

## Connective issues

*The structure and Biochemistry of Cartilage.* By A. Serafini-Fracassini, and J. W. Smith. Pp. vii+236. (Churchill Livingstone: Edinburgh and London, 1974.) £8.00.

THIS book is a very readable account of the biochemistry of connective tissue components, and of the structure and morphology of cartilage. It provides a good background to the biochemistry of connective tissue and gives an excellent introduction to cartilage morphology with particularly detailed accounts of the epiphyseal plate and calcification. In those topics it is a major advance upon existing texts.

The first half of the book gives a detailed account of the structure of elastin, collagen and the glycosaminoglycans. The subject is treated thoroughly and would do justice to a more general text on connective tissue biochemistry. Much of the information is contained in numerous tables which compare chemical compositions and amino acid analyses, and list physicochemical properties. This concise way of presenting data is backed by a text that is informative and to the point, which greatly enhances the value of the book to the general reader.

The molecular biology of connective tissue macromolecules is probably the most rapidly developing field of research relating to cartilage, and the inevitable delay between the finish of literature searches and publication has produced some points at which these sections are now out of date. For example, there is little emphasis on the different genetic species of collagen present in different tissues. The distinction in composition between cartilage collagen  $[\alpha 1(I)]_3$  and skin-bone collagen  $[\alpha 1(I)]_2 \alpha_2$  is described, but their significance as gene products that are tissue specific is not discussed at all. Similarly, new information on the organisation of proteoglycans has shown that they aggregate by binding to hyaluronic acid, forming very high molecular weight complexes within the cartilage matrix. The staining of proteoglycans in cartilage sections for electron microscopy has, therefore, more recently been reassessed taking this into account. The problem that information becomes rapidly out of date is always present to a greater or lesser extent in scientific reviews but in this instance it does not detract from the usefulness of the large amount of additional information presented.

The second half of the book is concerned with the morphology of different types of cartilage. The transition from biochemistry to morphology is bridged by two chapters in which tech-

niques of studying connective tissue components with both the optical microscope and electron microscope are appraised critically, and the general ultrastructure of cartilage is reviewed. The remainder of the book then deals in some depth with the development and structure of the epiphyseal plate and with the calcification of cartilage. It finishes with shorter sections on articular cartilage and elastic cartilage. The chapters on the epiphyseal plate are particularly worthy of mention as they give a comprehensive account of its development, structure, nutrition, the formation of matrix, and the presence of lysosomal enzymes during the subsequent calcification of the tissue. It is difficult to find these topics described in such detail elsewhere.

## Cholinergic transmission – from Russia

*Acetylcholine: an Approach to the Molecular Mechanism of Action.* By M. J. Michelson and E. V. Zeimal. Translated from the Russian by E. Lesser and Mira Lesser. (International Series of Monographs in Pure and Applied Biology. Division: Modern Trends in Physiological Sciences, vol. 38) Pp. xviii+241. (Pergamon: Oxford and New York, December 1973.) £8.50.

INTEREST in the application of techniques of molecular biology to the study of drug-receptor interactions, in particular at the cholinergic synapse, has grown rapidly in recent years. So the advent of a book claiming to discuss the "molecular mechanism of action of acetylcholine" would seem to be of vital and topical concern. But the book fails to generate the interest promised by its title. That may be partly because the authors concentrate much of their attention on the more classical "chemical-pharmacological" approach of determining structure-activity relationships; but it may also reflect the fact that, despite the initial advance afforded by success in the isolation of the cholinergic receptor, further progress in elucidating the molecular events whereby acetylcholine produces its effects has been disappointing slow.

Nevertheless, the book includes much material of interest to students of cholinergic transmission. The authors describe work carried out by themselves and a variety of colleagues in Russian laboratories over the past 30 years. The reference list shows that most of this work has been published only in Russian, and may therefore be new to English speaking readers.

There is an initial introductory chapter on the electrophysiological and biochemical functioning of the cholinergic synapse, with an interesting

The book, primarily a text on cartilage, can perhaps be criticised for the allocation of excessive space to connective tissue biochemistry. Much of the research on the structure of elastin and collagen does not relate directly to cartilage. The book also lacks any attempt at a systematic account of the various types of mammalian cartilage or indeed any discussion of phylogeny, and for these reasons it cannot be regarded as a comprehensive work. The general standard of presentation is, however, very high. There is an abundance of illustrations and a particularly large number of electron micrographs. Each chapter also contains an extensive bibliography which enhances its value as a reference work.

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account of what seems to be the first recording of the endplate potential, by Ginetsinsky and Michelson, in 1935. There follows a brief but informative discussion on the current knowledge of the chemical structure of cholinergic receptors. Again it is pleasing to read of evidence obtained by Turpaev in the early 1960s for the presence of sulphhydryl groups in the acetylcholine receptor, which anticipated the experiments of Karlin and his colleagues.

Theories of drug-receptor interaction are assessed well in the third chapter but the mathematical treatments are unnecessarily complicated by the avoidance of conventional symbols. The following three chapters deal essentially with results obtained from comparing the activities of a variety of acetylcholine analogues on both the acetylcholine receptor and acetylcholinesterase, from which the authors attempt to make deductions about the active centres of both molecules, and about the arrangement of receptors (or subunits of the receptor) on the postsynaptic membrane. Unfortunately, the treatment is lengthy and repetitive and the derived information is scanty and, at best, equivocal.

The final chapter, on non-synaptic cholinergic receptors, draws together data from a variety of tissues including foetal and denervated muscle, autonomic ganglia, Renshaw cells and *Aplysia* giant neurones, and fills in many of the gaps left in previous chapters. Once again, there is a surprising reference to results obtained by Ginetsinsky and his colleagues on foetal muscle some years before similar observations were made in laboratories outside Russia. It is to be hoped that publication of this book in English (an excellent translation) is a sign that such failures in communication will be less frequent in the future. Vasanta Srinivasan