

problem of how a scattered family of isotypes is maintained as a homogeneous set is one which is considered at length. The authors conclude that RNA-mediated gene conversion is the likely mechanism.

In edited works, unlike books of single authorship, the value of the whole is rarely greater than the sum of the individual parts. The valuation put on individual chapters will no doubt vary from reader to reader; as far as this reader is concerned there were enough stimulating chapters to maintain my interest throughout. I did, however, encounter minor points of irritation. Not all the authors cite their references in the same way, whilst references in most chapters are cited in full, in others the titles are omitted, a method of reference citation which I personally find annoying. Another example of the autonomous non-integrated nature of the contributions is, perhaps, more important. The report of the conference is incomplete in that not all participants submitted manuscripts for publication. The editor explains in his introduction that 'some speakers felt the information they presented was not appropriate for a proceedings volume'. In a review of differentiation and development, Lovett refers to the interesting talk of Champe on conidiation mutants of *Aspergillus* and the light which they throw on competence of the organism to respond to induction signals. Unfortunately an account of Champe's talk is not to be found in the proceedings, an omission which leaves the reader frustrated and with the distinct feeling of having missed out on something.

In a rapidly developing area like the one dealt with here, libraries have to purchase new books if they are to stay up to date; on the other hand a book's useful half life is limited as the reports it contains are overtaken by further developments. In the present financial climate when expenditure on educational matters is severely restricted, a decision to purchase books in a rapidly evolving field is therefore a fine judgement. In the final analysis the balance falls decisively in favour of recommending this book to all libraries with an interest in this area.

JEFF BOND

*Department of Genetics
University of Edinburgh*

Lysosomal Storage Diseases. Biochemical and Clinical Aspects. By RICHARD W. E. WATTS and DOROTHY A. GIBBS. London: Taylor & Francis, 1968, 284 pages, £35, ISBN 0 85066 326 1.

This book reviews the thirty or so inherited metabolic disorders that give rise pathologically to lysosomal storage in man. These diseases are of interest not only because they account for some 15% of known metabolic diseases but also because they have often been at the forefront of new developments such as prenatal diagnosis, enzyme replacement therapy and

cdNA cloning. Many of these aspects are in fact covered in this book.

The eleven chapters deal with the following subjects: biochemical diagnosis, genetics, sphingolipidoses, mucopolysaccharidoses, glycoproteinosis, mucopolipidoses, acid lipase deficiencies, glycogenosis type II, approaches to treatment and future prospects. Sections dealing with specific diseases are subdivided into: biochemistry, clinical phenotype, pathology, biochemical diagnosis and genetics. Most disorders are covered but the omission of cystinosis is more than a little surprising since this disease is not uncommon (sixty-six patients were reported in one French study) and the disease has been known since early this century. Recent reports suggest that the accumulation of cystine results from a defect in a specific ATP-dependent transporter across the lysosomal membrane. A similar defect may account for the accumulation of sialic acid in Salla disease, which is discussed but may not be confined to Finland as suggested. Cases have now been found in North America, Belgium and the U.K. On the subject of diseases covered, I was disappointed to find lactosylceramidosis appearing again. Subsequent biochemical and neuropathological studies have shown that the original patient almost certainly had the type C variant of Niemann–Pick disease (where lactosylceramide as well as other lipids commonly accumulate).

A number of other irritating errors have crept into this book which for me, I am afraid, devalued what would otherwise have been an excellent account, being both well written and clearly laid out. Useful tables and figures abound many of which have been taken from well-recognized and standard works but some of these, such as the illustrations of patients with type A Niemann–Pick disease and Farber disease, should surely have been properly acknowledged!

In discussing approaches to prenatal diagnosis the authors rightly point to the unknown risks of spontaneous abortion following chorionic villus sampling, however the most recent survey reported is protected by anonymity! An informative table is provided giving a choice of samples recommended for enzyme diagnosis. But I wonder how much experience the authors have had of diagnosis of Krabbe disease with serum or Pompe disease with leucocytes; each would require special care. Similarly the removal of neutral β -galactosidase is not normally necessary when diagnosing GM1 gangliosidosis, and serum or urine should certainly not be used.

In the chapter dealing with the mucopolysaccharidoses the authors are obviously more on home ground and a much better account is given. There is an excellent review of glycosaminoglycan structure and degradation and both Hurler and Hunter diseases are particularly well covered. On the other hand, Sanfilippo disease, which may be equally common and exists in at least four enzymatic variants, was given rather short shrift. When discussing the X-linked

inheritance of Hunter disease the authors rightly suggest that this might exist in females in association with a chromosome anomaly. However the two patients cited here were in fact due to multiple sulphatase deficiencies.

