

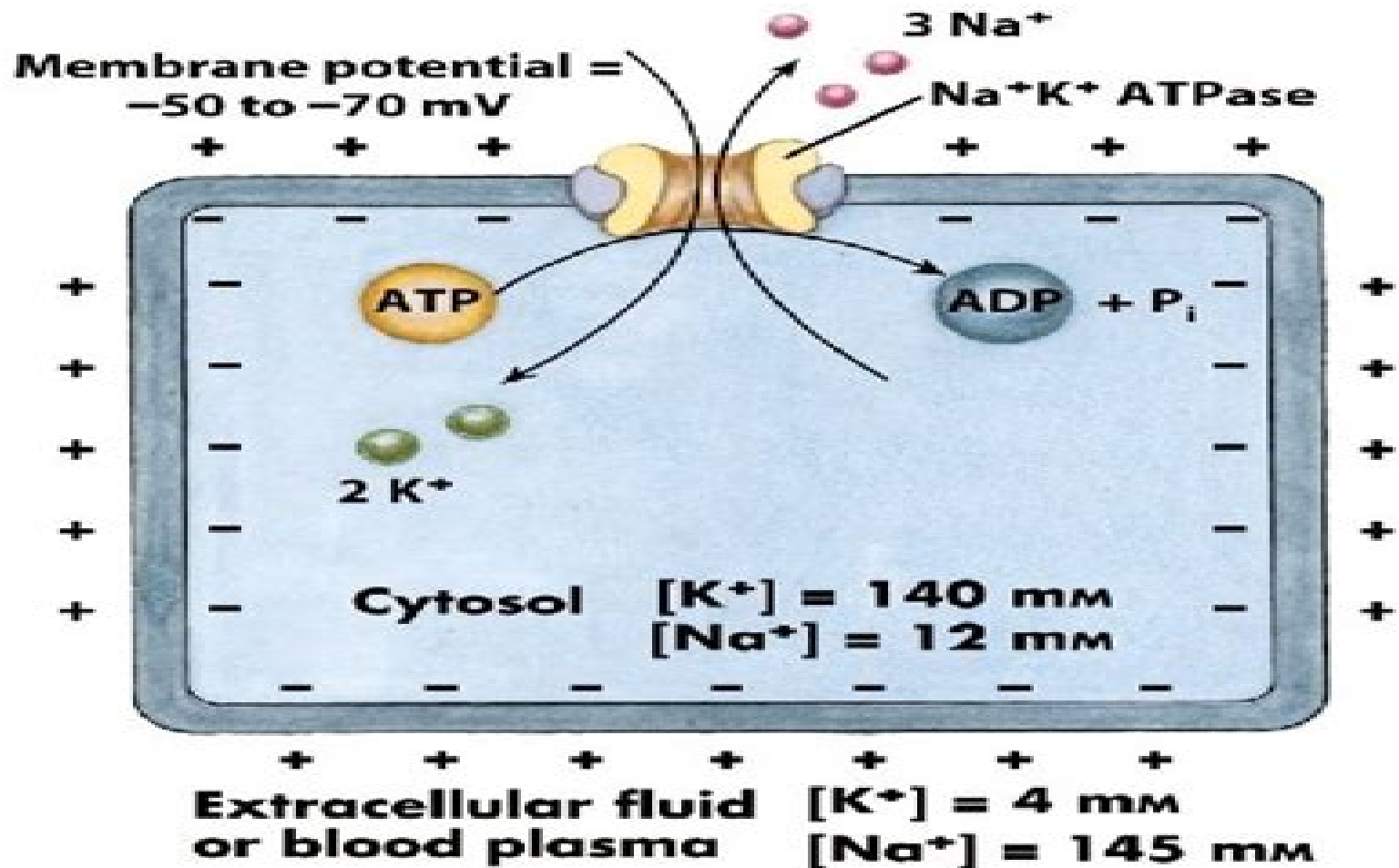
Biological Membranes and Transport

Primary active transport: ATP-dependent active transporters

P-type

Active cotransport of Na^+ and K^+

Reversibly phosphorylated by ATP



Electrogenic Chloride Transporters In Biological Membranes

Hamid M. Said



Electrogenic Chloride Transporters In Biological Membranes:

