PHYSIOLOGY OF MEMBRANE DISORDERS

Edited by
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Preface

The purpose of this book is to provide the reader with a rational frame of reference for assessing the pathophysiology of those disorders in which derangements of membrane transport processes are a major factor responsible for the clinical manifestations of disease. In the present context, we use the term "membrane transport processes" in a catholic sense, to refer to those molecular processes whose cardinal function, broadly speaking, is the vectorial transfer of molecules—either individually or as ensembles—across biological interfaces, the latter including those interfaces which separate different intracellular compartments, the cellular and extracellular compartments, and secreted fluids—such as glomerular filtrate—and extracellular fluids. Evidently, consideration of these processes, and of the pathophysiology of membrane disorders, requires an understanding of the composition and structure of biomembranes, of the physical rules governing membrane transport processes, of the way in which chemical regulators—either physiologic or pharmacologic—regulate or modify membrane transport processes, and of the ways in which these events are interpreted into specialized phenomena such as cell volume regulation, signal transmission in excitable tissues, cell-to-cell communication, and secretory processes in epithelia.

Accordingly, *Physiology of Membrane Disorders* is divided into five major sections. Part I, The Nature of Biological Membranes, provides an overview of the physical structure and composition of plasma membranes, and of the dynamic relations between structure and function. Part II, Methods for Studying Membranes, provides insights into the ways, including theoretical, chemical, and physical techniques, in which one may assess the characteristics of membranes and membrane systems. Part III, General Problems in Membrane Biology, furnishes a general description of events—e.g., active and passive solute permeation, cell volume regulation, cellular communications, and the effect of drugs, hormones, and immune reactions on these phenomena—common to most biomembranes. Part IV, Transport Events in Specialized Cells, Tissues, and Organs, is an account of transport events unique to certain specialized systems, e.g., unique cell types, excitable tissues, and various epithelia. Finally, Part V, Clinical Disorders of Membrane Disorders, utilizes the concepts presented in Parts I–IV to analyze

current information and views about the pathophysiology and chemical manifestations of a number of disorders in which aberrancies of membrane structure and/or function play a major role in disease pathogenesis. Finally, our particular thanks to Donna Gunnin for her invaluable help in copyediting the book.

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