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# BOOK REVIEWS

**Methods in Enzymology,** Vols. 154 and 155, **Recombinant DNA,** Parts E and F. Edited by R. WU AND L. GROSSMAN (Vol. 154), and by R. WU (Vol. 155). Academic Press, Orlando, FL, 1987. Vol. 154, 576 pp., $66.00; Vol. 155, 628 pp., $75.00.

Two more volumes in the Methods in Enzymology series on recombinant DNA methods have appeared. These two, Vol. 154 edited by Ray Wu and Lawrence Grossman and 155 edited by Wu alone, provide as best one can in the book format, a technical update on some of the most important and widespread molecular genetic methods in use today. In Vol. 154 there are excellent collections of chapters on DNA cloning, library screening and gene mapping, oligonucleotide and oligopeptide synthesis and analysis, and site-directed mutagenesis and selected topics in protein engineering. Volume 155 presents a description and unique uses of new restriction enzymes, a summary of rapid DNA sequencing methods, and a potpourri of a number of other important methods including pulsed field gel electrophoresis, the theory and use of DNA melting in alkaline denaturing gradient gel analysis, the use of polymerase chain reactions, and a number of other methods. Both new volumes, in conjunction with the recent Vol. 153 and the older Vols. 68, 100, and 101 help to fill out a collection of molecular genetic methods in a way consistent with the long and innovative tradition of this series—to present methods in a coherent, historically relevant, and technically useful format. The immense strength of these volumes lies in this combination of up-to-date technique and history—the presentation of a seamless and continuing story of scientific technology by the innovators themselves. This of course requires the sort of editing that one has come to expect, and has usually received, in these volumes as well as thorough and careful selection of topics and authors.

For the most part, the chapters are well written, thorough, authoritative, and filled with detailed useful recipes. In many cases, the recipes contain not only a description of the ingredients but also tested sources, a very useful addendum. Of course, as in all multi-authored volumes, the quality of the writing of the presentations varies. Particularly useful for most readers probably will be the long and exhaustive discussion of rapid DNA sequencing methods, both manual and automated, and the discussion of mutagenesis methods. Unfortunately, in this era of the "human genome initiative," carrying with it the need to sort out the advantages of rapid manual methods versus automated sequencing, there is no description of the still unpublished multiplex approach that has been described informally at meetings for some time. A discussion of the relative merits of this method as opposed to other rapid manual methods, so thoroughly covered in the new volumes, would have been useful. The growing importance of pulsed field and related techniques for characterization of very large regions of DNA is well documented by several chapters in Vol. 155, and the background for one of today's most useful new methods, polymerase chain reactions to amplify very small amounts of target sequence, is well described.

One of the major problems with the format of this series is the relatively long delay between development of a new technique and its inclusion in this series, a problem that is compounded by a number of similar competing collections of techniques that often find more extensive usefulness in the day-to-day life of laboratory workers. A prime example of the lag between a very rapidly moving technology and publication is the recent development of the yeast artificial chromosome (YAC) system, a technique that should now be part of any discussion of gene mapping. The important truth of course is that Methods in Enzymology does not have a corner on the market of techniques as it had in the past. But it does continue to present methods in a thorough and comprehensive style, and these volumes will, together with other collections, become invaluable resources in most molecular genetics laboratories.

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**Methods in Enzymology,** Vol. 148, **Plant Cell Membranes.** Edited by LESTER PACKER AND ROLAND DOUCE. Academic Press, Orlando, FL, 1987. $79.00

The fact that enormous progress has been made in the isolation, fractionation, and reconstitution of chloroplast thylakoid membranes has tended to obscure the equally significant progress that has occurred with other membrane systems found in plants. As the editors of this volume in the "Methods" series point out, a collection of in-depth articles on techniques for the isolation of plant cell membranes of the mitochondrion, tonoplast, nucleus, etc., as well as detailed descriptions of methods for characterizing their constituents is, in fact, overdue. The

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appearance of this volume along with the breadth of topics covered provides recognition of the tremendous progress that has occurred in manipulating the membrane systems of plants.

