Contents

Preface ..... *v*
Acknowledgement ..... *xiii*
Contributors ..... *xvii*

PART I INTEGRIN ACTIVATION AND FOCAL ADHESION MEASUREMENTS

1 Measurement of Integrin Activation and Conformational Changes on the Cell Surface by Soluble Ligand and Antibody Binding Assays 3
Zhengli Wang and Jieqing Zhu

2 Quantification of Integrin Activation and Ligation in Adherent Cells 17
Zaki Al-Yafeai and A. Wayne Orr

3 Multiparametric Analysis of Focal Adhesions in Bidimensional Substrates 27
Vanessa C. Talayero and Miguel Vicente-Manzanares

4 Focal Adhesion Isolation Assay Using ECM-Coated Magnetic Beads 39
Wesley Sturgess and Vinay Swaminathan

PART II PROXIMITY AND MICROSCOPY-BASED METHODS TO DETERMINE INTEGRIN INTERACTIONS

5 Functional Integrin Regulation Through Interactions with Tetraspanin CD9 47
Álvaro Torres-Gómez, Beatriz Cardeñes, Ester Díez-Sainz, Esther M. Lafuente, and Carlos Cabañas

6 Proximity-Dependent Biotinylation (BioID) of Integrin Interaction Partners 57
Satu-Marja Myllymäki, Xiaonan Liu, Markku Varjosalo, and Aki Manninen

7 Analyzing the Integrin Adhesome by In Situ Proximity Ligation Assay 71
Brian A. Perrino, Yeming Xie, and Cristina Alexandru

PART III BIOCHEMICAL, PROTEOMICS AND COMPUTATIONAL METHODS TO DETERMINE INTEGRIN INTERACTIONS

8 Single-Protein Tracking to Study Protein Interactions During Integrin-Based Migration 85
A. V. Radhakrishnan, Tianchi Chen, Jose Filipe Nunes Vicente, Thomas Orré, Amine Mehidi, Olivier Rossier, and Grégory Giannone

9 Biochemical Characterization of the Integrin Interactome 115
Rejina B. Khan, Lorena Varela, Alana R. Cowell, and Benjamin T. Goult

10 Network Analysis of Integrin Adhesion Complexes 149
Frederic Li Mow Chee and Adam Byron

PART IV BIOPHYSICAL METHODS TO DETERMINE INTEGRIN ACTIVATION AND ITS CELLULAR AND MOLECULAR EFFECTS

11 Surface Patterning for the Control of Receptor Clustering and Molecular Forces of Integrin-Mediated Adhesions 183
Federica Pennarola and Elisabetta Ada Cavalcanti-Adam

12 Dynamics and Physics of Integrin Activation in Tumor Cells by Nano-Sized Extracellular Ligands and Electromagnetic Fields 197
Alkiviadis-Constantinos Cefalas, Vassilios Gavriil, Angelo Ferraro, Zoe Kollia, and Evangelia Sarantopoulou

PART V INTEGRIN ACTIVATION AND INTERACTIONS IN SPECIFIC SYSTEMS AND PROCESSES

13 Genetic Instruction of Megakaryocytes and Platelets Derived from Human Induced Pluripotent Stem Cells for Studies of Integrin Regulation 237
Ana Kasirer-Friede and Sanford J. Shattil

14 Quantitative Analysis of Integrin Trafficking 251
Enoir Farage and Patrick T. Caswell

15 Methods to Study Integrin Functions on Exosomes..... 265
Eiji Kawamoto, Eun Jeong Park, and Motomu Shimaoka

PART VI INTEGRIN LIGANDS AND THE EXTRACELLULAR MATRIX

16 Functional Bioinformatics Analyses of the Matrisome and Integrin Adhesome 285
Edward Roy Horton

17 Quantifying Polarized Extracellular Matrix Secretion in Cultured Endothelial Cells..... 301
Fabiana Clapero, Dora Tortarolo, Donatella Valdembri, and Guido Serini

Index *313*