

# Contents

<i>Preface</i> . . . . .	<i>v</i>
<i>Contributors</i> . . . . .	<i>ix</i>
1 Methods to Analyze EVs . . . . . <i>Bernd Giebel and Clemens Helmbrecht</i>	1
2 Tunable Resistive Pulse Sensing for the Characterization of Extracellular Vesicles . . . . . <i>Sybrein L.N. Maas, Marike L.D. Broekman, and Jeroen de Vrij</i>	21
3 Immuno-Characterization of Exosomes Using Nanoparticle Tracking Analysis . . . . . <i>Kym McNicholas and Michael Z. Michael</i>	35
4 Imaging and Quantification of Extracellular Vesicles by Transmission Electron Microscopy . . . . . <i>Romain Linares, Sisareuth Tan, Céline Gounou, and Alain R. Brisson</i>	43
5 Quantitative Analysis of Exosomal miRNA via qPCR and Digital PCR . . . . . <i>Shayne A. Bellingham, Mitch Shambrook, and Andrew F. Hill</i>	55
6 Small RNA Library Construction for Exosomal RNA from Biological Samples for the Ion Torrent PGM™ and Ion S5™ System. . . . . <i>Lesley Cheng and Andrew F. Hill</i>	71
7 A Protocol for Isolation and Proteomic Characterization of Distinct Extracellular Vesicle Subtypes by Sequential Centrifugal Ultrafiltration . . . . . <i>Rong Xu, Richard J. Simpson, and David W. Greening</i>	91
8 Multiplexed Phenotyping of Small Extracellular Vesicles Using Protein Microarray (EV Array) . . . . . <i>Rikke Bek and Malene Møller Jørgensen</i>	117
9 Purification and Analysis of Exosomes Released by Mature Cortical Neurons Following Synaptic Activation . . . . . <i>Karine Laulagnier, Charlotte Javalet, Fiona J. Hemming, and Rémy Sadoul</i>	129
10 A Method for Isolation of Extracellular Vesicles and Characterization of Exosomes from Brain Extracellular Space . . . . . <i>Rocío Perez-Gonzalez, Sebastien A. Gauthier, Asok Kumar, Mitsuo Saito, Mariko Saito, and Efrat Levy</i>	139
11 Isolation of Exosomes and Microvesicles from Cell Culture Systems to Study Prion Transmission . . . . . <i>Pascal Leblanc, Zaira E. Arellano-Anaya, Emilien Bernard, Laure Gallay, Monique Provansal, Sylvain Lehmann, Laurent Schaeffer, Graça Raposo, and Didier Vilette</i>	153

12	Isolation of Platelet-Derived Extracellular Vesicles . . . . .	177
	<i>Maria Aatonen, Sami Valkonen, Anita Böing, Yuana Yuana, Rienk Nieuwland, and Pia Siljander</i>	
13	Bioinformatics Tools for Extracellular Vesicles Research. . . . .	189
	<i>Shivakumar Keerthikumar, Lahiru Gangoda, Yong Song Gho, and Suresh Mathivanan</i>	
14	Preparation and Isolation of siRNA-Loaded Extracellular Vesicles . . . . .	197
	<i>Pieter Vader, Imre Mäger, Yi Lee, Joel Z. Nordin, Samir E.L. Andaloussi, and Matthew J.A. Wood</i>	
15	Interaction of Extracellular Vesicles with Endothelial Cells Under Physiological Flow Conditions . . . . .	205
	<i>Susan M. van Dommelen, Margaret Fish, Arjan D. Barendrecht, Raymond M. Schiffelers, Omolola Eniola-Adefeso, and Pieter Vader</i>	
16	Flow Cytometric Analysis of Extracellular Vesicles . . . . .	215
	<i>Aizea Morales-Kastresana and Jennifer C. Jones</i>	
	<i>Index</i> . . . . .	227

Exosomes and Microvesicles

Methods and Protocols

Hill, A.F. (Ed.)

2017, XII, 228 p. 39 illus., 21 illus. in color., Hardcover

ISBN: 978-1-4939-6726-1

A product of Humana Press