeletal muscle and its cation ionophoric properties. The section on acetylcholine receptors includes reports on: a) the presence of nicotinic receptors in *Locusta* head ganglionic tissue, b) multipoint point attachment of α-cobratoxin and acetylcholine receptor from *Torpedo marmorata*, c) structural comparison of α-cobratoxin and α-bungarotoxin based on their crystallographic analyses, d) probing the neurotoxin II of *Naja Naja axiana* and acetylcholine receptor interaction through studies on photo-induced crosslinking, e) functionally important residues in short and long neurotoxins studied by spectroscopic methods, f) magnetic resonance evaluation of snake neurotoxin structure-function relationship, and g) characterization of various functional states of acetylcholine receptor through the use of a new ligand, triphenylmethyl phosphonium. The last section, except for one article on the effect of synthetic toxins on the functioning of calcium channels in the somatic neural membrane, is devoted to reports on new toxins. Very interesting results on the chemistry and biological properties of the toxins from the American scorpion *Centruroides sculpturalris*, Toxin II of *Anemonia sulcuta*, honeybee neurotoxin-Apamin, scorpion insectotoxin I_5 A, toxins of spider venom of the families *Theridiidae, Araneidae* and *Segestriidae*, presynaptically acting neurotoxins of *Lactodectus* spiders and on the myotoxic and neurotoxic phospholipase A of some Australian snake venoms and β-Bungarotoxin, are presented in this section.

There is a wealth of new and very useful information on a variety of neurotoxins of

several species in this volume. Neurochemists, especially those interested in the biochemistry of ion channels and acetylcholine receptors would find this book very valuable.

Department of Biochemistry
Indian Institute of Science
Bangalore 560012.

P. S. SASTRY

The cell division cycle in plants (Seminar Series 26) edited by J. A. Bryant and D. Francis. Cambridge University Press, The Edinburgh Building, Shaftesbury Road, Cambridge CB2, 2RU, 1985, pp. 246, $37.50.

This volume is the published proceedings of a Seminar Series Symposium on the Cell Division Cycle in Plants which formed part of the 213th meeting of the Society of Experimental Biology, held in April 1983 at Cardiff, England.

Progress in understanding cell cycle in plants seems slow in comparison with the dramatic advances made in this area in prokaryotes, yeast or mammalian systems. This volume emphasizes the importance of the former in areas such as DNA replication, chromatin organization, the mitotic apparatus, cell-cycle control ranging from the molecular through the cellular to the organ level, DNA replication in the absence of cell division (endoreduplication) and chloroplast division. The book has thus a wide coverage of almost all major aspects of cell division cycle as applied to plants. Special mention must be made about the treatment of the *C* values in DNA replication and the replication organization which have been discussed at length consonant with their importance in cell cycle. Also three topics are discussed which are directly relevant to the understanding of cell division and differentiation in higher plants. They are: (1) the differentiation of dividing cells, (2) growth substances and cell division, and (3) calcium protein kinase and the cell cycle. Similarly, questions like (1) How does the cell cycle in the shoot meristem change during floral evocation? (2) What are the regulating agents and how is cell cycle regulated? (3) What is the significance of these changes on flowering? are posed and attempts to answer them have been made.

Apart from the aspects of cell cycle mentioned above which deal specifically with plants, other aspects like *C* values in DNA replication and the replicon organization have applications not only to plants but also to animal cells and prokaryotic cells.

All chapters in the book are treated with a uniform style, which makes them very readable. References cited at the end of each chapter are adequate. The text very successfully describes not only a variety of basic cell culture and related techniques, but also frequently manages to apply these techniques to handling plant species for which methods are not readily available elsewhere. It should prove very useful to students entering plant cell culture field for the first time and to established workers wishing to broaden their expertise into biotechnology, for example.

Department of Microbiology and Cell Biology
Indian Institute of Science
Bangalore 560012.

