

Book Reviews

Carotenoids: Chemistry and Biology. Edited by Norman I. Krinsky, Micheline M. Matthews-Roth, and Richard F. Taylor. Plenum, New York, London, 1989, x + 382 pp., ISBN 0-306-43607-8, \$85.00 (hardback).

This camera-ready volume is a compilation of presentations made at the Eighth International Symposium on Carotenoids (July 27–31, 1987), held in Boston, Massachusetts. This symposium is conducted once every 3 years, and the 25 chapters of the present proceedings reflect updates in the state of knowledge on the carotenoids, which are used industrially as colorants and as animal feed supplements and also show great potential for utilization in preventive medicine.

The first chapter represents the keynote address at the Boston symposium and features some intricate work recently carried out in the laboratory of C. H. Eugster of Zurich on the isolation and structure elucidation of novel carotenoids. Considered next are reviews on advances on the characterization of plant and animal carotenoids and carotenoproteins. Then follow several chapters on carotenoid analysis, bioavailability, biosynthesis, function, isolation, metabolism, and synthesis. Among these is an intriguing contribution on carotenoid extraction artifacts by S. Liaaen-Jensen entitled "Artifacts of Natural Carotenoids—Unintended Carotenoid Synthesis." The role of the carotenoids in plant photosynthesis is discussed in a chapter by T. A. Moore and colleagues. In a somewhat speculative chapter, G. Ourisson and Y. Nakatani contend that in bearing two distally placed highly polar groupings, certain bacterial carotenoids may be incorporated into phospholipid membranes and, therefore, might serve as cell membrane reinforcers. While only plants can synthesize carotenoids *de novo*, animals can transform such compounds that occur in the diet into species-specific metabolites, and a useful overview on this topic is provided by K. Schiedt in a chapter entitled "New Aspects of Carotenoid Metabolism in Animals."

The carotenoids in general, and the compound β -carotene primarily, have attracted a lot of attention for their possible effects in preventing cancer when given to human populations as dietary supplements. In an excellent chapter by N. I. Krinsky entitled "Carotenoids in Medicine," the established functions of these compounds as precursors of vitamin A and in photoprotection and radical quenching are described, and a brief review is provided on experimental evidence that demonstrates the activity of carotenoids as bacterial antimutagens and as anticarcinogens in cell and organ cultures and in animal systems. The topic of β -carotene as a cancer chemopreventive agent is elaborated on in chapters by K. Manoharan and colleagues and by H. F. Stich and associates. Other possible beneficial effects of carotenoids are detailed in chapters on their effects as protective agents against phototoxicity and their role in enhancing the immune system.

The final two chapters of the book describe the production of the carotenoid astaxanthin by total synthesis and

summarize the commercial production of carotenoids by biosynthetic procedures, with particular emphasis on the mariculture of algae. The book is provided with a short (5-page) Index.

While it is very unlikely that anyone would wish to read this volume from cover to cover, it does constitute a very important updated resource for the many scientists in diverse disciplines whose work impacts on the carotenoids. It is also recommended for purchase by institutional libraries.

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Molecular and Cellular Biology of Multidrug Resistance in Tumor Cells. Edited by Igor B. Roninson, Plenum Press, New York, 1991, xviii + 406 pp., ISBN 0-306-43547-0, \$85.00.

This book represents a comprehensive summary of knowledge in the rapidly growing field of tumor multidrug resistance (MDR). This phenomenon, an ability of tumor cells to protect themselves from hydrophobic toxic agents, including many potent anticancer drugs, was described for the first time more than 20 years ago. This discovery attracted a great number of scientists because it was immediately realized that MDR could be responsible, at least partially, for tumor resistance to chemotherapy. Now it is known that the basis of MDR in most cases is an overexpression of the *mdr* gene encoding membrane ATPase, P-glycoprotein. This membrane pump has an unprecedented property to recognize and transport out of cells structurally dissimilar compounds. The very essence of the MDR phenomenon, the mechanism of the P-glycoprotein action, is still obscure. However, there is a great amount of information available on the genetic mechanism of the MDR development, biology of the MDR cells, some biochemical properties of P-glycoprotein, its evolutionary relationships with other membrane transporters, its expression in normal and tumor cells, and some initial approaches to circumvent MDR.

All these aspects of the MDR research are described in 20 chapters of the book written by leading scientists working in this field. Each chapter is based on the experiments carried out by the authors but is not limited to them and contains a review of the described topic. The obvious advantage of this style is that every chapter can be read separately. On the other hand, the same facts are frequently discussed several times in different chapters. It can be somewhat distracting for a reader who is trying to read the whole book. In addition, the reader has to keep in mind that the MDR-related research is very dynamic and that many new discoveries were made since the book was prepared for publication (the latest references are dated 1989). The greatest progress

was achieved in the characterization of dozens of new molecular homologues of P-glycoprotein in bacteria, protozoa, nematoda, insects, and mammals. Especially important among them are CFTR, the chloride channel whose mutations lead to cystic fibrosis, and the products of the genes located in the MHC genetic locus and participating in antigen presentation. The current understanding is that P-glycoprotein is just one of the members of a large superfamily of structurally similar but functionally different membrane transporters, most of which are apparently highly specific to their substrates. It is still not clear what structural feature gives P-glycoprotein its uniquely low chemical specificity. Another piece of information missed in this book is a number of very recent, sometimes contradictory, publications defin-

ing the role of P-glycoprotein in clinical tumor drug resistance.

Despite the understandable time gap between the information contained in this book and our most current knowledge, this book is a timely publication providing a necessary and excellent review of a large volume of papers concerning the MDR phenomenon that have been published since the late sixties till the late eighties.

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