Advances in Comparative and Environmental Physiology G.A. Gerencser, 2012-12-06 Biological cell membranes regulate the transfer of matter and information between the intracellular and extracellular compartments as basic survival and maintenance functions for an organism This volume contains a series of reviews that are concerned with how biological plasma membranes regulate the transport of chloride between the intracellular and extracellular compartments of a cell This book is also an attempt to analyze the molecular basis for the movement of chloride across a cell membrane This volume is devoted to a diversity of electrogenic chloride transport mechanisms in representative cell membranes of all living things The first section of the book Chaps 1-4 focuses on mechanisms of primary active chloride transport i.e. photon or ATP driven while the second section Chaps 5-6 centers on secondary active chloride transporters symport and antiport in both plant and animal plasma membranes The last section which comprises seven chapters Chaps 7-13 deals with chloride channels in cell membranes of prokaryotes and eukaryotes of most every phylum It is hoped that with this particular ordering the reader can glean a telescopic view of the evolutionary history of the various electrogenic chloride transporters *Advances in Comparative and Environmental Physiology*, 1994-02-04 Biological cell membranes regulate the transfer of matter and information between the intracellular and extracellular compartments as basic survival and maintenance functions for an organism This volume contains a series of reviews that are concerned with how biological plasma membranes regulate the transport of chloride between the intracellular and extracellular compartments of a cell This book is also an attempt to analyze the molecular basis for the movement of chloride across a cell membrane This volume is devoted to a diversity of electrogenic chloride transport mechanisms in representative cell membranes of all living things The first section of the book Chaps 1-4 focuses on mechanisms of primary active chloride transport i.e. photon or ATP driven while the second section Chaps 5-6 centers on secondary active chloride transporters symport and antiport in both plant and animal plasma membranes The last section which comprises seven chapters Chaps 7-13 deals with chloride channels in cell membranes of prokaryotes and eukaryotes of most every phylum It is hoped that with this particular ordering the reader can glean a telescopic view of the evolutionary history of the various electrogenic chloride transporters *Advances in Comparative and Environmental Physiology* G. A. Gerencser, G. A. Ahearn, P. A. V. Anderson, 1994-02-04 *Physiology and Pathology of Chloride Transporters and Channels in the Nervous System* F. Javier Alvarez-Leefmans, Eric Delpire, 2009-08-22 The importance of chloride ions in cell physiology has not been fully recognized until recently in spite of the fact that chloride Cl⁻ together with bicarbonate is the most abundant free anion in animal cells and performs or determines fundamental biological functions in all tissues For many years it was thought that Cl⁻ was distributed in thermodynamic equilibrium across the plasma membrane of most cells Research carried out during the last couple of decades has led to a dramatic change in this simplistic view We now know that most animal cells neurons included exhibit a non equilibrium distribution of Cl⁻ across their plasma

