

BOOK REVIEWS

The Biochemistry of the Tissues (2nd Edition)

by P. Banks, W. Bartley and L. M. Birt

J. Wiley and Sons; London, New York, Sydney, Toronto, 1976

xv + 493 pages. £14.50 (cloth), £6.25 (paper)

As is apparent from perusal of the contents of journals of medical education over the past few years, there is much current concern over the content of medical and dental biochemistry courses, and the suggestion that biochemistry has replaced anatomy as the least favourite subject in the preclinical curriculum. It is, I believe, generally agreed by most of those who teach medical and dental classes that in order to capture and retain the interest of these students one must approach the subject in a manner radically different from that employed in an Honours biochemistry course. Numerous more or less gimmicky solutions have been proposed to this end often preceded or closely followed by text books to match. Two major trends are however discernible; first, consideration of disease conditions as a vehicle for introducing fundamental biochemical concepts, and second a greater emphasis on what may be described as the physiological aspects of the subject, such as the role of individual tissues and the interaction between them. When the first edition of 'The Biochemistry of the Tissues' appeared in 1968 it was one of the earliest (if not the earliest) text to attempt this latter approach and has in consequence been widely used especially for MB,BS students.

In the preface to the second edition the authors state that in this edition they have added some basic chemistry, discussion of certain tissues and specialised functions not previously considered and consideration of the whole body response to conditions such as starvation and over-feeding as well as a general updating to take account of the growth of relevant biochemical knowledge. Being myself an early (and satisfied!) fan of 'Biochemistry. A Functional Approach' (R. W. McGilvery's excellent text for medical biochemistry courses) I had not previously examined 'The Biochemistry of the Tissues' as a possible alternative. Having now done so I see no reason to alter my opinion regarding the superiority of McGilvery despite the fact that the current edition of this latter book was published in 1970 and is therefore now somewhat dated.

The 2nd edition of 'The Biochemistry of the Tissues' illustrates very well the pitfalls which await those intending to adopt the tissue approach to biochemistry. In contrast perhaps to the other major subjects of the preclinical medical curriculum an organ-based approach is in my opinion not well suited to a MB,BS biochemistry course since the metabolism of the tissues is characterised by a fundamental unity and by complex interrelationships which are both at least as important as the diversity. In the hands of the authors of this book the use of the tissue approach has some very curious consequences. For example glycolysis and the tricarboxylic acid cycle plus respiratory phosphorylation are discussed as pathways of muscle metabolism while fatty acid and ketone oxidation is considered in the section devoted to liver biochemistry. Indeed the version of the tricarboxylic acid cycle presented as a muscle pathway includes succinate thiokinase and omits all mention of succinyl-CoA—acetoacetate CoA transferase despite the evidence from enzymic capacity and other studies which clearly indicates the importance of ketone bodies as a fuel for metabolism of certain muscles. Protein, and purine and pyrimidine, biosynthesis are discussed in the section devoted to biochemistry of the intestine. While I can see some rationale for consideration of protein synthesis in the context of the rapid turnover of the mucosal-wall hydrolases, it seems wholly irrational to consider the pyrimidine and purine biosynthetic and degradative pathways under this heading. So far as I am aware the pathways of de novo synthesis of both purines and pyrimidines as well as their

degradation occur primarily in the liver while other tissues incorporate the bases into their nucleotide pools predominantly by use of the salvage-pathways only one of which receives a very cursory mention. Thus the whole topic of pyrimidine and purine metabolism, which, like fatty acid and ketone metabolism, is a splendid example of inter-tissue relationships, receives very inadequate treatment. There are many other examples of the confusion produced in this text by the tissue approach but one of the most serious concerns the discussion of de novo fatty acid synthesis from glucose as a pathway of adipose tissue. This tissue location is certainly correct for the rat but not for example for the chicken. In this latter species glucose is converted to fatty acid predominantly in the liver and the pathway does not occur to a significant extent in adipose tissue. Studies over the past 5 years in well-fed Western humans suggest likewise that human adipose tissue has little capacity for de novo fatty acid synthesis from glucose which therefore occurs predominantly in the liver. Such a tissue location may also be inferred from the ease with which humans develop fat-loaded livers on overfeeding with carbohydrate or ingestion of alcohol. The effect of the particular organisation employed seems therefore to obscure rather than to illuminate the role of the different tissues. Any teacher who tries to use this book as presently constructed will, I feel, spend much of his time telling his (or her) students to ignore the implications of its organisation.

I am also much puzzled both by certain of the topics which have been included in this edition and even more by those which have been omitted. For example there is no mention at all of the exciting new developments in our understanding of the roles of the fat-soluble vitamins, especially D and K. The omission of vitamin D which receives only one brief mention is particularly serious since the new knowledge is already revolutionising the treatment of defects in calcification which occur as a consequence of, for example, renal disease. Instead very brief chapters are included on the biochemistry of the lung, the biochemistry of the eye, terminal differentiation, senescence and several other topics which are very poorly understood at the present time. I have no quarrel with the concept of the importance of these areas to medical practice, but surely it is incumbent on the authors of an introductory text to select specialised topics in which the current state of knowledge permits a reasonably coherent account. As it stands many of these chapters read like a catalogue of poorly co-ordinated facts sometimes loosely linked to a disease state. Often too an area of real interest is treated very superficially – as for example in the discussion of the role of dipalmityl-lecithin as the lung surfactant. In this context I would also question the value of the section on specific immune responses (Chapter 28) since the six pages allotted to this complex and important subject is wholly inadequate in view of its impact on both biochemistry and medicine.

I would contend that medical students are not well served by the standard texts such as for example those of Lehninger and Stryer which are founded in a structural approach to the subject, and that a successful medical biochemistry text should focus on function. From this admittedly prejudiced viewpoint 'The Biochemistry of the Tissues' promises much but fails to deliver. I shall not be recommending it to our MB, BS students at King's College.

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