T. RAMAKRISHNAN

Modern methods in protein chemistry, Volume 2, Review Articles (including those from an international conference held in Bielefeld, F. R. G., June 1-2, 1984) edited by H. Tschesche. Walter de Gruyter, P.O. Box 110240, D-1000, Berlin 30, 1985, pp. 434, $94.

This is a continuation of the series of articles published in 1983 in the previous volume. The book describes the recent developments in analytical methods used in protein chemistry. The book consists of 21 articles describing various micro methods for the determination of proteins, glycoproteins, etc., affinity chromatography of proteins using synthetic dyes or metal ions, FPLC and HPLC for the separation of proteins and peptides, amino-acid analysis by HPLC, chemical modification of proteins, immunoassays of peptides and proteins, use of fluorescence-activated cell sorting, cross-linking reagents, colour reagents, etc. Some articles also describe the automated methods of peptide or oligonucleotide synthesis, improvements in detection and separation of amino-acid derivatives, various computer programmes for the structural analyses of proteins, secondary structure determination of membrane proteins by Raman spectroscopy, etc. The book in general is helpful to the protein chemists interested in applying modern methods. The book also has a wide list of references from which readers can get all the procedural details, etc.

Among the methods described, FPLC and HPLC, which have been described in detail, are of wide use to the protein chemists and the readers will be much benefited by them. Similarly, the article on chemical modification of proteins, micro analysis of polypeptide structure using cross-linking agents, fluorescent-labelled antibodies, and colour reagents, metal ion and dye-linked affinity chromatography, and other micro methods are highly informative. However, some of the articles are rather long, for example, the use of cellulose acetate paper in the determination of proteins has been discussed in detail although it is not widely used. The article also lacks clarity. The articles on DNA and RNA sequence analysis and immunoassays of peptides and proteins are rather brief and the literature cited is also not exhaustive.

Overall the book is a good addition to the previous volume and serves as a guide to know about modern analytical methods in protein chemistry.

Department of Biochemistry
Indian Institute of Science
Bangalore 560 012.

H. S. SAVITHRI

Modern methods in protein chemistry, Volume 3, Review Articles by H. Tschesche. Walter de Gruyter and Co., P.O. Box 110240, D-1000, Berlin 30, 1988, pp. 385, DM 240.

Ever since Edman developed the sequential degradation of N-terminal amino acids in proteins for the determination of their sequence the field of protein chemistry continues to fascinate bioorganic chemists and biochemists alike. The past decade has witnessed a considerable revival of interest in the chemical, biological and physical properties of proteins which is not surprising in view of the diversity of functions performed by them in the living systems. However, the sheer quantity of research result being generated in the field of protein chemistry makes the task daunting for anyone who chooses to edit a text

covering the field. Volume 3 of *Modern methods in protein chemistry* attempts to highlight several areas that have yielded interesting results in recent years.

In general the contributions in this volume are presented with a wealth of useful references and reasonable illustrations. The subjects covered are rather heterogeneous and include new developments in the synthesis of peptides with biological activities, microsequencing of proteins, gas-phase sequencers, amino-acid analysis, photoaffinity labeling and identification of neurotransmitter and nucleotide-binding sites, enzyme immunoassays, colloidal metal particles in protein blotting, bifunctional reagent for protein topology, microcalorimetry, crystallographic image reconstruction studies on ribosomes, clonogenic bioasirays and electroporation. Though the volume is purported to contain review articles there are quite a few chapters which do not belong to this category. Six of the articles are comprehensive reviews.

