
Preface

Genetic technology is the buzzword of the new millennium. Via the media, we are informed day by day about new genes, disease-causing mutations, cloned animals, “Frankenstein” food, and further advances in the Human Genome Project. However, in spite of the constant media attention, most people remain confused about the importance and application of these new discoveries. It seems that only the high priests of this new technology, armed with PhDs in molecular biology, understand the meaning, importance, and consequences of these new breakthroughs. But should it be like this? After all, molecular biology is only a tool, though one that enables us to study the secrets of life, death, and disease development.

Vision Research Protocols has been written for those scientists, optometrists, and ophthalmologists who are interested in eye research, but have not been trained in molecular biology. It covers molecular biological techniques from the basics to the most sophisticated recent technologies. In each case, the techniques described have been adapted to the special requirements of eye research. The first four chapters discuss crucial molecular biological methodologies that create a basis for the more complex methodologies presented later. The last chapter discusses the impact of these new technologies on everyday clinical services.

The first four chapters follow the basic dogma of molecular biology. They describe the extraction of DNA and detection of mRNA and protein expression *in vitro* and *in vivo*. In addition, Chapter 2 gives a description of the basics of tissue culture technology, which has significantly advanced biological research since the 1970s.

In a philosophical sense, diseases can be considered as disturbances in the normal balance within a complex organism. In molecular terms, certain genes become up or down regulated, or turned on and off out of sequence. In this respect, the new molecular biological techniques can have a significant impact both in the development of animal models and on new treatments for diseases. Chapters 5, 6, and 12 discuss technologies suitable for the down regulation of gene expression. Chapters 7–10 are devoted to the new gene therapy technologies. Following a very enthusiastic start in the early 1990s,

gene therapy proved to be a difficult technology to apply, and further improvements are required before it can be considered ready for clinical application. However, even in its present form, it is particularly suitable for the development of animal models and for testing new therapies in transgenic and knock-out animal models. *Vision Research Protocols* contains a detailed description of the three most popular viral delivery vehicles: recombinant adeno, adeno-associated, and retroviruses. In addition, delivery methods for the most popular animal models are also described.

In summary, I recommend *Vision Research Protocols* to all medical and nonmedical scientists who are thinking of using these new technologies in their research, or those clinicians who would like to find out the current state of progress in this important field of molecular medicine.

I would like to sincerely thank all the contributors, who are leading scientists in their fields with real hands-on experience in the different techniques. They were wonderful to work with, and I would specifically thank them for providing their invaluable comments in the troubleshooting sections of each chapter. I also would like to thank Ms. Louise Kemp, who has been superb in organizing the contributions of experts from three continents.

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