Vascular Biology Protocols
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Edited by

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Preface

Cardiovascular disease is the greatest scourge affecting the industrialized nations and is increasing rapidly in developing countries, responsible for high morbidity and mortality. Over the past decades, the pathogenesis, diagnosis, treatment, and prevention of cardiovascular diseases have been benefited significantly from intensive research activities. More molecules and novel techniques have been made available to better understand the progression and management of cardiovascular diseases. In order to provide a comprehensive “manual” in a field that has become as broad and deep as cardiovascular medicine, this volume of “Methods in Molecular Medicine” covers a wide spectrum of in vivo and in vitro techniques encompassing biochemical, pharmacological, and molecular biology disciplines which are currently used to assess vascular disease progression. Each chapter included in this volume focuses on a specific vascular biology technique and describes various applications as well as caveats of these techniques. The protocols included here are described in detail, allowing beginners with little experience in the field of vascular biology to embark on new research projects.

The first few chapters are focused on protocols for animal models commonly used in vascular biology research. These models include rat carotid artery balloon injury, plaque-rapture, atherosclerosis, ventricular hypertrophy, hypertension, and insulin resistance. Besides these in vivo protocols, several ex vivo and in vitro protocols often employed to assess vascular functions may be also found in this volume such as pseudo-working heart, analysis of glucose metabolism in perfused transgenic mice, evaluation of cardiovascular renin angiotensin aldosterone activation, detection and quantification of apoptosis in vasculature.

The next series of chapters include protocols for isolation, characterization, and assays to assess the function/dysfunction of various vascular cell types. We have then lined up a few chapters on detection of reactive oxygen species and post-translational modification of proteins including protein glycoxidation, assessment of kinase activity, and 2D gel electrophoresis. In order to keep pace with the cutting-edge research, we have also inserted, as the final chapter, a protocol that describes stem cell therapy in the heart and vasculature.

We hope that this protocol handbook, among all series of “Methods in Molecular Medicine” will prove useful information to those who wish to
broaden their knowledge for cardiovascular research tools. To achieve this goal, credit must be given to all talented and dedicated scientists involved in this book series. Our deepest appreciation goes to Professor John Walker, the Series Editor for Methods in Molecular Medicine, for his encouragement and guidance throughout the preparation process. We are indebted to all contributing authors for their professional expertise, knowledge and devoted scholarship, which are at the very “heart” of this book.

Nair Sreejayan
Jun Ren
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