Book Reviews


This multi-author monograph is not intended to be a textbook for the student reading molecular biology, but rather a way of bringing up to date the scientist or physician whose studies were completed before the present knowledge explosion. As such it fills a gap in genetics and biochemistry, and is an important addition to the literature of molecular biology. The authors have achieved a remarkable combination of depth of treatment with easy readability and have included very recent work while maintaining a balanced presentation.

In each chapter (except the last) the basic processes of life are considered rather than a particular species or group; the similarity in these respects of man, insects, plants, fungi, bacteria, and viruses is exemplified. The structure and function of the different nucleic acids, DNA, mRNA, tRNA, and ribosomes, are considered with admirable clarity and completeness. The chapters on protein synthesis and its control are outstanding among reviews of this subject. It is particularly gratifying that the quantitative aspects of gene action and its control, and of the activity of enzymes, are discussed so fully. The section on inborn errors of metabolism is the weakest; there are several serious errors in the table on pp. 195–196, and the treatment of thalassaemia is rather superficial by present-day standards. A final chapter on human cytogenetics is very clearly written and informative, but seems a little out of place in a book on molecular biology. The index is inadequate; it is

in Nuclei of Polymorphonuclear Leukocytes in Various Animals' by Davidson; 'Sex Chromatin in Smears from the Reproductive and Urinary Tracts' by Carpentier; 'Sex Chromatin Surveys in Newborn Babies' by MacLean, describing an application of sex chromatin studies which has been outstandingly successful; 'Sex Chromatin and Antenatal Sex Diagnosis' by Riis and Fuchs, two Danish investigators who give an objective account of their experiences with amniocenteses for possible termination of pregnancies in women who are heterozygous carriers of sex-linked abnormalities; 'Sex Chromatin, Klinefelter's Syndrome and Mental Deficiency' by Ferguson-Smith; 'Sex Chromatin in Gonadal Dysgenesis' by Moore; 'Sex Chromatin, Sex Chromosomes and Sex-linked Characters' by Polani; 'The Sex Chromatin and Hermaphroditism' by Lennox; 'Sex Chromatin in Tumours' by Tavares; 'Sex Chromatin and Developmental Abnormalities' by Benirschke; and 'Sex Chromatin and Medicolegal Problems' by Moore.

The chapters of more general or theoretical interest are: 'The Discovery of the Sex Chromatin' and 'Sex Chromatin Patterns in Various Animals' by Moore; 'Morphological Characteristics of the Sex Chromatin' by Klinger; 'Staining Affinities and Cytochemical Properties of the Sex Chromatin' by Culling; 'Single-X Derivation of Sex Chromatin' by Ohno; 'Correlations between Sex Chromatin Patterns and Sex Chromosome Complexes in Man' by Barr; 'Behavior of the Sex Chromatin during Altered States of Cell Metabolism' by Bertram; 'The Sex Chromatin in Cultured Cells' by Miles; 'The Sex Chromatin of Freemartins and Other Animal Intersexes' by Moore; 'Sex Chromatin in Embryonic and Fetal Tissues' by Austin; 'Sex Chromatin in Transplanted Tissues' by Basu; 'Sex Chromatin and the Sex Ratio in Man' by Stevenson; and 'Sex Chromatin and Gene Action in the X-Chromosome of Mammals' by Mary Lyon.

Regarding terminology, the Editor on p. 3 disapproves of the term 'Barr body' 'partly because Dr. Barr has discouraged its use, but mainly because the term is neither informative nor descriptive'. 'Barr body', however, has two advantages compared with 'sex chromatin', in certain contexts: (1) it excludes drumsticks, so that the subheading by Davidson 'The Relationship of the Drumsticks to the Sex Chromatin in Tissue Cells' might have become more simply 'The Relationship of Drumsticks to Barr Bodies'; (2) the term 'Barr body' is a countable, whereas 'sex chromatin' is not. The very considerable advances which have been made in our knowledge of the nature and origin of Barr bodies have largely come as a result of relating the maximum numbers of Barr bodies present in cells with the numbers of X chromosomes in the karyotype, as shown in the contributions by Barr and by Klinger. The term 'Barr body' is clearly adapted for the quantitative approach, whereas such suberferuges as 'sex chromatin masses' or 'sex chromatin bodies' discourage it. The fact that the quantitative approach still needs fostering in this subject is perhaps indicated by a subscript on p. 98 — 'A typical neutrophil in a blood film from a male. A drumstick is not visible.' This gives no indication to the uninstructed that, on an average, 97% of neutrophils in females also fail to show a drumstick. Again, on p. 334 there appears a statement 'There is evidence to show that about 5 per cent of XO zygotes are spontaneously aborted', which should read: 'There is evidence that about 5 per cent of spontaneously aborted zygotes have an XO sex chromosome constitution'.

