Cellular Organelles

Chloroplasts. J. KENNETH HOOBER. Plenum, New York, 1984. xii, 280 pp, illus. $42.50; paper, $19.95. Cellular Organelles.

The realization that the "semi-autonomous" organelles of eukaryotic cells, mitochondria and chloroplasts, possess unique, almost bizarre molecular regulatory systems and that they play more than an energy-generating role has led to a blossoming of research on the physiology, genetics, and development of organelles. Conferences are devoted to organelles; societies are formed to plumb their intricacies. Inevitably the outpouring of literature has led some intrepid souls to attempt to summarize and review the field. Chloroplasts have been superbly treated in the encyclopedic work of Kirk and Tilney-Bassett, *The Plastids*, which, although several years old, remains the major monograph on these organelles. Mitochondria are treated in a group of books, mostly conference proceedings and an excellent book by Tedeschi. Now textbooks are beginning to appear.

A series by Plenum, Cellular Organelles, began auspiciously with Tzagoloff's *Mitochondria* and now is equally well served by Hoober's *Chloroplasts*. Inevitably this book will be compared to Halliwell's *Chloroplast Metabolism* and Prebble's *Mitochondria, Chloroplasts and Bacterial Membranes*. Hoober's book is more detailed and more comprehensive than the other two. It is first and foremost a textbook designed to introduce the advanced student familiar with cell biology, biochemistry, and genetics to this unique, energy-generating organelle, but it has some of the characteristics of a monograph in that Hoober places emphasis on aspects of chloroplast biology that appeal to him. For instance, a large amount of the experimental detail discussed in the book is drawn from work on *Chlamydomonas*, an organism dear to the author's heart. Fortunately the bulk of the work is balanced enough that a student can get a sense of the diversity of chloroplasts.

Chloroplast research presents an interesting problem. Those studying mitochondria can figuratively (some results suggest literally) work "in the dark," but chloroplast investigators must appreciate the many ways other than photosynthesis in which light mediates and modulates reactions within the cell. Almost every aspect of chloroplast development is light-sensitive in a variety of higher plants and some algae. Transcription, translation, and post-translational events involved in chloroplast synthesis as well as the interplay between nuclear and chloroplast genome are regulated to some extent by light. Often the investigator must attempt to determine the link between the light-absorbing molecule and the ultimate molecular event. This problem is, unfortunately, rarely addressed in textbooks. Hoober does attempt to give insight into the matter and his sections on photoregulation, although brief, at least bring up the subject.

The book's nine chapters contain a brief historical survey, a solid description of photosynthesis, discussions of biochemical and genetic aspects of structure, function, and development, and finally a discussion of the evolutionary aspects of chloroplast development. The photographs and micrographs are very good, the figures and tables clear and straightforward. The text is detailed enough that a working scientist interested in chloroplasts would find the book valuable as an introduction; advanced undergraduates and beginning graduate students will find it a gold mine.

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Extracellular Matrix

Extracellular Matrix Biochemistry. KARL A. PIEZ and A. H. REDDI, Eds. Elsevier, New York, 1984. xx, 473 pp., illus. $60.

The Role of Extracellular Matrix in Development. ROBERT L. TRELSTAD, Ed. Liss, New York, 1984. xviii, 643 pp., illus. $76. From a symposium, Irvine, Calif., June 1983.

The papers in these two volumes discuss much of the current research on extracellular matrix. One of the volumes is a general treatise and the other is the proceedings of a symposium. The Piez and Reddi volume primarily attempts to paint a large picture, minimizing details and allowing for individuality in the styles of the contributing authors. It is clearly written, well illustrated, and up to date. The book contains 11 chapters, six of them dealing with aspects of collagen biology, chemistry, and pathology.

The book begins with a chapter by Piez in which the molecular structure of collagen is defined, some of its properties are described, and some related proteins are noted. A large part of the chapter is devoted to an analysis of the ways in which collagen molecules can polymerize, including contemporary models of three-dimensional structure. A chapter by Miller is a compendium of the detailed structures of the most well-characterized collagens; the chapter contains an analysis of the homology of these structures and some speculations concerning their evolutionary implications.

Chapters by Kivirikko and Myllylä on the biosynthesis of the collagens and by Woolley on mammalian collagenases delineate unknown territory particularly well and present balanced views of the literature. The illustrations and tables in Woolley's chapter are skillfully woven into the text and prove extremely helpful in highlighting many of the author's points.

A chapter by Timpl on the immunology of the collagens contains a general discussion of protein antigenicity followed by a more detailed discussion of collagen as an immunogen. The author draws heavily upon his own research contributions and those of his collaborators. The illustrations are particularly helpful.

A lucid discussion of elastin by Gosline and Rosenbloom is especially successful in its treatment of mechanochemistry. The chapter integrates the chemical and physical aspects of the subject well.

A chapter by Hakomori *et al.* on fibronectin and related extracellular glycoproteins is a refreshing treatment of a subject that has received enormous attention in recent years. Broad biological concepts are presented in a wealth of well-illustrated detail, with an even-handed view of the literature. The tables alone will serve as an important source of information for students.

A discussion of the structure and metabolism of proteoglycans by Heinegård and Paulsson clarifies a subject that is rather complex because of the extreme variability of proteoglycan structure. The range of such variability was noted by early workers in the field, but its exquisite detail is only now being unveiled. This subject is central to the chapter. Though the illustrations are vital for comprehension of the text, they often contain an excess of detail, which is distracting. One certainly develops an appreciation of the major questions that abound in this field; it will be fascinating to read a similar chapter several years from now.

Bones and teeth are analyzed by Veis on the basis of both a reworking of earlier data and an integration of recent studies. The chapter contains well-se-