Subcellular Biochemistry

Volume 14

Artificial and Reconstituted Membrane Systems

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SUBCELLULAR BIOCHEMISTRY

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Preface

This collection of 11 chapters is devoted to a survey of artificial and reconstituted membrane systems. These are fundamental themes and areas of great current importance in membrane biochemistry. They also relate well to the founding concept of this series, namely, to present studies that progressively work toward and provide us with an "integrated view of the cell." In this volume, it is the application of a wide range of physiochemical and biochemical techniques to the study of membrane lipids and proteins which serves to demonstrate the significant progress that has been made in this field over the past 25 years. From the understanding of *simplified* artificial systems, it is hoped that it will ultimately be possible to gain a more accurate understanding of natural biological membranes, in all their diversity.

This book is an appropriate successor to Volume 13 of the series, which deals with fluorescence studies on biological membranes. Indeed, the present chapter by Lesley Davenport and colleagues was originally due for inclusion in Volume 13, but has been held over for inclusion in this volume, where it integrates remarkably well with the other topics.

The extremely varied and interesting contents of this volume are now briefly outlined. In Chapter 1, Jacqueline A. Reynolds and Darrell R. McCaslin present a pertinent survey of the interaction of detergents with membrane lipids and proteins, together with an assessment of the reconstitution process. This chapter sets the technical scene for much of what is to follow, since the use of detergents occupies a principal role in many of the studies to be described. P. J. Quinn then contributes a very thorough and extensively illustrated account of membrane lipid phase behavior and lipid–protein interactions, and in Chapter 3 a consideration of the reconstitution of physiological membrane molecular mechanisms (such as ion transport and receptors) in bilayer lipid membranes and patch-clamp bilayers is presented by Peter M. Vassilev and H. Ti Tien. A detailed biophysical assessment of the application of fluorescence studies to membrane dynamics and heterogeneity is then offered by Lesley Davenport, Jay R. Knutson, and Ludwig Brand. This is followed by an excellent account of membrane fusion, fusogenic agents, and osmotic forces from J. A. Lucy

and Q. F. Ahkong. In Chapter 6, Dick Hoekstra and Nejat Düzgüneş present a survey of lectin–carbohydrate interactions in model and biological membrane systems. This is an impressively thorough account of what is currently an extremely important topic in membrane biochemistry.

Nobuhito Sone then gives us an interesting review of the energy-transducing complexes in bacterial respiratory chains, and this is followed by a somewhat personal description of the reconstitution of the high-affinity receptor for immunoglobulin E by Jean-Pierre Kinet and Bruce Grasberger. Wolfgang Hanke and Heinz Breer then discuss the reconstitution of acetylcholine receptors in planar lipid bilayers and a brief, yet pertinent, survey of the use of liposomes as carriers of drugs by Gregory Gregoriadis follows. Finally, an extremely thorough description of the impact of reconstitution experiments on the understanding of physiological protein translocation processes is contributed by Abol-Hassan Etémadi.

It is hoped that the diversity and scientific depth of the material included in this volume of *Subcellular Biochemistry* will enable it to be of widespread interest and value to membrane biochemists and others drawn to this fascinating field of study.

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