

Pdf free Cell membrane and transport answers free download Copy

membrane transport is targeted towards researchers with an interest in the mechanism of solute transport across biological membranes its scope is broad ranging from the techniques required to study transport itself through the expression purification and reconstitution of transporters to techniques for investigation of their structures as such it not only proves the necessary technical grounding for newcomers to the field but should also be of value to old hands wishing to get up to date with recent developments in these areas while some of the approaches described require sophisticated equipment e g a stopped flow fluorimeter most of the protocols can be implemented in any well found laboratory preparation of this volume comes at a time when a result of genome sequencing our knowledge of membrane transporter sequences is far outstripping our understanding of their molecular mechanisms our hope is that this book will help future researchers to redress this imbalance an introduction to the principles of membrane transport how molecules and ions move across the cell membrane by simple diffusion and by making use of specialized membrane components channels carriers and pumps the text emphasizes the quantitative aspects of such movement and its interpretation in terms of transport kinetics molecular studies of channels carriers and pumps are described in detail as well as structural principles and the fundamental similarities between the various transporters and their evolutionary interrelationships the regulation of transporters and their role in health and disease are also considered provides an introduction to the properties of transport proteins channels carriers and pumps presents up to date information on the structure of transport proteins and on their function and regulation includes introductions to transport kinetics and to the cloning of genes that code transport proteins furnishes a link between the experimental basis of the subject and theoretical model building this is a fascinating collection of personal accounts which is a must read for anyone interested in membrane transport or the history of the development of the current picture of membrane transport physiology this delightful book could serve variously as a history for investigators and historians or as a textbook for advanced students no biology or medical library should be without it to the second edition when preparing the manuscript for the original edition of this book we were only partly aware of the pace at which the field of membrane transport was developing and at which new ideas as well as new techniques would be applied to it the fact is that some of the chapters are now outdated e g the one on the molecular aspects of transport and many others require revision in the light of new information that has appeared in the past five years however it is also true that we overemphasized in the first edition certain points that now appear less important and underestimated the impact of certain others that have since assumed a position among the most forcefully discussed topics of membrane research in making amends it was thus thought useful to include the discussion of these latter problems both in the theoretical and in the comparative sections and on the other hand to omit some of the less topical subjects there was a different reason for rewriting the section on kidney and for dropping the section on mito chondria the help of an expert nephrologist was enlisted for improving chapter 24 while it was decided that mitochondria represent a special field both conceptually being only subcellular particles and methodologically more indirect estimation techniques being involved than with whole cells or tissues and that more adequate information can be found in treatises specializing in work with mitochondria transport and diffusion across cell membranes is a comprehensive treatment of the transport and diffusion of molecules and ions across cell membranes this book shows that the same kinetic equations with appropriate modification can describe all the specialized membrane transport systems the pores the carriers and the two classes of pumps the kinetic formalism is developed step by step and the features that make a system effective in carrying out its biological role are highlighted this book is organized into six chapters and begins with an introduction to the structure and dynamics of cell membranes followed by a discussion on how the membrane acts as a barrier to the transmembrane diffusion of molecules and ions the following chapters focus on the role of the membrane s protein components in facilitating transmembrane diffusion of specific molecules and ions measurements of diffusion through pores and the kinetics of diffusion and the structure of such pores and their biological regulation this book methodically introduces the reader to the carriers of cell membranes the kinetics of facilitated diffusion and cotransport systems the primary active transport systems are considered emphasizing the pumping of an ion sodium potassium calcium or proton against its electrochemical gradient during the coupled progress of a chemical reaction while a conformational change of the pump enzyme takes place this book is of interest to advanced undergraduate students as well as to graduate students and researchers in biochemistry physiology pharmacology and biophysics not many years ago problems of

