
Preface

Vaccine research and development is advancing at an unprecedented pace, with an increasing emphasis on rational design based upon a fundamental understanding of the underlying molecular mechanisms. The aim of this volume is to provide a selection of contemporary protocols that will be useful to both novice and advanced practitioner alike. The variety of procedures required to design, develop, produce, and assess a vaccine is immense and covers aspects of chemistry, biochemistry, molecular biology, cell biology, and immunology. No single volume can hope to cover these topics exclusively. Rather, here we attempt to provide a methods sourcebook focusing on hands-on practical advice. Complementary and background information may be found in other volumes in the *Methods in Molecular Medicine* series. Of particular interest are volumes on *Dendritic Cell Protocols*, *Interleukin Protocols*, *Vaccine Adjuvants*, and *DNA Vaccines*.

Since the publication of the first edition of *Vaccine Protocols* there have been major advances, particularly in the areas of bacterial genomics, antigen-specific T-cell quantification, genetic manipulation of vaccine vectors, the harnessing of natural molecules concerned with the regulation of immune responses, and the burgeoning field of DNA vaccinology. Hence, the extensive revision of this edition with new chapters on live viral vaccine vectors, attenuated bacterial vectors, immunomodulators, MHC-peptide tetrameric complexes, and the identification of vaccine candidates by genomic analysis. Additionally, chapters from the first edition have been updated to accommodate state-of-the-art methods in vaccinology. We have maintained the overall structure of the book to comprise essentially three basic chapter types. First, those describing in detail the development and production of vaccines using specific techniques, including genetic manipulation of viruses or bacteria to produce live attenuated vaccines, vaccine vectors, or inactivated toxins and the production of synthetic peptides and conjugate vaccines. Second, chapters describing more general techniques for vaccine formulation and delivery and assessment of immune responses. Finally, a few chapters review the critical areas of scale-up to manufacture, vaccine quality assurance, and clinical trials in order to prime the reader with the relevant background information. Together with a general overview of vaccines, the present volume on *Vaccine Protocols* should provide valuable and relevant practical information to all those seeking to produce improved or novel vaccines.

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