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KEY=ION - MILLER MELINA

PHARMACOLOGY OF IONIC CHANNEL FUNCTION: ACTIVATORS AND INHIBITORS

Springer Science & Business Media Cells maintain uneven distribution of Na, K and Ca ions across the cell membrane and membranes of intracellular organellae. Cells exert their functions by allowing for some ion to cross the membrane through ion channels which either produces an electrical effect across the membrane or switches on a series of chemical or physicochemical reactions. This is a comprehensive book about these vitally important ion channels with detailed description of the molecular structure and function and especially of activators and inhibitors. All chapters are written by renowned specialists in their field.

ION CHANNEL PHARMACOLOGY

Oxford University Press, USA The improved understanding of ion channel structure, achieved through the use of molecular biology techniques, has opened the way for the development of new drugs targeted at specific types of ion channels. This book provides a comprehensive, single-volume overview of the effects of different drugs and toxins on ionic channels. The first part of the book deals with the development of ion channels, while subsequent chapters detail the electrophysiological properties and pharmacology of eight different types of ion channels, including intracellular, cyclic nucleotide-gated, and receptor operated channels. Drug effects in various cell types, along with the potential use of channels in therapeutics, are discussed for each channel type. Comprehensive and up-to-date, Ion Channel Pharmacology is an essential reference for every investigator in this fast-growing area of research.

ION CHANNELS DOWN UNDER

Academic Press Ion Channels Down Under, Volume 79 provides up-to-date information on ion channel pharmacology, their pharmacological modulators, and role in a diverse range of poorly treated medical conditions. Contributors include prominent scientists and highly-recognized experts with major accomplishments in the field of ion channel pharmacology. Topics covered include the role of ion channels in health and disease, ion channels as therapeutic targets and the molecular pharmacology of ion channels. Provides a must read book on ion channel pharmacology Contains up-to-date information on a number of ion channels, their pharmacological modulators, and their role in a diverse range of poorly treated medical conditions Contains contributions from prominent scientists and highly-recognized experts with major accomplishments in the field

ION CHANNEL DRUG DISCOVERY

Royal Society of Chemistry A rapidly growing field, this book covers the recent advances in screening technology, ion channel structure and modelling, with up-to-date case histories.

VOLTAGE-GATED ION CHANNELS AS DRUG TARGETS

John Wiley & Sons Edited by the most prominent person in the field and top researchers at US pharmaceutical companies, this is a unique resource for drug developers and physiologists seeking a molecular-level understanding of ion channel pharmacology. After an introduction to the topic, the authors evaluate the structure and function of ion channels, as well as related drug interaction. A section on assay technologies is followed by a section each on calcium, sodium and potassium channels. Further chapters cover genetic and acquired channelopathies, before the book closes with a look at safety issues in ion channel drug development. For medicinal and pharmaceutical chemists, biochemists, molecular biologists and those working in the pharmaceutical industry.

ION CHANNEL LOCALIZATION

METHODS AND PROTOCOLS

Springer Science & Business Media Active researchers describe how to use current and developing technologies to determine the exact cell sites of ion channels and receptors. With emphasis on techniques employing the unique properties of these proteins, core topics include all major pharmacological tools for ion channel determination. Also covered are fluorescent and radioligand assays, visualization methods employing green fluorescent protein, and novel assays based on the functional properties of ion channels and receptors, as well as emerging atomic force microscopy methodologies. Of interest to cell biologists, neurophysiologists, and molecular neurobiologists. Lopatin is affiliated with the University of Michigan Medical School. Nichols is affiliated with the Washington University School of Medicine. c. Book News Inc.

HANDBOOK OF ION CHANNELS

CRC Press The New Benchmark for Understanding the Latest Developments of Ion Channels Ion channels control the electrical properties of neurons and cardiac cells, mediate the detection and response to sensory stimuli, and regulate the response to physical stimuli. They can often interact with the cellular environment due to their location at the surface of cells. In nonexcitable tissues, they also help regulate basic salt balance critical for homeostasis. All of these features make ion channels important targets for pharmaceuticals. Handbook of Ion Channels illustrates the fundamental importance of these membrane proteins to human health and disease. Renowned researchers from around the world introduce the technical aspects of ion channel research, provide a modern guide to the properties of major ion channels, and present powerful methods for modeling ion channel diseases and performing clinical trials for ion channel drugs. Conveniently divided into five parts, the handbook first describes the basic concepts of permeation and gating mechanisms, balancing classic theories and the latest developments. The second part covers the principles and practical issues of both traditional and new ion channel techniques and their applications to channel research. The third part organizes the material to follow the superfamilies of ion channels. This part focuses on the classification, properties, gating mechanisms, function, and pharmacology of established and novel channel types. The fourth part addresses ion channel regulation as well as trafficking and distribution. The final part examines several ion channel-related diseases, discussing genetics, mechanisms, and pharmaceutical advances.