membranes and transport attracted the attention of but a few dozen enthusiasts mainly physiologists who recognize the significance of membranes for the stabilization of the general steady state of organisms the first symposium organized some fifteen years ago could boast of the attendance of perhaps fifty scientists the remaining fifty were not yet sure that membranes was the topic of their choice ranging in specialization from physical chemistry to bacterial genetics who clairvoyantly decided to study what now has become the number one subject at most congresses of biophysics physiology and even biochemistry and microbiology as is the case with many rapidly developing fields the interest in membranes and transport seems to be growing out of bounds and the whole field of membrane biology interdisciplinary as it is has penetrated into the realms of a number of branches of physics chemistry and biology its subject is primarily biological and although much has been done in the world to increase the exactness of biology over the past thirty years one cannot strive for a rigorous mathematical description of biological phenomena since as much in february 1974 an international workshop on membrane transport in plants was held at the nuclear research centre jlich west germany more than two hundred and fifty people from fourteen countries took part in this highly successful meeting a somewhat similar meeting took place in liverpool england two years ago and it became clear there that progress in the field of membrane transport in plants was now so marked that a second and wider meeting in germany was more than fully justified the members of our programme committee u zimmermann chairman jlich frg j dainty the contributions of this volume are concerned with transport phenomena in multimembrane systems and in simple epithelia in addition to the very substantial progress that has been made in the area of transport of fluid and solutes across artificial model membranes in vitro and across simple symmetrical cell membranes much has been learned from studies of transport phenomena in multi membrane systems of higher complexity to be reviewed in this volume it should be recalled that many of the fundamental conceptual and methodological problems of transport physiology have been successfully approached and defined by studying simple epithelia in vitro and that the direction that research has taken has been affected in a major way by the cellular transport models that have evolved from this approach since then striking progress has been made in several areas not only have we been witnessing a keen and productive interest in the relationship between fine structure and transport behavior in multimembrane systems but significant advancements have also been made in defining individual active and passive transport operations in analysing cell ion activities and transport pools and in describing the differences in transport functions that underly the membrane asymmetry and cell polarization of cells subserving directional transport experimental science is a complicated creature at the head there is a gordian knot of ideas and hypotheses behind is the accumulated mass of decades of research only the laboratory methods the legs which propel science forward remain firmly in touch with the ground growth however is uneven dinosaurs develop by solid means to give a vast body of results but few ideas others sprint briefly to success with brilliant though ill supported ideas the problems which this book addresses is to maintain an organic unity between new ideas and the current profusion of innovative experimental tools only then can we have the framework on which our research thoughts may flourish the contributors are outstanding scientists in their respective fields and they record here in a clear manner the methodology with which they perform their experiments they also illustrate some of their most exciting findings in all chapters the emphasis is on the critical analysis of the methodology which is often avoided in refereed journals these techniques are explained in this book in adequate detail each chapter is extensively referenced and contains the most recent material available from author's laboratory at the time of going to press this volume forms the cornerstone of this series of four books on membrane transport in biology it includes chapters that address i the theoretical basis of investigations of transport processes across biological membranes ii some of the experimental operations often used by scientists in this field iii chemical and biological properties common to most biological membranes and iv planar thin lipid bilayers as models for biological membranes the themes developed in these chapters recur frequently throughout the entire series transport of molecules across biological membranes is a special case of diffusion and convection in liquids the conceptual frame of reference used by investigators in this field derives in large part from theories of such processes in homogeneous phases examples of the application of such theories to transport across biological membranes are found in chapters 2 and 4 of this volume in chapter 2 sten knudsen emphasizes a statistical and molecular approach while in chapter 4 sauer makes heavy use of the thermodynamics of irreversible processes taken together these contributions introduce the reader to the two sets of ideas which have dominated the thinking of scientists working in this field theoretical consideration of a more special character are also included in several other chapters in volume i for example ussing chapter 3 re works the flux ratio equation which he introduced into the field of transport across biological membranes in 1949 this book provides a molecular view of membrane transport by means of numerous biochemical and biophysical techniques the rapidly growing numbers of atomic structures of transporters in different conformations and the constant progress in bioinformatics have recently added deeper insights the unifying

mechanism of energized solute transport across membranes is assumed to consist of the conformational cycling of a carrier protein to provide access to substrate binding sites from either side of a cellular membrane due to the central role of active membrane transport there is considerable interest in deciphering the principles of one of the most fundamental processes in nature the alternating access mechanism this book brings together particularly significant structure function studies on a variety of carrier systems from different transporter families glutamate symporters leu like fold transporters mfs transporters and smr rnd exporters as well as abc type importers the selected examples impressively demonstrate how the combination of functional analysis crystallography investigation of dynamics and computational studies has made it possible to create a conclusive picture or more precisely a molecular movie although we are still far from a complete molecular description of the alternating access mechanism remarkable progress has been made from static snapshots towards membrane transport dynamics water relations in membrane transport in plants and animals contains the presentations in a symposium dealing with water relations in membranes in plants and animals during the 27th annual fall meeting of the american physiological society held at the university of pennsylvania 17 19 august 1976 the purpose of the symposium was to explore the common modes of water regulation in plants and animals in these proceedings the mechanisms employed to restrict water flow across plant and metazoan animal cells are described putative differences in mechanisms of water regulation retained by plant versus animal cells become inconsequential in the light of the numerous similarities dependence upon bioelectric potentials maintained across cell membranes energy dependence of uphill water movement and solute coupling during water transport the presentations can be organized into four the first takes up specific mechanisms of water transport in plants the second and third parts deal with specific mechanisms in invertebrates and vertebrates respectively the fourth part covers generalized mechanisms common to plants and animals the aim of this book is to bring together in one volume the current research and thought on the concept of membrane fluidity as a biological phenomenon the invited articles are intended to review recent developments in the areas of membrane research covered and to summarize the current concepts and theories in those areas the authors have been given ample opportunity to present their thoughts and speculation on membrane fluidity and related phenomena in a more expanded form than is usually possible in reviews of this type it is hoped that this approach will have a stimulating effect on research and theoretical development in the biomembrane field the chapters in this book are arranged in three sections the first of which covers physical studies of membrane fluidity and related phenomena on the molecular level included are chapters on intermolecular hydrogen bonding between membrane lipids thermal analysis of membranes application of fluorescence and nmr spectrometry to the study of membrane fluidity and the effect of drugs and other compounds on membrane stability and fluidity the second section deals with the regulation of membrane fluidity in microorganisms plants and higher organisms by factors such as temperature fatty acid chain length lipid desaturation and polar head group structure the contributions of this volume are concerned with transport phenomena in multimembrane systems and in simple epithelia in addition to the very substantial progress that has been made in the area of transport of fluid and solutes across artificial model membranes in vitro and across simple symmetrical cell membranes much has been learned from studies of transport phenomena in multimembrane systems of higher complexity to be 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membrane transport in biology since the publication of the last volume there have been spectacular advances in this field these advances have been in part the result of the application of exciting new methodologies and in part the result of new insights into the regulation and integration of transport processes this volume as well as a sixth volume which is in preparation are intended to cover key areas in which the development has been particularly striking for many years the trend in studies of membrane transport had been that of increasing specialization with regard to the transporter of interest and of the cell or tissue studied this trend was supported by the enormous number of publications directed at understanding the cellular physiology of specific organ systems and tissues and also by the fact that different tissues often seemed to react so differently to the same conditions that mechanisms unique to each appear to be at play one of the happy developments in recent years has been the realization that this apparent disparity of behaviors in different tissues is based on varying

