

## Book reviews

**DNA-Protein Interactions.** Andrew Travers. Chapman and Hall, London. 1993. Pp. 180. Price £14.95, paperback. ISBN 0 412 25990 7.

Much has been written about the structure, shape and function of proteins. Many structural biochemists and molecular biologists, however, tend to overlook the subtleties of the departure of DNA from the classic B-form and the consequences of such distortions for the biological activity of DNA in its interactions with other molecules. Molecular biologists quite naturally think of DNA as essentially linear, while structural biochemists working on proteins tend to assume that the structure of all DNA is B-DNA. In this relatively short book, Andrew Travers has tried to rectify this lamentable situation, by presenting many examples of DNA-protein interactions, in the context of their biological roles, from a strongly DNA-centric viewpoint. In my case, as a scientist working on the structures of DNA-binding proteins, but not yet with DNA itself, he has succeeded.

After a preface where he acknowledges the limitations of such a survey of a rapidly advancing field, the author starts with a chapter revising the basics of DNA structure and the parameters used to describe local and global conformation. He explains how the typical gross structures of DNA strands are related to detailed local deviations from ideality, and then goes on in subsequent chapters to describe examples of some of the different sorts of DNA-protein interactions that have been observed. In each case he emphasizes the role played by the shape and flexibility of the different DNA sequences in optimizing binding.

For such a short book, the coverage is extremely broad. There are chapters on three-dimensional architecture of protein-DNA complexes, sequence-specific binding of proteins to DNA, the mechanism of RNA chain initiation, regulation of promoter selectivity in eubacteria, the mechanism of eukaryotic transcription and the relationship between chromatin and transcription. In each of these chapters the author gives a brief summary of the processes and issues involved and then discusses the mechanisms proposed at the atomic level. He uses examples of genetic experiments and structures of proteins and protein-DNA complexes as appropriate, drawing out trends where possible, and pointing out where current knowledge is incomplete.

Would I buy this book if I hadn't been sent a copy to review? The title is enticing, the contents page reassuringly comprehensive and the author is well respected in the field, but I do have some reservations. The figures are a little disappointing. In these days of computer graphics the absence of any colour, and the somewhat simplistic nature of some of the figures seems a wasted opportunity. These are very mild complaints though; unnecessary colour can be a

distraction, and it is always better to err on the side of simplicity in order to get one's idea across. What is more limiting is the paucity of labels on the figures and the extreme terseness of the figure legends. Added to the fact that the text referring to a figure is often a page-turn away, this means that one sometimes ends up guessing what the author intended to convey, and I wonder how well a reader that doesn't have a reasonable knowledge of the subject already will cope.

On the whole though, anyone who knows about either protein structure or DNA, and who wants to extend their knowledge into the field of DNA-protein interaction, will find this book of great service.

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**Molecular Genetics of Sex Determination.** Stephen S. Wachtel (ed.). Academic Press, London. 1994. Pp. 518. Price £59.50, hardback. ISBN 0 12 728960 7.

This book contains all you ever wanted to know about mammalian sex determination but were afraid to ask!

There are chapters on the hunt for the testis-determining factor, possible (TDF) candidates, identification of SRY as TDF, the structure of the sex chromosomes, X-chromosome inactivation, sex reversal in mice, chromosomal abnormalities, steroid deficiencies and the Anti-Mullerian Hormone story. Oh yes, there is also a chapter on *Drosophila* sex determination, the principle function of which appears to be to keep the word 'mammalian' off the book cover. Individual chapters are all excellent, and so they should be, since they were written by the people who formulated the theories and/or those that did the lab work. In soccer terms, this is the Brazilian World Cup squad. In fact, the line-up contains so many of the acknowledged experts in this field that it is simpler to relate that neither Burgoyne nor Goodfellow have contributed chapters, than it is to list those that have. However, good quality players do not always make a great team — English fans will be aware of how important the Manager is. The impression here is that the authors were given free rein and while this has resulted in chapters which can stand alone, it has created a measure of repetition over the book as a whole. For example, the editor himself has contributed to an excellent overview on 'The Search for the Male-Determining Gene', which I have no doubt will form the basis of countless student essays for many years to come,

but it does rather steal the thunder from Sinclair, Gubbay and Lovell-Badge in the following two chapters. It can also lead to confusion for those not already familiar with this field — the two chapters which review work on Anti-Mullerian Hormone have startlingly different conclusions as to the significance of recent studies.

In all honesty, this is really a very good book which will provide an invaluable source of reference and these carping criticisms result from the disappointment that there are *not* chapters on the sex determination of reptiles, birds (particularly chickens) and fish, in addition to the well-written review on *Drosophila*. In my opinion, the prize for readability goes to Hampikian, Cooper and Graves for the chapter on 'Sex Determination in Marsupials and Monotremes' while not necessarily agreeing on the importance of transgenic marsupials. I shall leave dedicated readers to find the chapter ghost-written by my collaborators, R. Zimmerman and N. Mailer.

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**Gene and Chromosome Analysis (Part B), Methods in Molecular Genetics (Vol. 2).** Kenneth W. Adolph (ed.). Academic Press, London. 1993. Pp. 369. Price £57.00, hardback. ISBN 0 12 044303 1.

A large number of techniques are available to examine biological processes at the molecular level. Publications such as *Molecular Cloning: A Laboratory Manual* by Sambrook and colleagues and *Current Protocols in Molecular Biology* have successfully compiled recipes, hints and tips to tackle most techniques used in molecular biology. These manuals give necessarily limited insight into the wider application of the techniques they describe. This problem is addressed in *Gene and Chromosome Analysis (Part B)*, the second volume in the series *Methods in Molecular Genetics* edited by Kenneth W. Adolph.

The book is divided into five sections covering recombinant DNA, chromosome and DNA analysis, immuno-

globulin genes, mutants and mutagenic activity and finally, replication, transcription and translation. The twenty chapters cover an eclectic array of techniques and research areas. Some give overviews of particular biological systems and describe the techniques used by the authors to analyse them. Others give more technical examinations of particular methodologies. The preface suggests that the book 'will provide practical experimental procedures for use in the laboratory'. It satisfies this claim with mixed success.

From a purely technical point of view, some chapters are more informative than others. For example, the chapter by Hofbauer and Denhardt provides background information and detailed protocols for the isolation of cDNA clones representing low-abundance mRNAs by differential and subtractive hybridization. Another highlight is the excellent chapter reviewing current methods in pulsed-field gel analysis of megabase DNA by Smith and co-workers. Other chapters detail methods that have been used in specific areas but could readily be applied to other systems. One case is the chapter describing the physical mapping of human immunoglobulin heavy chain variable region gene loci by Matsuda and Honjo. This would be a useful guide for analysis of other large tracts of DNA cloned as yeast artificial chromosomes. Unfortunately, there appears to be no standard format for the presentation of methods. Some are given in numbered stages, while others are in the less easy to follow standard text format. Apart from chapters obviously concerned with a particular technique, finding a specific protocol is also difficult. Nevertheless, the index does provide some guidance for this. Apart from practical applications, this book may also be of value for those wishing to gain knowledge of certain research areas. In this context, I found chapters on *p53* gene mutations and heritable mutagenic activity in maize informative and interesting.

In conclusion, I expect this volume to be of little direct use at the bench, but it may find a worthwhile home as a reference text, emphasizing the practical applications of the diverse techniques used by molecular biologists.

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