

Preface

Over the last 30 years, a revolution has taken place that has put molecular biology at the heart of all the biological sciences, and has had extensive implications in many fields, including the political arena. A major impetus behind this revolution was the development of techniques that allowed the isolation of specific DNA fragments and their replication in bacterial cells (*gene cloning*). These techniques also included the ability to engineer bacteria (and subsequently other organisms including plants and animals) to have novel properties, and the production of pharmaceutical products. This has been referred to as *genetic engineering*, *genetic manipulation*, and *genetic modification* – all meaning essentially the same thing. However, many of the applications extend further than that, and do not involve cloning of genes or genetic modification of organisms, although they draw on the knowledge derived in those ways. This includes techniques such as *nucleic acid hybridization* and the *polymerase chain reaction (PCR)*, which can be applied in a wide variety of ways ranging from the analysis of differentiation of tissues to forensic applications of DNA fingerprinting and the diagnosis of human genetic disorders. In an attempt to cover this range of techniques and applications, we have used the term *DNA technology* in the subtitle.

The main title of the book, *From Genes to Genomes*, is derived from the progress of this revolution. It signifies the move from the early focus on the isolation and identification of specific genes to the exciting advances that have been made possible by the sequencing of complete genomes. This has in turn spawned a whole new range of technologies (*post-genomics*) that are designed for genome-wide analysis of gene structure and expression, including computer-based analyses of such large data sets (*bioinformatics*).

The purpose of this book is to provide an introduction to the concepts and applications of this rapidly-moving and fascinating field. In writing this book, we had in mind its usefulness for undergraduate students in the biological and biomedical sciences (who we assume will have a basic grounding in molecular biology). However, it will also be relevant for many others, ranging from research workers who want to update their knowledge of related areas to

anyone who would like to understand rather more of the background to current controversies about the applications of some of these techniques.

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