combinations of a limited number of transport mechanisms all mediated by the same or similar proteins some of these transport proteins have already been isolated and analyzed with respect to amino acid sequence whereas others are just entering this phase membranes play an enormous role in our life biological cell membranes control the fluxes of substances in and out of cells artificial membranes are widely used in numerous applications including green separation processes in chemistry agroindustry biology medicine they are used as well in energy generation from renewable sources they largely mimic the structure and functions of biological membranes the similarity in the structure leads to the similarity in the properties and the approaches to study the laws governing the behavior of both biological and artificial membranes in this book some physico chemical and chemico physical aspects of the structure and behavior of biological and artificial membranes are investigated this second volume in the series on membrane transport in biology contains a group of essays on transport across single biological membranes separating the inside and outside of cells or organelles we have not attempted to include material on all types of plasma and intracellular membranes but rather have emphasized structures which have been studied relatively thoroughly four chapters describe transport of different types of molecules and ions across the plasma membranes of mammalian red cells two essays concern the excitable membranes of nerve and muscle cells while the remaining four chapters treat transport across several types of intracellular membranes water makes up more than two thirds of the mass of most living cells the transport of water between the inside and outside of cells and organelles is important for the function of these structures as a result of investigations in many laboratories over the past four decades our picture of the water permeability of the red cell membranes is rather detailed when compared to the water permeability of other biological membranes in chapter 1 r i macey describes this picture and also considers the permeability of red cell membranes to non electrolytes including metabolic substrates such as sugars amino acids purines and nucleosides the aim of this text is to provide students with an overview of this important and developing area of biology the emphasis is on the biochemist s view of biological transport discovering the molecular structures and investigating the molecular details when the six of us gathered to start planning for what was to be the third edition of physiology of membrane disorders it was clear that since 1986 when the second edition appeared the field had experienced the dawning of a new era dominated by a change in focus from phenomenology to underlying mechanisms propelled by the power of molecular biology in 1985 detailed molecular information was available for only three membrane transporters the lac permease bacterial rhodopsin and the acetylcholine receptor during the decade that has since elapsed almost all of the major ion channels and transport proteins have been cloned sequenced mutagenized and expressed in homologous as well as heterologous cells few if any of the transporters that were identified during the previous era have escaped the probings of the new molecular technologies and in many instances considerable insight has been gained into their mechanisms of function in health and disease indeed in some instances novel unexpected transporters have emerged that have yet to have their functions identified the decision to adopt the new title molecular biology of membrane transport disorders was a natural outgrowth of these considerations this volume contains the proceedings of the febs symposium on the biochemistry of membrane transport which was held at the swiss institute of technology zürich july 18 23 1976 of the speakers invited or originally only five could not attend the meeting and of the lectures given all but one of the texts are published here thus this volume gives a faithful account of the way the meeting was originally conceived and actually took place this symposium on biochemistry of membrane transport was the first symposium sponsored by the febs outside the yearly febs meetings after the special meeting on industrial biochemistry which took place in dublin in 1973 and it reflects the interest and the trend for gatherings of smaller size than the official febs meetings the topic of the symposium was an easy choice not only because membrane transport is becoming more and more important to biochemistry every year but also because of the long standing interest of swiss science in the field in the choice of the topics and of the speakers efforts were made to achieve as balanced a coverage of the area as possible however since some aspects of membrane biochemistry were dealt with extensively at the parallel 10th international congress of biochemistry in hamburg gfr certain topics were given less emphasis than others the symposium was attended by about 400 participants we expected 200 250 among them 48 were invited speakers and some 200 contributed posters membrane transport processes in organized systems is a softcover book containing portions of physiology of membrane disorders second edition the parent volume contains six major sections this text encompasses the fourth and fifth sections transport events in single cells and transport in epithelia vectorial transport through parallel arrays we hope that this smaller volume which deals with transport processes in single cells and in organized epithelia will be helpful to individuals interested in general physiology transport in single cells and epithelia and the methods for studying those transport processes thomas e andreoli joseph f hoffman darrell d fanestil stanley g schultz vll preface to the second edition the second edition of physiology of membrane disorders represents an extensive revision and a considerable expansion of the first edition yet the purpose of the second

