

Book review

Analysis of Genes and Genomes

by Richard J Reece

469pp, John Wiley and Sons Ltd, 2004, ISBN 0-470-84379-9 (hardback, £110), 0-470-84380-2 (paperback, £34.95)

When I began my PhD nearly forty years ago, most geneticists were concerned with the relationship between genotype and phenotype. We knew roughly what genes were and how they worked, but not much about their organisation in any particular genome, other than perhaps in *E.coli*. We are now in the post-genomic age, where the publication of the complete DNA sequence of an organism is an interesting, but relatively commonplace event, and the real problem facing biology is how to make sense of the information we have available.

How did we get from there to here? In the last three decades, cloning, genetic engineering and sequencing gave biologists the tools to isolate, amplify and analyse genes, and made it possible to ask a whole set of new questions, and what is more, to get answers to those questions. These technologies are the focus of this book, and although I am a bit of a sceptic about technology for its own sake, if one is going to understand and evaluate the experiments, one needs to understand the techniques, and that creates a need for books like this which describe and explain the use of these tools.

I particularly liked the first chapter which recapitulates some classical experiments in molecular genetics, many of which laid the foundations for the technologies that over the last thirty years led to the avalanche of new information about our genes and how they are organised, structured and expressed. These experiments too often get forgotten about in what we teach today, but the value of these classic experiments lies not just in the results and their implications, but also in what they reveal about how science is done.

The next seven chapters form the core of the book in the sense that they cover much of the technology of cloning genes, isolating and characterising them, including topics like vectors, restriction enzymes, PCR technology, screening and identification etc. It is not an exhaustive list, deliberately so, because the author has chosen illustrative examples rather than trying to cover everything, but it is remarkably comprehensive in its coverage. One always finds surprising omissions in books like this, and I was a little surprised to find no mention of transposon mutagenesis and transposon tagging in the chapter on Mutations.

Chapters 9 and 10 cover sequencing projects and bioinformatics, and the rapidly expanding field of chip technology, global gene expression studies, and regulatory networks. The development of chip technology is fascinating, because it offers a way to look at the function of genomes in a more holistic manner than ever before, and this is opening up whole new areas of investigation. There are still major problems to be solved in getting reliable

quantitative data, and at this early stage the technology could go in lots of different directions.

The final three chapters cover the application of this technology to the engineering of plants, animal cells and animals, which is of course an area of considerable controversy. The treatment is factual, as throughout the book, and deals with what we can and cannot currently accomplish. This is a refreshing contrast to many of the highly public claims and counterclaims of practitioners and opponents in this field.

Approaching any book like this, a reviewer has to ask basic questions, such as who the book is aimed at, what is its coverage of the subject and how does it succeed in its approach. This book clearly looks as if it is aimed at advanced undergraduate level/beginning postgraduates, and for many years, the only book in the same field was Old and Primrose's 'Principles of Gene Manipulation', which came out in a new edition about three years ago. For the sake of interest, I compared the contents pages of the two books, and as you might expect, much of the contents are fairly similar. Reece's book is more up to date, due to its later publication date, and it is a thorough, readable and comprehensive treatment of a rapidly developing field. It is clearly a text which will be very useful to undergraduates, but I think it also deserves a wider readership, because some chapters could well serve as an introduction to the subject for a non-specialist reader seeking to get an understanding of the technology involved in the study and manipulation of genes.

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