ION CHANNELS

FROM STRUCTURE TO FUNCTION

Oxford University Press, USA Ion channels are intimately involved in the everyday physiological functions that enable us to live a full and varied life. When disease strikes, malfunction of ion channels or their dependent is often involved, either as the cause or the effect of the illness. Thus, billions of dollars have been, and still are being, invested in research to understand the physiological and pathophysiological functions of ion channels in an attempt to develop novel therapeutic treatments for a wide range of diseases. This book provides a comprehensive overview of ion channel structure and function. It comprises two major parts. Part one is an introductory overview of the ion channel superfamily and the generic aspects of ion channel function. This part also reviews the methodologies by which ion channel function can be studied from the perspective of performing detailed biophysical characterization through to the deployment of high throughput approaches for identifying novel ion channel ligands. Part two of the book provides an in-depth review of the individual ion channel subfamilies and, as such, is subdivided into four broad sections: Voltage-Gated Ion Channels, Extracellular Ligand-Gated Ion Channels, Intracellular Ligand-Gated Ion Channels, and Polymodal-Gated Ion Channels, with each chapter focused on specific family members. These chapters have been written by world leading experts and provide a detailed overview of the structure, biophysics, localization, pharmacology, physiology, and disease relevance of each particular ion channel subfamily. Reviewing both the basic principles of ion channel function and providing a detailed up-to-date review of the phsyiological and pharmacological aspects of individual ion channel sub-families, this book constitutes both an excellent introduction to the field for non-specialists, as well as a highly valuable reference text for experienced researchers already working in the ion channel area.

NONSELECTIVE CATION CHANNELS

PHARMACOLOGY, PHYSIOLOGY AND BIOPHYSICS

Birkhäuser It can be argued that nonselective cation channels were the first sort of ion channel to be described, though the word channel was not used at the time. Their existence was implied by Fatt and Katz in 1952, when they described the action of acetylcholine at the muscle endplate as producing "a large nonselective increase of ion permeability, i.e. a short circuit". Shortly afterwards, in 1956, Katz referred to "aqueous channels through which small ions can pass ... " (del Castillo and Katz, Prog. Biophysics and Biophys. Chern. 6, 121-170). Now, more than thirty years later, it has become clear that there are far more types of nonselective cation channels than anyone could have imagined a few years ago, and that they are found in a vast range of tissues. One has, of course, become quite accustomed to such diversity in, for example, GABA receptors, but this is not quite the same thing. A In the case of GABAA receptor we are talking about a fairly narrow range of structural diversity (resulting largely from differences in subunit composition) within a single type of channel with more-or-less well defined function. In the case of nonselective cation channels the function is often not known, and relatively few have been cloned. It seems certain though, that they encompass a wide range of quite different structural types.

FUNCTION AND PHARMACOLOGY OF TRPM3 ION CHANNEL

MOLECULAR PHYSIOLOGY AND PHARMACOLOGY OF CARDIAC ION CHANNELS AND TRANSPORTERS

Springer Science & Business Media Knowledge of cardiac ion channels and transporters has advanced remarkably in the last two decades with the development of patch-clamp and molecular biological techniques. This textbook offers a comprehensive overview of structures and functions of ion channels and transporters in the heart. Readers are first introduced to the molecular biology and

electrophysiology of all the important ion channels. After discussing their developmental changes, the pharmacology and pathophysiology of clinically-relevant ion channels are reviewed. Molecular aspects of the cardiac excitation-contraction coupling and intracellular Ca2+ regulation by ion transporters are also described. The book will be useful to electrophysiologists, cardiac physiologists and pharmacologists, and molecular biologists interested in ion channels at all levels. For research specialists, the book will provide a perspective of the field. The book can be used as a reference source for working scientists in the fields of ion channels, biophysics, cardiac electrophysiology, and pharmacology. It is aimed at graduate and medical students, designed for use as a textbook for graduate and medical courses.

