1. Record Nr. UNINA9910919815203321

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Titolo	Cardiac Electrophysiology Methods and Models : A Practical Handbook for Scientists, Engineers, and Clinicians / / edited by Paul A. Iaizzo, Michael D. Eggen, Tinen L. Iles
Pubbl/distr/stampa	Cham : , : Springer Nature Switzerland : , : Imprint : Springer, , 2024
ISBN	9783031710674 9783031710667
Edizione	[2nd ed. 2024.]
Descrizione fisica	1 online resource (677 pages)
Altri autori (Persone)	EggenMichael D IlesTinen L
Disciplina	616.12
Soggetti	Cardiology Internal medicine Internal Medicine
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Foreword by Tim Laske -- Section 1: Introduction -- Clinical Cardiac Electrophysiology: An Overview of its Evolution -- Section 2: Overview -- Basic Cardiac Electrophysiology: Excitable Membranes -- Cardiac Action Potentials, Ion Channels, and Gap Junctions -- Anatomy and Physiology Overview of the Cardiac Conduction System -- The Surface Electrocardiogram and Clinical Cardiac Electrophysiology -- Section 3: Disease States and Therapies -- Catheter Ablation of Cardiac Arrhythmias -- Cardiac Ablative Technologies -- Cardiac Anatomy Relative to Ablation Therapies -- Electroporation Ablative Therapy as a Clinical Tool: An Old Technology Revisited -- Pacing and Defibrillation -- Cardiac Resynchronization Therapy -- Section 4: Methods and Models -- Cardiac Cellular Electrophysiological Modeling -- Cardiac Monophasic Action Potentials: Endocardial, Epicardial, and Transmural Recordings -- Impact of Geometric Simplifications on Cardiac Computational Models of Electrophysiology to Assess Cardiac Resynchronization Therapy -- Cardiac Tissue Engineering: A Pathway for Repair -- Isolated Tissue Models -- The Utility of Large Mammalian Isolated Heart Models to Perform Multi-Channel Recordings and

Analyses of Cardiac Rhythmicity and Conductivity In Vitro -- Probing Small Animal Models for Pathogenesis of Cardiac Arrhythmias Using Optical Mapping -- The Use of Large Animal Models for Cardiac Electrophysiology Studies -- Optical Mapping and Calcium Imaging -- Electrophysiology of Single Cardiomyocytes: Patch Clamp and Other Recording Methods -- Functional Stimulation of Cardiac Tissue and the Electrode Tissue Interface: Laboratory Tutorials and Exercises -- Engineering Principles of Lead Extraction -- Innovation in Clinical Care: Case Studies from Contemporary Cardiac Electrophysiology.

Sommario/riassunto

Cardiovascular disease is the major cause of mortality and morbidity around the world. While significant progress has been made in treating a major sub-category of cardiac disease and arrhythmias, significant unmet needs remain. Every day, thousands of patients die due to arrhythmias in the U.S. alone, and atrial fibrillation is the most common arrhythmia that affects millions of Americans at any given time. Therefore, there is an urgent public need to continue to develop new and better therapies for arrhythmias. This book reviews key research methods and protocols in cardiac electrophysiology with a focus on advantages and pitfalls. It will discuss new developments as well as traditional treatments and methods. Chapters will focus on practical implementation and collaborative cross-functional research methods. The book will contain contributions from scientists and clinicians from various academic and industrial research institutions. The inclusion of industrial experts expands the scope and potential audience of this book, and provides important perspective beyond basic science. Contributors will include researchers and clinicians from academic institutions such as the University of Minnesota, Harvard, Washington University, Case Western, Indiana University, and Manchester University. Methods and Models in Cardiac Electrophysiology will be a must-have resource for clinical academic scientists, engineers from industry (Biotech, Pharma, and Medical Device), undergraduate and graduate students, physicians, biomedical engineers, and high school and college teachers interested in studying cardiac electrophysiology and cardiac function. The book may also be of interest to students in the fields of physiology, molecular biology, cellular biology, biomedical engineering, mechanical engineering, electrical engineering, and related areas. .