

CONTENTS

Contributors

ix

1. The Membrane Receptor for Plasma Retinol-Binding Protein, A New Type of Cell-Surface Receptor	1
Hui Sun and Riki Kawaguchi	
1. Introduction	3
2. Diverse Physiological Functions of Vitamin A, a Molecule Essential for Vertebrate Survival	4
3. Retinol-Binding Protein, the Specific Carrier of Vitamin A in Blood	7
4. Diverse Evidence for the Existence of an RBP Receptor that Mediates Vitamin A Uptake	9
5. Identification of RBP Receptor	12
6. Structure and Function Analysis of the RBP Receptor's Interaction with RBP	20
7. Pertinent Questions Related to RBP Receptor	23
8. RBP Receptor as a Potential Target in Treating Human Diseases	29
9. Concluding Remarks	32
Acknowledgment	32
References	32
2. Vascular Smooth-Muscle-Cell Activation: Proteomics Point of View	43
Antonella Cecchetti, Silvia Rocchiccioli, Claudia Boccardi, and Lorenzo Citti	
1. Introduction	44
2. Characteristics of Vascular Smooth-Muscle Cells	45
3. Proteomics Approaches for VSMC Proteome Mapping	58
4. Posttranslational Modifications and Their Biological Functions in VSMCs	69
5. From Putative Markers to New Therapeutic Targets	78
6. Concluding Remarks	86
Acknowledgments	87
References	87

3. Molecular Basis for Endothelial Lumen Formation and Tubulogenesis During Vasculogenesis and Angiogenic Sprouting	101
George E. Davis, Amber N. Stratman, Anastasia Sacharidou, and Wonshill Koh	
1. Introduction	103
2. Overview of Endothelial Lumen Formation and Tubulogenesis	106
3. Molecular Mechanisms Controlling Vascular Lumen Formation	119
4. Functional Roles of Cdc42 and Rac1 in EC Lumen and Tube Formation	128
5. Roles of MT1-MMP and Vascular Guidance Tunnels in EC Lumen Formation and Tube Remodeling Events	136
6. Mechanisms Controlling EC Lumen and Tube Stability	144
7. Role for MMPs in the Molecular Control of Vascular Tube Regression Responses	151
8. Conclusions and Future Directions	153
Acknowledgments	154
References	154
4. SUMO and Its Role in Human Diseases	167
Kevin D. Sarge and Ok-Kyong Park-Sarge	
1. Introduction	168
2. The Sumoylation Cycle	168
3. Sumoylation and Cancer	170
4. Sumoylation of Proteins Involved in Neurodegenerative Diseases	171
5. Sumoylation and Heart Disease	177
6. Concluding Remarks	178
Acknowledgments	179
References	179
5. Focal Adhesion Kinase: Exploring FAK Structure to Gain Insight into Function	185
Jessica E. Hall, Wei Fu, and Michael D. Schaller	
1. Introduction	186
2. Biological and Physiological Significance of FAK	187
3. Domain Structure	191
4. Autoinhibition	199
5. FAK Binding Partners	204
6. Development of FAK Therapeutics	212
7. Future Directions	215
References	216

6. Roles of Small Ubiquitin-Related Modifiers in Male Reproductive Function	227
Margarita Vigodner	
1. Introduction	228
2. Regulation of Protein Functions by Sumoylation: Lessons from Other Cell Types	230
3. Unique Aspects of Sumoylation in Male Germ Cells	236
4. Concluding Remarks and Future Perspectives	251
Acknowledgment	252
References	252
<i>Index</i>	261