
Contents

Part I 3',5'-cCMP and 3',5'-cUMP as Second Messengers

cCMP and cUMP Across the Tree of Life: From cCMP and cUMP Generators to cCMP- and cUMP-Regulated Cell Functions	3
Roland Seifert	
cCMP and cUMP in Apoptosis: Concepts and Methods	25
Sabine Wolter, Fanni Dittmar, and Roland Seifert	
Mammalian Nucleotidyl Cyclases and Their Nucleotide Binding Sites	49
Stefan Dove	
The <i>Pseudomonas aeruginosa</i> Exoenzyme Y: A Promiscuous Nucleotidyl Cyclase Edema Factor and Virulence Determinant	67
K. Adam Morrow, Dara W. Frank, Ron Balczon, and Troy Stevens	
Cyclic Nucleotide Monophosphates in Plants and Plant Signaling	87
Claudius Marondezde, Aloysius Wong, Ludivine Thomas, Helen Irving, and Chris Gehring	
cAMP-Dependent Protein Kinase and cGMP-Dependent Protein Kinase as Cyclic Nucleotide Effectors	105
Robin Lorenz, Daniela Bertinetti, and Friedrich W. Herberg	
Regulation of HCN Ion Channels by Non-canonical Cyclic Nucleotides	123
Bryan VanSchouwen and Giuseppe Melacini	
Interaction of Epac with Non-canonical Cyclic Nucleotides	135
Holger Rehmann	
Identification of cCMP and cUMP Substrate Proteins and Cross Talk Between cNMPs	149
Jens Schlossmann and Stefanie Wolfertstetter	
Inactivation of Non-canonical Cyclic Nucleotides: Hydrolysis and Transport	169
Erich H. Schneider and Roland Seifert	

Part II 3',5'-cIMP, 8-nitro-cGMP, 2',3'-cNMPs and Cyclic Dinucleotides as Signaling Molecules

3',5'-cIMP as Potential Second Messenger in the Vascular Wall 209
Susan W.S. Leung, Yuansheng Gao, and Paul M. Vanhoutte

Discovery and Roles of 2',3'-cAMP in Biological Systems 229
Edwin K. Jackson

8-Nitro-cGMP: A Novel Protein-Reactive cNMP and Its Emerging Roles in Autophagy 253
Hirokazu Arimoto and Daiki Takahashi

Cyclic Dinucleotides in the Scope of the Mammalian Immune System 269
Arun K. Mankan, Martina Müller, Gregor Witte, and Veit Hornung

Part III Methods/Tools for cNMP Research

Mass Spectrometric Analysis of Non-canonical Cyclic Nucleotides 293
Heike Bähre and Volkhard Kaever

Medicinal Chemistry of the Noncanonical Cyclic Nucleotides cCMP and cUMP 307
Frank Schwede, Andreas Rentsch, and Hans-Gottfried Genieser

Holistic Methods for the Analysis of cNMP Effects 339
Manuel Grundmann and Evi Kostenis

The Chemistry of the Noncanonical Cyclic Dinucleotide 2'3'-cGAMP and Its Analogs 359
Frank Schwede, Hans-Gottfried Genieser, and Andreas Rentsch

Index 385

Non-canonical Cyclic Nucleotides

Seifert, R. (Ed.)

2017, VIII, 387 p. 65 illus., 35 illus. in color., Hardcover

ISBN: 978-3-319-52671-3