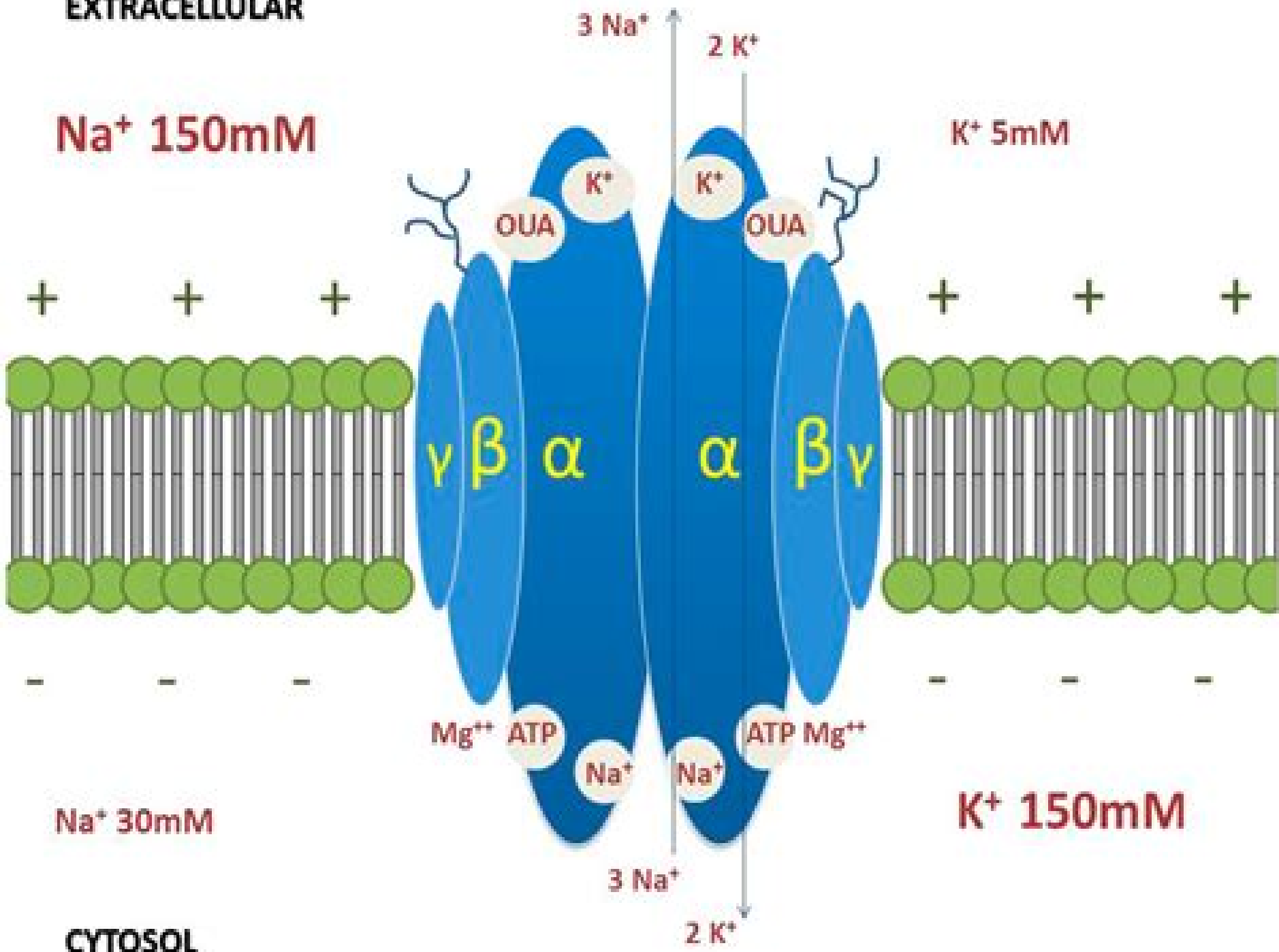


EXTRACELLULAR

$\text{Na}^+$  150mM

$\text{K}^+$  5mM



# Na K Atpase Structure And Kinetics

**Anthony Martonosi**



## Na K ATPase Structure And Kinetics:

*Na, K-ATPase, Structure and Kinetics* Jens Gregersen Norby, J. C. Skou, 1979      The Enzymes of Biological Membranes Anthony Martonosi, 2012-12-06 In the first edition of *The Enzymes of Biological Membranes* published in four volumes in 1976 we collected the mass of widely scattered information on membrane linked enzymes and metabolic processes up to about 1975 This was a period of transition from the romantic phase of membrane biochemistry preoccupied with conceptual developments and the general properties of membranes to an era of mounting interest in the specific properties of membrane linked enzymes analyzed from the viewpoints of modern enzymology The level of sophistication in various areas of membrane research varied widely the structures of cytochrome c and cytochrome b were known to atomic detail while the majority of membrane linked enzymes had not even been isolated In the intervening eight years our knowledge of membrane linked enzymes expanded beyond the wildest expectations The purpose of the second edition of *The Enzymes of Biological Membranes* is to record these developments The first volume describes the physical and chemical techniques used in the analysis of the structure and dynamics of biological membranes In the second volume the enzymes and metabolic systems that participate in the biosynthesis of cell and membrane components are discussed The third and fourth volumes review recent developments in active transport oxidative phosphorylation and photosynthesis      *Transport And Diffusion Across Cell Membranes* Wilfred Stein, 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 in biochemistry physiology pharmacology and biophysics      *The Sodium Pump* Society of General Physiologists. Symposium, 1991      *Red Cell Membrane Transport in Health and Disease* Ingolf Bernhardt, J. Clive Ellory, 2013-04-17 The red cell has been a focus for scientific and medical investigation since the earliest times A higher erythrocyte sedimentation

rate was associated with diseases usually pyrexias before the thermometer was invented Furthermore ever since the early observers Swammerdam and Leeuwenhoek saw discrete corpuscles in samples of blood using the first microscopes there has been a significant scientific interest in the structure and function of red blood cells The later discovery that red cells were not spherical but biconcave discs introduced a scientific puzzle which is still not completely resolved today and identified the need for a detailed knowledge of the plasma membrane composition and structure and its interaction with the cytoskeleton Important concepts like the lipid bilayer together with its more recent refinement as asymmetric in phospholipid composition led to the identification of translocases involved in actively maintaining its composition Understanding the mechanics of red cell deformation as these biconcave discs traverse capillaries was advanced by the pioneering work of Rand and Burton in the Sixties and progressed by Evans Skalak and others Based on the bilayer couple hypothesis the shape changes that are possible for a human red cell from echinocyte to stomatocyte were described by Sheetz and Singer in the Seventies in terms of alterations in the individual halves of the bilayer Certain clinical conditions are associated with obvious changes in red cell morphology

