

# Contents

## Part I Molecules and Pathways of Apoptosis

<b>1 Caspases: Activation, Regulation, and Function</b> . . . . .	3
Stefan J. Riedl and Fiona L. Scott	
<b>2 The Bcl-2 Family Proteins</b> . . . . .	25
Wen-Xing Ding and Xiao-Ming Yin	
<b>3 The Mammalian IAPs: Multifaceted Inhibitors of Apoptosis</b> . . . . .	63
Eric C. LaCasse, Herman H. Cheung, Allison M. Hunter, Stephanie Plenchette, Douglas J. Mahoney, and Robert G. Korneluk	
<b>4 Structural Biology of Programmed Cell Death</b> . . . . .	95
Yigong Shi	
<b>5 The Death Receptor Pathway</b> . . . . .	119
Maria Eugenia Guicciardi and Gregory J. Gores	
<b>6 The Mitochondrial Pathway: Focus on Shape Changes</b> . . . . .	151
Silvia Campello and Luca Scorrano	
<b>7 The Endoplasmic Reticulum Pathway</b> . . . . .	177
Michael W. Harr and Clark W. Distelhorst	
<b>8 Reactive Oxygen Species in Cell Fate Decisions</b> . . . . .	199
Han-Ming Shen and Shazib Pervaiz	
<b>9 The Integration of Metabolism and Cell Death</b> . . . . .	223
Jonathan L. Coloff, Yuxing Zhao, and Jeffrey C. Rathmell	

<b>10</b>	<b>Transcriptional Regulation of Apoptosis</b> . . . . .	239
	Crissy Dudgeon, Wei Qiu, Quanhong Sun, Lin Zhang, and Jian Yu	
<b>11</b>	<b>Clearance of Apoptotic Cells – Mechanisms and Consequences.</b> . . . . .	261
	Carylyn J. Marek and Lars-Peter Erwig	
<b>12</b>	<b>Systems Biology Approaches to the Study of Apoptosis</b> . . . . .	283
	Heinrich Huber, Eric Bullinger, and Markus Rehm	
<b>Part II Apoptosis in Model Organisms</b>		
<b>13</b>	<b>Programmed Cell Death in Plants: Apoptotic but Not Quite</b> . . . . .	301
	Naohide Watanabe and Eric Lam	
<b>14</b>	<b>Tracing the Roots of Death: Apoptosis in <i>Saccharomyces cerevisiae</i></b> . . . . .	325
	Didac Carmona-Gutierrez and Frank Madeo	
<b>15</b>	<b>Programmed Cell Death in <i>C. elegans</i></b> . . . . .	355
	Monica Darland-Ransom, Yi-Chun Wu, and Ding Xue	
<b>16</b>	<b>Cell Death in <i>Drosophila</i></b> . . . . .	375
	Dianne C. Purves, Jessica P. Monserrate, and Carrie Baker Brachmann	
<b>Part III Apoptosis in Mammalian Physiology and Pathogenesis</b>		
<b>17</b>	<b>Cell Death: Defining and Misshaping Mammalian Embryos</b> . . . . .	409
	Zahra Zakeri and Richard A. Lockshin	
<b>18</b>	<b>Matters of Life and Death in the Immune System</b> . . . . .	423
	Christopher P. Dillon and Douglas R. Green	
<b>19</b>	<b>Cell Death in the Hematopoietic System</b> . . . . .	443
	Emma C. Josefsson and Benjamin T. Kile	
<b>20</b>	<b>Cell Death in Acute Neuronal Injury</b> . . . . .	461
	R. Anne Stetler, Armando P. Signore, and Jun Chen	
<b>21</b>	<b>Apoptosis in Neurodegenerative Diseases</b> . . . . .	479
	Qiuli Liang and Jianhua Zhang	

<b>22 Apoptosis in Cardiovascular Pathogenesis</b> . . . . .	505
Hamid el Azzouzi, Meriem Bourajja, Paula A. da Costa Martins, and Leon J. De Windt	
<b>23 Apoptosis in Lung Injury and Disease</b> . . . . .	523
Stefan W. Ryter, Hong Pyo Kim, and Augustine M. K. Choi	
<b>24 Apoptosis in Liver Injury and Liver Diseases</b> . . . . .	547
Yosuke Osawa, Ekihiro Seki, and David A. Brenner	
<b>25 Apoptosis in Acute Kidney Injury</b> . . . . .	565
Navjotsingh Pabla, Qingqing Wei, and Zheng Dong	
<b>26 Apoptosis in Cancer Biology and Cancer Therapeutics</b> . . . . .	581
Simone Fulda	

**Part IV Alternative Cell Death Mechanisms and Pathways**

<b>27 Necrosis: Molecular Mechanisms and Physiological Roles</b> . . . . .	599
Linde Duprez, Nele Vanlangenakker, Nele Festjens, Franky Van Herreweghe, Tom Vanden Berghe, and Peter Vandenabeele	
<b>28 Caspase-Independent Mitotic Death</b> . . . . .	635
Katsumi Kitagawa	
<b>29 Lysosomal Proteases in Cell Death</b> . . . . .	647
Nathalie Andrieu-Abadie	
<b>30 Autophagy and Cell Death</b> . . . . .	671
Wentao Gao, Jeong-Han Kang, Yong Liao, Min Li, and Xiao-Ming Yin	

**Part V Approaches to the Study of Apoptosis**

<b>31 Analysis of Apoptosis: Basic Principles and Protocols</b> . . . . .	691
Man Jiang, Craig Brooks, Guie Dong, Xiaoning Li, Hong-Min Ni, Xiao-Ming Yin, and Zheng Dong	
<b>Index</b> . . . . .	713