



Journal of Contemporary Neurology

Volume 1999,
Books Received 1R
December 1999

ISSN 1081-1818. MIT Press Journals, Five Cambridge Center, Cambridge, MA 02142-1407, USA; tel.: (617) 253-2889; fax: (617) 577-1545; *journals-orders@mit.edu*, *journals-info@mit.edu*. Published one article at a time in html and PDF source form on the Internet. For more information and other articles see:

- <http://mitpress.mit.edu/CONE/>

©1999 Massachusetts Institute of Technology. Subscribers are licensed to use journal articles in a variety of ways, limited only as required to ensure fair attribution to authors and the *Journal*, and to prohibit use in a competing commercial product. See the *Journal's* World Wide Web site for further details. Address inquiries to the Subsidiary Rights Manager, MIT Press Journals; (617) 253-2864; *journals-rights@mit.edu*.

The MIT Press

Books Received

The Paradox of Sleep; The Story of Dreaming

Michel Juvet, translated by
Laurence Garey

1999, The MIT Press
Cambridge, Massachusetts

Michel Juvet, perhaps the world's leading researcher on sleep and dream research, is considered responsible for the discovery of paradoxical sleep—a “new” third state of the brain as different from normal sleep as sleep is from waking. In *The Paradox of Sleep*, Juvet takes the reader on a scientific and sociological tour of the history of sleep and dream research, concluding with his own ideas on the function of dreaming.

Juvet tells the story of a handful of neurobiologists, including himself, who pioneered sleep and dream research in the 1950s. He describes the technical and ideological obstacles they faced and opens his own laboratory to the reader, explaining anatomical, biochemical, and even genetic techniques. He also touches on psychological, philosophical, and metaphysical aspects of sleep and dreaming.

A key section of the book is Juvet's discussion of why we dream. After summarizing Freud's theory of dreams, he contrasts it with current neurobiological data. Finally, he outlines his own controversial theory about why we dream: to preserve our individuality. Dreaming, claims Juvet, is necessary for the genetic reprogramming of our brain.

(Preceding adapted by the Editor of *The Journal of Contemporary Neurology* from the publisher's notes.)

The Integrative Neurobiology of Affiliation

C. Sue Carter, I. Izja Lederhendler,
and Brian Kirkpatrick, editors

1999, The MIT Press
Cambridge, Massachusetts

This book examines the biological—especially the neural—substrates of affiliation and related social behaviors. Affiliation refers to social behaviors that bring individuals closer together. This includes such associations as attachment, parent-offspring interactions, pair bonding, and the building of coalitions. Affiliations provide a social matrix within which other behaviors, including reproduction and aggression, may occur. While reproduction and aggression also reduce the distance between individuals, their expression is regulated in part by the positive social fabric of affiliative behavior.

Until recently, researchers have paid little attention to the regulatory physiology and neural processes that subserve affiliative behaviors. The integrative approach in this book reflects the constructive interactions between those who study behavior in the context of natural history and evolution and those who study the nervous system.

The book contains the partial proceedings of a conference of the same title held in Washington, DC, in 1996. The full proceedings was published as an annal of the New York Academy of Sciences.

(The preceding was adapted by the Editor of *The Journal of Contemporary Neurology* from the publisher's notes.)

Stress, Immune Function, and Health: The Connection

Bruce S. Rabin

1999, John Wiley & Sons
New York

The last 10 years have seen an explosion of research on the relationships between the brain and the immune system. Much of this work has focused on the implications of psychological and social factors for our health. Psychological and physical stressors have been found to alter both humoral and cellular immune function. These changes have been attributed to direct central nervous system innervation of the immune system, to stress-elicited changes in circulating levels of hormones, and to stress-elicited coping behaviors such as smoking and poor diet that can also modify function of the immune system. Moreover, stress has also been associated with the deterioration of immune-related health outcomes, such as decreased host resistance to infection and the onset and exacerbation of autoimmune diseases. This book presents an unusually comprehensive and readable summary and integration of the various scientific disciplines that study brain-immune system–health interactions.

This very exciting area of basic and clinical research underscores the potential importance of stress reduction and stress coping as components of preventive medicine. The subject has been reported on in numerous edited multi-contributor publications. However, this volume differs in that it is a singly authored book written by a card-carrying physician/immunologist/scientist who actively contrib-

utes to both basic and clinical science. It will be of interest to researchers and health-care workers whose areas of interest include the brain and the immune system, the brain and health, or the immune system and health.