RECENT ADVANCES IN VOLTAGE-GATED SODIUM CHANNELS, THEIR PHARMACOLOGY AND RELATED DISEASES

Frontiers E-books It is our pleasure to co-edit a Research Topic on voltage-gated sodium channels pharmacology and related diseases. We are in a process to inviting submissions of novel research article, state-of-the-art review papers and viewpoints on this topic. All the papers will follow a peer-review process according to the guidelines of Frontiers in Pharmacology. Voltage-gated sodium channel play a critical role in electrical signalling in many excitable cells such as neurons, skeletal muscle cells and cardiac myocytes. They are responsible for the initiation and the propagation of action potential, allowing integration of higher processes. They are formed by one alpha subunit that forms the pore of the channel and one or several regulatory subunits. Sodium channels are the target for local anaesthetics, antiarrhythmic drugs, and anticonvulsants. This class of ion channels is prime target to several toxins. Recently, a number of mutations in sodium channels that often results in alterations of rapid channel gating have been identified and linked to human diseases. Such channelopathies cause periodic paralysis, myotonia, long QT syndrome and other cardiac conductance disturbances, pain, hemiplegic migraine, and epilepsy. Sodium channels play also a negative role in malignant cellular proliferation, chronic pain, and other diseases. Considering these crucial physiological and pathological implications, it is not surprising that sodium channels have been and still are key targets for drug development. This Research Topic of Frontiers of Pharmacology of Ion Channels and Channelopathies will focus on this important class of ion channels how they operate, their pharmacology and their implication in diseases.

PHARMACOLOGY OF IONIC CHANNEL FUNCTION: ACTIVATORS AND INHIBITORS

Springer Cells maintain uneven distribution of Na, K and Ca ions across the cell membrane and membranes of intracellular organellae. Cells exert their functions by allowing for some ion to cross the membrane through ion channels which either produces an electrical effect across the membrane or switches on a series of chemical or physicochemical reactions. This is a comprehensive book about these vitally important ion channels with detailed description of the molecular structure and function and especially of activators and inhibitors. All chapters are written by renowned specialists in their field.

ION CHANNEL SIGNALLING IN CANCER: FROM MOLECULAR MECHANISMS TO THERAPEUTICS

Frontiers Media SA

PHARMACOLOGY OF POTASSIUM CHANNELS

Springer Nature The aim of the present book is to comprehensively review current advances in understanding of genetics, structural biology, pharmacology of potassium channels and their roles in disease as well as to identify current gaps in knowledge. The ultimate goal is to provide a scientific foundation for better understanding of modulatory mechanisms and pharmacology of potassium channels and to use this understanding to drive future drug discovery. This book will be a must-have for academic and industrial scientists interested in physiology, pharmacology, pathology and structure-functional relationships of ion channels. The book will also be helpful for lecturers and students in the college and university classrooms, as well as for anyone interested in the state-of-the art in modern cell biology, physiology and pharmacology.

TRENDS IN PHARMACOLOGICAL SCIENCES 2000 RECEPTOR & ION CHANNEL NOMENCLATURE SUPPLEMENT

PHARMACOLOGICAL ASPECTS OF LIGAND-GATED ION CHANNELS AS TARGETS OF NATURAL AND SYNTHETIC AGENTS

Frontiers Media SA

VOLTAGE GATED SODIUM CHANNELS

Springer Science & Business Media A number of techniques to study ion channels have been developed since the electrical basis of excitability was first discovered. Ion channel biophysicists have at their disposal a rich and ever-growing array of instruments and reagents to explore the biophysical and structural basis of sodium channel behavior. Armed with these tools, researchers have made increasingly dramatic discoveries about sodium channels, culminating most recently in crystal structures of voltage-gated sodium channels from bacteria. These structures, along with those from other channels, give unprecedented insight into the structural basis of sodium channel function. This volume of the Handbook of Experimental Pharmacology will explore sodium channels from the perspectives of their biophysical behavior, their structure, the drugs and toxins with which they are known to interact, acquired and inherited diseases that affect sodium channels and the techniques with which their biophysical and structural properties are studied.

