
Contents

Part I Diffusion and Perfusion Imaging

1 Physical Principles of Diffusion Imaging	3
Thinesh Sivapatham and Elias R. Melhem	
2 Clinical Applications of Diffusion	13
Reza Forghani and Pamela W. Schaefer	
3 Physical Principles of MR Perfusion and Permeability Imaging: Gadolinium Bolus Technique	53
Mark S. Shiroishi, Saulo Lacerda, Xiaoli Tang, Naira Muradyan, Timothy P.L. Roberts, and Meng Law	
4 Non-gadolinium Perfusion Technique (Arterial Spin Labeling)	61
Huan Tan and Jonathan H. Burdette	
5 Clinical Applications of MR Perfusion Imaging	71
Ronald L. Wolf	
6 Stroke: Clinical Application of Perfusion and Diffusion	107
Niloy Dasgupta and Max Wintermark	
7 Clinical Applications of Dynamic Contrast-Enhanced (DCE) Permeability Imaging	117
Saulo Lacerda, Mark S. Shiroishi, and Meng Law	

Part II Magnetic Resonance Spectroscopy

8 Magnetic Resonance Spectroscopy: Physical Principles	141
Stefan Blüml	
9 Magnetic Resonance Spectroscopy: Clinical Applications	155
Alena Horská and Ivan Tkáč	

Part III Multi Modality Functional Neuroradiology

10 Functional Imaging-Based Diagnostic Strategy: Intra-axial Brain Masses	197
Arastoo Vossough and Seyed Ali Nabavizadeh	
11 Functional Neuroimaging of Epilepsy	221
Noriko Salamon	

12 Functional Neuroradiology of Traumatic Brain Injury	229
Matilde Inglese and Eytan Raz	
13 Functional MRI of Multiple Sclerosis	247
Heather A. Wishart	
14 Functional Neuroradiology of Psychiatric Diseases	261
Paolo Nucifora	
15 Neuroimaging of Pain	273
Richard H. Gracely and Pia C. Sundgren	

Part IV BOLD Functional MRI: Physical Principles

16 Principles of BOLD Functional MRI	293
Seong-Gi Kim and Peter A. Bandettini	
17 fMRI Scanning Methods	305
Alexander B. Pine and Feroze B. Mohamed	
18 Experimental Design and Data Analysis for fMRI	321
Geoffrey K. Aguirre	
19 Challenges in fMRI and Its Limitations	331
R. Todd Constable	
20 Neurovascular Uncoupling in Functional MR Imaging	345
Jorn Fierstra and David John Mikulis	
21 Functional Connectivity MR Imaging	355
Michelle Hampson, Xilin Shen, and R. Todd Constable	
22 Clinical Challenges of Functional MRI	373
Nader Pouratian and Susan Y. Bookheimer	

Part V BOLD Functional MRI: Clinical Applications

23 fMRI of Language Systems: Methods and Applications	393
Jeffrey R. Binder	
24 Functional MRI Studies of Memory in Aging, Mild Cognitive Impairment, and Alzheimer's Disease	419
Shannon L. Risacher, Heather A. Wishart, and Andrew J. Saykin	
25 fMRI Wada Test: Prospects for Presurgical Mapping of Language and Memory	455
Brenna C. McDonald, Jacob Kean, and Andrew J. Saykin	
26 fMRI of Human Visual Pathways	485
Edgar A. DeYoe, John L. Ulmer, Wade Mueller, Lotfi Hacin-Bey, Viktor Szeder, Mary Jo Maciejewski, Karen Medler, Danielle Reitsma, and Jedediah Mathis	
27 Brain Mapping for Neurosurgery and Cognitive Neuroscience	513
Joy Hirsch	
28 Pediatric Applications of fMRI	545
Nolan R. Altman and Byron Bernal	

29 fMRI of the Central Auditory System.....	575
Deborah A. Hall	
30 fMRI of Epilepsy	593
Karsten Krakow	
31 Applications of fMRI to Psychiatry.....	609
Melissa Lopez-Larson and Deborah A. Yurgelun-Todd	
32 Applications of fMRI to Neurodegenerative Disease	639
Shamseldeen Y. Mahmoud, Stephen E. Jones, and Michael D. Phillips	
33 Applications of MRI to Psychopharmacology.....	671
Dan J. Stein, Yihong Yang, and Betty Jo Salmeron	
34 Functional MRI: Cognitive Neuroscience Applications	687
Mark D'Esposito, Andrew S. Kayser, and Anthony J.W. Chen	
 Part VI Diffusion Tensor Imaging	
35 Diffusion Tensor Magnetic Resonance Imaging: Physical Principles	709
Thomas A. Gallagher, Andrew L. Alexander, and Aaron S. Field	
36 Issues in Translating Imaging Technology and Presurgical Diffusion Tensor Imaging.....	731
John L. Ulmer, Jeffrey I. Berman, Wade M. Mueller, Wolfgang Gaggl, Edgar A. DeYoe, and Andrew P. Klein	
37 White Matter: Functional Anatomy of Key Tracts.....	767
Mohit Maheshwari, Andrew Klein, and John L. Ulmer	
38 Epilepsy: Clinical Applications of Diffusion Tensor Imaging.....	785
Timothy M. Shepherd and Christopher P. Hess	
39 DTI and fMRI: Review of Complementary Techniques	803
Jay J. Pillai and Domenico Zaca	
 Part VII Beyond Proton Imaging	
40 Magnetoencephalography: Epilepsy and Brain Mapping	833
Erin Simon Schwartz and Timothy P.L. Roberts	
41 PET-CT/MR Imaging in Head and Neck Cancer: Physiologic Variations, Pitfalls, and Directed Applications	845
Laurie A. Loevner	
42 Simultaneous PET and MR Imaging of the Human Brain	867
Ciprian Catana, A. Gregory Sorensen, and Bruce R. Rosen	
43 The Role of Molecular Imaging in Personalized Medicine	893
Michelle Bradbury	
44 Metabolic Magnetic Resonance Imaging: A Case for Bioscales in Medicine.....	911
Keith R. Thulborn, Ian C. Atkinson, and Aiming Lu	

Part VIII Functional Spine and CSF Imaging

- 45 Functional MRI of the Spinal Cord: Diffusion-Weighted, Diffusion Tensor Imaging, and Fiber Tractography..... 931**
 Meng Law, Majda M. Thurnher, Eric Schwartz, and Adam Flanders
- 46 MRI of Hydrocephalus and CSF Velocity Imaging 949**
 William G. Bradley Jr.

Part IX Neuroanatomical Brain Atlas

- 47 Neuroanatomical Atlas of Key Presurgical and Cognitive Eloquent Cortex Regions..... 969**
 Feroze B. Mohamed, Michael Yannes, Muhammed Malik, and Scott H. Faro
- 48 Normal Anatomic Atlas of Common White Matter Tracts Using DTI..... 983**
 Andrew P. Klein
- 49 fMRI Paradigms..... 997**
 Feroze B. Mohamed and Scott H. Faro
- Index..... 1003**

Functional Neuroradiology

Principles and Clinical Applications

Faro, S.H.; Mohamed, F.B.; Law, M.; Ulmer, J.T. (Eds.)

2012, XXI, 1029 p. 897 illus., 476 illus. in color. With
online files/update., Hardcover

ISBN: 978-1-4419-0343-3