The glycoproteinoses are probably the least common of the lysosomal storage disorders. But, due to the substrate linkages acted upon, they form an interesting link between the sphingolipidoses and mucopolysaccharidoses. Covered in this section also are the steps involved in glycoprotein processing, although this could equally well have been discussed in the following chapter dealing with the mucopolysaccharidoses, where a defect in post-translational modification has been identified. But, contrary to the statement made here, carrier detection is possible, but most reliably by assay of the primary gene product rather than by indirect means.

A number of attempts have been made to correct these lysosomal defects and the chapter dealing with treatment provides an honest but rather depressing account of the state of affairs. For most of us the blood – brain barrier provides an important protective mechanism but for patients with neurological involvement it presents a major obstacle to effective enzyme replacement therapy. However, patients without brain involvement may benefit from treatment such as bone marrow transplant. In the future, as pointed out, this may provide a useful vehicle for gene correction by DNA-insertion into stem cells, but such techniques are likely to be tested out on animal models first and a useful list of these is appended. However, we must hope that the confusion shown by these authors concerning α - and β -mannosidosis in Angus cattle or Nubian goats is rectified first.

In conclusion then, in many respects this book has achieved its aims of being an up-to-date account of lysosomal storage diseases and their biochemistry. It is good value for money and with the caveat in mind that we should not believe everything we read, I would recommend it to students and teachers alike; for those of us more intimately involved in the subject, there is still much to recommend it.

GUY T. N. BESLEY
Biochemical Genetics Unit
Department of Pathology
Royal Hospital for Sick Children
Edinburgh DH9 1LF

The Consequences of Chromosome Imbalance: Principles, Mechanisms and Models. By CHARLES J. EPSTEIN. Cambridge University Press, 1986. £45.00, \$59.50. Developmental and Cell Biology Series No. 18. ISBN 0 521 25464 7.

Other books concerned with aneuploidy have been published, but Professor Epstein is to be congratulated for covering an area of the subject which is so extremely complex that it has previously been largely

omitted from the reviews. By gathering together a vast amount of information from the literature (nearly 100 pages of the book are devoted to references alone), and calling on his own expertise in the field, he has addressed the major question of how and why chromosome imbalance is deleterious. Earlier volumes have concerned themselves mainly with the much more straightforward issues of how aneuploidy might arise, and its frequency in the human population in which it is such a major source of genetic burden. Here, the major concern is to try to reduce the complex phenotypic effects of an aneuploid state to separable elements which can be attributed to the imbalance of a specific gene locus or sets of loci. In doing so, the author also suggests that more will be learnt about normal development and function.

Early in the book, the author considers what general principles, if any, are to be deduced from all the available clinical data on human syndromes, pointing out the problems of subjective reporting of morphological defects which so often make the data difficult to interpret. Characteristic, albeit, variable syndromes are nevertheless associated with different chromosome abnormalities, in spite of the fact that few if any physical features are exclusive to any particular chromosome anomaly. Distinctive features arise also for example, from very small deletions such as the del 15q11-q12 or 13 in Prader-Willi syndrome.

Central to the understanding of how monosomy and trisomy for various loci or segments of chromosomes produce their consequences are gene dosage effects, and a section of the book is devoted to a consideration of the secondary consequences of decreasing or increasing enzyme activities by about 50% on metabolic reactions in which they are involved. The pros and cons of the suggestion that aneuploidy produces its effects by altering rates of cell proliferation are argued out.

Animal models for the study of mammalian and human aneuploidy receive a good deal of attention, and a clear account of the use which can be made of stocks of mice carrying Robertsonian translocations with mono-brachial homology in the generation of monosomic and trisomic conceptuses, is given. The mouse is still seen by the author as the best available model system for the study of the disturbances associated with aneuploid development in man. This in spite of the fact that no whole chromosome homologies (with the possible exception of the X chromosome) are to be found between the two species: Homology has been shown however, for many small syntenic groups of genes. Finally, the book deals with three specific clinical problems in human aneuploidy, namely trisomy 21 (Down syndrome), XO (Turner syndrome, gonadal dysgenesis) and the role and importance of aneuploidy in cancer progression, in the latter case, an understanding of the mechanisms involved perhaps being relevant to the prevention or control of the effects.