

## **Part I Physiology and Structure of Mitochondria**

|  |     |
|--|-----|
| <b>1 The Oxidative Phosphorylation System in Mammalian Mitochondria</b> .....  | 3   |
| Sergio Papa, Pietro Luca Martino, Giuseppe Capitanio, Antonio Gaballo,<br>Domenico De Rasmio, Anna Signorile, and Vittoria Petruzzella |     |
| <b>2 Physiology and Pathophysiology of Mitochondrial DNA</b> .....   | 39  |
| Hongzhi Li, Danhui Liu, Jianxin Lu, and Yidong Bai   |     |
| <b>3 Mitochondrial Ca<sup>2+</sup> as a Key Regulator of Mitochondrial Activities</b> .....  | 53  |
| Tito Calì, Denis Ottolini, and Marisa Brini  |     |
| <b>4 Mitochondria and Nitric Oxide: Chemistry and Pathophysiology</b> .....  | 75  |
| Paolo Sarti, Marzia Arese, Elena Forte, Alessandro Giuffrè,<br>and Daniela Mastronicola  |     |
| <b>5 Mitochondria and Reactive Oxygen Species. Which Role in Physiology<br/>and Pathology?</b> .....                                   | 93  |
| Giorgio Lenaz  |     |
| <b>6 Uncoupling Proteins: Molecular, Functional, Regulatory, Physiological<br/>and Pathological Aspects</b> .....                      | 137 |
| Francis E. Sluse   |     |
| <b>7 The Mitochondrial Pathways of Apoptosis</b> .....   | 157 |
| Jérôme Estaquier, François Vallette, Jean-Luc Vayssiere, and Bernard Mignotte  |     |

## **Part II Mitochondria and Disease**

|  |     |
|--|-----|
| <b>8 Inherited Mitochondrial Disorders</b> .....                           | 187 |
| Josef Finsterer  |     |
| <b>9 Role of Mitochondrial Function in Insulin Resistance</b> .....        | 215 |
| Myrte Brands, Arthur J. Verhoeven, and Mireille J. Serlie                  |     |
| <b>10 Mitochondria and Diabetes. An Intriguing Pathogenetic Role</b> ..... | 235 |
| Philip Newsholme, Celine Gaudel, and Maurico Krause                        |     |

|  |     |
|--|-----|
| <b>11 Mitochondria and Heart Disease</b> .....   | 249 |
| Elinor J. Griffiths  |     |
| <b>12 Mitochondria in Neurodegeneration</b> .....  | 269 |
| Lezi E and Russell H. Swerdlow   |     |
| <b>13 Mitochondria and Cancer: A Growing Role in Apoptosis, Cancer Cell Metabolism and Dedifferentiation</b> .....                       | 287 |
| Roberto Scatena  |     |
| <br><b>Part III Mitochondria, Aging and Pharmacotoxicological Aspects</b>  |     |
| <b>14 Mitochondria and Aging</b> .....   | 311 |
| Hsin-Chen Lee and Yau-Huei Wei   |     |
| <b>15 Mitochondria and Drugs</b> .....   | 329 |
| Roberto Scatena  |     |
| <b>16 Iatrogenic Mitochondriopathies: A Recent Lesson from Nucleoside/Nucleotide Reverse Transcriptase Inhibitors</b> .....              | 347 |
| George P.H. Leung  |     |
| <b>17 Dysfunction of Mitochondrial Respiratory Chain Complex I in Neurological Disorders: Genetics and Pathogenetic Mechanisms</b> ..... | 371 |
| Vittoria Petruzzella, Anna Maria Sardanelli, Salvatore Scacco, Damiano Panelli, Francesco Papa, Raffaella Trentadue, and Sergio Papa     |     |
| <b>18 Anthracyclines and Mitochondria</b> .....  | 385 |
| Alvaro Mordente, Elisabetta Meucci, Andrea Silvestrini, Giuseppe Ettore Martorana, and Bruno Giardina                                    |     |
| <br><b>Part IV Applications of Mitochondrial Science</b>   |     |
| <b>19 Mitochondrial Proteomic Approaches for New Potential Diagnostic and Prognostic Biomarkers in Cancer</b> .....                      | 423 |
| Patrizia Bottoni, Bruno Giardina, Alessandro Pontoglio, Salvatore Scarà, and Roberto Scatena   |     |
| <b>20 Mitochondria in Anthropology and Forensic Medicine</b> .....   | 441 |
| Tomasz Grzybowski and Urszula Rogalla  |     |
| <b>Index</b> .....   | 455 |