The first of the review articles is an account of the work on the strategies for the localization and synthesis of protein-binding sites authored by M. Z. Atassi. The author presents a lucid account of the mapping of the antigenic and subunit interfaces and ligand-binding sites in several proteins of known three-dimensional structure as well as the T- and β-cell recognition sites on the influenza virus A hemagglutinin. He then proceeds to the development of the concept of surface simulation synthesis for designing peptides with biological activity. In another article, F. Hucho *et al* review the methods and the advantages of rapid photoaffinity labeling as compared to the static photoaffinity labeling for identification of the transient conformational states and the localization of effector domains in the primary and quaternary structures in the nicotinic acetylcholine receptor by microsequencing. H. J. Hinz's 'Microcalorimetry of protein-ligand interaction and protein unfolding' is a comprehensive review on this subject. The author, after explaining that the treatment by classical statistical thermodynamics is adequate for proteins, discusses the thermodynamic quantities relevant to biological systems and the methods used for obtaining them. The potential of the method is illustrated by the analysis of linkage phenomena in the tryptophan synthetase, elucidation of the path of unfolding for identifying domains structure in proteins and the contribution of various amino acids in the stability of bovine pancreatic trypsin inhibitor. In the paper, 'Application of bifunctional reagents for topological investigation', R. M. Kamp describes properties of bifunctional cross-linking agents, their reactivities, span-length, and cleavability, etc., as well as the use of these reagents in elucidating the arrangement of proteins in *E. coli* ribosomes, development of diagonal electrophoresis for the identification of the cross-linked species, their isolation by HPLC and their chemical characterization. Another comprehensive article is by A. Yonath and H. G. Wittman on 'Crystallographic and image reconstruction studies on (eubacterial) ribosomes'. The authors are successful in presenting a very absorbing account of the methods developed for the crystallization of ribosomes, characterization of their packing parameters, their preliminary characterization, phase determination, etc., in these studies. The three-dimensional image reconstruction has resulted in the identification of a tunnel in ribosomes through which proteins, during their synthesis, may be traversing the particle. E. Neumann and E. Boldt in their review article trace the history of the development of electroporation, its principle as well as its application in gene transfer into the cultured cell.

There are several chapters dedicated to the development of new techniques for protein chemistry. The article by R. Frank and H. Gausepohl deals with the continuous flow peptide synthesis in which the authors suggest an orthogonal scheme for peptide synthesis employing different chemicals for deprotecting the N-α-amino and the side-chain groups, respectively, for efficient peptide synthesis. F. Reimann *et al* in their article outline the development of new modulas for the gasphase-sequencer. In another article, L. Meincke and H. Tschesche describe the preparation of a derivatized porous glass support and advocate the replacement of polybrene-coated glass fibre filter with the former. The article by G. Bauw *et al* deals with the microsequencing of electrophoresed proteins by blotting on polybase-coated glass fibre sheets. I. Betner and P. Foldi describe the fluorenylmethoxy carbonylchloride-derivatized amino acids for an ultrasensitive detection of amino acids in biological fluids and proteins. Though Fmoc has been used earlier for the pre-column derivatization of amino acids, it has not become very popular. The modifications introduced by these authors are likely to make this method very useful. The volume contains an article authored by H. E. Meyer *et al* on the microcharacterization of phosphoserine residues in proteins by their conversion to β-methylaminoalanine or s-ethylcysteine residues and another on the identification of the nucleotide-binding site or tubulin contributed by K. Linse and E.-M. Mandelhoue. Two articles by R. Geiger and others on the bioluminescence-enhanced detection of antigens provide insights into the development of a very sensitive enzyme-linked immunoassay system. These articles perhaps could have been combined into one. Another article by R. E. Geiger and R. Hamber outlines the application of the above technique for Western blotting. M. Moeremans *et al* discuss the use of colloidal metal particles in protein blotting. H. R. Maurer describes the clonogenic assay for peptides and drugs which is probably one of the very sensitive bioassays for testing the activities of drugs, etc. R. Luhrmann and R. Renter in their article discuss the specificities of autoantibodies to small ribonucleoproteins from patients with connective tissue disorders as well as define the antigenic regions in them.

The volume should have contained a review on the site-specific mutagenesis and another on the two-dimensional NMR for studying the peptide structure and conformation, since in the last five years there have been exciting developments, using these techniques, on relating the function of proteins with their structure. It is hoped that such topics would be included in the future volumes.

