AJNR

Magnetic Resonance Imaging: Methods and Biologic Applications, Vol. 124

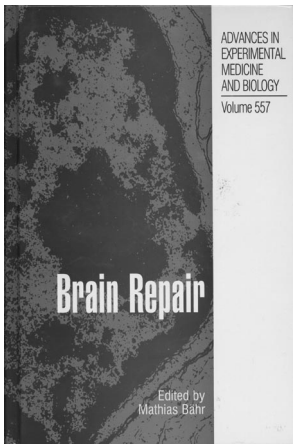
AJNR Am J Neuroradiol 2006, 27 (9) 2014a-2015
http://www.ajnr.org/content/27/9/2014a

BOOK REVIEW

Brain Repair: Advances in Experimental Medicine and Biology, Vol. 557

M. Bähr, ed. New York: Springer; 2005, 252 pages, 63 illustrations, $159.

One of the most exciting topics in the area of neuroscience is the study of brain injury and repair. Recent discoveries have enhanced our understanding of the mechanisms underlying cell death, as well as the testing of novel strategies to promote recovery of function. Thus, this publication is timely in that it provides up-to-date information regarding this topic. This contribution is the work of an impressive group of investigators in the area of central nervous system (CNS) injury. The publication is unique in that it touches on multiple aspects of brain injury and repair and includes 13 chapters. More than 35 contributors have provided state-of-the-art reviews on specific topics related to this important subject. The text is thoughtfully organized and easy to read. As will be discussed, this publication touches on cell death mechanisms, molecular aspects of injury and treatments, axonal regrowth and repair, as well as stem cell transplantation procedures. In the early chapters, emphasis is placed on cell death mechanisms. The authors then discuss other important consequences of CNS injury including formation of the glial scar. Pathomechanisms underlying cell death and glial scar formation also include specific therapeutic interventions. The final chapters relate to stem cells, including the endogenous stem cell response to injury as well as cellular transplantation strategies. Thus a strength of the publication is that it includes many facets of CNS injury.



The initial chapters cover an interesting discussion concerning cell death mechanisms, including programmed cell death. Other chapters relate to potential therapeutic strategies targeting cell death and repair. One chapter on neuroprotection by cyclic adenosine monophosphate explains cell-signaling pathways and possible interventions. Several chapters also discuss the glial and inflammatory response to injury. These areas of research are currently very important in terms of axonal growth and regeneration. Chapters comment on the neurobiology of P2 receptors and adenosine triphosphate–dependent cell-signaling cascades. These discussions give important information regarding molecular and cellular events underlying cell death as well as axonal growth and guidance. Strategies targeting the collagenous basement membrane formation and enhanced axonal growth are also discussed. Subsequent chapters cover the potential role of neural stem cells and recovery of function after CNS injury. Potential for endogenous neurogenesis to contribute to recovery is a major focus of one chapter. An interesting discussion also describes the potential of neurogenesis in abnormal neurologic additions, such as depression, bipolar disorders, and schizophrenia. Finally, transplantation strategies targeting Parkinson's disease are summarized from a historic perspective. The factors important to transplantation including graft materials, the need for immunosuppression, and novel imaging approaches are reviewed. This important discussion includes the different types of cell or grafts that may be potentially used in these studies. Similar types of reviews/comments are important for all the various neurologic diseases that may be considered for transplantation procedures. The figures and images throughout the book are satisfactory, and legends are appropriately descriptive. The references are comprehensive, current for a scholarly publication such as this.

Overall, the book is an excellent and important contribution to the area of CNS injury and repair and is relevant to the neuroradiology audience. MR imaging will allow quantitative assessment of neuroprotective strategies in patients. Neuroimaging will also play a major role in determining sites of injury as well as the exact location for cellular transplantation strategies. It may be possible in future years to visualize scar tissues and again monitor treatments directed at these consequences of injury. This book is recommended to students, predoctoral fellows, and postdoctoral fellows in training. Additionally, investigators actively pursuing CNS injury and repair research would benefit from this very nice collection of chapters and discussions by leaders in the field of CNS injury and repair.

BOOK REVIEW

Magnetic Resonance Imaging: Methods and Biologic Applications, Vol. 124

P.V. Prasad, ed. Totowa, NJ: Humana Press; 2006, 447 pages, 148 illustrations, $135.

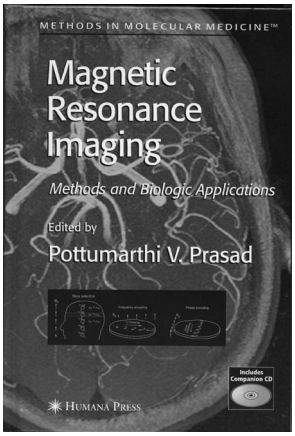
This book fills a niche in the current MR imaging literature by providing a collection of the most powerful MR imaging techniques being used currently. It also succeeds in conveying the variety of state-of-the-art MR imaging biologic applications in such a way that a person without extensive knowledge in MR imaging can make sense of this complex field of study. Because of the important topics that this book covers from functional/metabolic studies to molecular imaging, it is a great tool to introduce someone to the sensitivity and effectiveness of MR imaging.