The book begins with a thorough description of the components and functions of the immune system, along with examples of how the functions of the various immune components can be altered by stress. This review of the immune system will be of interest not only to individuals who are unfamiliar with immunology, but also to immunologists, as numerous examples from animal and human studies are provided that document alterations of immune-system function resulting from exposure to stress.

Following the overview of the immune system, the book discusses other basic science aspects of brain-immune interaction. Topics include the brain structures that regulate the function of the immune system, stressor-induced change in immune function, and hormones whose release is altered by stress, with subsequent implications for immune function. Throughout, examples from the research literature are provided, as well as cautions regarding the proper use of controls and the interpretation of experimental data.

The first five chapters of this book form a fairly complete, up-to-date discussion of the current understanding of brain-immune system interaction. Indeed, these chapters could form the basis of an undergraduate or graduate course in psychoneuroimmunology. The subsequent chapters turn to topics of more clinical and applied interest.

Chapter 6 discusses the clinical aspects of psychoneuroimmunology as related to autoimmune diseases, infectious diseases, and malignancies. The effects of stress on the onset and course of immune-mediated diseases are presented. In each case, the mechanisms responsible for these associations are discussed. This results in a cautious interpretation of the data in

relation to what we know and what we do not know about the proven clinical significance of stress.

Chapter 7 discusses the role the brain can play in altering response to stressful events. The emphasis is on social and psychological factors that act to protect people from the detrimental effects of such events. The potential role of personality characteristics, such as optimism, of support provided by the social environment, and of persons' belief systems in promoting health, is discussed. The author speculates as to how such factors might influence response to stressful events through brain regulation of hormonal response.

The final two chapters present interesting discussions of how stressful life events and stress hormones might influence the health and behaviors of the very young and the elderly. These chapters provide stimulating and thoughtful discussion of our social environment and its effect on health. Strong arguments for the importance of preventive medicine are made in regard to both enhancing the quality of health and controlling health-care expenditures.

The science of psychoneuroimmunology has progressed to the point where its findings have important health implications. This book makes a contribution to the understanding and importance of mind-body medicine. It will be found useful as a text both for undergraduate and graduate psychoneuroimmunology courses, and for all who are interested in the mind-body-health interaction.

(The preceding was adapted by the Editor of *The Journal of Contemporary Neurology* from the book's foreword, written by Sheldon Cohen, Ph.D., Carnegie Mellon University, and Stephen Manuck, PhD, University of Pittsburgh.)

Beyond the Cognitive Map: From Place Cells to Episodic Memory

A. David Redish

1999, The MIT Press
Cambridge, Massachusetts

This book starts from the hypothesis that the rodent hippocampus is involved in navigation, but may also be involved in memory or other processes. It builds a theory of rodent navigation that is consistent with the anatomical, neuropharmacological, neurophysiological, and behavioral experimental literature. Although the theory draws heavily from the theoretical and experimental work done by other researchers over the last century, some specific aspects of the overall theory are novel. Once a role for the hippocampus in navigation has been identified, the other theories are examined. The role hypothesized for the hippocampus in navigation in rodents may open a new window on its role in memory in primates. This book represents only a snapshot of the state of the field of hippocampal research and rodent navigation as of January 1998. Many questions are still open, and many issues are still unresolved.

Chapter 1 reviews the hippocampus debate, identifying key results and the two major competing theories of hippocampal function: episodic memory (Cohen and Eichenbaum, 1993) and the cognitive map (O'Keefe and Nadel, 1978). Chapters 2-7 detail a comprehensive theory of navigation and explore aspects of navigation that occur outside the hippocampus. Chapters 8-12 focus on the role of the hippocampus in navigation, arguing that it allows the animals to 1) reset their internal coordinate systems from external input (chapter 9), and 2) store and replay recently traveled routes (chapters 11 and 12). Chapter 13 returns to hippocampal function generally, while chapter 14 addresses the role of the hippocampus in primates and asks whether it is conserved across species.

(The preceding was adapted by the Editor of *The Journal of Contemporary Neurology* from the introduction in the book.)

Neurodevelopmental Disorders

Helen Tager-Flusberg, editor

1999, The MIT Press
Cambridge, Massachusetts

Part I includes an introductory chapter in which an overview is provided of the history, methods, and developments in the fields that contribute to current research on neurodevelopmental disorders. This introduction also describes the cognitive neuroscience perspective, which guides this new interdisciplinary research program.

