

## Seminal discussions

Keith Dudley

**Molecular Biology of the Male Reproductive System.** Edited by David de Kretser. Academic Press: 1993. Pp. 483. £76, \$99.

THE testis, if you will excuse the pun, has become a rather 'sexy' tissue to study, and for good reason. If the recently publicized reports of dramatically falling sperm counts in a range of animals prove correct, there is a clear need to improve our understanding of how spermatogenesis is regulated. Moreover, the way in which germ cells develop provides a whole set of unique questions relating to control of

complex developmental pathway activated by the testis-determining gene.

The primary regulators of spermatogenesis are hormonal in nature, luteinizing hormone (LH) and follicle-stimulating hormone (FSH) acting on the Leydig and Sertoli cells respectively. Appropriately, then, two chapters are devoted to the way in which these hormones function, with a further chapter entitled "Paracrine Mechanisms in Testicular Control" outlining what is known about the way in which Leydig and Sertoli cells communicate with each other and with the germ cells. The ideas and experiments described here are pivotal to our understanding of spermatogenesis. The hormonal signals received by the testis are relayed by second messengers and growth factors to the developing germ cells. The line of communication is not unidirectional, however, and good evidence supports the idea that the germ cells also play a role in controlling Sertoli cell function. Like most of the other chapters in the book these chapters on hormonal influences are extensively referenced and punctuated by clear, well annotated diagrams and photographs.

Unsurprisingly the pathway of cellular differentiation present in the seminiferous tubules has tempted many to ask whether their favourite gene is transcribed during spermatogenesis. Two chapters in this book address this rather complex topic. Oncogenes, homeobox genes and others too numerous to mention have been used to probe northern blots of germ-cell RNA with, in most cases, the detection of transcripts. In the vast majority of cases these observations have done little to increase our understanding of how spermatogenesis is regulated but can be seen as the first step towards this goal. Both chapters dealing with gene expression during spermatogenesis act as an informative catalogue of what has and has not been studied in this context. Analysis of this issue is continually dogged by the possibility of functionally meaningless gene expression occurring as the result of chromosome condensation in preparation for DNA packaging.

The final complement of chapters is provided by discussions of growth factors in testicular function, signalling in spermatozoa, iron transport (highlighting the problems and benefits imposed by the blood-testis barrier) and vascular controls in testicular physiology. Those of us with an active research interest in the testis will find *Molecular Biology of the Male Reproductive System* a most accessible update on our current understanding of the subject. It would, however, be a shame if a book of this quality did not gain a wider, non-specialist readership. □

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## Structural perspectives

David M. J. Lilley

**Understanding DNA: The Molecule and How it Works.** By C.R. Calladine & H. R. Drew. Academic Press: 1992. Pp. 220. £15, \$32.50.

**DNA-Protein Interactions.** By Andrew Travers. Chapman & Hall: 1993. Pp. 180. £14.95, \$44.

**DNA Topology.** By A. D. Bates and A. Maxwell. IRL Press: 1993. Pp. 114. £8.95, \$15.95.

**Unraveling DNA.** By Maxim D. Frank-Kamenetskii. VCH: 1993. Pp. 205. £20, DM40.

THERE has been an immense amount of activity in the areas of DNA structure and DNA-protein interactions since the beginning of the 1980s. This has largely come about because of the availability of high-resolution structures of DNA, proteins and their complexes using crystallography and nuclear magnetic resonance. The pace of ideas in the field has been hard to keep up with, and students' reading lists have grown ever longer. It has therefore been clear for some time that these subjects are fertile matter for textbooks, and the lack of such books has been a problem for undergraduate teaching. Now, like the proverbial London buses, four arrive at once. Yet despite a significant overlap in subject matter, it would be hard to imagine four more different books.

Of the four, *Understanding DNA* by Chris Calladine and Horace Drew is undoubtedly the most stylish. This is a book that the authors were clearly bursting to write, and it shows because their characters are indelibly imprinted on it. Their theme is that most of the structural properties of DNA can be derived from a consideration of the chemistry and interactions of the base pairs. From these assumptions, and some simple geometry, Calladine and Drew demonstrate that nucleic acids naturally adopt roughly 11-fold helices. Going a little deeper into the analysis they introduce propeller twist, and show how this results in certain classes of structure for different sequences. This then leads to a consideration of DNA curvature by oligoadenine tracts. The book is beautifully crafted, with a logical step-by-step approach to the subject. The view of DNA essentially from the point of view of the bases alone will not meet with universal approval, but it will provide valuable stimulation to thinking in the area. The result is a book from which the advanced undergraduate will benefit, and which will also generate a refreshing perspective for experts. The tone is a touch patronizing in places for some tastes, but

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United Artists (Courtesy Kobal)

**Woody Allen as a sperm, from the film *Everything You Always Wanted to Know about Sex but Were Afraid to Ask*.**

gene expression: how is cellular differentiation controlled so precisely both across and along the seminiferous tubule, what is the significance of the germ-cell syncytia and how do the final stages of sperm formation occur in the absence of transcription?

This book deals almost exclusively with mammals which, in view of the title, may cause some indignation among, for example, *Drosophila* biologists. That small reservation apart, the chapters have been well chosen and cover most of the important aspects of testis development and function. Appropriately, the first two chapters deal with events in the genital ridges leading to the formation of the testis, giving some of the latest ideas about how the SRY gene may be functioning. The juxtaposition of these chapters leaves the reader in no doubt about the highly