

BOOK REVIEWS

Plant Molecular Biology: by DONALD GRIERSON and SIMON COVEY. Blackie, Glasgow, 1985. 176 pp. £17.95 hardback, £8.95 paperback.

In these days when almost every issue of *'Nature'* reports some startling new discovery in plant molecular biology, the ordinary plant scientist cannot but be aware of the rapid developments that are taking place. The problem for him is not only one of keeping up-to-date but also of interpreting the complex jargon that is used in describing these new discoveries. I picked up this introductory text—the first in the field as far as I am aware—hoping that all would be revealed. Although my hopes were not entirely fulfilled, I can say that it provides a concise, well-written introduction to the exciting advances that have been made into probing the molecular basis of heredity of the plant cell.

The unique challenge of the plant cell to the molecular biologist arises from the fact that the DNA differs in nuclei, plastids and mitochondria and that there is genetic interaction and exchange between these three systems. The strength of the book lies in providing thoroughly up-to-date accounts of these three separate genomic systems. The second and third chapters deal with nuclear DNA and the expression of nuclear genes while the fourth and fifth

respectively cover the chloroplast and mitochondrial DNA. The remaining topics emerge from these four core chapters and review in turn environmental factors affecting gene expression, the *Rhizobium*-legume interaction, the *Agrobacterium* crown gall disease system, plant viruses and plant genetic engineering.

It is in the first chapter that I had most difficulty. The authors have tried in the space of 18 pages to provide an introduction to gene cloning, identification and DNA sequencing and in my view, it is really too brief for the general reader. Terms are used with little explanation and some form of glossary is really needed. However, the student with a strong background in general molecular biology will probably have no difficulties. For the uninitiated, the authors do provide a good reading list, to books, reviews and to key literature references.

This text is prepared as a third year undergraduate course book and I can see it being adopted widely for this purpose. We have already done so at Reading. It has all the ingredients for success. The format is attractive, there are many excellent illustrations and the price is reasonable. It deserves to do well.

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Biological Macromolecules and Assemblies: Vol. 2: Nucleic Acids and Interactive Proteins: Edited by F. A. JURNAK and A. MCPHERSON. John Wiley, New York, 1985, pp. 508 + xii. £87.

This second volume in the series reviews current knowledge of nucleic acid structure in relation to that of the proteins with which nucleic acids interact. In the biological environment, these are the proteins which regulate the expression and processing of nucleic acids. Rapid developments in this exciting area of biochemistry are beginning to afford a more complete understanding of the mode of action of a number of carcinogens, mutagens and drugs which influence genetic expression by interacting with nucleic acids and nucleoprotein complexes. The volume arises from the synergistic convergence of two major lines of research. One is the more classical fibre diffraction studies of nucleotides and oligonucleotides, backed up by work on the chemical, physical and biological properties of these nucleotides. The other is that line of research which has concerned itself with the X-ray crystallography of the interactive proteins.

The first three chapters centre on the atomic resolution of the primary physiological forms of DNA and in particular how structures may signal sequence/physiological activity relationships. Subsequent chapters de-

scribe the structure of proteins that recognize and bind to sequence-defined sites on DNA so affecting the expression of specific genes. The final chapters discuss proteins that bind to single-stranded DNA irrespective of sequence. In particular pancreatic ribonuclease and the gene-5 DNA unwinding protein are considered. The concluding chapter examines proteins that bind exclusively to RNA. As the editors point out, although the structures of the tRNA substrates are known in considerable detail, those of the tRNA synthetases themselves are proving more difficult to unravel. Nevertheless, even with this very difficult problem, crystallography is beginning to provide answers.

The price of this book at £87 gives an indication as to its highly specialist nature and the rather limited readership anticipated. It is not exactly bedside reading but rather a reference work for the library. As such, the volume offers a great wealth of crystallographic implications of the structural relationships emerging between nucleic acids and proteins. It is profusely illustrated with carefully prepared and reproduced diagrams, formulae and representations of three-dimensional structures. In brief, it is a book for the initiated but one well worth dipping into for the non-specialist wishing to gain some insight into this rapidly developing area of biochemistry.

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