Contents

Preface to the Series .............................................................. v
Preface .............................................................................. vii
Contributors .................................................................... ix

1 Translation, Touch, and Overlap in Multi-fluorescence Confocal Laser Scanning Microscopy to Quantitate Synaptic Connectivity .......................... 1
   Floris G. Wouterlood and Jeroen A.M. Beliën

2 Surgical Procedures to Study Microglial Motility in the Brain and in the Spinal Cord by In Vivo Two-Photon Laser-Scanning Microscopy ......................... 37
   Alexander Cupido, Bogdan Catalin, Heinz Steffens, and Frank Kirchhoff

3 Analysis of Brain Projection Systems Using Third-Generation Neuroanatomical Tracers and Multiple Fluorescence Laser Scanning Microscopy ........................................... 51
   Floris G. Wouterlood

4 Combining Multichannel Confocal Laser Scanning Microscopy with Serial Section Reconstruction to Analyze Large Tissue Volumes at Cellular Resolution ........................................... 83
   Federico Luzzati

5 Modeling Excitotoxic Ischemic Brain Injury of Cerebellar Purkinje Neurons by Intravital and In Vitro Multi-photon Laser Scanning Microscopy .......................... 105
   Amanda J. Craig, Gary D. Housley, and Thomas Fath

6 Analysis of Morphology and Structural Remodeling of Astrocytes ........................................... 129
   Tatjana C. Jakobs

7 Quantitative Analysis of Axonal Outgrowth in Mice ........................................... 145
   Rosa-Eva Huettl and Andrea B. Huber

8 Zebrafish Brain Development Monitored by Long-Term In Vivo Microscopy: A Comparison Between Laser Scanning Confocal and 2-Photon Microscopy ........................................... 163
   Nicolas Dross, Carlo Antonio Beretta, Peter Bankhead, Matthias Carl, and Ulrike Engel

9 Analysis of Actin Turnover and Spine Dynamics in Hippocampal Slice Cultures ........................................... 189
   Kristin Michaelsen-Preusse, Yves Kellner, Martin Korte, and Marta Zagrebelsky
10 Quantitative Geometric Three-Dimensional Reconstruction of Neuronal Architecture and Mapping of Labeled Proteins from Confocal Image Stacks .................................................. 219
  Jan Felix Evers and Carsten Duch

11 Confocal Microscopy Used for the Semiautomatic Quantification of the Changes in Aminoacidergic Fibers During Spinal Cord Regeneration .................................................. 239
  Blanca Fernández-López, Antón Barreiro-Iglesias, and María Celina Rodicio

12 Reconstruction and Morphometric Analysis of Hippocampal Neurons from Mice Expressing Fluorescent Proteins .......................................................... 251
  Nataliya Golovyashkina, Frederik Sündermann, Roland Brandt, and Lidia Bakota

13 Machine Learning to Evaluate Neuron Density in Brain Sections .............. 263
  Lorène Penazzi, Frederik Sündermann, Lidia Bakota, and Roland Brandt

14 Shearlet Analysis of Confocal Laser-Scanning Microscopy Images to Extract Morphological Features of Neurons .................................................. 293
  Frederik Sündermann, Sebastian Lotter, Wang-Q Lim, Nataliya Golovyashkina, Roland Brandt, and Gitta Kutyniok

Index ........................................................................................................ 305
Laser Scanning Microscopy and Quantitative Image Analysis of Neuronal Tissue
Bakota, L.; Brandt, R. (Eds.)
2014, XII, 307 p. 107 illus., 84 illus. in color., Hardcover
ISBN: 978-1-4939-0380-1
A product of Humana Press