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Nota di contenuto	Prologue: Lipidology - the science of lipids -- I THE OVERLOOKED MOLECULES -- Life from molecules -- Head and tail -- Oil and water -- Lipids speak the language of curvature -- A matter of softness -- Soft shells shape up -- Biological membranes - models and fashion -- II LIPIDS MAKE SENSE -- Lipids in bilayers - a stress-full and busy life -- The more we are together -- Lipids in Flatland -- Social Lipids -- Lively lipids provide for function -- Proteins at lipid mattresses -- III LIPIDS IN ACTION -- Cholesterol on the scene -- Lipids in charge -- Being smart - a _shy matter of fat -- Liquor and drugs - as a matter of fat-. Lipid eaters -- Powerful and strange lipids at work -- Survival by

Sommario/riassunto

The present book gives a multi-disciplinary perspective on the physics of life and the particular role played by lipids (fats) and the lipid-bilayer component of cell membranes. The emphasis is on the physical properties of lipid membranes seen as soft and molecularly structured interfaces. By combining and synthesizing insights obtained from a variety of recent studies, an attempt is made to clarify what membrane structure is and how it can be quantitatively described. Furthermore, it is shown how biological function mediated by membranes is controlled by lipid membrane structure and organization on length scales ranging from the size of the individual molecule, across molecular assemblies of proteins and lipid domains in the range of nanometers, to the size of whole cells. Applications of lipids in nanotechnology and biomedicine are also described. The first edition of the present book was published in 2005 when lipidomics was still very much an emerging science and lipids about to be recognized as being as important for life as proteins, sugars, and genes. This significantly expanded and revised edition takes into account the tremendous amount of knowledge gained over the past decade. In addition, the book now includes more tutorial material on the biochemistry of lipids and the principles of lipid self-assembly. The book is aimed at undergraduate students and young research workers within physics, chemistry, biochemistry, molecular biology, nutrition, as well as pharmaceutical and biomedical sciences. From the reviews of the first edition: "This is a highly interesting book and a pleasure to read. It represents a new and excellent pedagogical introduction to the field of lipids and the biophysics of biological membranes. I reckon that physicists and chemists as well as biologists will benefit from this approach to the field and Mouritsen shows a deep insight into the physical chemistry of lipids." (Göran Lindblom, *Chemistry and Physics of Lipids* 2005, vol. 135, page 105-106) "The book takes the reader on an exciting journey through the lipid world, and Mouritsen attracts the attention with a lively style of writing ... a comprehensive view of the 'lipid sea' can be easily achieved, gaining the right perspectives for envisaging future developments in the nascent field of lipidomics." (Carla Ferreri, *ChemBioChem*, Vol. 6 (8), 2005).