

1. Record Nr.	UNINA9910438129003321
Titolo	FMRI : basics and clinical applications / / Stephan Ulmer, Olav Jansen, editors
Pubbl/distr/stampa	Heidelberg, Germany, : Springer, c2013
ISBN	3-642-34342-2
Edizione	[2nd ed.]
Descrizione fisica	1 online resource (vi, 325 pages) : illustrations (some color)
Collana	Gale eBooks
Altri autori (Persone)	UlmerStephan JansenOlav
Disciplina	612.82
Soggetti	Brain mapping Magnetic resonance imaging
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references at the end of each chapters and index.
Nota di contenuto	Contents; Part I : Basics; 1: Introduction; 2: Neuroanatomy and Cortical Landmarks; 2.1 Neuroanatomy and Cortical Landmarks of Functional Areas; 2.1.1 Sensorimotor Cortex; 2.1.1.1 Transverse Sections; 2.1.1.2 Sagittal Sections; 2.1.2 The Insula; 2.1.2.1 Sagittal Sections; 2.1.2.2 Transverse Sections; 2.1.3 Speech-Associated Frontal Areas; 2.1.3.1 Transverse Sections; 2.1.3.2 Sagittal Sections; 2.1.4 Auditory Cortex and Speech-Associated Temporoparietal Areas; 2.1.4.1 Transverse Sections; 2.1.4.2 Sagittal Sections; 2.1.4.3 Coronal Sections; 2.1.5 Visual Cortex; 2.1.5.1 Sagittal Sections References3: Spatial Resolution of fMRI Techniques; 3.1 Introduction; 3.2 Vascular Structure and Hemodynamic Response; 3.3 Spatial Resolution of BOLD fMRI; 3.4 Perfusion-Based fMRI Approaches; References; 4: The Electrophysiological Background of the fMRI Signal; 4.1 Introduction; 4.2 The Compound Neural Signal; 4.3 The Passive Electric Properties of the Brain; 4.4 The Neural Correlate of the BOLD Signal; 4.5 The Coupling of Synaptic Activity and CBF; 4.6 Conclusions; References; 5: High-Field fMRI; 5.1 Introduction; 5.2 Benefits and Limitations of High- and Ultra-High-Field MRI 5.3 Special Aspects of High-Field fMRI5.4 Ultra-High-Field fMRI: Recent Neurocognitive Studies; 5.5 Ultra-High-Field fMRI and Possible Clinical Applications; References; 6: fMRI Data Analysis Using SPM; 6.1

Introduction; 6.2 SPM Software Overview; 6.2.1 Requirements; 6.2.2 Installation; 6.2.3 Interface; 6.2.4 File Formats; 6.3 Spatial Transformations; 6.3.1 Data Preparation; 6.3.2 Realignment; 6.3.3 Coregistration; 6.3.4 Spatial Normalisation; 6.3.5 Spatial Smoothing; 6.4 Modelling and Statistical Inference; 6.4.1 The General Linear Model; 6.4.2 Contrasts; 6.4.3 Topological Inference 6.4.4 Population-Level Inference 6.5 Conclusions; References; 7: Meta-Analyses in Basic and Clinical Neuroscience: State of the Art and Perspective; 7.1 An Introduction to Quantitative Meta-Analysis in Neuroimaging Science; 7.2 Preconditions and Preliminaries of Quantitative Meta-Analysis; 7.3 Activation Likelihood Estimation; 7.4 Applying Quantitative Meta-Analysis; 7.5 Perspectives and Future Directions; References; Part II : Clinical Applications; 8: Preoperative Blood Oxygen Level-Dependent (BOLD) Functional Magnetic Resonance Imaging (fMRI) of Motor and Somatosensory Function 8.1 Rationale for fMRI in Rolandic Neurosurgery 8.2 Review of Literature; 8.3 General Considerations; 8.4 Diagnostic Aims; 8.5 Selection of Candidates for Preoperative fMRI; 8.6 Paradigms for Clinical Motor and Somatosensory fMRI; 8.7 Preoperative fMRI in Patients with Rolandic Brain Tumors; 8.7.1 Somatotopic Mapping of the Primary Motor Cortex (Standard Protocol); 8.7.2 Somatotopic Mapping of the Primary Somatosensory Cortex; 8.7.3 Localization of the Precentral Gyrus in Patients with Paresis; 8.8 Limitations and Pitfalls; References 9: The Functional Anatomy of Speech Processing: From Auditory Cortex to Speech Recognition and Speech Production

Sommario/riassunto

Since functional MRI (fMRI) and the basic method of BOLD imaging were introduced in 1993 by Seiji Ogawa, fMRI has evolved into an invaluable clinical tool for routine brain imaging, and there have been substantial improvements in both the imaging technique itself and the associated statistical analysis. This book provides a state of the art overview of fMRI and its use in clinical practice. Experts in the field share their knowledge and explain how to overcome diverse potential technical barriers and problems. Starting from the very basics on the origin of the BOLD signal, the book covers technical issues, anatomical landmarks, the full range of clinical applications, methods of statistical analysis, and special issues in various clinical fields. Comparisons are made with other brain mapping techniques, such as DTI, PET, TMS, EEG, and MEG, and their combined use with fMRI is also discussed. Since the first edition, original chapters have been updated and new chapters added, covering both novel aspects of analysis and further important clinical applications.