Parts II and III contain a series of chapters on genetically based neurodevelopmental disorders. Case studies are included to provide descriptions of the syndromes and especially to illustrate the variability that is found among children with disorders of the same etiology. Two or more chapters are devoted to every syndrome covered in these sections. In this way, different research perspectives, views, and ways of integrating across disciplines may be considered. Part II (chapters 2–11) focuses on disorders of known etiology, illustrating many different genetic mechanisms, whereas part III (chapters 12–18) focuses on complex genetic disorders for which no specific genes have yet been found.

In part IV, the final section of the book, neurodevelopmental disorders are explored from wider perspectives, including neurobehavioral teratology, sensory disorder, brain damage, and the field of psychiatry. The chapters on teratology (chapters 19 and 20) highlight the common principles that underlie neurodevelopmental disorders that result from either genetic or prenatal exposure to environmental agents that affect brain development. Chapter 21 discusses the rare and intriguing condition called synesthesia, in which cognitive distortions occur at the sensory and perceptual level. This is unlike neurodevelopmental disorders in which only higher-level cognitive domains (such as language, visuospatial, or social cognition) are affected. The next chapter (chapter 22)

summarizes research on hydrocephalus, which is defined on the basis of brain dysmorphology rather than by behavioral or physical features. Because it is common in several different neurodevelopmental disorders, hydrocephalus can provide an important model from which to view such disorders. Chapter 23 addresses the development of language in children who have sustained focal lesions in various brain regions. The studies discussed in this chapter challenge the traditional theories of brain and language, and provide strong evidence for taking a constrained plasticity view of development. In the final chapter (chapter 24), child psychiatry and clinical genetic perspectives are presented, illustrated by considering two additional genetically based disorders: Tourette syndrome and Marfan syndrome.

One of the primary objectives in editing this book was to cross-fertilize the conceptual models and methods that have been developed in explorations of different disorders or disciplines. By bringing together research that cuts across such a diverse range of syndromes, disorders, and disciplines, it is hoped that new work in this broad field will be stimulated. The ultimate goal is to understand for each disorder how mutations in genetic material lead to specific alterations in neural development that are realized in unique patterns of cognition and behavior. The aim in this book is to argue that this goal will be achieved by developing and expanding on the cognitive neuroscience perspective that is now beginning to frame research in this field.

(The preceding was adapted by the Editor of *The Journal of Contemporary Neurology* from the preface in the book.)

Unsupervised Learning: Foundations of Neural Computation

Geoffrey Hinton and Terrence J. Sejnowski, editors

1999, The MIT Press
Cambridge, Massachusetts

This volume on unsupervised learning algorithms focuses on neural network learning algorithms that do not require an explicit teacher. The goal of unsupervised learning is to extract an efficient internal representation of the statistical structure implicit in the inputs. These algorithms provide insights into the development of the cerebral cortex and implicit learning in humans. They are also of interest to engineers working in areas such as computer vision and speech recognition who seek efficient representations of raw input data.

(The preceding was adapted by the Editor of *The Journal of Contemporary Neurology* from the publisher's notes in the book.)

Fast Oscillations in Cortical Circuits

Roger D. Traub, John G. R. Jeffreys, and Miles A. Whittington

1999, The MIT Press
Cambridge, Massachusetts

The study of cortical oscillations is of great interest to those working in many areas of neuroscience. A fast coherent EEG rhythm called "gamma" or "40 Hz" has been implicated in cognition, as it may play a role in binding features of objects. This rhythm may also be important for consciousness, as a number of drugs that induce general anesthesia disrupt the synchronization of the rhythm at clinically relevant concentrations. There is also suggestive evidence implicating dysfunction of gamma rhythms in Alzheimer's disease, and perhaps in other neuropsychiatric disorders. In *Fast Os-*

illations in Cortical Circuits, the authors use a combination of electrophysiological and computer-modeling techniques to analyze how large networks of neurons can produce both epileptic and functionally relevant synchronized oscillations. Specific topics covered include single hippocampal pyramid cells, hippocampal interneurons, synaptic interactions; gamma oscillations in brain slices as well as in vivo, the mechanisms of oscillation-synchronization (both local and long range), the switch from gamma to beta frequencies and its implications for memory, and the significance of gamma oscillations for brain function.

(The preceding was adapted by the Editor of *The Journal of Contemporary Neurology* from the publisher's

notes in the book.)

