

Preface to the First Edition

There are now a number of molecular biology manuals on the market and the editor of an entirely new one has a duty to explain why his contribution should be needed. My answer is that although there are some excellent handbooks for researchers who already know the basic principles of gene cloning, there are very few that cater for the absolute beginner. Unfortunately, everyone is a beginner at some stage in their careers and even in an established molecular biology laboratory the new research student can spend a substantial amount of time not really understanding what is going on. For the experienced biologist expert in a discipline other than molecular biology, and perhaps without direct access to a tame gene cloner, guidance on how to introduce recombinant DNA techniques into his or her own research programme can be very difficult to obtain. For several years I have run a basic gene cloning course at UMIST and I have continually been impressed by the number of biochemists, botanists, geneticists, cell biologists, medics and others who want to learn how to clone and study genes.

The contributors to *Essential Molecular Biology: A Practical Approach* were asked to write accounts that combine solid practical information with sufficient background material to ensure that the novice can understand how a technique works, what it achieves, and how to make modifications to suit personal requirements. Where appropriate, the reader is also given advice on more advanced or specialized techniques. In all cases the authors have responded to the challenge and produced chapters that make concessions to the beginner without jeopardizing scientific content or practical value. I hope that the result is a handbook that will guide newcomers into molecular biology research.

The book is split into two parts. Volume I deals with the fundamental techniques needed to carry out DNA cloning experiments. The emphasis is on coming to grips with the necessary practical skills and understanding the background in sufficient detail to be able to adjust to circumstances as the project progresses. In Volume II, procedures for preparing gene libraries and identifying genes are described, together with methods for studying the structure of a cloned gene and the way it is expressed in the cell. It is assumed that the basics from Volume I are now in place, but the procedures are still

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described in the same down to earth fashion with protocols complemented by background information and troubleshooting hints.

I must thank a number of people for their help with this book. First, I am grateful to the authors who provided the manuscripts more or less on time and were prepared in many cases to make revisions according to my requests. I would especially like to thank Paul Towner for stepping in at the last minute after I had been let down with one chapter. The participants and assistants on the recent UMIST gene cloning courses helped me formulate the contents of the book and my colleague Paul Sims provided valuable advice. The Series Editors and publishers made encouraging noises when the going got tough and sorted out a number of problems for me. I am also grateful to my research students for giving their opinion on the practical contents of the book. Finally, I would like to thank my wife Keri for proving that even an archaeologist can learn how to clone genes.

1990

T.A.B.

Preface to the Second Edition

The primary objective of *Essential Molecular Biology: A Practical Approach*, that the book should be accessible and informative to researchers encountering molecular biology techniques for the first time, is as valuable today as it was when the first edition was written 10 years ago. If anything, the need for a basic DNA manual has increased as molecular biology techniques have become more and more mainstream in disparate areas of research. Gene cloning, sequencing and PCR are now central to those various research fields grouped together under the heading 'molecular life sciences' and an ever-increasing number of new research students enter these fields every year. Equally impressive has been the spread of DNA techniques into areas of research such as molecular ecology and biomolecular archaeology, where the power of DNA analysis is contributing to scientific knowledge in disciplines that just a few years ago either did not exist at all or had little use for clones and PCR products. When planning the Second Edition of *Essential Molecular Biology: A Practical Approach* I therefore determined from the very start that the objective of the book should remain the same: 'to combine solid practical information with sufficient background material to ensure that the novice can understand how a technique works, what it achieves, and how to make modifications to suit personal requirements'.

Since the first edition was published there has been a dramatic expansion in the range and sophistication of molecular biology techniques, even in those basic techniques that are of greatest importance to the newcomer. To address these changes, every chapter has been revised and updated as appropriate, with some chapters completely rewritten. This is particularly true for the more advanced techniques described in Volume II but also applies to the very basic procedures covered in Volume I, the advances over the last 10 years even involving such fundamental techniques as DNA purification and agarose gel electrophoresis. Despite these changes, the two volumes are still organized according to the rationale of the first edition, with the procedures for DNA and RNA manipulation (purification, electrophoresis and the construction and cloning of recombinant molecules) in Volume I and those for isolating and studying individual genes (preparation and screening of libraries, polymerase chain reactions, DNA sequencing and studying gene expression) in Volume II.

An edited volume is only as good as the chapters it contains and I therefore wish to thank all the contributors for taking such great care to address the objective of

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Essential Molecular Biology by making their chapters lucid and informative. I also thank Liz Owen and Lisa Blake of Oxford University Press for ensuring that the chapters became a book rather than languishing in my computer, and my wife Keri Brown for helping me find the time to organize and assemble these two volumes.

2001

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