edition is identical to that of its predecessor namely to provide a rational analysis of membrane transport processes in individual membranes cells tissues and organs which in turn serves as a frame of reference for rationalizing disorders in which derangements of membrane transport processes play a cardinal role in the clinical expression of disease as in the first edition this book is divided into a number of individual but closely related sections part v represents a new section where the problem of transport across epithelia is treated in some detail finally part vi which analyzes clinical derangements has been enlarged appreciably this book describes a half century of research on cellular membrane transport and on metabolic energy capture and utilization during this time which begins in the late 1930s the effort and imagination of various scientists overthrew reigning formulations created novel explanatory models and unified previously distinct experimental fields my primary goal is to display the course of that research showing how new experiments defined novel entities and processes and how an encompassing field bioenergetics then emerged a secondary goal is to present examples of mainstream biological research that illustrate how experimental results seen as refutations confirmations and elaborations can sway opinion toward a solid consensus this interpretation differs from the currently fashionable view of some commentators that stresses instead the central roles of power prestige gender class and ethnicity in any case the scientific practices exhibited here deserve proper philosophical scrutiny although constraints of space have squeezed any analysis from this draft brief mention of salient issues does appear in relevant chapters and in the final conclusions oddly historians and philosophers seem reluctant to deal with this science those who do consider biological topics tend to focus on the theory of evolution even though the bulk of biological research in this century in terms of papers published and technology influenced has dealt not with evolution per se but with what may be termed physiology and biochemistry and these endeavors which are the aims efforts and accomplishments of the vast majority of biologists have been largely ignored this volume brings together contributors from several different fields of cell biology physiology and molecular biology the common thread that runs through all of the work presented is that cell processes regulate the activities of membrane transport proteins and classes of membrane transport proteins participate in a number of critical cell phenomena this volume is unique in covering three different members of the atp binding cassette family mdr cfr and ste6 in one place as well as in including structure and function analysis of the sodium pump in the same forum where its cell biology is considered the book will appeal to a broad range of biologists with interests in membrane transport membrane biology cell biology and sorting transporters and channels are membrane proteins that mediate the traffic of metabolites water and ions across biological membranes membrane transport proteins are crucial to maintain homeostasis and assure cell survival upon intracellular or environmental stress a failure of any of these transport systems may have dramatic consequences for cell function there is increasing evidence that membrane transport proteins play important functions in healthy conditions and that their absence or dysfunction may cause diseases in recent years much attention has been paid to diseases resulting from defective transporters carrier diseases and ion channels channelopathies very interestingly altered expression of transporters has been described in several human pathologies on this basis many transport proteins are well acknowledged targets for drugs many others are involved in drug delivery and disposition and or are considered potential targets others are off targets for drugs and then are responsible for side effects thus membrane protein drug discovery is now an emerging field where the search for physiological mechanisms of regulation and for chemical compounds as modulators of transport activity present new opportunities for drug development and for new therapies this research topic addresses the latest research advances in membrane transport proteins stimulating future research on these important protein families intracellular transport is a collection of papers that examines the processes of and the mechanisms underlying intracellular transport one paper describes that all active transport processes in the amoeba are intracellular and depend on dynamic transformations of membrane into cytoplasm and of cytoplasm into membrane another paper discusses the kinetics of membrane transport of which the phenomena of counterflow can become a mobile carrier system the paper notes that the specific transport properties of membranes are conferred by the proteins of the surfaces that are grouped as macromolecular complexes probably similar to those of enzymes one paper describes the concept of parametric pumping an oscillation driven separation process as a possible model for active transport in biological cells another paper compares the fine scale diffusion effects that happen in a mixture without large scale concentration gradients and where the effect are on a large scale the homogenous kinetic law can be used in the large scale situation the law already can account for any of the fine scale diffusion effects the paper notes that without large scale concentration gradients the transport event is from a local region to a nearby reaction site only where the effects are on a large scale the diffusion results in a gross transport of over distances larger than molecular dimensions this collection can prove useful for mathematicians cellular biologists physical chemists physiologists electron microscopists geneticists and engineers 51 worldwide leading experts in the field of erythrocyte research contributed to this first book on transport processes in red blood cells it explains the

latest findings on the basis of well established principles in an accessibly structured and carefully organized compilation with contributions by numerous experts after being frequently urged to write upon this subject and as often declining to do it from apprehension of my own inability i am at length compelled to take up the pen however unqualified i may still feel myself for the task william withering m d i have yet to find a description or a quote that better summanzes my initial ambivalence towards embarking on such an endeavor as partici pating in putting together this monograph the impetus for the red cell has been a simple genuine membrane a model for solute transport desire to bring together an authoritative account of the state of the art and knowledge in the red ceil membrane transport field in particular it seems important to emphasize the pivotal role the red cell has played for several decades in the discovery and the elucidation of mechanisms of plasma membrane transport processes it is only with such knowledge that we can hope to push ahead and make progress in this exciting multifaceted area eventually one hopes to not only further our knowledge of red cells but apply the newly gained insights to any other of the plasma membrane cell with the common denominator in this compendium of reviews the reader will find that the term model will take on a variety of gists and meanings in some chapters the red cell has been chosen as a model membrane solely on the basis of its preeminent design and simplicity with contributions by numerous experts

Membrane Transport 2000-06-15 membrane transport is targeted towards researchers with an interest in the mechanism of solute transport across biological membranes its scope is broad ranging from the techniques required to study transport itself through the expression purification and reconstitution of transporters to techniques for investigation of their structures as such it not only proves the necessary technical grounding for newcomers to the field but should also be of value to old hands wishing to get up to date with recent developments in these areas while some of the approaches described require sophisticated equipment e.g. a stopped flow fluorimeter most of the protocols can be implemented in any well found laboratory preparation of this volume comes at a time when a result of genome sequencing our knowledge of membrane transporter sequences is far outstripping our understanding of their molecular mechanisms our hope is that this book will help future researchers to redress this imbalance

Channels, Carriers, and Pumps 2014-12-09 an introduction to the principles of membrane transport how molecules and ions move across the cell membrane by simple diffusion and by making use of specialized membrane components channels carriers and pumps the text emphasizes the quantitative aspects of such movement and its interpretation in terms of transport kinetics molecular studies of channels carriers and pumps are described in detail as well as structural principles and the fundamental similarities between the various transporters and their evolutionary interrelationships the regulation of transporters and their role in health and disease are also considered provides an introduction to the properties of transport proteins channels carriers and pumps presents up to date information on the structure of transport proteins and on their function and regulation includes introductions to transport kinetics and to the cloning of genes that code transport proteins furnishes a link between the experimental basis of the subject and theoretical model building

