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Inflammatory Disorders of the Nervous System

Pathogenesis, Immunology, and Clinical Management

Edited by

Alireza Minagar, MD
J. Steven Alexander, PhD

Louisiana State University Health Science Center
Shreveport, LA

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Series Editor’s Introduction

The critical role of the inflammatory response in the pathophysiology of certain nervous system disorders has been appreciated for quite some time. Currently, rapidly accelerating knowledge of new molecular mechanisms known to be involved in systemic inflammatory disorders has extended to the investigation of a number of peripheral and central neurological disorders. Many of those discussed in this volume have been the usual suspects for immune-mediated, inflammatory neurological disorders such as, for example, multiple sclerosis, acute disseminated encephalomyelitis, optic neuritis, transverse myelitis, central nervous system (CNS) vasculitis, and neuropsychiatric systemic lupus erythematosus. Importantly, possible inflammatory mechanisms are now also undergoing scrutiny in chronic neurological diseases traditionally classified as neurodegenerative disorders, such as Alzheimer’s and Parkinson’s diseases.

In Inflammatory Disorders of the Nervous System, Drs. Minagar and Alexander have gathered an impressive group of investigators who review the basic principles of neuroinflammation and their emerging role in the more common inflammatory disorders of the nervous system. The first group of chapters review new and emerging research in neuroinflammation, while the rest explore the diseases cited above as well as other disorders where the role of the immune system and inflammation is currently less well understood, such as neurosarcoidosis, HIV-associated dementia, and HTLV-associated neurological disorders. As the authors of these chapters point out, the central nervous and immune systems have a known special relationship, disturbances in which may account for some aspects of neuroinflammation. The role of microglia in inflammatory CNS disease has never been fully understood and now comes under scrutiny as possibly mediating maladaptive inflammatory responses. On the other hand, a balance appears to exist between the useful and protective vs possibly damaging effects of various neuroinflammatory mechanisms. The extent to which neuroinflammation is either a primary, etiological cause or a more passive, associated bystander in the pathophysiology of neurological disorders probably varies considerably among various conditions. Sorting all of this out remains for future research that should be ably assisted by this outstanding overview of the current state of knowledge in this area.

Daniel Tarsy, MD
Department of Neurology
Beth Israel Deaconess Medical Center
Harvard Medical School
Boston, MA
The last decade witnessed vast scientific advances in our understanding of molecular mechanisms of the inflammatory cascade involved in pathogenesis of diverse neurological disorders. Endothelial cells, activated leukocytes, resident immune cells within the central nervous system (CNS), and many classes of inflammatory mediators, especially chemokines and cytokines, are the major components of this complex and largely unsolved pathological puzzle. Through innumerable experiments, we have learned more about the role of each one of these players in the course of the inflammatory response, and have become able to apply some of our knowledge toward the development of more effective treatments with fewer adverse effects.

The objective of *Inflammatory Disorders of the Nervous System: Pathogenesis, Immunology, and Clinical Management* is to provide readers with a highly detailed review of the basic principles of neuroinflammation and extensive updates on the latest findings on common neuroinflammatory disorders. Emerging concepts in the field of inflammation such as “endothelial and leukocyte microparticles” and “gene microarray technology” are introduced and provide important links between CNS and general inflammation processes. Our book should be of interest to a broad range of both basic research and clinical scientists with a core interest in neuroinflammation. It is our impression that neuroinflammation is among the most rapidly growing fields in inflammation research, and our knowledge of new developments in this field will enable scientists and clinicians around the globe to better diagnose and treat some of these untreatable and exigent neurological conditions.

We are greatly indebted to the contributors, who made *Inflammatory Disorders of the Nervous System: Pathogenesis, Immunology, and Clinical Management* a reality by providing their superior knowledge and expertise in this rapidly developing field. We are also grateful to Richard Lansing, Robin Weisberg, and Damien DeFrances of Humana Press who provided their invaluable editorial expertise and technical advice for the publication of this book. We hope that our scientist colleagues find this book a useful resource in their unrelenting research into the mechanisms of inflammation.

