PROTEIN—LIPID INTERACTIONS

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Preface

Protein–lipid interactions as a field of study is now a mature area, and has been reviewed in volumes and single review articles several times in the past decade or so. Over this period there has not been complete agreement in the interpretation of results from a range of methods and systems. Some rationalization has now been achieved and to some degree a level of consensus of opinion and description of the protein–lipid interface (as presented by Mouritsen and Biltonen from a thermodynamic viewpoint, and from a spectroscopic and structural aspect by Marsh) and its all-important relevance to the functional integrity (as described by Sandermann, Duncan, McIntyre and Fleischer) of the system, has been described.

It was thought appropriate that a reflective view could now be presented in a volume with two objectives in mind. Firstly, to look towards the future, and try to envisage how the subject may develop in the near to medium-term future. Secondly, to present contrasting or complementary views on the same system, for example, the acetylcholine receptor is discussed from a predominantly structural aspect by Barrantes and from the kinetic standpoint by Rankin, Raines, Dalton and Miller. Similarly, the (Ca^{2+}–Mg^{2+})-ATPase is considered in the sarcoplasmic reticulum by Thomas and Mahaney, and in reconstituted systems by Lee and East.

Recent new information has been gained about the genetic modulation of membranes and the effect on protein–lipid interactions (as discussed by McGee, Fung and Bankaitis), as well as how proteins and peptide insertion into the membrane could involve the membrane lipids (from de Kroon, de Gier and de Kruijff). An intriguing possibility that M13 bacteriophage infection can involve lipid–protein interactions is discussed by Hemminga, Sanders, Wolfs and Spruijt, where reconstitution and in vivo studies of the coat protein (a 50-mer) give information about assembly and association of the protein in the membrane. Peripheral protein–lipid interactions are considered by Sankaram and Marsh, and the effects of cholesterol on lipid–protein interactions in natural membranes are considered by Castuma, Lamy-Freund, Brenner and Schreier. The future possibilities for the use of FT-IR spectroscopy are considered by Arrondo and Goñi and, again looking well into the future, the way in which lipid–protein interactions may control 2D array and 3D crystal formation of integral membrane proteins is discussed by Watts, Vénien-Bryan, Sami, Whiteway, Boulter and Sternberg.

It is hoped that this volume not only gives an update on specific aspects of the field, but also shows a way in which the phenomenon of protein–lipid interactions is now seemingly infiltrating many areas of biomembrane research, from recombinant DNA studies, protein insertion and assembly and reconstitution considerations to structural studies of membrane proteins.

A. Watts
December, 1992

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