Book review

An Introduction to Genetic Engineering (2nd edn)

DST Nicholl

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Prior to 1970, molecular biology was severely limited by the inability of researchers to cut DNA molecules at specific sites. The breakthrough came with Hamilton Smith's discovery of a restriction endonuclease from *Haemophilus influenzae*, and his elucidation of the simple target sequence at which the enzyme cuts DNA.

In the 1950s host-controlled restriction and modification were recognised as common phenomena, in which a single cycle of phage growth in a particular bacterial host strain alters the host range of the progeny virus. The virus fails to form plaques efficiently when plated on a second bacterial host strain, so its host range is restricted. Those few virus particles that do form plaques on the second host strain produce progeny that subsequently can plate efficiently when re-tested on the second strain. The modification that allows the virus to plate efficiently on the second strain differs fundamentally from mutation because it is imposed by the host cell on which the virus was last grown, and it is not inherited. The modification is lost upon one cycle of growth on the original strain.

In the 1960s, Arber and Dussoix clarified the molecular basis of the phenomena, and the first restriction enzyme, from *Escherichia coli* K, was isolated and characterised by Meselson and Yuan in 1968. Although sites recognised by the *E. coli* K enzyme could be genetically mapped in phage DNA, determined efforts to define the DNA sequences cleaved were unsuccessful because the mechanism of *E. coli* K enzyme is complex. Hamilton Smith's discovery of the prototypically simple and useful enzyme from *Haemophilus* was the key that unlocked the door to the phenomenal development of recombinant DNA technology. The verb to *restrict* DNA was coined.

Although by the mid-1960s restriction and modification had been recognised as interesting phenomena

within the field of bacterial genetics, who could have foreseen the astonishing impact restriction enzymes would have, with the subsequent explosion of recombinant DNA technology, gene manipulation and genetic engineering?

All of today's undergraduates in genetics, biochemistry, molecular biology and biotechnology need to understand genetic engineering, its techniques, and its applications both within and beyond the laboratory. Desmond Nicholl's book, *An Introduction to Genetic Engineering (2nd edition)*, aims to meet this demand. Although it is an introductory text, in practice it would suit students who already have some knowledge of molecular biology. Divided into three parts, it first briefly covers basic molecular biology, then the methodology of gene manipulation, including PCR, and finally the applications of genetic engineering in the genomics, medical, and biotechnological fields. The treatment is logical, with a writing style that is clear and concise, resulting in pages that are admirably packed with facts. In the later chapters, Nicholl takes the opportunity to note the variety of ethical and practical issues of genetic screening, gene therapy, transgenic farm animals, GMOs and organismal cloning, but without addressing these in depth. The book is of a length, price, and level of treatment that make it suitable for many undergraduate courses. The illustrations are monochrome and it is not referenced.

For this reviewer there was a strong sense of *déjà vu* because this book is very derivative. For example, in chapter 6, out of 16 figures and tables, six of them are acknowledged as being taken from *Principles of Gene Manipulation* (of which I am a co-author), and three others are acknowledged as being taken from other textbooks. However, borrowing heavily from other textbooks will matter little to the average undergraduate reader, and I do not doubt that Nicholl's book will find an appreciative audience.

RW Old
Department of Biological Sciences
University of Warwick
Coventry CV4 7AL, UK
E-mail: ROld@bio.warwick.ac.uk