

*MTP International Review of Science. Biochemistry Series One. Vol. 4.**Biochemistry of Lipids*

Edited by T. W. Goodwin

Butterworths; London: University Park Press; Baltimore, 1974

iii + 294 pages. £10.45

In the light of the objectives set out in the preface, this volume could almost contravene the Trade Descriptions Act since, by no stretch of the imagination, can it be said to provide anything approaching a complete account of our present knowledge of lipid biochemistry.

Not that its contents are without interest. The articles by Vogelos and by Gurr on the synthesis of the saturated and unsaturated fatty acids respectively and those by Bowen, Davidson and Ramsey on the lipids of the nervous system and by Horton on the prostaglandins are all good authoritative accounts by distinguished workers in these areas. They are somewhat out of date in places and not particularly novel in that similar reviews covering much the same ground are to be found elsewhere, but they would certainly serve the advanced student and the non-specialist biochemist well enough.

In this company, however, it is the article by Gaylor on the enzymes of sterol biosynthesis that catches the eye. Here is a subject central to lipid biochemistry treated in a fresh and thought-provoking

way with excellent perspective of past, present and future, problems defined, progress assessed and new directions indicated. Full of homespun practical advice and quotable quotes too, "don't waste clean thoughts on dirty enzymes", for example.

Finally, two specialized articles find a place in the volume. One by Hemming deals in detail with the intriguing role of the polyisoprenoids in the formation of the glycans and the other, by Haines, considers briefly the odd group of substances now known as the halogenated sulphatides. These are restricted at present to a particular group of algae and they may turn out either to be mere biochemical curiosities or compounds of much wider biological significance. Time will tell.

So, all in all, quite an interesting pot-pourri: but certainly not, in my opinion, for purchase by the general biochemist seeking a comprehensive survey of the present state of lipid biochemistry.

D. S. Robinson

*MTP International Review of Science. Biochemistry Series One. Vol. 5.**Biochemistry of Carbohydrates.*

Edited by W. J. Whelan

Butterworths; London: University Park Press; Baltimore, 1975

441 pages. £10.45

The volume comprises eight review articles covering many aspects of the biochemistry of carbohydrates.

The topics covered deal with the structure and functions of polysaccharides, glycoproteins, proteoglycans, regulation of glycogen and intermediary carbohydrate metabolism including a discussion of inborn errors. Each chapter is written by a single or joint authors who are recognised as experts in their appropriate fields.

Chapter 1 deals with the relationship between structure and function of polysaccharides and shows how complex biopolymers containing additional lipid or protein play fundamental roles in the cell. Liberal use of figures and diagrams to illustrate structures proves helpful. The importance of interplay between carbohydrate and lipid is also noted and exemplified by the effect of polysaccharides in binding the long-chain acyl-CoA products of the fatty acid synthetase from *Mycobacterium phlei*.

Chapter 2 follows on naturally with a discussion of glycoproteins and glycolipids and their role in cell-surface phenomena such as intercellular adhesion and cellular recognition. Indeed, the point is well made that "sugar-containing molecules are uniquely sensitive to specific recognition proteins". Both of these carbohydrate-containing groups of molecules are integral components of the plasma membrane and the major glycoprotein from human erythrocytes, for example, is covered in some depth. Treatment of the biosynthesis of these products, especially with respect to the carbohydrate-peptide linkage and possible involvement of isoprenoid intermediates was disappointing, but many of these aspects are dealt with in the next chapter in connection with proteoglycans.

The following two chapters cover the structure, biosynthesis (chapter 3) and function of proteoglycans with special emphasis on connective tissue. Proteoglycans refer to complexes of the acidic glycosaminoglycans (usually esterified additionally to sulphate) which are covalently linked to protein. Hyaluronic acid, chondroitin sulphate, dermatan sulphate, keratan sulphate, heparin and heparan sulphate are all treated fully and their role in the structure of cartilage and other tissues examined. However, the balance of this volume would have been improved if this material had been reduced in content (it occupies over a quarter of the total) and integrated into one chapter.

Regulation of intermediary carbohydrate meta-

bolism covers reactions involving the interconversions from glucose to pyruvate in the glycolytic and gluconeogenic directions with a brief mention of the pentose phosphate pathway. The scope of this chapter is restricted almost entirely to vertebrate liver and muscle, and the tricarboxylic acid cycle reactions are completely ignored. Much emphasis is placed on the reactions catalysed by phosphofructokinase and fructose diphosphatase reflecting the current interest in this pair of enzymes in regulating metabolic flux and in the general importance of substrate cycling which is dealt with in depth. However, the material is generally presented as a collection of data and the reader is not guided towards an integrated view of carbohydrate metabolism in the intact animal or even in liver or muscle.