The varying outlooks of the different authors may be illustrated by the following two quotations: 'Thus, the sexual dimorphism of somatic interphase nuclei first found in 1949 and the realization 10 years later that each sex chromatin body represents a single heterochromatic X is now seen to be a mechanism for dosage compensation in placental mammals' (Ohno, p. 120). 'According to the inactive-X hypothesis, the single heteropyknotic X-chromosome which forms the sex chromatin of female mammals is genetically inactivated. This inactivation is postulated to occur early in embryonic development . . . etc.' (Lyon, p. 383). In spite of the undoubted success of sex chromatin studies, most investigators will agree that the more theoretical aspects are still largely in the realm of hypotheses. For the time being, this book provides useful summaries of the achievements which have been made as well as of some of the problems which remain for the future.

Ursula Mittwoch
irritating not to find ‘thalassemia’ or ‘hemoglobinopathy’, though ‘globinopathies’ appears. The defects are relatively minor and the book as a whole succeeds admirably in its object. There can be few geneticists who would not find it of the utmost value in understanding the very stuff of their science. The book is produced to the very high standard one has come to expect of this publisher.

L. I. WOOLF


Pseudochoolinesterase is an extraordinary enzyme which has diverse functions. The activity in the serum is measured to determine liver function and is also investigated to assess the degree of poisoning by anti-choolinesterases. It is of importance for the anaesthetist and the surgeon because it attacks succinylcholine. It is for this reason that this muscle relaxant is short acting and has become most useful in anaesthetics. In psychiatry, suxamethonium is used to prevent the side-effects of electro-convulsion therapy. The physiological function of pseudochoolinesterase is still under discussion. It is of particular interest in this connexion that pseudochoolinesterase in the brain, in the intestines, and in the nerve endplates of muscle is always found side by side with true cholinesterase which is the truly physiological enzyme hydrolysing acetylcholine. High substrate concentrations of acetylcholine inhibit the true cholinesterase, whereas pseudochoolinesterase can act even on unphysiologically high concentrations of acetylcholine. Possibly the function of pseudochoolinesterase is the protection of the vital cholinesterase against accumulation of acetylcholine at high concentration. Pseudochoolinesterase was the first serum protein for which a genetic control was reported. It exists in several allelic forms, and one of them, the so-called ‘silent’ gene variant, is of interest because its gene expresses itself by producing no enzyme activity at all in vivo. However, the authors of this book suggest that there is in fact some small residual activity present.

The volume deals with these many aspects of pseudochoolinesterase in detail. In its introduction, it discusses the biochemical interpretation of pharmagenetic phenomena as a whole, and then describes the biochemistry of pseudochoolinesterase by defining that of the enzyme itself and differentiating it from the biochemistry of arylesterases, carboxylesterases, lipases, atropine-esterases, and other cholinesterases. It then discusses the usual common variant of the enzyme, its inhibition, reactivation, and different techniques of measuring activity. Other chapters deal with the dibucaine resistant variant, the fluoride resistant variant, and the silent gene, giving a number of hypotheses for their inheritance. In addition to the usual pseudochoolinesterase and its variants, there is found associated with them a so-called C3 component which is related to pseudochoolinesterase rather than haemoglobin A2 is related to normal haemoglobin A. Enzyme kinetics are discussed in detail, as is the connexion between the structure of substrates and enzyme action. One chapter is devoted to the use of pseudochoolinesterase estimation as a liver function test and another is given over to the role of pseudochoolinesterase in anaesthetics, the management of apnoeas, and the occurrence of apnoeas in different context. There is a useful section on techniques at the end. This book is to be highly recommended.

H. LEHMANN


This book is a continuation of McKusick’s catalogue of X-linked traits, patented in 1962. A similar catalogue on autosomal recessives was begun in 1962, and a year later computer methods were initiated, making it possible to begin a catalogue of dominant phenotypes in 1964. This resultant volume deals with 837 dominants, 531 recessive, and 119 X-linked traits. Each entry carries a brief description of the phenotype, a summary of genetic information available, and key references. A scholarly introduction indicates the value of this formidable undertaking as a contribution to genetics and to the clarification of the specific significance of hereditary affections. An authors’ index of some 6000 entries and a surgical index with about 3000 entries add to the value of this unique encyclopaedia. Because of its comprehensiveness and accuracy, this book is assured of a place in every medical genetics department.

ARNOLD SORSBY


This beautifully organized volume breaks radically with the purely descriptive accounts of mental disorders. This is seen at its best in the 4th and 5th of the eight sections into which this book is divided, and these deal with the hereditary mental defects induced by metabolic disorders and those associated with chromosomal anomalies. Both these sections, the one contributed by H. Bickel and H. Cleve and the other by W. Lenz, have the further merit of covering critically a scattered literature not readily available in summary form. Over 40 metabolic disorders and almost as many chromosomal defects are discussed. Mental deficiency is dealt with on a more clinical basis in two further sections, idiopathic disorders being considered by E. Zerbin-Rüdin, while