

Contents

| | |
|--|-----|
| Preface | xv |
| Part I Development of MEA for Cells, Acute Slices, and Cultured Tissues | |
| 1 A History of MEA Development <i>Jerome Pine</i> | 3 |
| 2 On Micro-Electrode Array Revival: Its Development, Sophistication of Recording, and Stimulation <i>Michael Fejt, Alfred Stett, Wilfried Nisch, Karl-Heinz Boven, and Andreas Möller</i> | 24 |
| 3 Multi-Electrode Arrays: Enhancing Traditional Methods and Enabling Network Physiology <i>James Whitson, Don Kubota, Ken Shimono, Yousheng Jia, and Makoto Taketani</i> | 38 |
| 4 Development of 3-D Multi-Electrode Arrays for Use with Acute Tissue Slices <i>Marc Olivier Heuschkel, Corina Wirth, Esther-Marie Steidl, and Bruno Buisson</i> | 69 |
| 5 Electrophysiological Monitoring of Hippocampal Slice Cultures Using MEA on Porous Membrane <i>David Hakkoum, Dominique Muller, and Luc Stoppini</i> | 112 |
| 6 Mapping Spatio-Temporal Electrophysiological Activity in Hippocampal Slices with Conformal Planar Multi-Electrode Arrays <i>Walid Soussou, Ghassan Gholmieh, Martin Han, Ashish Ahuja, Dong Song, Min-Chi Hsiao, Zhuo Wang, Armand R. Tanguay Jr., and Theodore W. Berger</i> | 127 |

| | | |
|--|--|-----|
| vi | Contents | |
| 7 | Pattern Technologies for Structuring Neuronal Networks on MEAs <i>John C. Chang and Bruce C. Wheeler</i> | 153 |
| Part II MEA Applications: Dissociated Cell Cultures | | |
| 8 | Emerging Histiotypic Properties of Cultured Neuronal Networks <i>Guenter W. Gross and Kamakshi V. Gopal</i> | 193 |
| 9 | Closing the Loop: Stimulation Feedback Systems for Embodied MEA Cultures <i>Steve M. Potter, Daniel A. Wagenaar, and Thomas B. DeMarse</i> | 215 |
| 10 | Emerging Network Activity in Dissociated Cultures of Neocortex: Novel Electrophysiological Protocols and Mathematical Modeling <i>Michele Giugliano, Maura Arsiero, Pascal Darbon, Jürg Streit, and Hans-Rudolf Lüscher</i> | 243 |
| 11 | Analysis of Cardiac Myocyte Activity Dynamics with Micro-Electrode Arrays <i>Ulrich Egert, Kathrin Banach, and Thomas Meyer</i> | 274 |
| Part III MEA Applications: Acute/Cultured Slices | | |
| 12 | A Hippocampal-Based Biosensor for Neurotoxins Detection and Classification Using a Novel Short-Term Plasticity Quantification Method <i>Ghassan Gholmieh, Spiros Courellis, Vasilis Marmarelis, Michel Baudry, and Theodore W. Berger</i> | 293 |
| 13 | The Retinasensor: An In Vitro Tool to Study Drug Effects on Retinal Signaling <i>Elke Guenther, Thoralf Herrmann, and Alfred Stett</i> | 321 |
| 14 | Chronic Alcohol Effects on Hippocampal Neuronal Networks <i>Larry P. Gonzalez, Ken D. Marshall, Prashantha D. Holla, and Anand Mohan</i> | 332 |
| 15 | Applications of Multi-Electrode Array System in Drug Discovery Using Acute and Cultured Hippocampal Slices <i>Michel Baudry, Makoto Taketani, and Michael Krause</i> | 355 |
| 16 | Rhythm Generation in Spinal Cultures: Is It the Neuron or the Network? <i>Jürg Streit, Anne Tschertter, and Pascal Darbon</i> | 377 |

| | | |
|----|--|-----|
| 17 | Monitoring the Clock Neuron's Tick: Circadian Rhythm Analysis Using a Multi-Electrode Array Dish <i>Sato Honma, Wataru Nakamura, Tetsuo Shirakawa, and Ken-ichi Honma</i> | 409 |
| 18 | Investigation of Network Phenomena in Hippocampal Slices Using Multi-Electrode Recording Arrays <i>Laura Lee Colgin</i> | 425 |
| 19 | Exploring Fast Hippocampal Network Oscillations: Combining Multi-Electrode Recordings with Optical Imaging and Patch-Clamp Techniques <i>Edward O. Mann and Ole Paulsen</i> | 454 |
| | Index | 471 |

