Cardiac Electrophysiology Methods and Models

Daniel C. Sigg · Paul A. Iaizzo
Yong-Fu Xiao · Bin He
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Preface

Cardiovascular disease is the major cause of morbidity and mortality worldwide. While significant progress has been made in treating some major subcategories of cardiac disease, such as arrhythmias and ischemic heart disease, significant unmet needs remain. This, in turn, implies a great need for future basic, applied, and clinical research and, ultimately, therapeutic developments.

Even with major medical advances, every day in the USA alone, thousands of patients die due to the underlying arrhythmias. In this disease category, atrial fibrillation is the most common arrhythmia, affecting millions of patients around the world at any given time. To understand its complex causes in varied populations, the underlying mechanisms, and/or optimal therapies, the scientific and medical communities face tremendous challenges, and this requires great effort and cooperation. In other words, there is currently a major public need to continue to develop new and better therapies for treating or preventing arrhythmias. Accordingly – and fortunately – an ever-increasing number of biomedical, pharmaceutical, and medical personnel are interested in studying various aspects of arrhythmias at basic, translational, and applied levels. Not only has our overall understanding of the molecular basis of disease dramatically increased, but we are also seeing a growing number of available and emerging molecular, pharmacological, and device treatment-based therapies.

We recognize that there is a need, albeit one that poses a great challenge, to provide guidance for researchers in this field in the form of a practical, state-of-the-art handbook dedicated to cardiac electrophysiology models and methods. As such, one of our primary goals was to showcase the various authors' expertise on key research methods and protocols, pinpointing their advantages and pitfalls, and provide readers with a single resource with a focus on practical implementation and collaborative cross-functional research. Further, it was our vision to create this book, which is very much focused on practical methods and implementation, and yet provide enough theory so that the principles can be clearly understood and easily applied. Finally, it should be noted that this textbook has been primarily written by scientists and clinicians from various leading academic and industrial research institutions from across the globe, whose work has had a major impact on arrhythmia research.

We hope that this textbook will be a helpful reference for those teaching and/or studying cardiac electrophysiology. We are grateful to all the authors for their excellent contributions, to Monica Mahre for her outstanding administrative support, and to Springer publishers for making this book a reality.

Twin Cities of Saint Paul and Minneapolis,
Minnesota, USA,
October 28, 2009

Daniel Sigg, MD, PhD
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