About the Editors

Bianca Weinstock-Guttman

Bianca Weinstock-Guttman is Professor of Neurology at the State University of New York at Buffalo (USA), Director of the Baird MS Center at the Jacobs Neurological Institute (NY, USA) and Executive Director of the NY State MS Consortium (USA). She is also Director of the Pediatric MS Center of the Jacobs Neurological Institute, one of six centers of excellence established by the National MS Society.

Murali Ramanathan

Murali Ramanathan is Professor of Pharmaceutical Sciences and Neurology at the State University of New York at Buffalo. He serves as Co-Director of the Data Intensive Discovery Initiative. He received his PhD in bioengineering from the University of California, San Francisco (USA) in 1994. He received a BTech (Honors) in chemical engineering from the Indian Institute of Technology (Kharagpur, India) in 1983, and an MSc in chemical engineering from Iowa State University, Ames (USA) in 1989. The focus of his research is to identify gene–environment interactions and molecular mechanisms by which the autoimmunity of multiple sclerosis is translated into neurological damage in the CNS. His computational research interests focus on leveraging genome-wide datasets, next-generation sequencing techniques and gene–environment interactions for drug discovery for multiple sclerosis.

Robert Zivadinov

Robert Zivadinov is Professor of Neurology at the State University of New York at Buffalo and Clinical Professor of Neurology at Florida International University (USA). He has performed extensive research in multiple sclerosis, having published more than 200 articles and 400 abstracts in leading peer-reviewed journals. He is currently pursuing research studies on quantitative magnetic resonance, ultrasound and optic coherence tomography imaging findings in multiple sclerosis, Parkinson's and Alzheimer's disease, and aging. His current interests also concentrate on therapeutic interventions, including strategies towards assessing neuroprotective efforts in neurodegenerative disorders, as well as venous function, and genetic and neuroepidemiology fields of these diseases.

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Foreword

Personalized management of multiple sclerosis

Bianca Weinstock-Guttman, Murali Ramanathan & Robert Zivadinov

Multiple sclerosis (MS) is considered an inflammatory disease affecting the CNS. MS is a highly heterogeneous disease entailing a dissimilar disease course and a different response to therapies between individual patients. Data from natural history cohorts show a broad spectrum of disease severities. The disease course is considered benign in 10–15% of patients as they do not need an assistive device for walking, even after 20 years from disease onset, but often the cognitive status is not included in this assessment [1,2]. On the other end of the spectrum, there are fulminant courses of MS that lead to severe disability within a few years. The clinical variance may be related to etiology, the underlying pathological features and often to the superimposed comorbidities [3]. This heterogeneity of disease severity has obvious consequences on the response to therapy and therefore personalized treatment decisions should be tailored for each individual patient. Consequently clinical (i.e., male gender, non-Caucasian ethnicity, high relapse rate during the first 2–3 years, incomplete recovery from relapses, and motor symptoms early during disease) and/or surrogate predictors (i.e., MRI metrics, genetics or specific immunological biomarkers) are necessary to identify the most appropriate therapeutic management for individual patient.

Therapeutic strategies in general are often built on two general principles: interference with the inflammatory/pathogenic process versus repair or protection of the damaged tissues [4]. Recent studies, however, have suggested that several pathological conditions may result from the interplay between genetic susceptibility traits and environmental influences that, by modulating the epigenome, also affect disease onset and progression. It is conceivable that new lines of preventive and possibly therapeutic intervention might be developed to modulate disease onset or decrease the severity of tissue damage. Data from clinical trials provide information about efficacy and safety at a patient group level. However, it is obvious that treatment decisions in clinical practice must be made on an individual basis, entailing a personalized medicine approach. This book will discuss the concepts within the context of MS, providing insight into different aspects of the disease related to the underlying pathophysiology while questioning the initial location of injury and secondary reactive immune response, clinical myriad of disease symptoms and therapeutic approaches for relapsing versus progressive MS. Symptomatic therapy including important rehabilitation interventions built for the specific dysfunction of individual patient as well as alternative or complementary therapeutic interventions used by over 80% of MS patients will be presented.

Research on the pharmacogenomics of MS is increasing but a useful biomarker for clinical practice has so far not emerged [5]. The treatment armamentarium of MS has increased tremendously over the last few years and more treatments are close to registration. Currently, the MRI metrics provide the most reliable surrogate biological markers proven to help in delineating the disease course as well as monitoring patients response to a specific therapy. Two chapters in this book provide a review supporting the prognostic value of MRI metrics in predicting and monitoring response to different disease-modifying therapies.

Although a final cure for MS is still missing, MS will be manageable in most patients with appropriate therapies. The most important challenge regarding these therapeutic interventions will be to tailor the therapy to the needs of the patients and the severity of the disease. This will require the development of composite biomarkers, including clinical, genetic, imaging and/or immunological schemes that will allow for a better stratification of patients.

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