

METHODS IN MOLECULAR BIOLOGY

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Traumatic and Ischemic Injury

Methods and Protocols

Edited by

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Cover illustration: Endothelial cells of the blood-brain barrier stained for zonula occludens-1 (green) and nucleus (blue).

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Preface

Traumatic and ischemic injuries are some of the most devastating diseases and are responsible for high mortality and morbidity worldwide. Over the past decades, significant research has been conducted in this area, aimed at reducing or preventing complications after a traumatic or ischemic injury. Although some advances have been made in our understanding of the pathobiology of such insults, further research and innovative approaches are essential to clearly understand and treat these complex issues.

The use of a suitable animal model that exhibits many of the pathophysiological features of any disease is important for the identification of therapeutic targets and future drug development to alleviate its symptoms. A wide variety of small and large animal models are currently available for researchers working in the field of traumatic and ischemic injuries. The major advantage of using animals in research in these fields is the ability to obtain scientific information under well-defined conditions that closely mimic specific clinical scenarios. So, in the field of traumatic and ischemic injuries, it is important to continue animal studies and to develop new animal models and protocols that better reflect the clinical setting to gain further insight into the underlying cellular, biochemical, and physiological mechanisms involved. The general trend in the field is to use laboratory rodents to answer fundamental questions regarding cellular and molecular mechanisms while physiological processes are more commonly investigated in large animals due to the similarity to humans. The main focus of this volume was to compile the procedures for the development and application of several of such research models and techniques with the help from experts in their respective fields.

This particular volume is part of the *Methods in Molecular Biology* series and I hope will allow beginners with limited experience to initiate new research projects and established investigators to identify other comparable approaches and strategies. The first few chapters are mainly focused on some of the selected animal models and procedures commonly used in traumatic injury research followed by a chapter on hemorrhagic stroke. After that, a series of chapters on various ischemic injuries followed by some of the chapters specifically addressing sepsis models have been included. The last few chapters are dedicated to selected in vitro models from the field.

I would like to thank everyone who helped me directly or indirectly with this project. I am very much indebted to all the contributing authors for their time, hard work, and support for this project. I would like to express my gratitude to Ms. Chinchusha Anasooya Shaji and Dr. Himakarnika Alluri for their help in the organizing and editing processes. Also, my deepest appreciation goes to Prof. John Walker, the series editor, for his constant encouragement, guidance, and understanding, without which this project would not have been successful at all.

Temple, TX, USA

Binu Tharakan

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