
Preface

Recent years have witnessed the sequencing of numerous genomes, including the all-important human genome itself. While genomic information offers considerable promise for drug discovery efforts, it must be remembered that we live in a protein world. The vast majority of biological processes are driven by proteins, and the full benefits of DNA databases will only be realized by the translation of genomic information into knowledge of protein function. Ultimately, drug discovery depends on the manipulation and modification of proteins, and thus, the genomic panacea comes with significant challenges for life scientists in the field of therapeutic biotechnology. Indeed, it has become clear that success in the modern era of biology will go to those who apply to protein analysis the high-throughput principles that made whole-genome sequencing a reality.

In this context, phage display is an established combinatorial technology that is likely to play an even greater role in the future of drug discovery. The power of the technology resides in its simplicity. Rapid molecular biology methods can be used to create vast libraries of proteins displayed on

bacteriophage that also encapsulate the encoding DNA. Billions of different proteins can be screened en masse and individual protein sequences can be decoded rapidly from the cognate gene. In essence, the technology enables the engineering of proteins with simple molecular biology techniques that would otherwise only be applicable to DNA. In addition, the technology is very much suited to the methods currently used for high-throughput screening, and thus, can be readily adapted to the analysis of multiple targets and pathways.

This book comprises 17 chapters that provide a comprehensive view of the impact and promise of phage display in drug discovery and biotechnology. The chapters detail the theories, principles, and methods current in the field and demonstrate applications for peptide phage display, protein phage display, and the development of novel antibodies. The book as a whole is intended to give the reader an overview of the amazing breadth of the impact that phage display technology has had on the study of proteins in general and the development of protein therapeutics in particular. I hope that this work will serve as a comprehensive reference for researchers in the phage field and, perhaps more importantly, will serve to inspire newcomers to adapt the technology to their own needs in the ever expanding world of therapeutic biology.

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