



# Membrane Structural Biology: With Biochemical and Biophysical Foundations

By Mary Luckey

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## Membrane Structural Biology: With Biochemical and Biophysical Foundations By Mary Luckey

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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### Editorial Review

#### Review

"In summary, the author has done a remarkable job collecting information and synthesizing it into a readable, thorough, and most timely book for academic curricula."

D.A. Rintoul, Choice

"Full of well-chosen colour figures, beautifully reproduced, making full use of the range of high-resolution structures now available for membrane proteins...What is unique about this book is its concentration on structure and on how structure helps to explain function. There is also more explanation of the physical chemical background to membranes and lipid bilayers than is found in other, more general textbooks."

Anthony Lee, University of Southampton, Microbiology Today

"This sophisticated new text presents biological, chemical and physical perspectives at an advanced level while being a pleasure to read. It is very up-to-date, with an organization that is novel but logical."

Professor Stanley Parsons, University of California Santa Barbara

"In this book, Mary Luckey did a remarkable job of synthesizing an incredible amount of up-to-date information. The book will be extremely useful to research scientists, graduate students, and even undergraduates interested in understanding how biological membranes function."

Professor Hiroshi Nikaido, U. C. Berkeley

"Luckey has, courageously (I should say, heroically), decided to write a single-author book, integrating the results of biological, biochemical and biophysical methods into a treatise of some 300 pages. The result is a well-balanced overview of the structures and the various biological activities of membranes which a multi-author book cannot provide. The subjects are clearly structured, the figures informative and vivid."

Professor J. P. Rosenbusch, Biozentrum, University of Basel

"...a well-balanced, thorough, and up-to-date treatment of membrane proteins and their bilayer environment. This is a badly needed contribution that encompasses most of the many breakthroughs that have taken place over the past 15 years in membrane protein structural, computational, and cell biology."

Professor Chuck Sanders, Vanderbilt University

"The volume impressively combines lucid summaries of basic principals and concise explanations of many recent developments in our understanding of membranes. Important background about concepts or techniques is effectively presented in "boxes" that supplement the main text. The text is enriched by descriptions of the history of key concepts or advances. The burgeoning amount of structural information about membrane components, particularly three-dimensional structures of membrane proteins, is effectively incorporated into every aspect of this volume."

Gerald L. Hazelbauer, Professor and Chair, Department of Biochemistry, University of Missouri

"Unlike texts on the subject that have appeared in the interim that are multi-authored or highly specialized, Mary Luckey's new text achieves breadth without sacrificing depth, is coherent, current, comprehensive, and highly readable for graduate students. The text includes a wealth of adeptly communicated information that will expedite both the teaching and learning aspects of a course on Biomembranes."

Professor Rosemary Cornell, Simon Fraser University, British Columbia

"The volume should be on the shelf of any scientist whose research involves or might involve biological membranes. It will be a true resource in teaching basic biochemistry and an appropriate text for advanced, membrane-specific courses. For those of us who work with membranes, the book will be a well-thumbed source of information and one often loaned to students, postdocs or fellow faculty member wanting concise information about almost any aspect of membrane biology."

Linda L. Randall, Wurdack Professor of Biochemical Sciences, University of Missouri

"There has been a need, for some time, for a book, suitable for teaching this topic to final-year undergraduates and postgraduate students and most teachers of this cohort have had to look to reviews and original papers for teaching material. Mary Luckey's book changes all that. This book provides a history of the development of the field of biological membranes, but more importantly provides details of the major advances in the last decade that have provided insights into the functioning of membrane proteins; and it does so in an impressive and engaging style. This is a book for anyone interested or engaged in biomembrane research. It serves as a reference text, but also as a showcase to reveal the strides that have been made in this field over the past decade or so."

Molecular Membrane Biology

"A textbook ... has to be visually attractive ... Membrane Structural Biology passes this test with flying colours; it is full of well-chosen colour figures, beautifully reproduced ... few working on membranes would not find much to enjoy in the book. Perhaps the perfect gift for the membranologist in your family?"

Microbiology Today

"This book is great to read, its well-documented examples will leave a strong impression, and the presented straightforward explanations will help readers digest the complexity of the field."

Andreas Engel, Cleveland Center for Membrane & Structural Biology, Case Western Reserve University, Cleveland, Ohio for The Quarterly Review of Biology

#### About the Author

Professor Mary Luckey is a Professor in the Department of Chemistry and Biochemistry at San Francisco State University. She earned her Ph.D. in biochemistry at U.C. Berkeley with the first identification of an iron transport protein in the bacterial outer membrane. Her postdoctoral work demonstrated the specificity of the *E. coli* maltoporin in proteoliposomes. While continuing research on maltoporin structure and function, she has taught biochemistry for twenty-five years, including the graduate-level membrane biochemistry course that provided the impetus for this book.

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