## **Contents**

Contributors		xi
gra	ices from the dead: The complex vocabulary and intricate ammar of dead cells rold S. Levine and David S. Ucker	1
1.	Introduction	. 2
2.	The language of cell death	4
3.	An expanded view of the role of cell death	
	in homeostasis	6
4.	A universally heard language	14
5.	Paradigm	18
6.	A complex language	21
7.	Inbuit mechanisms that improve the signal-to-noise ratio	66
8.	An intricate grammar	67
9.	Conclusions	69
Refe	erences	69
<b>to</b> Ade	cleobindins and encoded peptides: From cell signaling physiology elaine Kwun-Wai Leung, Naresh Ramesh, Christine Vogel, I Suraj Unniappan	91
1.	Introduction	92
2.	Structural characteristics of the NUCB protein family	93
3.	Biochemical and structural properties of NUCB	98
4.	Structure of the EF-hand pair in NUCB1	99
5.	Calcium induces conformational changes in NUCB1	101
6.	DNA binding property of NUCB1	102
7.	Post-translational modification	102
8.	Subcellular distribution	104
9.	NUCB protein-protein interactions that mediate different	
	physiological functions	104
10.	NUCB encoded peptides	109
11.	Perspectives and considerations for future research	126
Ackı	nowledgments	127
Refe	erences	127

3. Estrogen receptor signaling mechanisms		135
Nat	thalie Fuentes and Patricia Silveyra	
1.	Estrogens: Definition and history	136
2.	Estrogen biosynthesis	137
3.	Estrogen metabolism	141
4.	Physiological functions of estrogens	142
5.	The estrogen receptors: History and discovery	142
6.	Structural properties of estrogen receptors	143
7.	3 , 3 3	146
·8.	Nuclear estrogen receptors: Direct genomic signaling	147
9.	Nuclear estrogen receptors: Indirect genomic signaling	148
10.	Membrane receptor: Indirect non-genomic signaling	150
11.		151
12.	Estrogen receptor ligand independent signaling	152
13.	, ,	153
14.	3 , 3	154
	Discussion	157
	knowledgments	158
Ref	erences	158
4. Int	racellular signaling of the AMP-activated protein kinase	171
Mir	ibane Dërmaku-Sopjani and Mentor Sopjani	
1.	The protein enzyme AMPK	172
2.	AMPK-mediated downstream targets	176
3.	Conclusions and perspectives	196
Ref	erences	197
5. Re	lationship between mitofusin 2 and cancer	209
Ale	ssandro Allegra, Vanessa Innao, Andrea Gaetano Allegra,	
and	d Caterina Musolino	
1.	Mitochondria as signaling organelles	209
2.	Mitochondrial fission and fusion	212
3.	Mitofusin 1 and mitofusin 2	214
4.	Mitofusin 2 and cancer	<b>2</b> 17
5.	MFN 2 in solid tumors	220
6.	Future perspective	226
Ref	rerences remains a second of the second of t	228
Fui	ther reading	236

	lolecular signaling in bone cells: Regulation of cell ifferentiation and survival	237
Li	lian I. Plotkin and Angela Bruzzaniti	
1.	Introduction	238
2.	Osteoblasts and osteocytes	239
	Osteoclast signaling mechanisms	250
4.	Regulation of bone cell differentiation and function through	
	cell-to-cell contact	261
5.	Concluding remarks	267
Acknowledgments		268
Re	eferences	268
	ctivating mutations of the gp130/JAK/STAT pathway	
in	human diseases	283
Ju	lliane Lokau and Christoph Garbers	
1.	Introduction: The IL-6 family of cytokines	284
2.	Intracellular signaling cascades activated by IL-6-type	
	cytokines	286
3.	Mutations in IL-6 family cytokines	289
4.	Mutations in the $\alpha$ -receptors IL-6R, IL-11R, and CNTFR	290
5.	Mutations in gp130 and related receptors	292
6.	Mutations in Janus kinases	293
7.	Mutations in STAT transcription factors	297
8.	Concluding remarks	299
Re	eferences	300
	quaporin water channels: New perspectives on the potential	
	ole in inflammation	311
M	argherita Sisto, Domenico Ribatti, and Sabrina Lisi	
1.		312
2.	3	313
3.	Physiological role of mammalian AQPs	316
4.	AQPs in inflammation	326
5.		
	of inflammation	326
6.	Conclusions	334
	cknowledgment	335
Re	ferences	335

9.	Intracellular protein complexes involved in synapse assembly in presynaptic neurons	347
	Kyung Ah Han, Ji Won Um, and Jaewon Ko	34/
	1. Introduction	348
	Intracellular synaptic signaling by presynaptic neurexins	349
	3. Intracellular synaptic signaling by presynaptic LAR-RPTPs	356
	<ul><li>4. Other presynaptic membrane proteins</li><li>5. Conclusions and future directions</li></ul>	361
	Acknowledgments	363
	References	364 364
10.	Dopamine signaling in the striatum	375
	Emmanuel Valjent, Anne Biever, Giuseppe Gangarossa,	
	and Emma Puighermanal	
	1. Introduction	376
	2. Distribution of DA receptors and intracellular signaling	
	in the striatum	376
	3. Modulation of histone H3 phosphorylation by dopamine	378
	4. Regulation of the ribosomal protein S6 by dopamine	386
	5. Future directions	389
	Acknowledgments	390
	References	390
11.	Recent advances in computational studies of GPCR-G protein	
	interactions	397
	Jinan Wang and Yinglong Miao	
	1. Introduction	397
	2. Bioinformatics of GPCR-G protein interactions	401
	3. Protein-protein docking on GPCR-G protein interactions	<b>40</b> 2
	4. Molecular dynamics simulations of GPCR-G protein interactions	403
	5. Discussions and outlook	411
	Acknowledgments	413
	References	413
	From traveler to homebody: Which signaling mechanisms	421
	sponge larvae use to become adult sponges?  Ilya Borisenko, Olga I. Podgornaya, and Alexander V. Ereskovsky	421
	Introduction	422
	2. Embryonic development	423

## Contents

3.	Morphology of the metamorphosis	426
4.	The fate of ciliated cells during metamorphosis of H. dujardini	428
5.	A journey from the outside inward: How ciliated cells become detached	432
6.	Signaling pathways in sponges	433
7.	Conclusions and perspective	442
Acknowledgments		<b>44</b> 3
References		443
Further reading		449