Membrane Transport 2013-05-27 this is a fascinating collection of personal accounts which is a must read for anyone interested in membrane transport or the history of the development of the current picture of membrane transport physiology this delightful book could serve variously as a history for investigators and historians or as a textbook for advanced students no biology or medical library should be without it

Cell Membrane Transport 2012-12-06 to the second edition when preparing the manuscript for the original edition of this book we were only partly aware of the pace at which the field of membrane transport was developing and at which new ideas as well as new techniques would be applied to it the fact is that some of the chapters are now outdated e.g. the one on the molecular aspects of transport and many others require revision in the light of new information that has appeared in the past five years however it is also true that we overemphasized in the first edition certain points that now appear less important and underestimated the impact of certain others that have since assumed a position among the most forcefully discussed topics of membrane research in making amends it was thus thought useful to include the discussion of these latter problems both in the theoretical and in the comparative sections and on the other hand to omit some of the less topical subjects there was a different reason for rewriting the section on kidney and for dropping the section on mitochondria the help of an expert nephrologist was enlisted for improving chapter 24 while it was decided that mitochondria represent a special field both conceptually being only subcellular particles and methodologically more indirect estimation techniques being involved than with whole cells or tissues and that more adequate information can be found in treatises specializing in work with mitochondria

Transport And Diffusion Across Cell Membranes 2012-12-02 transport and diffusion across cell membranes is a comprehensive treatment of the transport and diffusion of molecules and ions across cell membranes this book shows that the same kinetic equations with appropriate modification can describe all the specialized membrane transport systems the pores the carriers and the two classes of pumps the kinetic formalism is developed step by step and the features that make a system effective in carrying out its biological role are highlighted this book is organized into six chapters and begins with an introduction to the structure and dynamics of cell membranes followed by a discussion on how the membrane acts as a barrier to the transmembrane diffusion of molecules and ions the following chapters focus on the role of the membrane's protein components in facilitating transmembrane diffusion of specific molecules and ions measurements of diffusion through pores and the kinetics of diffusion and the structure of such pores and their biological regulation this book methodically introduces the reader to the carriers of cell membranes the kinetics of facilitated diffusion and cotransport systems the primary active transport systems are considered emphasizing the pumping of an ion sodium potassium calcium or proton against its electrochemical gradient during the coupled progress of a chemical reaction while a conformational change of the pump enzyme takes place this book is of interest to advanced undergraduate students as well as to graduate students and researchers

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Membrane Transport 2012-12-06 not many years ago problems of membranes and transport attracted the attention of but a few dozen enthusiasts mainly physiologists who recognize the significance of membranes for the stabilization of the general steady state of organisms the first symposium organized some fifteen years ago could boast of the attendance of perhaps fifty scientists the remaining fifty were not yet sure that membranes was the topic of their choice ranging in specialization from physical chemistry to bacterial genetics who clairvoyantly decided to study what now has become the number one subject at most congresses of biophysics physiology and even biochemistry and microbiology as is the case with many rapidly developing fields the interest in membranes and transport seems to be growing out of bounds and the whole field of membrane biology interdisciplinary as it is has penetrated into the realms of a number of branches of physics chemistry and biology its subject is primarily biological and although much has been done in the world to increase the exactness of biology over the past thirty years one cannot strive for a rigorous mathematical description of biological phenomena since as m h

Membrane Transport in Plants 2012-12-06 in february 1974 an international workshop on membrane transport in plants was held at the nuclear research centre jllii ich west germany more than two hundred and fifty people from fourteen countries took part in this highly successful meeting a somewhat similar meeting took place in liverpool england two years ago and it became clear there that progress in the field of membrane transport in plants was now so marked that a second and wider meeting in germany was more than fully justified the members of our programme committee u zimmermann chairman jllilich frg j dainty

Transport Across Multi-Membrane Systems 1978-12-01 the contributions of this volume are concerned with transport phenomena in multimembrane systems and in simple epithelia in addition to the very substantial progress that has been made in the area of transport of fluid and solutes across artificial model membranes in vitro and across simple symmetrical cell membranes much has been learned from studies of transport phenomena in multi membrane systems of higher complexity to be reviewed in this volume it should be recalled that many of the fundamental conceptual and methodological problems of transport physiology have been successfully approached and defined by studying simple epithelia in vitro and that the direction that research has taken has been affected in a major way by the cellular transport models that have evolved from this approach since then striking progress has been made in several areas not only have we been witnessing a keen and productive interest in the relationship between fine structure and transport behavior in multimembrane systems but significant advancements have also been made in defining individual active and passive transport operations in analysing cell ion activities and transport pools and in describing the differences in transport functions that underly the membrane asymmetry and cell polarization of cells subserving directional transport

Cell Membrane Transport 2013-06-29 experimental science is a complicated creature at the head there is a gordian knot of ideas and hypotheses behind is the accumulated mass of decades of research only the laboratory methods the legs which propel science forward remain firmly in touch with the ground growth however is uneven dinosaurs develop by solid means to give a vast body of results but few ideas others sprint briefly to success with brilliant though ill supported ideas the problems which this book addresses is to maintain an organic unity between new ideas and the current profusion of innovative experimental tools only then can we have the framework on which our research thoughts may flourish the contributors are outstanding scientists in their respective fields and they record here in a clear manner the methodology with which they perform their experiments they also illustrate some of their most exciting findings in all chapters the emphasis is on the critical analysis of the methodology which is often avoided in refereed journals these techniques are explained in this book in adequate detail each chapter is extensively referenced and contains the most recent material available from author's laboratory at the time of going to press

