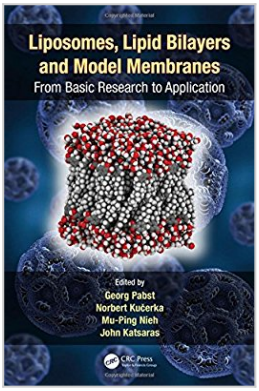

Liposomes, Lipid Bilayers and Model Membranes: From Basic Research to Application

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As a result of their unique physical properties, biological membrane mimetics, such as liposomes, are used in a broad range of scientific and technological applications. **Liposomes, Lipid Bilayers and Model Membranes: From Basic Research to Application** describes state-of-the-art research and future directions in the field of membranes, which has evolved from basic studies of the physicochemical properties of amphiphiles to their application in industry and medicine. Written by leading researchers in their fields, this book describes basic and applied research, and serves as a useful reference for both the novice and the expert.

Part one covers a range of basic research topics, from theory and computational simulations to some of the most up-to-date experimental research. Topics discussed include soft matter physics of membranes, nonlamellar phases, extraction of molecules by amphiphiles, lipid models for membrane rafts, membrane dynamics, nanodiscs, microemulsions, active membranes, as well as interactions of bilayers with drugs or DNA to treat disease or for gene transfer, respectively.

Part two of the book focuses on technological applications of amphiphiles, such as liposome-based nanoparticles for drug delivery, formulation of liposomes for prolonged *in vivo* circulation and functionalization for medical purposes, novel drug delivery systems for increased drug loading, and the use of tethered membranes for bio-sensing applications. Chapters also describe the use of liposomes in textile dyeing and how lipidic nanoparticles are used by the food industry.

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Editorial Review

About the Author

Georg Pabst received his Ph.D. in physics from the Graz University of Technology, Austria, and completed postdoctoral research at the Canadian Research Council, Chalk River, Ontario. After his return to Austria, he was a senior research officer at the Austrian Academy of Sciences and moved to the University of Graz, where he currently holds the position of assistant professor. His research is focused on the physics of biological membranes with the aim of delineating the functional role of membrane lipids in cellular transport and signaling.

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Mu-Ping Nieh received his Ph.D. in the Department of Chemical Engineering at the University of Massachusetts, Amherst, USA. He then worked as a postdoctoral researcher?a joint position at National Institute of Standards and Technology and The Pennsylvania State University. In 2002, he joined the National Research Council, Canada, at Chalk River, Ontario. Eight years later (2010), he became an associate professor in the Department of Chemical and Biomolecular Engineering at the University of Connecticut, Storrs, USA. His research primarily focuses on the underlying principles of spontaneous structures formed by soft materials, including lipids, polymers, and proteins, seeking a fundamental understanding of the structure–function relationship of self-assemblies.

John Katsaras is a senior scientist and distinguished R&D staff at Oak Ridge National Laboratory (ORNL). He received his Ph.D. in biophysics from the University of Guelph, Ontario, Canada. Prior to joining ORNL, he was a principal research officer at the National Research Council of Canada. He is internationally recognized for scientific contributions to the field of membrane biophysics, to materials of biological and medical relevance, and the application of x-ray and neutron scattering techniques to biologically relevant systems.

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