Volume 148 follows the style of previous books in the "Methods in Enzymology" series; the authors provide the usual detailed descriptions of the methodology, along with helpful suggestions to eliminate potential experimental problems. The editors have subdivided the information in the book into logical groupings and have done a fine job of selecting topics and authors to produce a book of manageable size while retaining what I consider to be the right amount of detail coupled with breadth of coverage.

Section I of the book covers cells and protoplasts (descriptions of preparative and *in vitro* culture techniques), as well as methods for the use of liposomes as cell-to-cell transfer agents. Section II, devoted to vacuoles and tonoplasts, provides information on membrane isolation procedures along with excellent chapters on methods for biochemical characterization of the $H^+$-translocating ATPase and pyridine nucleotide-dependent reductase activities associated with these membranes. Section III deals with plastids (chloroplasts, amyloplasts, chromoplasts) and again includes chapters on methods of preparation, on assays of function (protein transport, lipid biosynthesis), and on characterization of organellar and membrane constituents (cytochromes, lipids, thylakoid membranes, outer envelope membranes). Section IV, on mitochondria, is composed of chapters on isolation of the organelle as well as on special topics (isolation of outer membranes, purification of succinate dehydrogenase and cytochrome oxidase, lipid content and biosynthesis, characterization of membrane channels). Section V is composed of three chapters on peroxisomes and glyoxysomes (isolation, function in fatty acid degradation and protein and lipid content of the organelle's membrane), while Section VI provides chapters on nuclei, endoplasmic reticulum, and plasma membrane. The chapters in this section are devoted largely to isolation methods, augmented by chapters on lipid synthesis in endoplasmic reticulum and a survey of methods for labeling the surfaces of plasma membranes. The last section covers a miscellany of techniques (NMR, electron microscopy, 2D electrophoresis, rapid filtration, HPLC) that have found wide application in membrane-related research and are illustrated with relevant examples from existing research on plant systems.

This volume, coupled with earlier books in the "Methods" series, will provide a wealth of technical detail to investigators working on plant organelles, their membrane systems, and the constituents of those membranes. The rapid pace at which plant biology is advancing constitutes the main problem confronting authors, editors, and readers of this book. Much of the material here will have been augmented (although not superseded) in the time which inevitably elapses between writing and publication. The book is strongly recommended to beginning, as well as experienced, investigators working on the biochemistry and molecular biology of plant membranes.

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**Methods in Enzymology,** Vol. 158, **Metallobiochemistry,** Part A. Edited by J. F. RIORDAN AND B. L. VALLEE. Academic Press, San Diego, CA, 1988. 464 pp. $59.00.

The term metallobiochemistry melds the area of trace element analysis and function with the mainstream of biochemistry. Metalloenzymes are at the apex of the fusion in that these metabolically important biocatalysts are strictly dependent upon one or more of the essential trace elements. This book provides valuable information not only for researchers entering any area of metallobiochemistry but also for the well-established practitioners in the field. It is divided into three sections, Sample Preparation, Analytical Techniques, and Analysis of Metals. The editors have selected a series of topics in each section which provides an integrated overview of techniques, procedures, and pitfalls involved in trace elements research. Experts have been chosen to write the chapters and in general the results are excellent. In some cases proofreading is lax in that spelling and other minor errors occur. Overall there is good coverage of the analytical aspects of metallochemistry without excessive redundancy.

The section on sample preparation is particularly pertinent to all engaged in trace analysis in that it instills a healthy degree of paranoia. No analysis is better than the sample acquisition, preparation, and the reagents and materials used. Specific techniques for purification of water, dialysis tubing, chromatographic media, and buffers are described in sufficient detail to be extremely helpful. Methods for removing both adventitious and specific metal ions from metalloproteins are detailed along with procedures for metal substitution. A particularly valuable chapter on reference standards for metal analysis presents a comprehensive table of reference materials including description and suppliers.

Section II, Analytical Techniques, provides information regarding the theoretical basis, sensitivity, and precision of the methods commonly used in trace element analysis. The methods include spectrophotometry based on atomic absorption, flame emission, atomic fluorescence, and inductively coupled plasma as well as neutron activation and electrochemical methods of analysis.