*Alireza Minagar
J. Steven Alexander*
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Contributors

YEON S. AHN, MD • Wallace H. Coulter Platelet Laboratory, Department of Medicine, University of Miami School of Medicine, Miami, FL

DEBORAH ALEMAN-HOEY, MD • Division of Neurology, Department of Medicine, University of Texas Health Science Center at San Antonio, San Antonio, TX

J. STEVEN ALEXANDER, PhD • Department of Cellular and Molecular Physiology, Louisiana State University Health Sciences Center, Shreveport, LA

CRYSTAL S. ANGLEN, PhD • Department of Cellular and Molecular Physiology, The Scripps Research Institute, La Jolla, CA

ROHIT BAKSHI, MD • Center for Neurological Imaging, Brigham & Women’s Hospital, Harvard Medical School, Boston, MA

ROBIN L. BREY, MD • Division of Neurology, Department of Medicine, University of Texas Health Science Center at San Antonio, San Antonio, TX

STALEY A. BROD, MD • Department of Neurology, University of Texas Health Science Center at Houston, Houston, TX

MONICA J. CARSON, PhD • Division of Biomedical Sciences, University of California, Riverside, CA

WADE DAVIS, PhD • Department of Statistics, Baylor University, Waco, TX

DEEPA M. DESHPANDE • Transverse Myelitis Center, Department of Neurology, Johns Hopkins University School of Medicine, Baltimore, MD

PAUL D. DREW, PhD • Department of Neurobiology and Developmental Sciences, University of Arkansas for Medical Sciences, Little Rock, AR

ELDA M. DURAN, MS • Departments of Psychiatry and Behavioral Sciences, University of Miami School of Medicine, Miami, FL

MARJORIE R. FOWLER, MD • Department of Pathology, Louisiana State University Health Sciences Center, Shreveport, LA

FABRIZIO GIULIANI, MD • Department of Clinical Neurosciences, University of Calgary, Calgary, Alberta, Canada

EDUARDO GONZALEZ-TOLEDO, MD, PhD • Department of Radiology, Louisiana State University Health Sciences Center, Shreveport, LA

DAKSHINAMURTY GULLAPALLI, MD • Veterans Administrations Hospital, Salem, VA

LAWRENCE L. HORSTMANN, BS • Wallace H. Coulter Platelet Laboratory, Department of Medicine, University of Miami School of Medicine, Miami, FL

JOAQUIN J. JIMENEZ, MD • Wallace H. Coulter Platelet Laboratory, Department of Medicine, University of Miami School of Medicine, Miami, FL

WENCHE JY, PhD • Wallace H. Coulter Platelet Laboratory, Department of Medicine, University of Miami School of Medicine, Miami, FL

ADAM I. KAPLIN, MD, PhD • Department of Psychiatry and Behavioral Sciences, Johns Hopkins University School of Medicine, Baltimore, MD

WILLIAM J. KARPUS, PhD • Department of Pathology, Feinberg School of Medicine, Northwestern University, Chicago, IL

TONI KAZIC, PhD • Departments of Computer Science and Health Management Informatics, University of Missouri, Columbia, MO