membranes Over the last 10 to 15 years with the growth of molecular biology and the advent of new optical methods an enormous amount of exciting new information has become available on the molecular structure and function of Cl channels and carriers In nerve cells Cl channels and carriers play key functional roles in GABA and glycine mediated synaptic inhibition neuronal growth and development extracellular potassium scavenging sensory transduction neurotransmitter uptake and cell volume control Disruption of Cl homeostasis in neurons underlies pathological conditions such as epilepsy deafness imbalance brain edema and ischemia pain and neurogenic inflammation This book is about how chloride ions are regulated and how they cross the plasma membrane of neurons It spans from molecular structure and function of carriers and channels involved in Cl transport to their role in various diseases The first comprehensive book on the structure molecular biology cell physiology and role in diseases of chloride transporters channels in the nervous system in almost 20 years Chloride is the most abundant free anion in animal cells This book summarizes and integrates for the first time the important research of the past two decades that has shown that Cl channels and carriers play key functional roles in GABA and glycine mediated synaptic inhibition neuronal growth and development extracellular potassium scavenging sensory transduction neurotransmitter uptake and cell volume control The first book that systematically discusses the result of disruption of Cl homeostasis in neurons which underlies pathological conditions such as epilepsy deafness imbalance brain edema and ischemia pain and neurogenic inflammation Spanning topics from molecular structure and function of carriers and channels involved in Cl transport to their role in various diseases Involves all of the leading researchers in the field Includes an extensive introductory section that covers basic thermodynamic and kinetics aspects of Cl transport as well as current methods for studying Cl regulation spanning from fluorescent dyes in single cells to knock out models to make the book available for a growing population of graduate students and postdocs entering the field

Epithelial Transport

Physiology George A. Gerencser, 2010-03-10 Biological cell membranes regulate the transfer of matter and information between the intracellular and extracellular compartments as basic survival and maintenance functions for an organism This volume contains a series of reviews that are concerned with how epithelial plasma membranes regulate the transport of solutes between the intracellular and extracellular compartments of a cell This book is also an attempt to analyze the molecular basis for the movement of various solutes across an epithelial cell membrane This volume is devoted to a diversity of epithelial transport mechanisms in representative cell membranes of a variety of living things The first section of the book Chapters 1-6 focuses on mechanisms of solute transport in epithelia of invertebrates The last section which comprises ten chapters Chapters 7-16 deals with solute transporters in epithelial cell membranes of vertebrates It is hoped that with this particular ordering the reader can glean a telescopic view of the evolutionary history of the various epithelial solute transporters

Physiology of the Gastrointestinal Tract Kim E. Barrett, Faye K. Ghishan, Juanita L. Merchant, Hamid M. Said, Jackie D. Wood, 2006-05-10 FROM THE PREFACE The original purpose of the First Edition of Physiology of the Gastrointestinal Tract to

collect in one set of volumes the most current and comprehensive knowledge in our field was also the driving force for the Fourth Edition. The explosion of information at the cellular level made possible in part by the continued emergence of powerful molecular and cellular techniques has resulted in a greater degree of revision than that of any other edition. The first section now titled Basic Cell Physiology and Growth of the GI Tract contains numerous new chapters on topics such as transcriptional regulation, signaling networks in development, apoptosis and mechanisms in malignancies. Most of the chapters in this section were edited by Juanita L. Merchant. Section II has been renamed Neural Gastroenterology and Motility and has been expanded from seven chapters with rather classic titles to more than twenty chapters encompassing not only the movement of the various parts of the digestive tract but also cell physiology, neural regulation, stress and the regulation of food intake. Almost all of the chapters were recruited and edited by Jackie D. Wood. The third section is entirely new and contains chapters on Immunology and Inflammation which were edited by Kim E. Barrett. The fourth section on the Physiology of Secretion consists of chapters with familiar titles but with completely updated information to reflect the advances in our understanding of the cellular processes involved in secretion. The last section on Digestion and Absorption contains new chapters on the intestinal barrier, protein sorting and ion channels along with those focusing on the uptake of specific nutrients. These chapters were recruited and edited by Hamid M. Said and Fayez K. Ghishan. Collected in one set, the most current and comprehensive coverage of gastrointestinal physiology. Information presented in a style that is both readable and understandable. Valuable to the specialized researcher, the clinical gastroenterologist, the teacher and the student. Features an entirely new section on Immunology and Inflammation. Each section edited by the preeminent scientist in the field.

