

Book Reviews

The Genome; By R.S. Verma; VCH Publishers; New York, Weinheim and Cambridge, 1990; xix + 327 pages; £48.00, DM 136.00

This book is part of the series *Frontiers in Molecular and Cellular Biology* edited by E.E. Bittar. Following a short introduction with a historical look at chromosome studies, chapter 2 deals with chromosomal order, a range of differential staining techniques and the importance of chromosome banding patterns. An overview of the structural and functional aspects of chromatin and heterochromatin is presented in chapter 3. Chapters 4 and 5 are concerned with meiosis and describe the structure of centromeres and kinetochores, chromosome movement, crossing over and synaptonemal complexes. The intriguing questions of dosage compensation, sex determination, sex reversal and abnormalities of the sex chromosomes are discussed in chapter 6. Chapter 7 describes the composition, organisation and evolution of mitochondrial DNA and discusses mitochondrial genetic diseases. Sister-chromatid exchanges and their biological implications are considered in chapter 8. Various types of chromosome abnormalities and their implications in medicine are discussed in the next chapter.

The role of chromosomes, oncogenes and retroviruses in the transformation of a normal cell to the neoplastic state are considered in chapter 10. The final chapter discusses the application of recombinant DNA technology in the mapping and sequencing of human and non-human genomes, the diagnosis and prevention of genetic diseases and the prospects for gene therapy. Each of the eleven chapters contains a good and up-to-date list of references which is a useful supplement to the general text.

The book is good, informative and written in a clear style which is very easy to follow. The theories and hypotheses are certainly presented very well. This very good book should prove useful both to those already in the field and to those considering entering it; it is recommended to both molecular and cell biologists. However, this reviewer wonders whether a better title might have been 'Chromosomes' as the book gives a good account of chromosomes with very little information on the genome.

D. Savva

A Laboratory Guide for In vivo Studies of DNA Methylation and Protein/DNA Interactions; By H.P. Saluz and J.P. Jost; Birkhäuser Verlag; Basel, 1990; 286 pages; SFr 98.00

Those scientists familiar with the work of Jost's group will not be surprised to find that this laboratory manual provides a very thorough and meticulous account of the methodology involved in genomic footprinting and sequencing. At a time when a plethora of molecular biology recipe books are jostling for the Maniatis (now Sambrook) crown, the need for more specialised methods books is becoming apparent. Indeed, the IRL Practical Approach Series has been an excellent adjunct to these more general manuals.

Saluz and Jost have set themselves the task of providing the inexperienced molecular biologist with the necessary information to complete a genomic sequencing experiment from start to finish with very few theoretical or practical assumptions. The text is well-organised and user-friendly and has been improved upon after the first edition by the inclusion of a new section on a PCR-based approach to genomic sequencing, the expansion of the trouble-shooting

section and by the addition of material and practical hints from other laboratories which have been brave enough to apply genomic sequencing to their particular problems.

In my laboratory, the first edition provided an excellent practical guide to the isolation of 'high-quality' genomic DNA and made graduate students think about quantitative aspects of biochemistry, something which is seldom encountered in modern molecular biology. The revised edition maintains the high standards set by the first and adds a detailed account of Saluz and Jost's PCR-based method which circumvents the difficulties of transferring sequencing gel fragments to nylon.

Genomic sequencing, as the authors point out is the only way in which all specific methylation changes in the genetic material can be observed. It is therefore a technique of immense value to workers in the field. Now, with the aid of this book, Saluz and Jost bring the technique within the grasp

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of most molecular biologists. This book is also a useful companion to their publications, which out of necessity omit many of the practical steps the authors find essential to obtaining high-resolution sequencing gels. Finally, many of the comments in the appendix are applicable to the general

problems encountered in DNA isolation, hybridisation, sequencing and autoradiography, which makes the book useful to those who simply wish to be informed, and an 'essential buy' for genomic sequencers.

D. Hornby

Molecular Biological Methods for *Bacillus*; Edited by C.R. Harwood and S.M. Cutting; John Wiley; Chichester, 1990; xxxvi + 581 pages; £75.00

Historically, cloning and studying *Bacillus* genes has often been problematical due to the structural and segregational instability of plasmid cloning vectors and the toxicity of *Bacillus* DNA in *E. coli*. These problems have now been overcome and two chapters in *Molecular Biological Methods for Bacillus* comprehensively describe the current methods of choice for cloning *Bacillus* genes, that is, the use of phage vectors in a chapter on gene cloning techniques, and the use of integration or transposon derived vectors. The integration of genes into the chromosome confers many advantages over the use of plasmids and vectors which exploit the efficient homologous recombination activity of the *Bacilli* dominate studies of the molecular genetics of these organisms. The difficulties of using plasmids as cloning vectors and current knowledge of the mechanisms of deletion formation by many commonly used *Bacillus* plasmid cloning vectors are extensively reviewed in this volume, justifiably including a considerable informational input for a methods book. Most other aspects of molecular genetics are covered with chapters on the measurement of gene expression, genetic analysis, bacteriophages and a genetic and physical map of the *Bacillus subtilis* chromosome. The chapter on gene expression includes methods on the purification of *Bacillus* RNA polymerase and this may well be of use to workers interested

in other bacteria displaying RNA polymerase heterogeneity. Basic microbiological techniques are included, i.e. growth and maintenance of strains, sporulation and germination. More specialist topics are on the *Bacillus* cell envelope and secretion, DNA repair and replication. Although the appendix on the *Bacillus subtilis* sequence data base will fast be out of date, it provides information on how to communicate sequence data effectively to all other researchers in the field and is a starting point for newcomers. The book also includes appendices describing media, and the *Bacillus* genetic stock centre. Most notably absent from this book is a detailed chapter on the development of strains and the design of vectors for the use of *Bacillus* as a host for expressing and secreting foreign proteins. Minor points are that information is sometimes repeated (e.g. UV-mutagenesis procedures), and there is often a failure to cross-reference between contributions by different authors. The mixture of basic microbiological methods and techniques for molecular genetics specifically in the *Bacilli* make this book extremely useful to researchers already working with *Bacilli* and to scientists seeking to apply new techniques and approaches to other organisms.

M.C.M. Smith

Molecular Basis of Bacterial Pathogenesis (Volume XI of 'The Bacteria: A Treatise on Structure and Function'; Edited by Barbara H. Iglewski and Virginia L. Clark; Academic Press; San Diego, 1990; xi + 473 pages; £85.00

The study of the methods by which bacteria cause disease has contributed much to modern biology; think of Pasteur's work on fundamental immunology, or that of Griffith on the transforming principle in *Streptococcus* that turned out to be DNA. It remains a field of which the investigation requires a broad knowledge of biology from epidemiology to chemistry: the physiology of the host and its interaction with the invading organism; the structure and biology of the bacteria and the virulence factors that they produce; the genetics, molecular biology, biochemistry and protein structure of these factors. Yet it is surprisingly difficult to decide what is important and what is not; many pathogenic organisms produce proteins that superficially appear to be involved in

disease and have been studied for many years, but importance of which as a virulence factor is still controversial.

This volume, one of a series, deals with all these topics. But there is a sense in which its title 'Molecular Basis of Bacterial Pathogenesis' fails to deliver, and could even be misleading. It is not a comprehensive treatise of the field: it would certainly not do as an introduction or as a text book. But it is an interesting collection of papers usually describing recent research on a wide range of relevant topics. Many well-known pathogens such as *Salmonella*, *Neisseria* and *Vibrio cholerae* are discussed; other infamous bacterial diseases such as tetanus or pertussis (whooping cough) are mentioned only in passing.