
Preface

Gap junction channels are a group of intercellular channels ubiquitously expressed in tissues and organs to synchronize many physiological processes. Hemichannels were discovered about two decades ago (a hemichannel is half of a gap junction channel) as a relevant cell membrane pathway for the release and uptake of ions and small molecules, many of which are autocrine and paracrine signal molecules. Mutations in 14 out of 21 genes encoding gap junction protein subunits, called connexins, have been found to be associated with inherited human disorders and diseases, including hearing loss, skin diseases, peripheral and central neuropathic disorders, lens cataracts, cardiac arrhythmias, and developmental disorders. The prevalence of connexin 26 (Cx26) gene mutation-linked congenital sensorineural hearing loss is so high that complete DNA sequencing of the coding region of *GJB2* (the gene encoding Cx26) has become routine for newborns or during pregnancy. Because of the important physiological role of connexins and the linkage of the connexin gene mutations with many diseases, the field of connexin research has recently exploded and has become one of the most active areas of research. Numerous novel approaches and techniques have been developed, but there is no single book dedicated on the unique techniques and protocols for the research on these large pore channels. The last book on gap junction methods and protocols was published 15 years ago, which cannot meet the current need of researchers and trainees in the fields. To fill this gap, we recruited expert researchers in the field to share their state-of-the-art techniques, protocols, and thoughts/reviews on various approaches commonly used in the studies of gap junction channels and hemichannels.

Chapters 1 to 6 in this book are focused on the protocols on, approaches to, and reviews of gap junction channels, and Chapters 7 to 12 are on connexin hemichannels. We hope that this book will be a very useful reference book for graduate students, postdoctoral fellows, and researchers with an interest in gap junction channels and hemichannels. It should be noted that we have covered many common approaches in studying these channels, but some areas/approaches may not be discussed in detail in this book because of the difficulties in finding appropriate contributors.

We would like to thank all the contributors for taking their valuable time to put their chapters together to share their detailed experimental protocols and their views on different approaches. Without their willingness to help, consistent efforts in developing and revising their chapters, and their contribution in helping to reviewing some chapters, we would not be able to complete this book.

A video that relates to Chapter 3 is available from the CRC Press Web site. Interested readers should click on the Downloads/Updates tab at the following URL: <https://www.crcpress.com/Gap-Junction-Channels-and-Hemichannels/Bai-Sez/9781498738620>.