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Book Reviews

Advances in Enzymology and Related Areas of Molecular Biology Vol. 59

Edited by Alton Meister

John Wiley & Sons; New York, 1987

483 pages. £ 43.25

The latest volume in this well-known series features reviews on a relatively broad range of topics, including: (i) Fibronectin, a glycoprotein which is one of the best-characterized noncollagenous cell attachment factors, and an important model system for research on adhesion of cells; (ii) Synthesis and Degradation of Chitin, a polymer of *N*-acetylglucosamine and a component of the exoskeleton of many organisms; (iii) Mechanism of Action of Glutathione-Dependent Enzymes; (iv) Enzymology of Quinoproteins, embracing the properties of PQQ (pyrrolo-quinoline quinone), the PQQ-dependent quinoprotein oxireductases, and the mechanism of action of several of these enzymes; (v) Regulation of the 2′,5′-Oligoadenylate System by cAMP-Dependent Phosphorylation, which briefly summarizes research by Soviet investigators on biochemical mechanisms and regulatory processes involving both cAMP and (2–5)A, in which the activity of the latter is not limited to simply mediating interferon action: (vi) NMR Studies of the Mechanism of Enzyme Action (see below); (vii) Fructose 2,6-Bisphosphate, a potent regulator of liver 6-phosphofructo-1-kinase, first reported by the author of this chapter (E. Van Schaftigen) as recently as 1980, and now known to be present in a variety of organisms, with its regulatory role extended to several other enzyme systems, including fructose 1,6-bisphosphatase and plant PP_i-dependent phosphofructokinase.

Undoubtedly the chapter of most general interest is that on the use of NMR spectroscopy to study mechanisms of enzyme reactions, by A.S. Mildvan and D.C. Fry, the former a well-known pioneer in the field. Two classes of enzymes are given broad coverage, those catalyzing nucleophilic substitutions on phosphorus (adenylate kinase, cAMP-dependent protein kinase, DNA polymerase I, staphylococcal nuclease), and others involving polarization of carbonyl groups of substrates (glyoxalase I, yeast aldolase, biotin enzymes such as pyruvate carboxylase), followed by a short resumé of general conclusions on mechanisms of enzyme catalysis.

The authors depict how mechanisms of enzyme reactions may be deduced from fundamental NMR parameters, including relaxation rates, the latter of which furnish paramagnetic metal–nucleus, and inter-proton, distances, and dissociation rates of enzyme-substrate and enzyme-product complexes. As emphasized by the authors, relaxation rates in NMR spectroscopy are of the same order of magnitude as biochemical processes, so that NMR is not only a structural, but also a kinetic, tool which may be used to measure exchange rates at equilibrium of enzyme-substrate complexes simultaneously with their structures. Although this review presupposes a knowledge of NMR techniques which may be beyond the scope

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of many biochemists, the descriptions of various results, frequently compared with those obtained by other methods, including crystallography, will be of considerable value to all those engaged in research on enzyme reaction mechanisms.

Each chapter in this volume is preceded by a detailed list of contents which, together with the subject index, facilitates its accessibility even to the non-specialist. It should, however, be noted that literature references for all the reviews terminate somewhere in 1985, a price we unfortunately pay for the rapid progress of current research. The volume contains useful Cumulative Author and Subject Indexes to Vols. 1–59 inclusive.

David Shugar

Cysteine proteinases and their inhibitors

Edited by V. Turk

Walter de Gruyter; Berlin, 1986

846 pages. DM 390.00

This volume collects together approximately 70 papers that were given at a symposium with the same title, held in Portoroz, Yugoslavia, in September 1985. In addition to about 30 chapters on the enzymes themselves, many of which have been known and reasonably well characterised for a number of years, much of the book is devoted, rightly, to consideration of the more recently elucidated naturally-occurring inhibitors of cysteine proteinases, the cystatins. To the uninitiated, the proteins of this superfamily present a bewildering confusion of terminologies, but the volume is prefaced by a multi-authored chapter which introduces the now-accepted nomenclature detailing the three protein families of the superfamily. Consideration is also included of the significance of these inhibitors in medical conditions such as inflammation, sciatica and cancer.

However, much of the material in many of the chapters has since been published in learned journals, so it is difficult to envisage what the future of a volume such as this will be. The wealth of detail that it contains will make it an invaluable source book which those in the field will not want to be without. But then, most of them are likely to have participated in the symposium itself and so will already have a copy. Those with only a casual interest will presumably be content with the more recent publications in regular journals and will find little incentive to invest in this volume. At the listed price, it would seem an expensive purchase, although it does provide a companion volume to stand alongside previously issued volumes by the same publishers on 'Aspartic Proteinases and Their Inhibitors' and 'Proteinases in Inflammation and Tumour Invasion'. With the current global explosion of interest in matters proteolytic, libraries may be well advised to continue on with the series.

John Kay