Concepts and Models 2012-12-06 this volume forms the cornerstone of this series of four books on membrane transport in biology it includes chapters that address i the theoretical basis of investigations of transport processes across biological membranes ii some of the experimental operations often used by scientists in this field iii chemical and biological properties common to most biological membranes and iv planar thin lipid bilayers as models for biological membranes the themes developed in these chapters recur frequently throughout the entire series transport of molecules across biological membranes is a special case of diffusion and convection in liquids the conceptual frame of reference used by investigators in this field derives in large part from theories of such processes in homogeneous phases examples of the application of such theories to transport across biological membranes are found in chapters 2 and 4 of this volume in chapter 2 sten knudsen emphasizes a statistical and molecular approach while in chapter 4 sauer makes heavy use of the thermodynamics of irreversible processes taken together these contributions introduce the reader to the two sets of ideas which have dominated the thinking of scientists working in this field theoretical consideration of a more

special character are also included in several other chapters in volume i for example ussing chapter 3 re works the flux ratio equation which he introduced into the field of transport across biological membranes in 1949

Membrane Transport Mechanism 2014-03-13 this book provides a molecular view of membrane transport by means of numerous biochemical and biophysical techniques the rapidly growing numbers of atomic structures of transporters in different conformations and the constant progress in bioinformatics have recently added deeper insights the unifying mechanism of energized solute transport across membranes is assumed to consist of the conformational cycling of a carrier protein to provide access to substrate binding sites from either side of a cellular membrane due to the central role of active membrane transport there is considerable interest in deciphering the principles of one of the most fundamental processes in nature the alternating access mechanism this book brings together particularly significant structure function studies on a variety of carrier systems from different transporter families glutamate symporters leu like fold transporters mfs transporters and smr rnd exporters as well as abc type importers the selected examples impressively demonstrate how the combination of functional analysis crystallography investigation of dynamics and computational studies has made it possible to create a conclusive picture or more precisely a molecular movie although we are still far from a complete molecular description of the alternating access mechanism remarkable progress has been made from static snapshots towards membrane transport dynamics

An Introduction to Membrane Transport and Bioelectricity 1994 water relations in membrane transport in plants and animals contains the presentations in a symposium dealing with water relations in membranes in plants and animals during the 27th annual fall meeting of the american physiological society held at the university of pennsylvania 17 19 august 1976 the purpose of the symposium was to explore the common modes of water regulation in plants and animals in these proceedings the mechanisms employed to restrict water flow across plant and metazoan animal cells are described putative differences in mechanisms of water regulation retained by plant versus animal cells become inconsequential in the light of the numerous similarities dependence upon bioelectric potentials maintained across cell membranes energy dependence of uphill water movement and solute coupling during water transport the presentations can be organized into four the first takes up specific mechanisms of water transport in plants the second and third parts deal with specific mechanisms in invertebrates and vertebrates respectively the fourth part covers generalized mechanisms common to plants and animals

Plant Membrane Transport 1989 the aim of this book is to bring together in one volume the current research and thought on the concept of membrane fluidity as a biological phenomenon the invited articles are intended to review recent develop ments in the areas of membrane research covered and to summarize the current concepts and theories in those areas the authors have been given ample opportunity to present their thoughts and speculation on membrane fluidity and related phenomena in a more expanded form than is usually possible in reviews of this type it is hoped that this approach will have a stimulating effect on research and theoretical development in the biomem brane field the chapters in this book are arranged in three sections the first of which covers physical studies of membrane fluidity and related phenomena on the molecular level included are chapters on intermolecular hydrogen bonding between membrane lipids thermal analysis of membranes appli cation of fluorescence and nmr spectrometry to the study of membrane fluidity and the effect of drugs and other compounds on membrane stability and fluidity the second section deals with the regulation of membrane fluidity in microorganisms plants and higher organisms by factors such as tem perature fatty acid chain length lipid desaturation and polar head group structure

Water Relations in Membrane Transport in Plants and Animals 2013-10-22 the contributions of this volume are concerned with transport phenomena in multimembrane systems and in simple epithelia in addition to the very substan tial progress that has been made in the area of transport of fluid and solutes across artificial model membranes in vitro and across simple symmetrical cell membranes much has been learned from studies of transport phenomena in multi membrane systems of higher complexity to be reviewed in this volume it should be recalled that many of the fundamental conceptual and methodological problems of transport physiology have been successfully approached and defin ed by studying simple epithelia in vitro and that the direction that research has taken has been affected in a major way by the cellular transport models that have evolved from this approach since then striking progress has been made in several areas not only have we been witnessing a keen and productive interest in the reallationship between fine structure and transport behavior in multimem brane systems but significant advancements have also been made in defining individual active and passive transport operations in analysing cell ion activities and transport pools and in

describing the differences in transport functions that underly the membrane asymmetry and cell polarization of cells subserving directional transport