STUDIES OF EPITHELIAL TRANSPORTERS AND ION CHANNELS

ION CHANNELS AND TRANSPORTERS OF EPITHELIA IN HEALTH AND DISEASE - VOL. 3

Springer Nature This book discusses unique ion channels and transporters that are located within epithelial tissues of various organs including the kidney, intestine, pancreas and respiratory tract. The authors will show, that each of these channels and transporters play crucial roles in transepithelial ion and fluid transport across epithelia and their responsibility in maintaining homeostasis. The reader gains an understanding of the fundamentals of epithelial ion transport, in terms of function, modelling, regulation, trafficking, structure and pharmacology. This is the third of three volumes highlighting the importance of epithelial ion channels and transporters in basic physiology and pathophysiology of human diseases. The focus of this volume lies with different ion channel and transporter families. Additionally, this volume benefits from pharmaceutical contributors and their insights into recent pre-clinical drug discovery efforts and results from clinical trials. Overall, these chapters offer a more thorough coverage of individual epithelial ion channels and transporters from the 1st Edition, along with eleven new chapters. That makes Volume 3 an insightful contribution for physiology students, scientists and clinicians.

MODELING HUMAN ATRIAL PATHO-ELECTROPHYSIOLOGY FROM ION CHANNELS TO ECG - SUBSTRATES, PHARMACOLOGY, VULNERABILITY, AND P-WAVES

KIT Scientific Publishing

MANIPULATION OF ION CHANNEL FUNCTION AND ITS EFFECTS ON THE NEUROPHARMACOLOGY OF 5-HYDROXYTRYPTAMINE

METHODS IN PHARMACOLOGY

MOLECULAR AND CELLULAR BIOLOGY OF PHARMACOLOGICAL TARGETS

Springer Science & Business Media The current volume provides detailed experimental protocols used to study plasma membrane ion channels as pharmacological targets. Coverage includes molecular and biochemical characterization of ion channels; fuctional analysis of ion channels after reconstitution, expression, or in cells; and specific methods and tools. This wealth of information will benefit academic and industrial researchers and graduate students in pharmacology, biochemistry, physiology, and biophysics.

ION CHANNEL FACTSBOOK

VOLTAGE-GATED CHANNELS

Academic Press This fourth volume is devoted to Voltage Gated Ion Channel Families including those molecular complexes activated or modulated by: - Calcium- Potassium- Chloride- SodiumEntries provide information on: - nomenclature- expression- sequence analysis- structure and function- electrophysiology- pharmacology- information retrieval

ION CHANNELS AS THERAPEUTIC TARGETS

Academic Press This volume is the second part of the thematic on Ion Channels as Therapeutic Targets. The popular Advances in Protein Chemistry and Structural Biology series, an essential resource for protein chemists, brings forth new information about protocols and analysis of proteins, with each thematically organized volume guest edited by leading experts in a broad range of protein-related topics. Provides cutting-edge developments in protein chemistry and structural biology Discusses the use of ion channels as therapeutic targets Chapters are written by authorities in their field Targeted to a wide audience of researchers, specialists, and students

INTRACELLULAR REGULATION OF ION CHANNELS

Springer Science & Business Media Understanding the molecular processes by which ionic channels are regulated is central to the understanding of cellular function. Great advances in understanding these regulatory mechanisms have been recently achieved by the combination of several powerful techniques. Development of the patch clamp technique, ability to access the intracellular channels sites, and genetic manipulation of channel structure have allowed studies of channel function in native membranes. Cloning, sequencing and determining the channel structure and its subunits allows further insight into the regulatory mechanisms of channel function. In planning this symposium, we organized the scientific discussions around specific molecular topics independent of the tissue and species of origin. Clearly, the subject of ion channel regulation is multi-faceted, with a large number of very talented scientists working in the field. The NATO Symposium represented an attempt to bring together these individuals and synthesize and evaluate new ideas and experimental findings. A great deal of novel data was presented, and scientific insight into the molecular processes which regulate ionic channels was furthered. This book gives a synopsis of the scientific presentations and is organized into 3 sections. The first section deals with the diversity of K + channels and their regulation, including structure-function and mechanistic studies. Presentations dealt with the characterization and modulation of a variety ofK+ channels in cardiac and neuronal cells, including ATP dependent K+ channels, Na + -

activated K+ channels, delayed rectifier K+ channels and the diversity of their regulation by G-proteins.

