

adequately covers most contemporary problems in the developmental biology of mammals. Thus, chapter 1 provides a detailed description of the present status of gene transfer into mouse embryos. Though many laboratories use the transgenic mouse as a standard experimental object, and much has been written about this, the reader will find original approaches here, and much new data on transgenic mice.

Chapter 2 is written by Drs J. McGrath and Davor Solter, who pioneered a new and very effective method of nuclear transplantation in early mammalian embryos. The authors detail their technique of enucleating newly fertilized mouse eggs and introducing into them pronuclei from other eggs. Some further problems where this technique may well be applicable are mentioned.

Chapter 3 is devoted to mouse oocyte fusion. Although only a few laboratories use this technique at present, there is no doubt that it can give interesting results in the study of nuclear-cytoplasmic relationships in early mammalian development.

Chapters 4 and 5 cover the problem of in vitro fertilization. Chapter 4 contains a thorough analysis of the results obtained by in vitro fertilization of eggs from laboratory and domesticated animals, while chapter 5 is devoted to the recent progress in human in vitro fertilization and embryo transfer. Both chapters include interesting and important information on the *in vitro* fertilization problem including the practical aspects, i.e. its application in farm animal breeding and in medicine. To my regret, however, no detailed technical protocols are given. The authors are very well qualified and could have shared their technical knowledge and experience to help to overcome the numerous difficulties that still exist in the application of in vitro fertilization and embryo transfer, especially in our own species.

Chapter 6 deals with approaches to sex regulation in mammals, namely prefertilization sexing, pre-implantation sexing and post-implantation sexing in laboratory and farm animals. One cannot but agree with the author that knowledge of the sex of embryos could be economically advantageous. However, it is hardly likely that a great profit could be expected if the total outlay on modern technology is taken into account.

Chapter 7 is a review of cryopreservation of mammalian eggs and embryos. The pioneering works of Drs D. Whittingham and I. Wilmut on reliable methods of freezing mouse embryos were published 15 or more years ago. Since then, embryo cryopreservation has come to be a standard procedure not only in laboratory studies, but also in farm animal breeding, and even for human embryos. It has had a considerable economic impact, which gives added assurance of the validity of the author's recommendations.

In chapter 8 the reader finds a detailed description of the present state of embryo transfer in animals. The introduction of these procedures was responsible for a

revolution in farm animal breeding, and as a result there has sprung up a whole embryo transfer industry. I do not dare to judge how much better the commercial application of embryo transfer techniques would be in the hands of those who have read this chapter. There is a selected list of references which the reader will undoubtedly find very useful.

Chapters 9–13 are devoted to the theoretical aspects of mammalian development. In chapter 9 Dr M. H. Johnson comments on the results obtained in his laboratory concerning the role of cell interactions in generating cell diversity in early mouse embryos. Even those who are familiar with other recent reviews of Dr Johnson on the same subject will find here new ideas in support of his polarization hypothesis.

Chapter 10 concentrates on tissue interactions in developing skin, teeth and related ectodermal derivatives, and chapter 11 on epithelial–mesenchymal interactions in the embryonic development of the mammary gland. Both chapters adequately describe the present state of these far from simple problems and contain information useful for those who are interested in new ideas and modern methods in morphogenesis.

Chapters 12 and 13 discuss immunological and immunogenetic approaches to the analysis of mammalian development. These are relatively new approaches, and the reader will find many things to attract his attention.

On the whole, this book leaves a good impression. It should find a place, if not on the scientist's desk, then on the library shelves. Although the developmental biology of mammals is a fast-moving and competitive field, with a great number of books devoted to it, this particular volume is not only a source of interesting and helpful information now, but it will undoubtedly remain so for some years to come.

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Gene Structure in Eukaryotic Microbes. Special publications of the Society for General Microbiology, vol. 22. Edited by J. R. KINGHORN. Oxford: IRL Press. 1987. 312 pages. Soft cover £27.50/US\$52.00. ISBN 1 85221 0400.

Even given the title of this book, it is not reasonable to expect the same aspects of genes to be discussed in depth for each of the diverse organisms loosely grouped as microbes. Nevertheless the reader has some expectation that different organisms will be compared in terms of the structure of 'typical' genes. At the very least one hopes for the sort of overall structure that permits the reader to draw his own conclusions. This book is unfortunately not particularly successful on these counts. Only in the final chapter (P. Montagu), nominally comparing 'lower'

with 'higher' eukaryotes, is a serious attempt made to summarize the similarities and differences between organisms. In brief, the book suffers from 'multi-author syndrome'. That said, the majority of chapters are good enough summaries of their respective fields that a reader with some understanding of molecular biology can use the book to broaden his or her horizons.

