# Membrane Structural Biology With Biochemical And Biophysical Foundations

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Membrane Structural Biology: With Biochemical and ...
Summary. Essential for the compartmentalization that defines cells and organisms, biomembranes are fundamental to life. Early membranes played a crucial role in the origin of life as the structures that defined what stayed in and what was kept out of primordial cells. In addition to their compartmentalization function, membranes provide modern cells with energy derived from chemical and charge gradients, organize and regulate enzyme activities, facilitate the transduction of information, and ...

Introduction (Chapter 1) - Membrane Structural Biology
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A wealth of new high resolution structures of membrane proteins are presented, including the Na/K pump and a receptor-G protein complex, offering exciting insights into how they function. All key tools of current membrane research are described, including detergents and model systems, bioinformatics, protein-folding methodology, crystallography and diffraction, and molecular modeling.

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The aim of structural biology has been always the study of biological macromolecules structures and their mechanistic behaviour at molecular level. To achieve its goal, multiple biophysical methods and approaches have become part of the structural biology toolbox. Considered as one of the pillars of structural biology, X-ray crystallography has been the most successful method for solving three ...

Membrane protein crystallography in the era of modern ...
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An updated edition on membrane biology, providing new high resolution structures of membrane proteins and insights into how they function.

This textbook provides a strong foundation and a clear overview for students of membrane biology and an invaluable synthesis of cutting-edge research for working scientists. The text retains its clear and engaging style, providing a solid background in membrane biochemistry, while also incorporating the approaches of biophysics, genetics and cell biology to investigations of membrane structure, function and biogenesis to provide a unique overview of this fast-moving field. A wealth of new high resolution structures of membrane proteins are presented, including the Na/K pump and a receptor-G protein complex, offering exciting insights into how they function. All key tools of current membrane research are described, including detergents and model systems, bioinformatics, protein-folding methodology, crystallography and diffraction, and molecular modeling. This comprehensive and up-to-date text, emphasising the correlations between membrane research and human health, provides a solid foundation for all those working in this field.

Membrane Structural Biology brings together a physicochemical analysis of the membrane with the latest structural biology on membrane lipids and proteins to offer an exciting portrayal of biomembranes. Written with remarkable clarity, this text appears at a time when membranes have moved back into the scientific spotlight and will provide a unique foundation for advanced students and working scientists. The structure, function, and biogenesis of membrane lipids and proteins are examined, bioinformatics and computational approaches to membrane components are introduced, and the high-resolution structures that are giving new insights into the vital roles membranes play are discussed. The many correlations between membrane research and human health are discussed and key themes for future work in this area are identified. Membrane structural biology is poised to answer many basic and applied questions and this cutting-edge text will provide a solid grounding for all those working in this field.

Cutting-edge text providing a foundation for membrane biology suitable for advanced students and working scientists.

The Advanced Study Institute on "Structure, Biogenesis and Dynamics of Biological Membranes, held in Cargese from June 14-26, 1993, has been dealing with four major topics in membrane biochemistry today: lipid dynamics and lipid-protein interactions, protein translocation and insertion, intracellular traffic aud protein structure and folding. The lecturers discussed these topics starting from several disciplines, including biochemistry, cell biology, genetics, and biophysics. This wayan interdisciplinary and very inte~sting view on biological membrane systems was obtained. At first an extensive overview of -mainly biophysical -techniques which can be used to study dynamic processes in membranes was presented. Sophisticated approaches such as ESR and NMR have been applied succesfully to unravel details of specific lipid-protein interactions. x ray analysis provides detailed structural information of several proteins and the possible implications for protein functions. Information obtained this way is complemented by studies on mechanisms and kinetics of protein folding. The latter information is indispensable when discussing protein translocation and insertion: proces:;es in which folding and unfolding play essential roles. Extensive insight was offered in the complicated machinery of phospholipid biosynthesis. In particular, the application of sophisticated genetic techniques has allowed a better understanding of the mechanisms regulating the synthetic machinery and detailed studies on a variety of mutants, lacking one or more of the essential enzymes, have resulted in the beginning of a bL!:

Structure and Function of Biological Membranes explains the membrane phenomena at the molecular level through the use of biochemical and biophysical approaches. The book is an in-depth study of the structure and function of membranes. It is divided into three main parts. The first part provides an overview of the study of the biological membrane at the molecular level. Part II focuses on the detailed description of the overall molecular organization of membranes. The third part covers the relationship of the molecular organization of membranes to specific membrane functions; discusses catalytic membrane proteins; presents the role of membranes in important cellular functions; and looks at the membrane systems in eukaryotic cells. Biochemists, cell physiologists, biologists, researchers, and graduate and postdoctoral students in the field of biology will find the text a good reference material.

An Introduction to Biological Membranes: From Bilayers to Rafts covers many aspects of membrane structure/function that bridges membrane biophysics and cell biology. Offering cohesive, foundational information, this publication is valuable for advanced undergraduate students, graduate students and membranologists who seek a broad overview of membrane science. Brings together different facets of membrane research in a universally understandable manner Emphasis on the historical development of the field Topics include membrane sugars, membrane models, membrane isolation methods, and membrane transport.

Biological membranes provide the fundamental structure of cells and viruses. Because much of what happens in a cell or in a virus occurs on, in, or across biological membranes, the study of membranes has rapidly permeated the fields of biology, pharmaceutical chemistry, and materials science. The Structure of Biological Membranes, Third Edition pro

In the last few years there have been many exciting and innovative developments in the field of membrane protein structure and this trend is set to continue. Structural Biology of Membrane Proteins is a new monograph covering a wide range of topics with contributions from leading experts in the field. The book is split into three sections: the first discusses topics such as expression, purification and crystallisation; the second covers characterisation techniques and the final section looks at new protein structures. The book will hence have wide appeal to researchers working in and around the field and provide an up-to-date reference source. Introductory sections to each topic are accompanied by more detailed discussions for the more experienced biochemist. Detailed descriptions of experimental methods are included to demonstrate practical approaches to membrane protein structure projects. The book also offers an up-to-date reference source in addition to descriptions of new and emerging developments, including state-of-the-art techniques for solving membrane protein structures. Structural Biology of Membrane Proteins encompasses both basic introductions and detailed descriptions of themes and should appeal to a wide range of biochemical scientists, both experienced and beginner.

Introduction to Biological Membranes: Composition, Structure and Function, Second Edition is a greatly expanded revision of the first edition that integrates many aspects of complex biological membrane functions with their composition and structure. A single membrane is composed of hundreds of proteins and thousands of lipids, all in constant flux. Every aspect of membrane structural studies involves parameters that are very small and fast. Both size and time ranges are so vast that multiple instrumentations must be employed, often simultaneously. As a result, a variety of highly specialized and esoteric biochemical and biophysical methodologies are often utilized. This book addresses the salient features of membranes at the molecular level, offering cohesive, foundational information for advanced undergraduate students, graduate students, biochemists, and membranologists who seek a broad overview of membrane science. Significantly expanded coverage on function, composition, and structure Brings together complex aspects of membrane research in a universally understandable manner Features profiles of membrane pioneers detailing how contemporary studies originated Includes a timeline of important discoveries related to membrane science