ION CHANNELS

Springer Science & Business Media Ion channels play a vital role in basic physiological functions such as generation of electrical activity in nerves and muscle, control of cardiac excitability, intracellular signaling, hormone secretion, cell proliferation and many other biological processes. Because of their prevalence and the critical role they play in virtually all tissue types and organs, ion channels are also involved in a number of pathophysiological conditions. The aim of this volume is to review recent advances in the field of ion channel related diseases. Following an overview chapter summarizing the current state of ion channel screening technologies, five topics covering areas such as cancer, cardiac arrhythmias, cystic fibrosis, and pain have been selected, and the current state of knowledge is presented by leading experts in their field. Each chapter is structured to cover the biological rationale for the target, the current status in the development of agents to treat the disease, and future prospects and challenges facing each therapeutic area. The reader will receive a critical overview covering the progress made in the rapidly developing and complex field of ion channels and diseases.

ENCYCLOPEDIA OF MOLECULAR PHARMACOLOGY

Springer Science & Business Media An essential text, this is a fully updated second edition of a classic, now in two volumes. It provides rapid access to information on molecular pharmacology for research scientists, clinicians and advanced students. With the A-Z format of over 2,000 entries, around 350 authors provide a complete reference to the area of molecular pharmacology. The book combines the knowledge of classic pharmacology with the more recent approach of the precise analysis of the molecular mechanisms by which drugs exert their effects. Short keyword entries define common acronyms, terms and phrases. In addition, detailed essays provide in-depth information on drugs, cellular processes, molecular targets, techniques, molecular mechanisms, and general principles.

ION CHANNELS IN HEALTH AND SICKNESS

BoD – Books on Demand Ion channels are proteins that make pores in the membranes of excitable cells present both in the brain and the body. These cells are not only responsible for converting chemical and mechanical stimuli into the electrical signals but are also liable for monitoring vital functions. All our activities, from the blinking of our eyes to the beating of our heart and all our senses from smell to sight, touch, taste and hearing are regulated by the ion channels. This book will take us on an expedition describing the role of ion channels in congenital and acquired diseases and the challenges and limitations scientist are facing in the development of drugs targeting these membrane proteins.

CALCIUM CHANNEL PHARMACOLOGY

Springer Science & Business Media Voltage-gated calcium channels are critical regulators of cytoplasmic levels of calcium, the universal signaling ion. As such, calcium channels trigger a wide range of cellular functions, from muscle contraction to neurotransmitter secretion, and are important players in human disease. Prominent in the nervous, cardiovascular, and endocrine systems, members of the calcium channel family are targets for existing antihypertensive and anticonvulsant drugs. In addition, they are emerging targets for drugs to treat an extraordinarily diverse group of disorders, including pain, cerebral ischemia, cardiac arrhythmia, and migraine. This book reviews the compounds that target individual calcium channel subtypes and the cellular and behavioral functions governed by each different channel. It contains information for basic scientists using calcium channel antagonists as experimental tools, for behavioralists studying animal models of human disease, and for pharmaceutical scientists interested in creating the next generation of calcium channel-targeted drugs. Several factors make an entire book on calcium channel pharmacology timely.

NOVEL CHEMICAL TOOLS TO STUDY ION CHANNEL BIOLOGY

Springer This volume describes chemical approaches to assess ion channel structure, function and pharmacology. Topics discussed include the use of engineered ionizable side chains to obtain information on permeation pathways and the local environment; the modification of engineered cysteine side chains, including cysteine scanning mutagenesis and the attachment of fluorescent probes and bio-reactive tethers; and the nascent use of genetic code expansion, evaluating its applications to ion channel and membrane proteins. This comprehensive text provides multifaceted perspectives on the great diversity of state-of-the-art methods which take advantage of the ever-expanding chemical toolbox to study ion channel biology. Capturing the contributions and innovations of renowned laboratory researchers in transmembrane protein study for the first time, this book is comprehensive in scope. It covers a wide array of experimental approaches: photochemistry, novel biological tools, and innovative spectroscopy, all combined with traditional techniques of electrophysiology and molecular biology. Novel Chemical Tools to Study Ion Channel Biology, part of the bestselling Advances in Experimental Medicine and Biology series is ideal for researchers and advanced students interested in biochemistry, biophysics, fluorometry, electrophysiology, and chemical biology. .