Membrane Fluidity 1984-09-01 well over one decade has passed since the appearance of the original four volumes of membrane transport in biology since the publication of the last volume there have been spectacular advances in this field these advances have been in part the result of the application of exciting new methodologies and in part the result of new insights into the regulation and integration of transport processes this volume as well as a sixth volume which is in preparation are intended to cover key areas in which the development has been particularly striking for many years the trend in studies of membrane transport had been that of increasing specialization with regard to the transporter of interest and of the cell or tissue studied this trend was supported by the enormous number of publications directed at understanding the cellular physiology of specific organ systems and tissues and also by the fact that different tissues often seemed to react so differently to the same conditions that mechanisms unique to each appear to be at play one of the happy developments in recent years has been the realization that this apparent disparity of behaviors in different tissues is based on varying combinations of a limited number of transport mechanisms all mediated by the same or similar proteins some of these transport proteins have already been isolated and analyzed with respect to amino acid sequence whereas others are just entering this phase

Transport Across Multi-Membrane Systems 2012-03-09 membranes play an enormous role in our life biological cell membranes control the fluxes of substances in and out of cells artificial membranes are widely used in numerous applications including green separation processes in chemistry agroindustry biology medicine they are used as well in energy generation from renewable sources they largely mimic the structure and functions of biological membranes the similarity in the structure leads to the similarity in the properties and the approaches to study the laws governing the behavior of both biological and artificial membranes in this book some physico chemical and chemico physical aspects of the structure and behavior of biological and artificial membranes are investigated

Transport Across Multi-Membrane Systems 1978 this second volume in the series on membrane transport in biology contains a group of essays on transport across single biological membranes separating the inside and outside of cells or organelles we have not attempted to include material on all types of plasma and intracellular membranes but rather have emphasized structures which have been studied relatively thoroughly four chapters describe transport of different types of molecules and ions across the plasma membranes of mammalian red cells two essays concern the excitable membranes of nerve and muscle cells while the remaining four chapters treat transport across several types of intracellular membranes water makes up more than two thirds of the mass of most living cells the transport of water between the inside and outside of cells and organelles is important for the function of these structures as a result of investigations in many laboratories over the past four decades our picture of the water permeability of the red cell membranes is rather detailed when compared to the water permeability of other biological membranes in chapter 1 r i macey describes this picture and also considers the permeability of red cell membranes to non electrolytes including metabolic substrates such as sugars amino acids purines and nucleosides

Membrane Transport in Biology 2013-03-07 the aim of this text is to provide students with an overview of this important and developing area of biology the emphasis is on the biochemist s view of biological transport discovering the molecular structures and investigating the molecular details

Ion and Molecule Transport in Membrane Systems 2021-08-10 when the six of us gathered to start planning for what was to be the third edition of physiology of membrane disorders it was clear that since 1986 when the second edition appeared the field had experienced the dawning of a new era dominated by a change in focus from phenomenology to underlying mechanisms propelled by the power of molecular biology in 1985 detailed molecular information was available for only three membrane transporters the lac permease bacterial rhodopsin and the acetylcholine receptor during the decade that has since elapsed almost all of the major ion channels and transport proteins have been cloned sequenced mutagenized and expressed in homologous as well as heterologous cells few if any of the transporters that were identified during the previous era have escaped the probings of the new molecular technologies and in many instances considerable insight has been gained into their mechanisms of function in health and disease indeed in some instances novel unexpected transporters have emerged that have yet to have their functions identified the decision to adopt the new title molecular biology of membrane transport disorders was a natural outgrowth of these considerations

Transport Across Single Biological Membranes 2012-03-23 this volume contains the proceedings of the febs symposium on the biochemistry of membrane

transport which was held at the swiss institute of technology zürich july 18 23 1976 of the speakers invited or originally only five could not attend the meeting and of the lectures given all but one of the texts are published here thus this volume gives a faithful account of the way the meeting was originally conceived and actually took place this symposium on biochemistry of membrane transport was the first symposium sponsored by the febs outside the yearly febs meetings after the special meeting on industrial biochemistry which took place in dublin in 1973 and it reflects the interest and the trend for gatherings of smaller size than the official febs meetings the topic of the symposium was an easy choice not only because membrane transport is becoming more and more important to biochemistry every year but also because of the long standing interest of swiss science in the field in the choice of the topics and of the speakers efforts were made to achieve as balanced a coverage of the area as possible however since some aspects of membrane biochemistry were dealt with extensively at the parallel 10th international congress of biochemistry in hamburg certain topics were given less emphasis than others the symposium was attended by about 400 participants we expected 200-250 among them 48 were invited speakers and some 200 contributed posters

Biochemistry of Membrane Transport 1983-10-06 membrane transport processes in organized systems is a softcover book containing portions of physiology of membrane disorders second edition the parent volume contains six major sections this text encompasses the fourth and fifth sections transport events in single cells and transport in epithelia vectorial transport through parallel arrays we hope that this smaller volume which deals with transport processes in single cells and in organized epithelia will be helpful to individuals interested in general physiology transport in single cells and epithelia and the methods for studying those transport processes thomas e andreoli joseph f hoffman darrell d fanestil stanley g schultz vll preface to the second edition the second edition of physiology of membrane disorders represents an extensive revision and a considerable expansion of the first edition yet the purpose of the second edition is identical to that of its predecessor namely to provide a rational analysis of membrane transport processes in individual membranes cells tissues and organs which in turn serves as a frame of reference for rationalizing disorders in which derangements of membrane transport processes play a cardinal role in the clinical expression of disease as in the first edition this book is divided into a number of individual but closely related sections part v represents a new section where the problem of transport across epithelia is treated in some detail finally part vi which analyzes clinical derangements has been enlarged appreciably

