

Preface

BIOELECTRONIC MEDICINE IS A NEW FIELD AT THE convergence of molecular medicine, neuroscience, and biomedical engineering. It exploits specific molecular mechanisms of neural regulation and technological advances that have allowed us to develop novel approaches to disease diagnosis and treatment. It is a field driven by innovative work that brings together multidisciplinary teams in research laboratories and the clinic and faces head-on the needs of patients. Bioelectronic approaches are currently being successfully applied in inflammatory bowel disease, rheumatoid arthritis, and other inflammatory and autoimmune diseases, paralysis, obesity, diabetes, cardiovascular disease, neurodegenerative diseases, and other debilitating disorders and conditions. This volume was compiled to inform the reader about these developments and is authored by many of the leaders in the field who have contributed substantially to preclinical and clinical research, technology development, and therapeutic applications.

Our intention has been to be as comprehensive as possible in each chapter, but we apologize to colleagues who were not included because of space limitations. The citations list the work of many others who could also have been rightfully included as leaders in this field. Readers will note the recurring themes of multidisciplinary research and clinical translation. This new field is evolving. Materials scientists, mathematicians, artificial intelligence specialists, and researchers from many other disciplines are joining forces with neuroscientists, immunologists, molecular biologists, and clinicians in our common goal of creating new diagnostic methods, new improved devices, and new treatment and rehabilitation approaches that will make a difference for patients. Our hope is that this book will inspire additional multidisciplinary discussions and collaborations that stimulate further progress in this area.

We thank the authors who enthusiastically responded to our invitations to participate in this project and wrote chapters highlighting many current aspects of bioelectronic medicine. We also thank the numerous peer reviewers who volunteered their time to read the manuscripts and provide constructive comments. We are grateful to Barbara Acosta, Richard Sever, Diane Schubach, and their colleagues at Cold Spring Harbor Laboratory Press for their dedicated professional efforts in developing the project and producing this book. We also thank Jonathan Cohen, Michelle Iglesias, and Samantha Kerath for their administrative support and efficiently coordinating the efforts. Finally, we thank our families for their understanding of the need for us to dedicate extra time to accomplish this project.

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