EXPRESSION AND ANALYSIS OF RECOMBINANT ION CHANNELS

FROM STRUCTURAL STUDIES TO PHARMACOLOGICAL SCREENING

John Wiley & Sons Filling the gap created over the past five years, during which many new techniques have entered the market, this book is directed at both the new and the experienced ion channel researcher wishing to learn more about the considerations and methods for studying recombinant ion channels. These latest developments are covered here for the first time, contributed by editors and authors working for major pharmaceutical companies and who routinely apply these techniques in their daily work. The first three chapters cover the use of the Xenopus oocyte expression system for structure-function studies, from basic approaches for manipulating ion channel cDNAs to more specialized but powerful techniques. This is followed by reviews of strategies and methodologies available for expressing channels in mammalian cells and for their analysis by patch-clamp electrophysiology. Chapters 6 to 8 review the latest methodologies for ion channel drug discovery, including high throughput screening using fluorescence and luminescence, as well as automated planar array electrophysiology. The remaining two chapters focus on approaches for determining ion channel crystal structures and on computational approaches to understanding channel mechanisms at atomic resolution. Rather than provide detailed protocols, indicated by references in each chapter, the authors provide a comprehensive and easily accessible overview of the techniques involved, reviewing underlying principles and providing working guidelines as well as an understanding of the key theoretical and practical considerations associated with each topic. In each case, this practical advice is illustrated by real life examples, taken either from the author's own experience or from key examples in the literature, providing valuable practical hints not found elsewhere. The result is a compendium of practical ion channel information that will prove a valuable resource to academic and industrial workers alike.

PHARMACOLOGY

PRINCIPLES AND PRACTICE

Academic Press Pharmacology meets the rapidly emerging needs of programs training pharmacologic scientists seeking careers in basic research and drug discovery rather than such applied fields as pharmacy and medicine. While the market is crowded with many clinical and therapeutic pharmacology textbooks, the field of pharmacology is booming with the prospects of discovering new drugs, and virtually no extant textbook meets this need at the student level. The market is so bereft of such approaches that many pharmaceutical companies will adopt Hacker et al. to help train new drug researchers. The boom in pharmacology is driven by the recent decryption of the human genome and enormous progress in controlling genes and synthesizing proteins, making new and even custom drug design possible. This book makes use of these discoveries in presenting its topics, moving logically from drug receptors to the target molecules drug researchers seek, covering such modern topics along the way as side effects, drug resistance, pharmacogenomics, and even nutriceuticals, one in a string of culminating chapters on the drug discovery process. The book is aimed at advanced undergraduates and beginning graduate students in medical, pharmacy, and graduate schools looking for a solid introduction to the basic science of pharmacology and envisioning careers in drug research. Uses individual drugs to explain molecular actions Full color art program explains molecular and chemical concepts graphically Logical structure reflecting the current state of pharmacology and translational research Covers such intricacies as drug resistance and cell death Consistent format across chapters and pedagogical strategies make this textbook a superior learning tool

RECEPTOR AND ION CHANNEL DETECTION IN THE BRAIN

METHODS AND PROTOCOLS

Humana Press Receptor and Ion Channel Detection in the Brain provides state-of-the-art and up-to-date methodological information on molecular, neuroanatomical and functional techniques that are currently used to study neurotransmitter receptors and ion channels in the brain. The chapters have been contributed by world-wide recognized neuroscientists who explain in an easy and detailed way well established and tested protocols embracing molecular, cellular, subcellular, anatomical and electrophysiological aspects of the brain. This comprehensive and practical manual is presented in a simple, step-by-step manner for laboratory use, and also offers unambiguous detail and key implementation advice that proves essential for successful results and facilitate choosing the best method for the target proteins under study. This work serves as a useful guide for young researchers and students in training as well as for neurologists and established scientists who wish to extend their repertoire of techniques.

ESSENTIAL ION CHANNEL METHODS

Academic Press The rapid growth of interest and research activity in ion channels is indicative of their fundamental importance in the maintenance of the living state. This volume was prepared with a view toward providing a sampling of the range of molecular and physical methods that are significant for the study of ion channels. As part of the Reliable Lab Solutions series, Essential Ion Channel Methods brings together chapters from volumes 293 and 294 of Methods in Enzymology. The chapters have been selected by the editor and updated, when possible, by their original authors to include new research and references. The result is a set of chapters which make use of graphics, comparisons to other methods, and provide tricks and approaches that make it possible to adapt methods to other systems. Methods are presented in a fashion that allows their replication by individuals new to the field, yet providing valuable information for seasoned investigators. Highlights top downloaded and cited chapters, authored by pioneers in the field and enhanced with graphics and easy to follow methods Loaded with detailed protocols developed and used by leaders in the field Refines, organizes and updates popular methods from one of our top selling series, Methods in Enzymology

