

# Contents

|   |     |
|---|-----|
| Preface.....  | v   |
| Contributors.....   | ix  |
| <b>Part I Ion Channels, Transporters and Excitotoxicity</b>   |     |
| 1 Regulation of Vulnerability to NMDA Excitotoxicity<br>During Postnatal Maturation .....                         | 3   |
| Jeremy D. Marks   |     |
| 2 Acidosis, Acid-Sensing Ion Channels, and Glutamate<br>Receptor-Independent Neuronal Injury .....                | 25  |
| Zhigang Xiong   |     |
| 3 Brain Ischemia and Neuronal Excitability .....  | 43  |
| Ping Deng and Zao C. Xu   |     |
| 4 Critical Roles of the Na <sup>+</sup> /K <sup>+</sup> -ATPase<br>in Apoptosis and CNS Diseases .....            | 53  |
| Adrian Sproul, Xin Zhou, and Shan Ping Yu   |     |
| 5 Emerging Role of Water Channels in Regulating<br>Cellular Volume During Oxygen Deprivation and Cell Death ..... | 79  |
| Thomas James Younts and Francis "Monty" Hughes, Jr.   |     |
| 6 A Zinc–Potassium Continuum<br>in Neuronal Apoptosis .....   | 97  |
| Patrick Redman, Megan Knoch, and Elias Aizenman   |     |
| 7 Mitochondrial Ion Channels in Ischemic Brain .....  | 117 |
| Elizabeth A. Jonas  |     |

**Part II Reactive Oxygen Species, and Gene Expression to Behavior**

|  |     |
|--|-----|
| <b>8 Perinatal Panencephalopathy in Premature Infants:<br/>Is It Due to Hypoxia-Ischemia? .....</b>        | 153 |
| Hannah C. Kinney and Joseph J. Volpe   |     |
| <b>9 Effects of Intermittent Hypoxia<br/>on Neurological Function .....</b>                                | 187 |
| David Gozal  |     |
| <b>10 Brainstem Sensitivity to Hypoxia and Ischemia .....</b>  | 213 |
| Joseph C. LaManna, Paola Pichiule, Kui Xu,<br>and Juan Carlos Chávez                                       |     |
| <b>11 Matrix Metalloproteinases in Cerebral Hypoxia-Ischemia .....</b>                                     | 225 |
| Zezong Gu, Jiankun Cui, and Stuart A. Lipton   |     |
| <b>12 Oxidative Stress in Hypoxic-Ischemic<br/>Brain Injury .....</b>                                      | 239 |
| Laura L. Dugan, M. Margarita Behrens, and Sameh S. Ali   |     |
| <b>13 Postnatal Hypoxia and the Developing Brain:<br/>Cellular and Molecular Mechanisms of Injury.....</b> | 255 |
| Robert M. Douglas  |     |
| <b>14 Hypoxia-Inducible Factor 1 .....</b>   | 277 |
| Gregg L. Semenza   |     |
| <b>15 Transcriptional Response to Hypoxia<br/>in Developing Brain .....</b>                                | 289 |
| Dan Zhou   |     |
| <b>16 Acute Stroke Therapy: Highlighting<br/>the Ischemic Penumbra.....</b>                                | 307 |
| Hang Yao   |     |
| <b>17 Genes and Survival to Low O<sub>2</sub> Environment:<br/>Potential Insights from Drosophila.....</b> | 323 |
| Gabriel G. Haddad  |     |
| <b>Index .....</b>   | 335 |