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lack of confidence in recommending this book as a learning tool.

The book is well produced, and attractive to look at, with lavish use

of colour and large-scale graphics. However, the contents do not match the packaging, and I came away from reading it disappointed.

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Summer solstice

From Ion Channels to Cell-to-Cell Conversations

edited by Ramon Latorre and Juan Carlos Saez, Plenum Press, 1997. (504 pages) (\$162.00)

ISBN 0 306 45605 2

The sun, the surf and ion channels? Move over Agatha Christie. *From Ion Channels to Cell-to-Cell Conversations* is a collection of essays by an international array of today's leaders in the field of biophysics, and one great read. On vacation recently, I happily devoured the book, part of a series from the Centro De Estudios Cientificos De Santiago. ('Dad, is that a bomb on the cover? Do you like my sand castle? When are you coming in the water?' 'No, Nicolas, that's their series logo. Yes, Becky, it's a very cool castle. Soon, Daniel.')

Seminar monographs usually fail to overcome at least one of three major hurdles: essays that are outdated, are only of parochial interest or overlook major subject areas. Remarkably, this book achieves its goals just as elaborated by Latorre, '(to) be useful to graduate students taking first steps in this field as well as a reference for the aficionado'. The essays introduce basic concepts and then explore them by considering some of the most important experimental advances in recent years. Like the best teachers, the book reveals the logic behind current methods and strategies by showing them in action.

The book is divided into two sections. The first, 'Ion Channels in Contact with the External World', shows how understanding of the

molecular basis for channel function has advanced through manipulation of channel-forming molecules by molecular genetic techniques and the use of exquisitely sensitive electrophysiological measurements. The authors describe what causes channels to open and close (or 'gate') their transmembrane conduction pathways, with excellent chapters on activation by voltage, calcium and ligands. How kinetics of channel gating can determine if ions flow inward or outward is explored by mutational interconversions. Channel regulation by second messengers and accessory subunits are well-considered. Then, by clear descriptions of studies on K⁺ channels, methods used to study assembly of multimeric channel complexes and transmembrane topology are shown.

The first section continues by considering the indirect methods now being exploited to reveal the structure of the channel pore – that mysterious portal that allows millions of ions to traverse a membrane each second through a single channel complex, often while achieving remarkable selectivity. The attributes of the outer pore are scrutinized by thermodynamic mutant cycles with channels and peptide inhibitors of known three-dimensional structure (don't be scared, it sounds worse than it is), while the depths of the pathway are interrogated by trapping small ions inside the deep pore. The section ends with a flourish, describing the molecular mechanisms through which ion channels mediate cell volume, olfaction, vision and genetically determined hypertension.

The second part of the book, 'Intercellular Channels', explores recent major steps forward in our understanding of channels that control cell-cell communication. Connexin

hemichannels combine to form channels called gap junctions between cells. These pathways are key to the biology of skeletal and smooth muscle, the heart, the lens of the eye, the liver and even, perhaps, interaction of free-roaming leukocytes and endothelial cells that line blood vessels. Thus, gap junctions allow cardiac myocytes to function as a syncytia, enabling propagation of electrical activity and contraction waves through the myocardium. From the molecular basis of voltage effects to abnormalities in connexin43 knockout mice, current methods and models are laid bare.

This book is a worthy companion to the central textbook of the field (*Ionic Channels of Excitable Membranes*, 2nd edition, by Bertil Hille, Sinauer Press, 1992). It does not offer the detail of a basic text; rather, it points to a basic concept and then investigates its operation in elegant detail. The only significant deficits in the book are its failure to consider the inward rectifier K⁺ channels or to enumerate newly emerging channel families. These are small problems in relation to what the volume does offer. *From Ion Channels to Cell-to-Cell Conversations* may be one of the last truly engaging volumes in this period that has preceded studies based on direct determination of channel structures. One last proviso: when reading the volume be certain to change positions often and apply plenty of sun block; it is very hard to put down.

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