COMPUTATIONAL TOXICOLOGY

METHODS AND PROTOCOLS

Humana Press This volume explores techniques that are currently used to understand solid target-specific models in computational toxicology. The chapters are divided into four sections and discuss topics such as molecular descriptors, QSAR and read-across; molecular and data modeling techniques to comply with both scientific and regulatory sides; computational toxicology in drug discovery; and strategies on how to predict various human-health toxicology endpoints. Written in the highly successful Methods in Molecular Biology series format, chapters include introductions to their respective

topics, lists of the methods and software tools used, step-by-step, readily reproducible computational protocols, and tips on troubleshooting and avoiding known pitfalls. Comprehensive and cutting-edge, Computational Toxicology: Methods and Protocols is a valuable resource for researchers who are interested in learning more about this expanding field.

KV7 CHANNELS: STRUCTURE, PHYSIOLOGY AND PHARMACOLOGY

Frontiers Media SA This Research Topic was in partnership with CAP Partner for the International Kv7 Channels Symposium held in Naples, Italy on September 2019.

VOLTAGE-GATED SODIUM CHANNELS: STRUCTURE, FUNCTION AND CHANNELOPATHIES

Springer This book provides a timely state-of-the-art overview of voltage-gated sodium channels, their structure-function, their pharmacology and related diseases. Among the topics discussed are the structural basis of Na+ channel function, methodological advances in the study of Na+ channels, their pathophysiology and drugs and toxins interactions with these channels and their associated channelopathies.

ION CHANNELS OF EXCITABLE CELLS

Academic Press Because of the highly significant and widely recognized roles of ion channels in physiology, pathophysiology, pharmacology, and toxicology, the term ion channel has now become a household word in the biomedical sciences. This volume covers preparations and techniques for the study of various ion channels. Both voltage-gated and ligand-gated ion channels of neurons, axons, and cardiac and smooth muscles are covered. It includes not only patch clamp techniques but molecular biology and imaging techniques as well. Comprehensive protocols included for the study of: Ion channels using patch-clamp, molecular biology, and imaging techniques Role of ion channels in physiology, pathophysiology, pharmacology, and toxicology Specific ion channels of specific tissues

THE PHARMACOLOGY OF THE MECHANOSENSITIVE CHANNELS OF ESCHERICHIA COLI

Mechanosensitive (MS) channels are a class of ion channels which are gated by membrane stretch. The mechanosensitive channel of large conductance (MscL) of the bacterium E.coli has become a prototype MS channel for studying structure-function relationships in this class of ion channels. MscL homologues have commonly been found in Gram-negative and Gram-positive bacterial strains forming a sub-family of a larger family of MS class of ion channels encompassing prokaryotes (bacteria and archaea) as well as cell-walled eukaryotes (fungi and plants). MscL and its homologues have been found to play an important role in osmoregulation of bacterial cells. Though the MS channels of bacteria have been thoroughly studied, little is known about the pharmacology of these channels. This thesis has one general aim, that is, to identify compounds which are able to gate and/or alter the gating of the MS channels of bacteria in particular, the MscL of E. coli. Using the patch-clamp technique, potential compounds mostly identified via in-silico techniques were examined to observe the effects on MscL reconstituted in artificial lipid membranes and MscS in giant bacterial spheroplasts. The compounds were tested for the ability to spontaneously gate the MscL and MscS and/or alter the Boltzmann distribution parameters of the MscL, indicative of an effect on the gating of MscL. Compounds showing potential as MscL activators were then examined for in-vivo effects using different growth assays. The effects of parabens, gallates, eriochrome cyanine R, brilliant green, deoxycholic acid are reported. Of these compounds, parabens and eriochrome cyanine R showed the most encouraging results. Identification of MS channel gate ligands not only benefits structural studies as tetrodotoxin has for the voltage-sensitive sodium channel, these compounds could also V potentially serve as base compounds for novel antibiotics which would target the MS channels of bacteria. Since the MS channels of bacteria serve as safety valves for the bacterium, gating during exposure to a hypo-osmotic challenge such as rain to release excessive cellular turgor, a pharmacological agent that could impair the gating of the MS channels releasing essential cytoplasmic osmolytes, would cause the growth impairment or death of the bacterium. With the rise in multi-drug resistant bacteria, continual development of novel antibiotics is crucial.

ION CHANNEL SCREENING: ADVANCES IN TECHNOLOGIES AND ANALYSIS

Frontiers E-books