In conclusion, this book contains several current and informative articles concerning protein chemistry and offers some valuable reviews for scientists actively involved in this area of research. However, at DM 240, I am afraid that only libraries and some affluent laboratories can afford to buy it.

Molecular Biophysics Unit
Indian Institute of Science
Bangalore 560012.

A. SUROLIA

Electrophoresis'83 edited by Hidematsu Hirai. Walter de Gruyter and Co., P.O. Box 110240, D-1000, Berlin 11, 1984, pp. 737, DM 280.

Electrophoresis'83 is a compilation of a variety of papers ranging from basics of

electrophoresis, design of apparatus, applications in biochemistry and clinical medicine. The paper by Allen presents both a historical as well as developmental account of electrophoretic technique. A series of papers by Radola, Chrambach, Bier, and Yasakuma deal with theoretical aspects of various types of electrophoresis, giving a detailed account of the problems associated with choice of material, field strength, pH gradient, resolution, staining and load capacity. In this connection the paper by Radda is very informative. Following this a whole series of papers deal with applications of two-dimensional electrophoresis and some of them provide evidence as to the sensitivity of the technique, particularly the papers by Rosenblum and his group. Three sections of the book deal with cell electrophoresis and isoelectric focussing and affinity electrophoresis and their application. In view of the wide variety of types of electrophoresis described in detail and the application to which these are put to, this book is very useful to all those who use the technique of electrophoresis.

Department of Biochemistry
Indian Institute of Science
Bangalore 560 012.

A. JAGANNADHA RAO

Aspartic proteinases and their inhibitors edited by V. Kostka. Walter de Gruyter and Co., P.O. Box 110240, D-1000, Berlin 11, 1985, pp. 613, DM 260, $109.

As given in the preface, proteinases and their inhibitors have received considerable attention during the last few decades particularly due to their suitability to study structure function. This book is a compilation of papers dealing with structure function, mechanism of action, clinical importance as well as molecular and biotechnological aspects of aspartic proteinases. The introductory papers by Kay and Feltmann give a lucid account of the basis for classification of the proteinases and their occurrence. Following this several papers deal with the isolation and characterization of aspartic proteinases from a variety of sources ranging from chlamydomonas to camel. Of these the paper by Kostka is noteworthy in that it gives an exhaustive account of aspartic proteinases. A series of papers in the volume deal with the chemistry as well as molecular structure of these proteinases. In addition, the paper by Best *et al* deal with the mouse-renin gene structure and it should be pointed out that it is an important contribution to the data on the structure of aspartic proteinases. The volume also deals with some clinical and commercial aspects of these enzymes and the possibility of their use as tumor markers is very interesting. The paper by Harboe gives a detailed account of the commercial aspects of aspartic enzymes and reading this would set at rest any doubt on the importance of these enzymes. Finally, this book is important to all those who are interested in chemical, clinical or commercial aspects of aspartic proteinases.

Department of Biochemistry
Indian Institute of Science
Bangalore 560 012.

A. JAGANNADHA RAO

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TITLE PAGE should contain the following: (i) a brief title with suitable words for indexing; (ii) the names of the authors and the institution(s) where the work was carried out; (iii) a footnote with the present address of the authors, if different from (ii); (iv) a 75-word Abstract which summarises the significant results of the communicated paper; (v) key words for indexing and information retrieval; (vi) major discipline; and (vii) a running/short title.

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3. RAMAKRISHNA NAIDU, G. AND NAIDU, P. R. Isotopic exchange study of nickel xanthate in the presence of toluidines, *Proc. Indian Acad. Sci.*, 1978, 87A, 443–446.

8. HINGDON, A. *Engineering mechanics*, 1968, Vol. 1, Ch. 3, pp. 79–104, Prentice-Hall.

9. RAMA MURTHY, K. *Conveyance of state distributions in multi-type Bellman-Harris and Crump-Mode-Jagers branching processes*, Ph.D. Thesis, Indian Institute of Science, Bangalore, India, 1978.

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