

Book Reviews

METHODS IN MOLECULAR BIOLOGY VOL. 214: SUPERANTIGEN PROTOCOLS

Edited by Teresa Krakauer. Humana Press, Totawa, New Jersey, USA, 2003. 260 pages. Price: US\$89.50. Hardcover.

This book is a new addition (volume 214) to John M Walker's series of *Methods in Molecular Biology*TM. It is also the first book that offers a comprehensive gathering of protocols applied directly to the study of superantigens (SAGs) but the readers of this review are advised not to assume it is only of relevance to superantigen researchers. The first of the 15 chapters provides an up-to-date review of our current knowledge on SAGs, including molecular structure, biological binding properties, concept of T cell stimulation, their potential role in human disease and aspects of SAG based vaccine development.

The following chapters cover a diverse range of SAG related research methods, which are outlined in a step-by-step easy to follow fashion. Each chapter closes with a very useful 'Notes' section, where the authors highlight potential problems with certain techniques and provide helpful tips.

Chapter 2 describes the techniques to produce large amounts of soluble recombinant superantigens after expression in *Escherichia coli*. This chapter might be of interest in the broadest range of readers, considering the high costs for commercially available SAGs and the easiness to produce recombinant SAGs at a fraction of the price. Chapter 3 is the only part that focuses on viral SAGs in this otherwise strongly bacterial SAG-orientated book. It describes the detection of mouse mammary tumour viral SAGs by flow cytometry.

Chapters 4–7 deal with the stability of SAGs and their molecular interactions with T cell receptor and MHC class II antigen. Recent advances in the production of soluble T cell receptors allow researchers to investigate the binding kinetics of SAG with T cell receptor (TcR) and MHC II using a BIAcoreTM real-time biosensor (Chapter 5). Over the last 10 years, biosensor studies have become increasingly important to study receptor/ligand interactions, but most of the publications are research articles that neglect the important technical details of this sophisticated method. Therefore, this chapter provides useful information on the direct application of real-time biosensor studies of SAGs.

Chapter 7 describes methods for the production of soluble TcR from *E. coli* in the milligram range, which facilitates alanine scanning mutagenesis studies of functional interactions between SAG and TcR. T cell receptor V β domains can then be selected for high affinity using a yeast display system (Chapter 6).

Protocols to study the immunological effects of SAGs on T cells, in particular the role of costimulatory molecules, signal transduction and cytokine responses are described in Chapters 8–10. These chapters deal with methods for enrichment of T cells and monocytes for proliferation assays, cell lysis and immunoprecipitation techniques, and detection and quantification of SAG-induced cytokines by ELISA. Chapter 11 provides protocols for RNase protection assays in the development of new therapeutics for the suppression of SAG-induced cytokine responses while the study of SAG induced

cytokine production and T cell stimulation at the single cell level are the focus of Chapters 12 and 13.

The final two chapters are dedicated to the analysis of the more pathogenic properties of SAGs, in particular the assessment of SAG-induced changes in epithelial ion transport (Chapter 14) and the use of animal models to investigate the pyrogenic and emetic properties of SAGs (Chapter 15).

This is an excellent book that comprehensively describes current methods used in SAGs-focused research. All the authors are well respected in the superantigen field which enhances the validity of the methods and protocols described. Some might argue that superantigens are a relatively rarefied field and thus this book would only be of interest to those directly engaged in superantigen research. However there are many methods and techniques within these pages with broad applicability to other research avenues. For example, the chapters on single cell staining of cytokines (Chapter 12) offer powerful methods for examining cells for individual cytokine production in response to any number of stimuli. The elegant methods of yeast surface expression of TcR used for directed evolution described by Churchill and Kranz (Chapter 6) are applicable to the study of any protein–protein interaction, not just TcR – superantigens. This book is a must for the superantigen laboratory shelves and recommended to those interested in applying some of the interesting and powerful techniques to their own research.

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NEUROINFLAMMATION: MECHANISMS AND MANAGEMENT, 2ND EDN

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Neuroinflammation was once the purvey of those of us studying infectious processes in the central nervous system (CNS) or other forms of inflammation resulting from the adaptive immune response such as the animal model of multiple sclerosis, experimental autoimmune encephalomyelitis (EAE). Neurodegenerative diseases were considered to be just that, degenerative, with any inflammation the byproduct of degeneration and its role to 'clean up' the destruction. The first edition of *Neuroinflammation: Mechanisms and Management* was published in 1998 and brought together work supporting the concept that in many of the degenerative diseases, activation of the CNS cells of the innate immune system, the microglia, and the subsequent inflammatory response preceded (causes) neuronal degeneration and/or contributed to ongoing destruction. This second edition, 5 years later, continues this theme.

The book is divided into two parts, I. inflammatory mechanisms and II. specific pathologic conditions and diseases. Microglia, as that enigmatic cell of the CNS, with its flexible morphology, antigenicity and functionality as well as its mobility and proliferative capacity opens the book in the first chapter. Interestingly, the role(s) of microglia in the

normal CNS is still the topic for much debate but a consensus is slowly building that it is the key 'target' for pharmacological approaches for halting or preventing progressive neurodegenerative diseases. The microglia is 'the' cell of importance in virtually all chapters. Other chapters dealing with mechanisms address apoptosis versus necrosis as types of cell death, chemokines, kinases and nitric oxide as mediators, all produced by microglia (as well as other cells).

Stroke and traumatic brain injury (TBI) (spinal cord injury) are discussed in a chapter each. There are six chapters on Alzheimer's disease, three on multiple sclerosis, and one each on Parkinson's and Huntington's diseases. One strength of the book is that there are chapters on existing and new experimental models of most of the diseases discussed. This allows the reader to compare studies and draw his/her own conclusions about the relevance of the models to the human disease. There is also a very interesting chapter on *in vivo* imaging (using radiolabelled ligands for the peripheral benzodiazepine receptors) in neuroinflammation and degeneration. Unfortunately this chapter could have used some careful editing as there were several minor and one major error in sentence structure.

The book is well balanced not only with respect to models versus human disease but also with respect to opinions. I

suggested above that a consensus was building that targeting the microglia would be good for neurodegenerative diseases, implying of course a causal role for it in disease. Not all contributors agree with this concept. Wenk and Hauss-Wegrzyniak make it quite clear at the beginning of their chapter that they do not believe 'neuroinflammation causes Alzheimer's disease'. They present an animal model which 'provides evidence that inflammation develops in response to existing genetically determined conditions within brains of AD patients'. How compelling this evidence is rests with the reader.

Finally, there are several chapters dealing with possible therapeutic approaches to neurodegenerative diseases. This book is highly recommended not just for those scientists working in the area of neurodegenerative diseases but perhaps most importantly for those, like myself, who have in the past tended to think of neuroinflammation as being driven principally by the peripheral adaptive immune system.

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