Cell Membrane Transport 1972 this book describes a half century of research on cellular membrane transport and on metabolic energy capture and utilization during this time which begins in the late 1930s the effort and imagination of various scientists overthrew reigning formulations created novel explanatory models and unified previously distinct experimental fields my primary goal is to display the course of that research showing how new experiments defined novel entities and processes and how an encompassing field bioenergetics then emerged a secondary goal is to present examples of mainstream biological research that illustrate how experimental results seen as refutations confirmations and elaborations can sway opinion toward a solid consensus this interpretation differs from the currently fashionable view of some commentators that stresses instead the central roles of power prestige gender class and ethnicity in any case the scientific practices exhibited here deserve proper philosophical scrutiny although constraints of space have squeezed any analysis from this draft brief mention of salient issues does appear in relevant chapters and in the final conclusions oddly historians and philosophers seem reluctant to deal with this science those who do consider biological topics tend to focus on the theory of evolution even though the bulk of biological research in this century in terms of papers published and technology influenced has dealt not with evolution per se but with what may be termed physiology and biochemistry and these endeavors which are the aims efforts and accomplishments of the vast majority of biologists have been largely ignored

Membrane Transport 1977-02 this volume brings together contributors from several different fields of cell biology physiology and molecular biology the common thread that runs through all of the work presented is that cell processes regulate the activities of membrane transport proteins and classes of membrane transport proteins participate in a number of critical cell phenomena this volume is unique in covering three different members of the atp binding cassette family mdr cfr and ste6 in one place as well as in including structure and function analysis of the sodium pump in the same forum where its cell biology is considered the book will appeal to a broad range of biologists with interests in membrane transport membrane biology cell biology and sorting

Molecular Biology of Membrane Transport Disorders 2013-11-11 transporters and channels are membrane proteins that mediate the traffic of metabolites water and ions across biological membranes membrane transport proteins are crucial to maintain homeostasis and assure cell survival upon intracellular or environmental stress a failure of any of these transport systems may have dramatic consequences for cell function there is increasing evidence that membrane

transport proteins play important functions in healthy conditions and that their absence or dysfunction may cause diseases in recent years much attention has been paid to diseases resulting from defective transporters carrier diseases and ion channels channelopathies very interestingly altered expression of transporters has been described in several human pathologies on this basis many transport proteins are well acknowledged targets for drugs many others are involved in drug delivery and disposition and or are considered potential targets others are off targets for drugs and then are responsible for side effects thus membrane protein drug discovery is now an emerging field where the search for physiological mechanisms of regulation and for chemical compounds as modulators of transport activity present new opportunities for drug development and for new therapies this research topic addresses the latest research advances in membrane transport proteins stimulating future research on these important protein families

Cell Membrane Transport 1988-08-01 intracellular transport is a collection of papers that examines the processes of and the mechanisms underlying intracellular transport one paper describes that all active transport processes in the amoeba are intracellular and depend on dynamic transformations of membrane into cytoplasm and of cytoplasm into membrane another paper discusses the kinetics of membrane transport of which the phenomena of counterflow can become a mobile carrier system the paper notes that the specific transport properties of membranes are conferred by the proteins of the surfaces that are grouped as macromolecular complexes probably similar to those of enzymes one paper describes the concept of parametric pumping an oscillation driven separation process as a possible model for active transport in biological cells another paper compares the fine scale diffusion effects that happen in a mixture without large scale concentration gradients and where the effect are on a large scale the homogenous kinetic law can be used in the large scale situation the law already can account for any of the fine scale diffusion effects the paper notes that without large scale concentration gradients the transport event is from a local region to a nearby reaction site only where the effects are on a large scale the diffusion results in a gross transport of over distances larger than molecular dimensions this collection can prove useful for mathematicians cellular biologists physical chemists physiologists electron microscopists geneticists and engineers

Biochemistry of Membrane Transport 2012-12-06 51 worldwide leading experts in the field of erythrocyte research contributed to this first book on transport processes in red blood cells it explains the latest findings on the basis of well established principles in an accessibly structured and carefully organized compilation

Membrane Transport Processes in Organized Systems 2012-12-06 with contributions by numerous experts

Moving Questions 2013-05-27 after being frequently urged to write upon this subject and as often declining to do it from apprehension of my own inability i am at length compelled to take up the pen however unqualified i may still feel myself for the task william withering m d i have yet to find a description or a quote that better summanzes my initial ambivalence towards embarking on such an endeavor as partici pating in putting together this monograph the impetus for the red cell has been a simple genuine membrane a model for solute transport desire to bring together an authoritative account of the state of the art and knowledge in the red ceil membrane transport field in particular it seems important to emphasize the pivotal role the red cell has played for several decades in the discovery and the elucidation of mechanisms of plasma membrane transport processes it is only with such knowledge that we can hope to push ahead and make progress in this exciting multifaceted area eventually one hopes to not only further our knowledge of red cells but apply the newly gained insights to any other of the plasma membrane cell with the common denominator in this compendium of reviews the reader will find that the term model will take on a variety of gists and meanings in some chapters the red cell has been chosen as a model membrane solely on the basis of its preeminent design and simplicity

Cell Biology and Membrane Transport Processes 1994-05-24 with contributions by numerous experts

Membrane Transporters and Channels as Targets for Drugs 2020-01-03

Basic Principles of Membrane Transport 1980-05-30

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Membrane Transport in Plants 1972

Red Cell Membrane Transport in Health and Disease 2013-04-17

Transport Organs 1979

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The Red Cell Membrane 1990-01-16

Physics of Membrane Transport 1973

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