Physiology of the Gastrointestinal Tract Hamid M. Said, 2018-03-08. Physiology of the Gastrointestinal Tract Sixth Edition. A Two Volume set covers the study of the mechanical, physical and biochemical functions of the GI Tract by linking clinical disease and disorder, thus bridging the gap between clinical and laboratory medicine while also covering breakthroughs in gastroenterology such as the brain gut axis and microbiome. Additionally, information is provided at the organism level including animal models of gastrointestinal disorders and therapeutic possibilities. The book covers a wide range of conditions from food allergies, constipation, chronic liver disease and IBS, also exploring emerging techniques to diagnose and normalize functions of the GI tract. As a highly referenced book, this is a useful resource for gastroenterologists, physiologists, internists, professional researchers and instructors teaching courses for clinical and research students. Discusses the multiple processes governing gastrointestinal function. Presents new information on the brain gut axis and microbiome. Edited by preeminent scientists in the field. Includes coverage of issues such as food allergies, constipation, chronic liver disease, IBS, Crohn's disease and more.

Muscle Contraction and Cell Motility H. Sugi, 2012-12-06. This volume intends to provide a comprehensive overview on the mechanisms of muscle contraction and non-muscle cell motility at the molecular and cellular level, not only for investigators in these fields but also for general readers interested in these

topics A most attractive feature of various living organisms in the animal and plant kingdoms is their ability to move In spite of a great diversity in the structure and function of various motile systems it has frequently been assumed since the nineteenth century that all kinds of motility are essentially the same Based on this assumption some investigators in the nineteenth century thought that the mechanisms of motility could better be studied on primitive non muscle motile systems such as amoeboid movement rather than on highly specialized muscle cells Contrary to their expectation however the basic mechanisms of motility have been revealed solely by investigations on vertebrate skeletal muscles since a monumental discovery of Szent Gyorgyi and his coworkers in the early 1940s that muscle contraction results from the interaction between two different contractile proteins actin and myosin coupled with ATP hydrolysis NaCl Transport in Epithelia R. Greger, 1988-05-30 After the pioneering studies by Ussing and co workers studies of epithelial Nael transport have come a long way The first phase of the phenomenological description of the cell as a black box has been followed by studies of cellular mechanisms the interplay of the different transport components and the mechanisms of regulation A broad spectrum of methods has been applied to many epithelia in a variety of species For the individual epithelia transport schemes have been proposed and at this point I think it is appropriate to take a pause and search for elements common to several epithelia This aspect triggered the publication of this book and in fact the various chapters emphasize that the functional components expressed in the various epithelia are not infinite in number but they occur in epithelia which are separated in evolution by several hundred million years The authors come both from the field of veterinary and human physiology as well as from biology In my opinion the close contacts and collaborations between physiologists and biologists have been essential for the progress in this field I wish to thank all authors for their contributions and I hope that the reader will appreciate this collection of up to date reviews on epithelia in nonvertebrates and vertebrates **Advances in Comparative and Environmental Physiology** F. Lang, D. Häussinger, 2012-12-06 One of the prerequisites for survival is the ability of cells to maintain their volume Thus during the course of evolution cells have learned a variety of strategies to achieve volume homeostasis This volume regulatory machinery involves regulation of both cellular metabolism and cellular transport and is exploited by hormones and transmitters to regulate cellular function This book illustrates the complex interplay of cell volume regulatory mechanisms and cellular function in a variety of tissues However our knowledge is still far from being conclusive and the present collection of reviews is thought to foster further experimental efforts to unravel the role of cell volume in the integrated function of cells *Chloride Movements Across Cellular Membranes*, 2011-09-22 All living cells are surrounded by a lipidic membrane that isolates them from the often harsh environment However to take up nutrients to excrete waste and to communicate among each other Nature has invented an incredibly diverse set of transmembrane transport proteins Specialized transporters exist to shuttle electrically charged ions positive cations like sodium or negative anions like chloride across the membrane In the recent years tremendous progress has been made in the field of chloride

transport The present book presents the state of the art of this rapidly expanding and interest gaining field of membrane transport It is addressed at a broad medically physiologically biologically and biophysically interested readership Describes the state of the art in anion transport research Written by leaders in the field Presents a timely discussion of this rapidly emerging and expanding field **Biomechanics of Feeding in Vertebrates** V.L. Bels,M. Chardon,P.

