
Preface

Peptide microarrays, with their unlimited content flexibility, are formidable tools in many areas of biochemistry and medicine. For example, they enable the design of enzyme inhibitors and enhancers or advance structural and functional information on protein interactions. When employed in epitope mapping, they serve to identify antibody binding domains that can be implemented in vaccine and new therapeutics development.

Peptide microarrays can also diagnose diseases. By the design of peptide arrays incorporating epitope collections, the huge amount of immunological information hidden in the plasma of an individual can be revealed, thus profiling his or her personalized immune response to infection, vaccination, allergens, and autoimmunity and providing hints on new biomarkers. Peptides in a miniaturized and multiplexed format test can simultaneously screen for dozens to thousands of biomarkers in a single assay with easier and less expensive protocols than most DNA or protein microarrays.

Advancements made in recent years in peptide library synthesis, immobilization chemistry, and array production have created a ground from which different new applications are derived, extending the ways in which peptide microarray technology is applied every day. The maturity of the technique is now proven by the many clinical applications published and by the several commercial providers offering support and services.

Peptide Microarrays: Methods and Protocols, Second Edition, is an updated outlook on peptide array technology. The 21 chapters in this volume provide insights into the technological fundamentals together with a comprehensive overview of the potentialities of this technology in basic research and clinical assays. Not all techniques could be described fully, but we have tried to match timely and useful new developments with consolidated approaches for both the experienced researcher and the novice to the field.

The book is divided into three parts each containing an introductory review chapter and a collection of protocols:

Part I, *Peptide arrays: cutting-edge methods and technology*, provides an overview of methodological aspects and is focused on general applications of peptide arrays such as affinity study, enzyme activity screening, epitope mapping, and secondary structure determination.

Part II, *Chemoselective strategies to peptide immobilization*, is devoted to smart methods of peptide binding and oriented display on surfaces.

Part III, *Peptide microarrays for medical applications*, comprises examples of clinical applications in the fields of allergy and autoimmunity.

Taken together, these chapters provide a set of invaluable tools to advance and extend research in peptide and protein chemistry, and we hope that our readers will take advantage of the unique insights and novel solutions offered by the authors of each chapter of this book. It is our hope that this volume will encourage scientists to apply current peptide array protocols to the study of interesting new biochemical and medical questions and will assist researchers aiming at developing new methods to further develop the peptide microarray technology.

We are grateful to all the authors for sharing their valuable knowledge when contributing this volume. We thank Prof. John Walker and the editorial staff of Springer for continuous encouragement and assistance. Finally, we wish to express gratitude to the members of our group and to all those who supported and continue to do so.

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<http://www.springer.com/978-1-4939-3036-4>

Peptide Microarrays

Methods and Protocols

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2016, XI, 298 p. 77 illus., 52 illus. in color., Hardcover

ISBN: 978-1-4939-3036-4

A product of Humana Press