
Preface

Enzyme-linked immunospot (ELISPOT) assay is a molecular tool for accurate quantification of cytokine-secreting immune system cells that is widely used in many fields of biomedical research including vaccine development, transplantation studies, and HIV, cancer, and allergy research. Although ELISPOT has been known to researchers for more than two decades, it still remains a state-of-the-art technique requiring solid knowledge and skills to run the assay. Being a combination of both bioassay and immunoassay techniques, ELISPOT consists of a set of multiple sequential procedures, each playing an important role in the outcome of the assay. It is well known that setting up an ELISPOT assay that produces recognizable and quantifiable spots may be very difficult not only for beginners, but also for experienced researchers. The *Handbook of ELISPOT: Methods and Protocols* is the first book dedicated entirely to the ELISPOT technique and is written for researchers who wish to learn about this assay and excel in performing it.

Handbook of ELISPOT: Methods and Protocols provides a comprehensive collection of ELISPOT protocols covering topics from vaccine development, tuberculosis research on animal models (mice, rat, and monkey), and for human studies. The book begins with a chapter on the history of ELISPOT technique written by one of the inventors of the ELISPOT assay (Chapter 1) and is followed by chapters on chemical and biological aspects of ELISPOT assays (Chapter 2), use of membrane-backed plates (Chapter 3), standardization and validation procedures (Chapter 4), removal of cells from ELISPOT plates (Chapter 5), cell separation techniques (Chapter 6), and quantification of ELISPOT data (Chapters 7 and 8). Chapters 9–12 cover the application of ELISPOT assays on animal models including rhesus macaque (Chapter 9), feline (Chapter 10), and mouse (Chapters 11 and 12) animal models. Application of the ELISPOT assay to human cells is covered in Chapters 13–16, which focus on using this assay to study measles (Chapter 13), multiple sclerosis (Chapter 14), monitoring immune responses (Chapter 15), and studying autoimmune sensorineural hearing loss (Chapter 16). Chapters 17–20 describe modifications of the ELISPOT assay, including development of multicytokine detection systems (Chapters 17–19) and combination of ELISPOT assay with immunocytochemistry (Chapter 20).

This book will serve both as a convenient reference manual for beginners and as a troubleshooting guide for experienced ELISPOT users. Methods and

protocols are written by the leading researchers in their fields and presented in such a way that they can be easily adapted and modified for different research projects. The *Handbook of ELISPOT: Methods and Protocols* contains detailed technical reviews on many different aspects of ELISPOT assays with emphasis on their merits and shortcomings.

I would like to thank all of the authors who dedicated a significant amount of their time to prepare high quality manuscripts. Their efforts will contribute to understanding the principles of ELISPOT assays and allow the use of this technique in many diverse fields of biomedical science. I thank Sarah Palzer for her editorial assistance, and I am particularly thankful to Dr. Monica Tsang for her advice and support with editing this book. I also wish to thank R&D Systems Inc. for supporting ELISPOT projects and inspiring my editorial work.

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Handbook of ELISPOT

Methods and Protocols

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