

CONTENTS

<i>Preface</i>	ix
<i>Contributors</i>	xi
1. Bending Rigidities of Lipid Bilayers: Their Determination and Main Inputs in Biophysical Studies	1
Hélène Bouvrais	
1. Introduction	2
2. Methods for the Determination of the Bending Rigidity	10
3. Focus on the Flickering Technique of GUVs	31
4. Main Inputs from the Measurements of the Bending Rigidities	55
5. Conclusion	66
References	67
2. Gene Electrotransfer: From Understanding the Mechanisms to Optimization of Parameters in Tissues	77
Maša Kandušer and Mojca Pavlin	
1. Introduction	78
2. Electric Pulse Parameters and Pulsing Protocols Used for Gene Electrotransfer	79
3. Analysis of Electroporation and Gene Electrotransfer Efficiency on Plated Cells and Cells in a Suspension	82
4. Different Steps Involved in Gene Electrotransfer	84
5. Theoretical Analysis	87
6. Electrotransfection of Cells Embedded in 3D Collagen Gel	94
7. Development of 3D Numerical Models for Optimization of Gene Electrotransfer	96
8. Conclusions	99
Acknowledgments	100
References	101

3. A Multi Time-Scale Approach of the Lipid Bilayer Dynamics	105
Magdalena Przybyło, Jan Procek, Marek Kaczyński, Tomasz Borowik, Martin Hof, and Marek Langner	
1. Introduction	106
2. Materials and Methods	110
3. Results	119
4. Discussion	129
Acknowledgments	130
References	130
4. Methods for Multiscale Modeling of Membranes	139
N. Goga, A. Rzepiela, M. N. Melo, A. H. de Vries, A. Hadar, A. J. Markvoort, S. Nedeá, and H. J.C. Berendsen	
1. Introduction	140
2. Reverse Transformation	142
3. Constant Multiscaling	147
4. Space Multiscaling	152
5. Artificial Chemistry MD	156
6. MC-MD Multiscaling	160
7. Conclusions	165
References	168
5. Cell Junctions as Membrane Raft Domains	171
Nataša Resnik and Peter Veranič	
1. Introduction	172
2. Membrane Rafts	174
3. Cell Junctions as Raft Domains	180
4. Membrane Rafts and Cell-Matrix Connections of Cancer Cells	187
5. Concluding Remarks	189
References	190
6. Counting and Characterizing Liposomes in Populations	195
Jernej Zupanc and Damjana Drobne	
1. Introduction	196
2. Liposome Populations Experiment	197
3. Computerized Data Extraction	199
4. Liposome Population Segmentation	210
5. Results and Discussion	216
6. Conclusions	220
References	221

7. Role of Surface-Active Lipids in Cartilage Lubrication	225
Matej Daniel	
1. Cartilage Structure	226
2. Cartilage Lubrication	228
3. Properties of Superficial Cartilage Layer	229
4. Lamellar Phospholipids Lubrication	233
5. Synovial Fluid Constituents in Lamellar Lubrication	235
6. SAPL Lubrication in Disease and Therapy	237
7. Future Directions	239
References	239
 <i>Subject Index</i>	 245