**Current Topics in Membranes and Transport**, 1983-09-01 Current Topics in Membranes and Transport **Specific Interaction and Biological Recognition Processes** Zeno Simon, Nicolae Voiculescu, Ioan Motoc, 1993-06-16 Specific Interaction and Biological Recognition Processes is devoted to two major aspects of biological processes specificity in biological recognition and the recognition processes themselves Topics covered in specificity include the theoretical basis for specificity in biological recognition the thermodynamic and chemical equilibrium background and consideration of the relationship between size of combining sites and specificity The use of semi empirical potentials for calculating interaction energies and the potential of quantum chemistry methods for calculating receptor effector affinities are also discussed The various recognition processes described include DNA replication transcription translation enzymatic reactions transmembrane transport processes mechanisms of action of hormones and other chemical messengers and self nonself recognition in immunology Specific Interaction and Biological Recognition Processes will be a useful reference for molecular biologists biochemists enzymologists immunologists oncologists pharmaceutical researchers and others interested in the topic **Membranes and Transport** Anthony N. Martonosi, 2012-12-06 This work is a collection of short reviews on membranes and transport It portrays the field as a mosaic of bright little pieces which are interesting in themselves but gain full significance when viewed as a whole Traditional boundaries are set aside and biochemists biophysicists physiologists and cell biologists enter into a natural discourse The principal motivation of this work was to ease the problems of communication that arose from the explosive growth and interdisciplinary character of membrane research In these volumes we hope to provide a readily available comprehensive source of critical information covering many of the exciting recent developments on the structure biosynthesis and function of biological membranes in microorganisms animal cells and plants The 182 reviews contributed by leading authorities should enable experts to check up on recent developments in neighboring

areas of research allow teachers to organize material for membrane and transport courses and give advanced students the opportunity to gain a broad view of the topic. Special attention was given to developments that are expected to open new areas of investigation. The result is a kaleidoscope of facts, viewpoints, theories, and techniques which radiates the excitement of this important field. Publication of these status reports every few years should enable us to follow progress in an interesting and easygoing format. I am grateful to the authors to Plenum Publishing Corporation and to several of my colleagues for their thoughtful suggestions and enthusiastic cooperation which made this work possible.

Membrane Physiology Thomas E. Andreoli, Darrell D. Fanestil, Joseph F. Hoffman, Stanley G. Schultz, 2012-12-06. *Membrane Physiology* Second Edition is a soft cover book containing portions of *Physiology of Membrane Disorders* Second Edition. The parent volume contains six major sections. This text encompasses the first three sections: The Nature of Biological Membranes, Methods for Studying Membranes, and General Problems in Membrane Biology. We hope that this smaller volume will be helpful to individuals interested in general physiology and the methods for studying general physiology.