The organization of the book is straightforward and easy to follow, with a structure of 5 distinct sections. The chapters within each section were appropriately selected to facilitate the reader's comprehension of these complex topics. These sections include "Introduction," "Anatomy," "Physiology," "Pathophysiology," and "Novel Contrast Agents and Mechanisms." The introduction contains a chapter that qualitatively covers the fundamentals of MR imaging and MR spectroscopy and a chapter discussing the basics and challenges of MR mi-

croscopy. The anatomy section focuses on MR microscopy characterizing mouse brain development, fetal development, and mouse phenotyping. The "Physiology" and "Pathophysiology" sections demonstrate the sensitivity of MR imaging experimental methods to characterize normal physiology as well as pathologic conditions. Examples of some areas covered include ischemia, tumor physiology, and tissue perfusion using investigative MR imaging methods, including perfusion imaging, functional MR imaging, proton and phosphorus spectroscopy, diffusion imaging, and exogenous contrast agents. The final section, "Novel Contrast Agents and Mechanisms," describes new exogenous contrast agents, including hyperpolarized xenon gas, superparamagnetic iron-oxides and manganese, and the new areas of investigation these agents provide. Although the book focuses on methods and biologic applications, it wisely does not cover all applications of MR imaging to maintain the focus. This text covers the essentials of MR imaging and MR spectroscopy and provides relevant research and application examples demonstrating the utility of MR imaging.

The book was written for an audience with limited MR imaging exposure and provides a concise overview of the physics, engineering, and biology involved. The text is very accurate, with an occasional poor choice in wording, which may lead the readers to incorrect assumptions. The references are both current and comprehensive and would aid the reader who requires more detail on a topic or methodologies on particular experiments. Not only are the references comprehensive but also well described in the text, thus eliminating a time-consuming search of the expansive reference list. Most books in this area focus on either the clinical utility or the physics and engineering behind MR imaging. This text fits into neither category and focuses instead on the cutting edge and current biologic research in the area. Although this text is unlikely to be a primary textbook to either clinicians or physicists, it is a nice addition to the libraries of both groups.

The biggest criticism about this book is related to the images and their captions. Although many of the images on the companion CD are in vivid color and clearly demonstrate the point, they are, unfortunately, converted to gray-scale for the text. In many cases, the gray-scale counterparts in the text do not convey the message of the text and serve to confuse the reader. Furthermore, no effort was made to alter the text, resulting in the images being described in color when none is present. In addition, there are no disclaimers in the figure captions stating that the color images are available on the CD. The quality of the figure captions and legends varies from chapter to chapter, but overall these captions and legends are descriptive as well as relevant. However, some chapters have captions that are entirely too descriptive, and the excessive content should have been removed and placed in a proper location in the text.



Although the text is well written and organized, the teaching value of the book is limited. The clinical utility of the text is minimal because of the focus of the book on experimental MR imaging and MR spectroscopy in animal models. This book may be a good reference for a research neuroradiologist interested in using the MR imaging techniques described, but a clinical neuroradiologist would have little need for such a book. Moreover, the teaching usefulness to a biomedical engineering or medical physics audience is also limited because of the lack of specific mathematic or engineering detail provided. The audiences that will benefit most from this text, as acknowledged by the editor, are biologic scientists in the fields of neuroscience, physiology, and other related fields who may be unaware of the experimental sensitivity that MR imaging provides.

This book provides a resource for scientists and students who are interested in using MR imaging by providing a thorough qualitative description of the fundamentals of MR imaging along with reviews of several important and cutting-edge MR imaging research areas. For MR imaging scientists and experts, this text may provide an easy-to-read review on subjects unfamiliar to them, along with comprehensive references providing the link to the more specific details these professionals require. I believe that this book will impart to the reader how powerful MR imaging and MR spectroscopy can be in areas of biologic research and not just their clinical diagnostic utility. I would recommend this book to anyone interested in the experimental utility of MR imaging.

BOOK REVIEW

Vertebroplasty and Kyphoplasty

D.K. Resnick, S.R. Garfin, eds. New York: Thieme; 2005, 138 pages, 37 tables, 140 illustrations, $99.95.

With the marked increase in number of vertebroplasty and, more recently, kyphoplasty procedures performed during the last decade, a textbook is needed that sums and organizes the vast amounts of research and clinical experience that deal with these often interchangeable techniques. Although there is already a book written that deals with vertebroplasty, the emerging field of kyphoplasty is new enough that most of its published work is confined to the journals. Daniel Resnick and Steven Garfin have compiled a book with a stated purpose of exploring these procedures in a "comprehensive, fair, and balanced fashion." Unfortunately, though an admirable ambition, the book does not seem to meet these goals.

The textbook, published by Thieme under the seal of the American Association of Neurologic Surgeons, is composed of a variety of chapters, which, as in most multi-authored books, have a range of quality. The chapter "Mechanisms of Pain Relief Following Vertebroplasty and Kyphoplasty" is well written and deals with an important, though still somewhat poorly understood, component of these procedures. Although relatively short, the author summarizes and explains the possible mechanisms of pain relief, from tissue toxicity and fracture stabilization to the benefits of high temperatures on existing pain fibers and tumor tissue. In addition the chapter "Com-