
Preface

Direct cell–cell communication is a common property of multicellular organisms that is achieved through membrane channels which are organized in gap junctions. The protein subunits of these intercellular channels, the connexins, form a multigene family that has been investigated in great detail in recent years. It has now become clear that, in different tissues, connexins speak several languages that control specific cellular functions. This progress has been made possible by the availability of new molecular tools and the improvement of basic techniques for the study of membrane channels, as well as by the use of genetic approaches to study protein function in vivo. More important, connexins have gained visibility because mutations in some connexin genes have been found to be linked to human genetic disorders.

Connexin Methods and Protocols presents in detail a collection of techniques currently used to study the cellular and molecular biology of connexins and their physiological properties. The field of gap junctions and connexin research has always been characterized by a multidisciplinary approach combining morphology, biochemistry, biophysics, and cellular and molecular biology. This book provides a series of cutting-edge protocols and includes a large spectrum of practical methods that are available to investigate the function of connexin channels.

Connexin Methods and Protocols is divided into three main parts. In the first part, we have included chapters dealing with common laboratory techniques that have been specifically adapted to the study of connexins and gap junction channels. The second part presents a variety of approaches that are more closely related to functional studies of this form of cell–cell communication. Finally, in the third part, we have grouped chapters that discuss the properties of connexins in relation to their functional role. Most chapters are organized in a very schematic fashion with a step-by-step presentation of the technique to facilitate its introduction into the laboratory. Other chapters are more narrative in style, since they discuss specific theoretical aspects of connexin biology and physiology and are, therefore, not amenable to the same format. We hope that *Connexin Methods and Protocols* will set the standard for assays used to investigate connexins and demonstrate their involvement in intercellular communication. Since there is an existing “connexin link” (connexin-connection@listserv.uni-stuttgart.de) that provides a forum to disseminate

information among researchers in this field, we hope that this electronic address may be used to post comments and protocol updates.

This book is intended for doctoral students and postdocs who are starting their work in the connexin field and wish to approach a key biological question involving several techniques. It will be equally useful to group leaders whose research activity either brings them to the study of connexins and cell–cell communication or requires the timely addition of more techniques to their laboratory repertoire. For instance, the cloning of the connexin counterparts in invertebrates, the innexin family, together with the association of connexin mutations to human diseases, has now brought developmental and human geneticists into the field of intercellular communication. It is to be hoped that the new breed of connexin researchers may find this book useful at this time.

At the 1987 Gap Junction meeting held in Asilomar (USA) the scientific community agreed on a nomenclature that distinguishes connexins on the basis of species of origin and appends the molecular mass predicted by cloned DNA sequences to the family name connexin (Cx). For example, the 43 kDa protein first identified in myocardial gap junctions is termed Cx43 and connexin homologs from different organisms can be distinguished with a suitable identifying prefix. Despite its limitations, this convention is currently used by the vast majority of researchers and, therefore, has been adopted throughout this book. The connexin family has now grown well beyond the only four members that were known 12 years ago. Thus, at the 1999 meeting on connexins and gap junctions (Gwatt, Switzerland), a committee was formed to address the issue of nomenclature. The committee has now reached a consensus and has recommended that the current nomenclature be retained.

Finally, we wish to thank all the authors for their patience in dealing with our picky reviews of the manuscripts. We hope that, despite the changes and rigidity in style that we have occasionally imposed, they will be as pleased with the outcome as we have been with their excellent contributions: we are already using some of their protocols in our laboratories. We are also grateful to the series editor, John Walker, for his invitation, since our editorial work has considerably improved our practical knowledge of connexins.

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