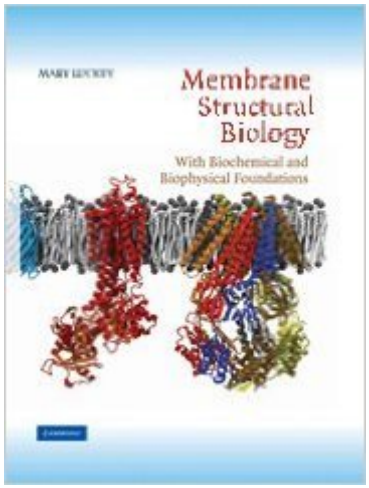
Membrane Structural Biology: With Biochemical And Biophysical Foundations



Synopsis

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.

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Customer Reviews

Membranes are complex biological structures which are necessary to create specialized compartments within the cells of living organisms. They are made of phospholipids and they embed many different kinds of (membrane) proteins which provide energetic and chemical supply to the cell. As an example we can consider an ion channel which is a specialized protein that allows ions such as K+ to move across the membrane. There are many different kinds of membrane proteins, each characterized by its unique 3D structure and biological function. So far, about 700 membrane protein structures have been determined with the aid of biomolecular crystallography (see Rupp's

book: "Biomolecular Crystallography: Principles, Practice, and Application to Structural Biology", 2009) and, more recently, by biomolecular NMR spectroscopy as well. Hence, it is not so simple to collect and organize the scientific results obtained by many research groups since 1985, when the first structure of a membrane protein was reported in the journal Nature by Deisenhofer and coworkers.Luckey's book is a beautiful introduction to the field of membrane structural biology which should be praised for the way the material was selected and organized. The book contains a lot of colored figures, many of them being 3D cartoon-type representations of protein structures and atomic-level details of important residues that are necessary for the correct function of the protein. The role of each protein is clearly explained in the text and the physical and biochemical methods of characterization are also discussed. In addition, each of the 12 chapters contains a list of key references for those with the desire to dig further into the field. I highly recommend the book not only to the students but also, and especially, to those scientists that carry on interdisciplinary research on membrane proteins.

This is a long-awaited textbook for a field, membrane biochemistry, which has been slowly building momentum for the past 20 years. Advances in our understanding or membrane structure, and the ramifications of that structure for membrane function, have come at a rapid pace in recent years. So this book comes at a very good time for those of us who understand that membranes and lipids are as critical to life as DNA or protein. The book is comprehensive; all facets of membrane biochemistry are covered in some detail. The illustrations are stunning, and indeed might be the crowning touch for the entire book. Recent advances in the field are included, along with the older classical results upon which the field was founded. The sections on lipid diversity, lipid biochemistry, and membrane protein assemblies are particularly welcomed; sometimes these topics get slighted in general biochemistry textbooks. It would be nice if the author included a more comprehensive bibliography, but, given the burgeoning literature in this field, it is understandable why she did not. In summary, the author has done a remarkable job collecting information and synthesizing it into a readable, thorough, and most timely textbook. (This review is excerpted from my review in Choice, the review journal of the American Library Association.)

Bioelectromagnetics: Biophysical Principles in Medicine and Biology (Issues in Biomedicine, Vol. 12) Bioelectrochemistry II: Membrane Phenomena (Ettore Majorana International Science Series) Biophysical and Physiological Effects of Solar Radiation on Human Skin: RSC (Comprehensive Series in Photochemical & Photobiological Sciences) The Biophysical Chemistry of Nucleic Acids and Proteins Biophysical Characterization of Proteins in Developing Biopharmaceuticals Structural Stability of Steel: Concepts and Applications for Structural Engineers Structural Analysis and Synthesis: A Laboratory Course in Structural Geology Structural Analysis and Synthesis: A Laboratory Course in Structural Geology 3rd (third) edition by Rowland, Stehen M., Duebendorfer, Ernest M., Schiefelbein, I published by Wiley-Blackwell (2007) [Spiral-bound] The Techniques of Modern Structural Geology, Volume 3: Applications of Continuum Mechanics in Structural Geology Chemi- and Bioluminescence (Clinical and Biochemical Analysis) Methods of Soil Analysis. Part 2. Microbiological and Biochemical Properties (Soil Science Society of America Book, No 5) (Soil Science Society of America Book Series) Fifty Shades of Narcissism: Your Brain on Love, Sex and the Narcissist: The Biochemical Bonds That Create an Addiction to Our Abusers Biochemical, Physiological, and Molecular Aspects of Human Nutrition Medicinal Chemistry: A Molecular and Biochemical Approach Bioactivation of Foreign Compounds (Biochemical Pharmacology and Toxicology Series) Guanidines: Historical, Biological, Biochemical, and Clinical Aspects of the Naturally Occurring Guanidino Compounds Cancer and the Search for Selective Biochemical Inhibitors