Chapter 6 contains a discussion of the chemistry and biochemistry of starch and of the enzymes involved in its degradation and biosynthesis. A survey of its occurrence and preparation is also provided together with details of its chemical and physical properties.

Regulatory mechanisms for glycogen metabolism found in skeletal muscle, bacteria and plant leaf tissue (starch) are next described and include the roles of protein kinases and phosphatases. Comparison of the regulatory processes in liver and muscle would have been rewarding but treatment of glycogen turnover in liver was not examined. However, the story leading up to the cascade system for the control of glycogenolysis by hormonal action and muscle contraction is well developed. Regulation of glycogen synthesis in bacteria and starch synthesis in plants occurs at the ADPglucose pyrophosphorylase level and these two processes are discussed together.

The final chapter covers some inborn errors of carbohydrate metabolism, that is, those caused by genetically determined diseases, and includes the enzymology and clinical features associated with disorders of glycogen, fructose and proteoglycan metabolism. The existence of these and related conditions provides direct evidence of the vital need for the integrated regulation of metabolic sequences in the well-being of the individual. The decision by the authors to exclude other conditions, such as galactosaemia, was surprising in view of the acknowledged number of recent reviews on glycogen storage disorders. Each of the three sections includes a useful

introduction to the nature of the inborn errors discussed and indicates the problems associated with these conditions. An interesting account of the use of cultured fibroblasts in the study of the disorders of the polysaccharide portion of proteoglycans is provided; these cells permit detailed studies on the disorders concerned.

Each chapter in this volume is completed by a comprehensive list of references; there are over 2000 in total. Much of the bibliography refers to work up to 1974 and in some cases it is extended to 1975. The text was remarkably free from misprints and a good subject index is provided.

In summary, a rather uneven picture of the biochemistry of carbohydrates is presented. Excessive

priority has been devoted to structural at the expense of metabolic aspects and emphasis throughout is given to polysaccharides. As a consequence, major omissions exist which relate to carbohydrate metabolism in systems other than vertebrates (apart from a section on polysaccharide synthesis in bacteria and plants). Topics such as fermentation in micro-organisms or the various polymers that constitute the bacterial cell wall are not mentioned. However, a great deal of information is provided in this text which does provide a most useful source of reference to all research workers interested in the biochemistry of polysaccharides and metabolism of carbohydrates.

N. M. Packter

MTP International Review of Science. Biochemistry Series One. Vol. 6.

Biochemistry of Nucleic Acids

Edited by K. Burton

Butterworths; London: University Park Press; Baltimore, 1974

iii + 364 pages. £10.45

This volume is a collection of eleven review articles on topics related to nucleic acids. The amount of editing seems to have been minimal, presumably to allow individual contributors the maximum freedom (including, for example, the spelling of eukaryotic/eucaryotic). The result is a book with astonishing omissions, for example there is nothing on mitochondrial nucleic acids although chloroplasts have a whole chapter, and there is no mention of homopoly-nucleotide sequences in RNA. On the other hand there is tedious repetition (three of the authors describe pyrimidine tract analysis of DNA; two of them describe the strategy of tRNA sequencing). The cross references are almost non-existent and the index is poor. The book has an elaborate system of numbering sections and sub-sections and yet the authors lamely refer to their colleagues' contributions with phrases such as "see chapter 5".

Despite the shortcomings of the book as a whole,

and the fact that it is somewhat out of date, several of the individual chapters are excellent. Thus the first chapter on nucleotide sequence determination by K. Murray is a concise, readable and thorough review of sequencing RNA and DNA. It is surprising that there is no reference to the presence of 2-methyl ribose in RNA. This chapter and chapter 4 are the exceptions to the rule that cross referencing is inadequate. Murray and Southern were clearly aware of the contents of one another's chapters.

The most extraordinary chapter is the second, "Influence of Nucleotide Sequence on DNA Properties" by R. D. Wells and R. M. Wastell. The choice of material is idiosyncratic in the extreme. The introduction is vague and does not refer to the Pullmans' work on the effects of sequence on helix stability. The authors are preoccupied with experimental studies on 'sequence isomers' of polynucleotides. The discussions of buoyant density centrifugation and