Not surprisingly, given the large number of man-years invested in the topic, the genes of the yeast *Saccharomyces cerevisiae* are the best understood, at least among the microbial eukaryotes. A clear summary of the structure of a typical *S. cerevisiae* gene is presented in the chapter by A. Brown and G. Lithgow: gene transcription and its regulation, and the DNA sequences directing these processes are clearly presented. In addition this chapter includes a discussion of post-transcriptional events – mRNA stability and translation – and their often overlooked roles in regulating gene expression. RNA splicing and the sequences that direct it in *S. cerevisiae* genes are discussed in a separate chapter (D. Gallwitz and colleagues). Filamentous fungi have been popular targets for the investigation of gene regulation, and the development of transformation systems in particular has led to the molecular analysis of structural and regulatory genes. S. J. Gurr and colleagues have assembled a useful and comprehensive list of filamentous genes so far studied, and attempt to draw general conclusions about the sequence requirements for transcription, splicing and so on.

The mitochondrial genomes of yeasts and filamentous fungi are discussed in three separate chapters: these could usefully have been combined, especially since *S. cerevisiae* and *Schizosaccharomyces pombe* are dealt with by the same author (K. Wolf: filamentous fungi are described by T. Brown). The total space devoted to mitochondrial genomes of fungi is nearly as much as to their nuclear genomes. Furthermore the nuclear genes of *S. pombe*, surely a contender for second place to *S. cerevisiae* as a model genetic microorganism, are not discussed other than peripherally.

The chapters on algae (D. Nicholl), *Physarum* (N. Hardman) and ciliated protozoa (A. Wilson & J. Somerville) present remarkable contrasts. The detailed structure of some nuclear and chloroplast genes of *Chlamydomonas* and *Euglena* is reviewed: an area of considerable interest since the two subunits of the central photosynthetic enzyme ribulose biphosphate carboxylase are encoded in different genomes. Rather few genes have been identified and analysed in *Physarum*, and consequently the chapter is mainly concerned with overall genome structure. From this point of view, the ciliates present the most intriguing picture, and the major genomic changes which take place during the development of the 'somatic' macronucleus from the 'germ-line' micronucleus are clearly explained.

Two other chapters deal with organisms of medical

rather than purely academic importance: the malaria parasite *Plasmodium* (M. Mackay) and trypanosomes responsible for several serious diseases (P. Michels). Interest has concentrated on the genes involved in pathogenicity such as surface antigens characteristic of the different stages in the life cycles, with a view to vaccine production. The variable surface glycoproteins of trypanosomes are responsible for evasion of the host's immune system, and the means by which the genes are assembled and activated by transposition to a telomeric site is one of the most exciting areas of current research.

In summary, this is a book whose constituent parts are very much better than the whole: priced at £27.50, the book is a useful library acquisition, but potential individual purchasers might prefer to consider texts more specifically related to their particular interests.

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International Industrial Biotechnology. Cambridge University Press. Vol. 8. 1988. 6 issues. £55 for Institutions, £32 for Individuals. ISSN 0269 7815.

This is a bimonthly periodical published by Cambridge University Press with editors from Cranfield Institute of Technology and an editorial board of 6 (4 UK, 1 USA, 1 Korea) and with the stated intention of appointing an additional editor from the far east. The periodical is a relaunch of a publication which began life as *Industrial Biotechnology Wales* in 1983 and edited by R. N. Greenshields.

Industrial Biotechnology aims at a wide readership and the two issues seen by this reviewer contained some 'regular features' including personal profiles, national biotechnology programmes, company reviews, equipment news, outlines of market surveys, book reviews and a list of forthcoming events together with a patents digest. In addition, there are a number of more specialized scientific articles (written at a standard suitable for the non specialist), on topics as diverse as HPLC applications, algal culture, monoclonal antibody technology, protein purification, agrofibres, etc.) and articles on economic aspects (business planning and financing).

This is therefore a 'current awareness' periodical likely to be read by those interested in the commercialization of biological research and to be found in 'coffee clubs' and the like. The nearest equivalent would be the well established *Nature 'Bio/Technology'*. At £5.33 per issue (personal subscription) it is priced competitively with the more glossy, colourful and upmarket 'Bio/Technology'. Time will tell if it is to be a commercial competitor.

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