Neuropeptides: Regulators of Physiological Processes

Fleur L. Strand

1999, The MIT Press
Cambridge, Massachusetts

This textbook brings together and synthesizes the neuropeptide research of the past decade in a comprehensive, scholarly manner. The book is divided into two parts. In part I, the author defines the basic principles of neuropeptide action, including their biosynthesis,

processing, transport, distribution, and interactions with receptors and second messenger systems. Strand also discusses the intimate interaction between neuropeptides, stress, and the immune system. In part II, she discusses the regulatory functions of the families of neuropeptides in sufficient detail to provide both the advanced student and senior investigator with a thorough understanding of the most important neuropeptides. The text also contains a complete and up-to-date reference/reading list.

(The preceding was adapted by the Editor of *The Journal of Contemporary Neurology* from the publisher's notes in the book.)

Editor
Keith H. Chiappa, M.D.

Associate Editor
Didier Cros, M.D.

Electronic Mail
chiappa@helix.mgh.harvard.edu

Journal of Contemporary Neurology is a peer-reviewed and electronically published scholarly journal that covers a broad scope of topics encompassing clinical and basic topics of human neurology, neurosciences and related fields.

Editorial Board

Robert Ackerman
Massachusetts General Hospital, Boston

Barry Arnason
University of Chicago

Flint Beal
Massachusetts General Hospital, Boston

James Bernat
*Dartmouth-Hitchcock Medical Center,
New Hampshire*

Julien Bogousslavsky
CHU Vaudois, Lausanne

Robert Brown
Massachusetts General Hospital, Boston

David Burke
*Prince of Wales Medical Research Institute,
Sydney*

David Caplan
Massachusetts General Hospital, Boston

Gregory Cascino
Mayo Clinic, Rochester

Phillip Chance
*The Children's Hospital of Philadelphia,
Philadelphia*

Thomas Chase
NINDS, National Institutes of Health, Bethesda

David Cornblath
Johns Hopkins Hospital, Baltimore

F. Michael Cutrer
Massachusetts General Hospital, Boston

David Dawson
Brockton VA Medical Center, Massachusetts

Paul Delwaide
Hôpital de la Citadelle, Liege

John Donoghue
Brown University, Providence

Richard Frith
Auckland Hospital, New Zealand

Myron Ginsberg
University of Miami School of Medicine

Douglas Goodin
University of California, San Francisco

James Grotta
University of Texas Medical School, Houston

James Gusella
Massachusetts General Hospital, Boston

John Halperin
*North Shore University Hospital / Cornell
University Medical College*

Stephen Hauser
University of California, San Francisco

E. Tessa Hedley-White
Massachusetts General Hospital, Boston

Kenneth Heilman
University of Florida, Gainesville

Daniel Hoch
Massachusetts General Hospital, Boston

Fred Hochberg
Massachusetts General Hospital, Boston

John Hoffman
Emory University, Atlanta

Gregory Holmes
Children's Hospital, Boston

Bruce Jenkins
Massachusetts General Hospital, Boston

Ryuji Kaji
Kyoto University Hospital

Carlos Kase
Boston University School of Medicine, Boston

J. Philip Kistler
Massachusetts General Hospital, Boston

Jean-Marc Léger
La Salpêtrière, Paris

Simmons Lessell
Massachusetts Eye and Ear Infirmary, Boston

Ronald Lesser
Johns Hopkins Hospital, Baltimore

David Levine
New York University Medical Center

Ira Lott
University of California, Irvine

Phillip Low
Mayo Clinic, Rochester

Richard Macdonell
Austin Hospital, Victoria, Australia

Joseph Masdeu
St. Vincent's Hospital, New York

Kerry R. Mills
Radcliffe Infirmary, Oxford

José Ochoa
Good Samaritan Hospital, Portland

Barry Oken
Oregon Health Sciences University, Portland

John Penney
Massachusetts General Hospital, Boston

Karlheinz Reiners
*Bayerische Julius-Maximilians-Universität,
Würzburg*

Allen Roses
Duke University Medical Center, Durham

Thomas Sabin
Boston City Hospital, Boston

Raman Sankar
University of California at Los Angeles

Joan Santamaria
Hospital Clinic Provincial de Barcelona

Kenneth Tyler
*University of Colorado Health Science Center,
Denver*

Francois Viallet
CH Aix-en-Provence

Joseph Volpe
Children's Hospital, Boston

Michael Wall
University of Iowa, Iowa City

Stephen Waxman
Yale University, New Haven

Wigbert Wiederholt
University of California, San Diego

Eelco Wijdicks
Mayo Clinic, Rochester

Clayton Wiley
University of California, San Diego

Anthony Windebank
Mayo Clinic, Rochester

Shirley Wray
Massachusetts General Hospital, Boston

Anne Young
Massachusetts General Hospital, Boston

Robert Young
University of California, Irvine