Vandewalle,2012-12-06 Although feeding is not yet been thoroughly studied in many vertebrates taxa and different conceptual and methodological approaches of the concerned scientists make a synthesis difficult the aim of the editors is to provide a comprehensive overview of the feeding design in aquatic and terrestrial vertebrates with a detailed description of its functional properties The book emphasizes the constant interaction between function and form behaviour and morphology in the course of evolution of the feeding apparatus and way of feeding both complementary and basically related to survival interspecific competition adaptation to environmental changes and adaptive radiations Special stress is drawn on quantification of the observational and experimental data on the morphology and biomechanics of the feeding design and its element jaws teeth hyoid apparatus tongue in order to allow present and further comparisons in an evolutionary perspective **The Journal of Experimental Biology** ,2009-06 **Advances in Comparative and Environmental**

Physiology ,2012-12-06 ADVANCES IN COMPARATIVE AND ENVIRONMENTAL PHYSIOLOGY helps biologists physiologists and biochemists keep track of the extensive literature in the field Providing comprehensive integrated reviews and sound critical and provocative summaries this series is a must for all active researchers in environmental and comparative physiology The present volume contains six reviews on Motile Activities of Fish Chromatophores Epithelial Transport of Heavy Metals Heavy Metal Cytotoxicity in Marine Organisms Comparative Pulmonary Morphology and Morphometry Molecular Adaptations in Resistance to Penicillins Molecular Adaptations of Enzymes From Thermophilic and Psychrophilic Organisms **Mechanisms of Systemic Regulation** Norbert Heisler,2012-12-06 **Mechanisms of Systemic**

Regulation: Acid—Base Regulation, Ion-Transfer and Metabolism Norbert Heisler,2012-12-06 *The Structure of Biological Membranes* Philip L. Yeagle,2004-06-28 Recent research has provided an abundance of new information on membrane biochemistry Now more than ever it is essential to update our current understanding of membrane structure and function to fully appreciate and apply these findings Completely revised and updated to reflect advances in the field *The Structure of Biological Membranes* *Classic Papers* ,1997-06-20 Articles in this *Classic Papers* volume are rewritten updated and extended versions of papers published in previous volumes of *Advances in Botanical Research* chosen because of the high citation of the original papers and the increase of knowledge in the field today Boulter and Croy discuss the structure and biosynthesis of legume seed storage proteins an area that has been revolutionized in recent years by advances in 3 D structural analysis and methods of gene manipulation Raven writes about the significant progress made in our understanding of the biochemistry of inorganic carbon acquisition by marine autotrophs and places this new information in

evolutionary and biogeochemical contexts Advances in biochemistry have also made impact on research into cyanotoxins Carmichael considers the expansion of cyanotoxin research in the light of the negative impact of these toxins on water quality and aquaculture industries The structure and regulation of algal photosystems are discussed by Larkum and Howe They write about the diversity of algal photochemical apparatus and light harvesting strategy which has only been appreciated with the use of molecular genetic approaches Finally Kunze Saedler and Loonig review advances in the field of plant transposable elements and the mechanism of transposition They cover the role of transposable elements in evolution and their use as molecular tools the importance of which has only speculated on in the original paper in 1986

Membrane Receptors, Channels and Transporters in Pulmonary Circulation Jason X. -J. Yuan, Jeremy P. T. Ward, 2010-03-10

