Book Reviews

EPILEPSY: MODELS, MECHANISMS AND CONCEPTS. 1993. Edited by Philip A. Schwartzkroin. Published by Cambridge University Press. 544 pages. $CDN 162.00.

Understanding the basic mechanisms of epilepsy presents a formidable scientific challenge. Epilepsy is not a disease but rather an umbrella term covering a multi-dimensional group of disorders associated with a wide variety of pathologies and biochemical disturbances that share the tendency to recurrent seizures. Both technical and conceptual limitations severely constrain direct investigation of basic mechanisms in patients. Investigators have, therefore, turned to animal models to study the pathophysiology of epilepsy. So many different models have been developed that there may now be more models than patients. This book is fortunately not a comprehensive survey of available epilepsy models. Instead, it focuses on a limited number of well-studied models to identify important conceptual frameworks that have emerged from their investigation.

The book is organized into three sections of five chapters. Each chapter, written by recognized authorities, describes a particular model and attempts to identify major concepts that have arisen from studying it or the types of issues which it is most suitable for investigating. The first section describes chronic models in intact animals and introduces some of the key issues. The kindling model, a variety of genetic animal models and the susceptibility of the immature brain to seizures are used to examine factors responsible for the development of the seizure-prone state or epileptogenesis. Intact animal models are also used to develop the idea that certain brain regions, particularly in the limbic system, act as epileptic "trigger" zones which either initiate seizures or serve as critical relays in the propagation of seizures. These models provide important links between simplified experimental preparations and the human epilepsies.

The second and third sections describe mainly *in vitro* models that have been used to study epileptic tissue and normal brain mechanisms that support epileptiform activity. The technical advantages provided by preparations such as the hippocampal and neocortical slice have been exploited to examine the cellular mechanisms underlying hyperexcitablity and hypersynchrony in the immature brain and in 'normal' brain rendered 'epileptic' by a variety of convulsant stimuli. These studies have yielded a rich array of hypotheses concerning the complex interplay among voltage- and ligand-gated ion channels embedded within recurrent excitatory and inhibitory local circuits that can account for the pacemaker properties of epileptic 'trigger' zones such as the hippocampal CA3 region. Studies on kindling and a model of limbic status epilepticus have identified the dentate gyrus as a critical 'gate' which normally prevents excessive activation of the hippocampus proper. One of the most important ideas that has emerged from epilepsy research is that seizures may render the brain permanently hyperexcitable. Several excellent chapters in section 2 discuss some of the mechanisms responsible for neuronal plasticity in response to seizures and neuronal damage as well as their potential relationship to epileptogenesis. However, the chapter describing *in vitro* studies on tissue removed from patients undergoing surgery for intractable epilepsy indicates that the hypotheses generated from the experimental models have yet to be confirmed in the 'human model'. Perhaps more subtle experimental models are needed.

Although it is not intended to be comprehensive, this book covers a broad spectrum of important issues and concepts and should stimulate discussion among clinical epileptologists and basic scientists interested in the pathophysiology of epilepsy. Most of the chapters are well written and adhere to the goal of describing key observations which have lead to important hypotheses. It is entirely fitting that the chapter by Jo-Ann Frank (in whose memory the book is dedicated) on the use of models of hippocampal sclerosis to investigate the relationships between seizures, neuronal plasticity and cell death is perhaps the best example of how critical appraisal of well-studied animal models can provide important insights into complex problems.

A few of the chapters in the first section present too much experimental detail. This sometimes obscures the concepts and makes for difficulty reading. However, this problem is largely offset by Dr. Schwartzkroin's introductions to each section. These, along with the general introduction to the book, highlight and amplify the major hypotheses discussed in each chapter and place them in a broader context. The introductory chapters, read on their own, provide a lucid, well thought out review of many of the major issues in epilepsy research and much of the progress that has been made over the past few decades. I highly recommend this volume.

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STROKE: PATHOPHYSIOLOGY, DIAGNOSIS AND MANAGEMENT. 2nd Edition, 1992. By Henry J.M. Barnett, J.P. Mohr, Bennett M. Stein and Frank M. Yatsu. Published by Churchill Livingstone, New York, Edinburgh, London, Melbourne and Tokyo. 1270 pages. $CDN 304.00

The second edition of "Stroke: Pathophysiology, Diagnosis and Management" is a comprehensive and up-to-date reference on cerebrovascular diseases. It is a multi-authored text conveniently divided into five sections.

The "Pathophysiology" section begins with a detailed overview of the epidemiology and risk factors for stroke. Dr. P.A. Wolf et al. provide useful information on hypertension, smoking, cholesterol, atrial fibrillation and other risk factors for stroke. Subsequent chapters on atherosclerosis, animal models of stroke, neurochemistry of stroke and PET studies in stroke are meant for neurologists with a special interest in stroke. The final section on pathology of stroke by Garcia et al. provides good illustrations on sub-types of stroke. It is a useful text for physicians interested in understanding mechanisms of cerebrovascular disease.

The section on "Diagnostic Studies for Stroke" provides practical guidelines to all physicians who see stroke patients on a regular basis. Dr. Mohr provides a concise overview of the available tests, their current indications and limitations in various stroke sub-types. This is followed by comprehensive and detailed reviews on the use of CT, MRI, cerebral angiography and ultrasound in cerebrovascular disease. There are excellent illustrations in each section which do not lose there quality in the printing process.

The section on the "Clinical Manifestations of Stroke" begins with a overview of the classification of stroke. This is followed by detailed discussions on the clinical presentation of stroke in the various cerebral arteries. Whereas the overview is useful and easy to read, subsequent chapters on arterial syndromes contain details on localization that are somewhat redundant for this text. The section on "Specific Medical Disease and Stroke" is a valuable reference source on uncommon stroke-subtypes.

The final section "Stroke Therapy" is perhaps the most practical section for the general neurologist. There are firm guidelines on the use of antiplatelet and anticoagulant medications and surgery in secondary prevention of stroke.