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Prof. Hiroaki Naritomi
Department of Neurology
Senri Chuo Hospital
Osaka 560-0082
Japan

Prof. Derk W. Krieger
Department of Neurology
Stroke Center
Rigshospitalet
Copenhagen 2100
Denmark

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Preface

Over the last 3 decades, we have become witnesses of various successful and not so successful attempts to minimize sequelae after brain injuries. All of these strategies had one thing in common, the belief that time is brain and salvage becomes impossible at a point of no return. Advances in supportive care, in particular neurocritical care, enhanced the functional outcome even with severe brain injury. For quite some time, recovery from brain injury has been extremely dynamic and individual. Although our understanding of brain recovery is still in its infancy, many eye-opening discoveries will potentially lead to a sea change of neurorehabilitation.

We have believed for many years that injury to the central nervous system is permanent and does not permit compensatory revival of neuronal systems. Recent breakthroughs in neuroscience, however, suggest that recovery from central nervous system injury arises through neuroregeneration and neuroplasticity. Neurorehabilitation is transforming into a thriving field of preclinical and clinical research focusing on understanding the mechanisms of neurological recovery and enhancing repair. Aided by computer science and biotechnology, brain-machine interfaces are being created that can replace lost function but may also one day allow to communicate with unconscious patients. Neurorehabilitation has become the new arena where neuropharmacology, biotechnology, molecular biology and computer science meet traditional approaches, such as physiotherapy, speech therapy, psychology and social services. Novel therapies will require controlled clincial trials. New agents and procedures, such as stem cells, neurotransplantation, electromagnetic stimulation, brain-computer hybrids and neuropharmaceuticals, are being put to test to transform traditional neurorehabilitation. This book intends to provide a current overview of the most promising areas of research prepared by clinicians and scientists entrenched in the field of neurorehabilitation. Each chapter intends to give a concise overview of the basic science underpinning and clinical consequences of the particular area in neurorehabilitation. We have selected the areas according to their importance from a clinical perspective. All authors were invited based on their personal experience in the field and were aided by associates where appropriate. The targeted readership includes neuroscientists,

rehabilitation specialists, geriatricians, neuroscience nurses, ergo-, speech and physiotherapists.

We feel very honored by the distinguished contributions of all authors and the fruitful collaboration with the publishers on this endeavor so close to our hearts.

Hiroaki Naritomi, Osaka
Derk W. Krieger, Copenhagen