Membrane Receptors Channels and Transporters in Pulmonary Circulation is a proceeding of the 2008 Grover Conference Lost Valley Ranch and Conference Center Sedalia Colorado September 3 7 2008 which provided a forum for experts in the fields of those receptors channels and transporters that have been identified as playing key roles in the physiology and pathophysiology of the pulmonary circulation The book rigorously addresses i recent advances in our knowledge of receptors channels and transporters and their role in regulation of pulmonary vascular function ii how modulation of expression and function of receptors channels and transporters and their interrelationships contribute to the pathogenesis of pulmonary vascular disease and iii the therapeutic opportunities that may be revealed by enhancing our understanding of this area The overall goal was to explore the mechanisms by which specific receptors channels and transporters contribute to pulmonary vascular function in both health and disease and how this knowledge may lead to novel interventions in lung dysplasia pulmonary edema lung injury and pulmonary and systemic hypertension to reduce and prevent death from lung disease

Membrane Receptors Channels and Transporters in Pulmonary Circulation is divided into six parts Part 1 Ion Channels in the Pulmonary Vasculature Basics and New Findings is designated for basic knowledge and recent findings in the research field of ion channels in pulmonary circulation There are five chapters in Part I discussing the function expression distribution and regulation of various ion channels present in pulmonary vascular smooth muscle cells and how these channels are integrated to regulate intracellular Ca^{2+} and cell functions Part II TRP Channels in the Pulmonary Vasculature Basics and New Findings is composed of five chapters that are exclusively designed to discuss the role of a recently identified family of cation channels transient receptor potential TRP channels in the regulation of pulmonary vascular tone and arterial structure Part III Pathogenic Role of Ion Channels in Pulmonary Vascular Disease includes four chapters that discuss how abnormal function and expression of various ion channels contribute to changes in cell functions and the development of pulmonary hypertension Part IV Receptors and Signaling Cascades in Pulmonary Arterial Hypertension consists of five chapters devoted to the role of bone morphogenetic protein receptors Notch receptors serotonin receptors Rho kinase and vascular endothelial growth factor receptors in the development of pulmonary arterial hypertension Part V Receptors and Transporters Role in

Cell Function and Hypoxic Pulmonary Vasoconstriction includes four chapters designed to illustrate the potential mechanisms involved in oxygen sensing and hypoxia induced pulmonary vasoconstriction and hypertension Part VI Targeting Ion Channels and Membrane Receptors in Developing Novel Therapeutic Approaches for Pulmonary Vascular Disease consists five chapters which discuss the translational research involving on membrane receptors channels and transporters including their potential as novel drug targets We hope that Membrane Receptors Channels and Transporters in Pulmonary Circulation will allow readers to foster new concepts and new collaborations and cooperations among investigators so as to further understand the role of receptors channels and transporters in lung pathophysiology The ultimate goal is to identify new mechanisms of disease as well as new therapeutic targets for pulmonary vascular diseases An additional outcome should be enhanced understanding of the role of these entities in systemic vascular pathophysiology since the conference will include researchers and clinicians with interests in both pulmonary and systemic circulations

Physiology of the Gastrointestinal Tract, Two Volume Set Hamid M. Said, 2012-07-04 Physiology of the Gastrointestinal Tract Fifth Edition winner of a 2013 Highly Commended BMA Medical Book Award for Internal Medicine covers the study of the mechanical physical and biochemical functions of the GI Tract while linking the clinical disease or disorder bridging the gap between clinical and laboratory medicine The gastrointestinal system is responsible for the breakdown and absorption of various foods and liquids needed to sustain life Other diseases and disorders treated by clinicians in this area include food allergies constipation chronic liver disease and cirrhosis gallstones gastritis GERD hemorrhoids IBS lactose intolerance pancreatic appendicitis celiac disease Crohn s disease peptic ulcer stomach ulcer viral hepatitis colorectal cancer and liver transplants The new edition is a highly referenced and useful resource for gastroenterologists physiologists internists professional researchers and instructors teaching courses for clinical and research students 2013 Highly Commended BMA Medical Book Award for Internal Medicine Discusses the multiple processes governing gastrointestinal function Each section edited by preeminent scientist in the field Updated four color illustrations

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