

Preface

Biological membranes have long been identified as key elements in a wide variety of cellular processes, including cell defence, communication, photosynthesis, signal transduction and motility, and thus they emerge as primary targets in both basic and applied research. In order to fully appreciate the role that biological membranes play in these essential biological processes it becomes crucial to get a molecular-level picture of the structure of their main components (i.e. lipids and membrane proteins) as well as the nature of their cross-interactions in order to decipher how these molecular recognition processes determine the modulation of membrane-related functions. In this respect, the high-resolution structure of quite a few membrane proteins determined in recent years, many of them of prokaryotic origin, are at centre stage in modern membrane research as they allow for the rational design and interpretation of experiments, which were unthinkable not too long ago.

This book is an attempt to assemble in a single volume the most recent views of some of the experts in the area of protein–lipid interactions which draw a general picture of the advances that this field has achieved in recent years, from very basic aspects to specialized technological applications. The topics in this book include the application of X-ray and neutron diffraction, infrared and fluorescence spectroscopies, as well as high-resolution NMR methodologies that improve our understanding of the specific interactions established between lipids and proteins within biological membranes, their structural relationships, and the implications to the biological functions they mediate. In addition, the insertion of proteins and peptides into the membrane and the concomitant formation of definite lipid domains within the membrane, are other topics covered in this volume. We hope that the selection of subjects is timely and stimulating both for the dedicated scientist and for the general reader.

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CHAPTER 2

NMR of Membrane Proteins in Lipid Environments:

The Bcl-2 Family of Apoptosis Regulators

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