THOMAS E. ANDREOLI, JOSEPH F. HOFFMAN, DARRELL D. FANESTIL, STANLEY G. SCHULTZ. vii. 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.

**The Na<sup>+</sup>, K<sup>+</sup>-pump: Molecular aspects** J. C. Skou, 1988. *Current Topics in Bioenergetics* D. Rao Sanadi, 2014-06-28. *Current Topics in Bioenergetics* Volume 11 provides information pertinent to the ATP-utilizing or synthesizing parts of the major bioenergetics reactions of cells. This book discusses the individual proteins comprising each of the energy-transducing ATPases and their organization into a functional structure. Organized into six chapters, this volume begins with an overview of the role of ATPases in the production and utilization of the H<sup>+</sup> gradient from a genetic and biochemical viewpoint. This text then examines the ATPase associated with bacterial membranes which is known to have an analogous function and a similar structure to that found in membranes of chloroplasts and mitochondria. Other chapters consider the composition and the biogenesis of chromaffin granules. This book discusses as well the models for the mode of action of peptide molecules. The final chapter deals with the various forms of energy transduction. This book is a valuable resource for biologists, physiologists, and pharmacologists.

Monovalent Cations in Biological Systems Charles A. Pasternak, 2024-12-06. This unique volume provides an integrated overview of the subject of monovalent cations specifically aimed at students and researchers. It is divided into two parts; the first deals with

the processes by which monovalent cations are transported across biological membranes the second deals with the processes that are affected by changes in intracellular cations Each chapter describes in simple biochemical terms the interaction between one or more monovalent cations and a particular biological system of importance to current understanding of body function in health and disease This useful publication is invaluable to students and researchers in biochemistry physiology neurology pharmacology anesthesiology cardio pulmonology hematology laboratory medicine endocrinology gastroenterology internal medicine psychiatry urology biomedical physics and medical nutrition Fish Physiology ,1984-08-09 Fish Physiology *Physiology of Membrane Disorders* Thomas E. Andreoli,Darrell D. Fanestil,Joseph F. Hoffman,Stanley G. Schultz,2013-11-11 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 THE EDITORS xi Preface to the First Edition The purpose of this book is to provide the reader with a rational frame of reference for assessing the pathophysiology of those disorders in which derangements of membrane transport processes are a major factor responsible for the clinical manifestations of disease In the present context we use the term membrane transport to refer to those molecular processes whose cardinal function broadly speaking is processes in a catholic sense the vectorial transfer of molecules either individually or as ensembles across biological interfaces the latter including those interfaces which separate different intracellular compartments the cellular and extracellular compartments and secreted fluids such as glomerular filtrate and extracellular fluids **ATPases** A.G. Lee,1996-12-17 Volume 5 of Biomembranes covers an important group of membrane proteins the ATPases The P type ATPases couple the hydrolysis of ATP to the movement of ions across a membrane and are characterized by the formation of a phosphorylated intermediate Included are the plasma membrane and muscle sarcoplasmic reticulum  $\text{Ca}^{2+}$  ATPases the  $\text{Na}^{+}$   $\text{K}^{+}$  ATPase the gastric  $\text{H}^{+}$   $\text{K}^{+}$  ATPase the plasma membrane  $\text{H}^{+}$  ATPase of fungi and plants the  $\text{Mg}^{2+}$  transport ATPase the *Salmonella typhimurium* and the  $\text{K}^{+}$  ATPase of *Escherichia coli* KdpB The other important classes of ATPase in eukaryotic systems are the vacuolar  $\text{H}^{+}$  ATPases and the  $\text{F}_0\text{F}_1$  ATP synthase and in bacteria the anion translocating ATPases responsible for resistance to arsenicals and antimonials and the  $\text{Na}^{+}$   $\text{Mg}^{2+}$  ATPase of *Acholeplasma* Finally eukaryotic systems contain a variety of ectonucleotidases important for example in hydrolysis of extracellular ATP released as a cotransmitter from cholinergic and adrenergic nerve terminals Volume 5 of Biomembranes explores structure function relationships for these membrane bound ATPases Calcium and Cellular Metabolism J.R.

Sotelo,J.C. Benech,1997-11-30 Proceedings of an international workshop held in Montevideo Uruguay September 25 October 6 1995     *Na, K-ATPase* ,     **Research Awards Index** ,1989     **Cumulated Index Medicus** ,1999     *Pumps, Channels and Transporters* Ronald J. Clarke,Mohammed A. A. Khalid,2015-09-16 Describes experimental methods for investigating the function of pumps channels and transporters Covers new emerging analytical methods used to study ion transport membrane proteins such as single molecule spectroscopy Details a wide range of electrophysiological techniques and spectroscopic methods used to analyze the function of ion channels ion pumps and transporters Covers state of the art analytical methods to study ion pumps channels and transporters and where analytical chemistry can make further contributions

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