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## Preface

More than 100 years have elapsed since the discovery of the blood-brain barrier (BBB). Evolving technologies starting with tracer studies, and more recently with genomics and proteomics, have provided novel information about the molecular properties of cerebral endothelium and astrocytes. The concept of the neurovascular unit has provided an impetus for in vitro studies of the interaction of brain endothelial cells with other components of the neurovascular unit such as pericytes, astrocytes, and neurons in steady states. However, such studies have to be done in animal models of neurological diseases and in humans to get a clearer understanding of the pathogenesis of BBB breakdown in nervous system diseases. Determination of the temporal course of BBB breakdown and the parallel molecular alterations remain important goals to identify therapeutic windows and pertinent therapeutic agents which will modify the disease process and prevent irreversible brain damage. There is also the need to develop imaging techniques for early diagnosis of brain diseases before irreparable tissue damage results. Although, modest advances have been made in the area of the BBB, parallel advances have not been made in the other neural barriers. These need to be studied to obtain an overall picture of the disease process.

*The Blood-Brain and Other Neural Barriers: Reviews and Protocols*, a sequel to *The Blood-Brain Barrier: Biology and Research Protocols*, provides the reader with additional protocols to study the barriers. The first section consists of current reviews of the properties of some of the components of the neurovascular unit, namely the brain endothelium, pericytes, and astrocytes. In addition, current information about the blood- cerebrospinal fluid barrier, the blood-retinal and blood-nerve barriers is also provided. The second section of the book gives detailed protocols of specific techniques written by experts in the field. The protocols include applications as well as caveats of these techniques. The first part describes techniques to image the barriers in humans and experimental animals, followed by cutting-edge molecular techniques to study the BBB and novel models to study the barriers. The last part details some of the prevalent techniques for the delivery of therapeutic agents across the BBB. This is a rapidly growing and competitive field, and, in some cases, results are too preliminary for publication of detailed protocols. It is hoped that the detailed protocols given in this book will aid the research efforts of not only graduate students but also more experienced investigators and will enable more studies of the blood-cerebrospinal, blood-retinal, and blood-nerve barriers.

I would like to acknowledge Prof. John M. Walker for this opportunity and for his help and all the authors who have contributed their protocols without which this book would not be possible.

This book is dedicated to my parents, Mohit Kumar and Labonya Nag for their unconditional love and support and for giving me the opportunity to pursue my goals.

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<http://www.springer.com/978-1-60761-937-6>

The Blood-Brain and Other Neural Barriers

Reviews and Protocols

Nag, S. (Ed.)

2011, XIV, 502 p., Hardcover

ISBN: 978-1-60761-937-6

A product of Humana Press