ROGER E. KELLEY, MD • Department of Neurology, Louisiana State University Health Sciences Center, Shreveport, LA
DOUGLAS A. KERR, MD, PhD • Transverse Myelitis Center, Department of Neurology, Johns Hopkins University School of Medicine, Baltimore, MD
TAMMY KIELIAN, PhD • Department of Neurobiology and Developmental Sciences, University of Arkansas for Medical Sciences, Little Rock, AR
CHITRA KRISHNAN, MHS • Transverse Myelitis Center, Department of Neurology, Johns Hopkins University School of Medicine, Baltimore, MD
MICHAEL D. LAIRMORE, DVM, PhD • Center for Retrovirus Research and Department of Veterinary Biosciences; Department of Molecular Virology, Immunology, and Medical Genetics, Comprehensive Cancer Center, The Arthur G. James Cancer Hospital and Solove Research Institute, Ohio State University, Columbus, OH
DOUGLAS J. LANSKA, MD • Veterans Affairs Medical Center, Tomah, WI and Department of Neurology, University of Wisconsin, Madison, WI
BINDHU MICHAEL, BVSc & AH, MSc, MS, PhD • Center for Retrovirus Research and Department of Veterinary Biosciences, Ohio State University, Columbus OH
ALIREZA MINAGAR, MD • Department of Neurology, Louisiana State University Health Sciences Center, Shreveport, LA
SHARIQ MUMTAZ, MD • Department of Neurology, Memorial University New Foundland, NL, Canada
AMRITHRAJ NAIR, BVSc & AH • Center for Retrovirus Research and Department of Veterinary Biosciences, Ohio State University, Columbus OH
CARLOS A. PARDO, MD • Transverse Myelitis Center, Department of Neurology, Johns Hopkins University School of Medicine, Baltimore, MD
LAWRENCE H. PHILLIPS, II, MD • Department of Neurology, University of Virginia Health Sciences Center, Charlottesville, VA
SEAN J. PITTOCK, MD • Department of Neurology, Mayo Clinic College of Medicine, Rochester, MN
CORINNE PLOIX, PharmD, PhD • Department of Molecular Biology, The Scripps Research Institute, La Jolla, CA
RAMAN SETH, MBBS, MS • Departments of Computer Science and Health Management Informatics, University of Missouri, Columbia, MO
PAUL SHAPSHAK, PhD • Departments of Psychiatry and Behavioral Sciences, Neurology, Pathology, Comprehensive Drug Research Center, and Pediatrics McDonald Foundation Gene Team, University of Miami School of Medicine, Miami, FL
WILLIAM A. SHEREMATA, MD • Multiple Sclerosis Center, University of Miami School of Medicine, Miami, FL
LEE SILVERMAN, DVM • Center for Retrovirus Research and Department of Veterinary Biosciences, Ohio State University, Columbus OH
DEAN M. WINGERCHUK, MD • Department of Neurology, Mayo Clinic College of Medicine, Scottsdale, AZ
V. WEE YONG, PhD • University of Calgary, Departments of Clinical Neurosciences and Oncology, Calgary, Alberta, Canada
RANA ZABAD, MD • Department of Clinical Neurosciences, University of Calgary, Calgary, Alberta, Canada
FABIANA ZIEGLER, MD • Departments of Psychiatry and Behavioral Sciences, University of Miami School of Medicine, Miami, FL
ROBERT ZIVADINOV, MD, PhD • Department of Neurology, State University of New York at Buffalo School of Medicine and Biomedical Sciences; Buffalo Neuroimaging Analysis Center, The Jacobs Neurological Institute, Buffalo, NY
Continuing Medical Education

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INTENDED AUDIENCE
This activity is intended for neurologists and other physicians who treat inflammatory disorders of the nervous system.

OVERALL GOAL
The overall goal of this activity is to update the knowledge of clinicians on strategies and techniques needed to comprehensively manage patients with inflammatory disorders of the nervous system.

LEARNING OBJECTIVES
After completing this CME activity, participants should have improved their overall knowledge and attitudes in regard to inflammatory disorders of the nervous system. Specifically, participants should be able to:

- Distinguish the pathogenesis of inflammation
- Discuss the details of interactions among activated leukocytes, endothelial cells, and inflammatory mediators (i.e., cytokines, chemokines, adhesion molecules, etc.) in the context of inflammatory disorders of the central nervous system
- Describe how the central nervous system and immune system communicate and interact during inflammation of the nervous system
- Assess the modern concepts behind the phenomenon of inflammation, such as endothelial microparticles, gene microarray expression, and failure of endothelial barrier function
- Understand the pathogenesis and clinical manifestations, as well as management, of some of the most common and least understood inflammatory disorders of the central nervous system, such as multiple sclerosis, neuro-sarcoidosis, HIV-associated-dementia, Devic’s disease, and West Nile virus encephalitis
- Demonstrate assessment strategies for patients with a variety of inflammatory disorders of the central nervous system

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