

Preface

As brain science evolved from defining and studying the workings of individual brain areas to the study of brain networks, there is increasing interest in the way different areas of the brain interact with each other and how these interactions change while subjects perform different tasks or learn new skills. Key studies in non-human primates have greatly advanced our knowledge in this area. Exciting new tools are now available to study the operation and formation of these networks in the human brain in health and disease. These include neuroimaging measures of functional connectivity, magnetoencephalographic and electroencephalographic studies and new methods of transcranial brain stimulation. These methods provide unique ways to probe individual connections and interactions within a complex system.

This book is an outcome of a minisymposium entitled “Functional modulation of the primary motor cortex: from animal models to clinical applications” held at the Society for Neuroscience meeting in San Diego in November 2010. We expanded the topics discussed at the minisymposium and included additional authors who are leaders in the field. The chapters are organised into three parts: the first deals with studies in primates; chapters in the second section describe how it is possible to use non-invasive tools to probe and manipulate connectivity in healthy individuals; the last section then considers the changes in connectivity in neurological and psychiatric disease.

The aim of the book is to bring an up-to-date perspective on new methodologies that are increasingly being used not only to probe, but even to modulate the excitability of cortical connections in animal and in human brain. These studies have advanced our understanding of the normal function of the brain circuits studied, but also form the basis for new therapeutic applications in neurological and psychiatric disorders.

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Cortical Connectivity

Brain Stimulation for Assessing and Modulating Cortical
Connectivity and Function

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