

Contents

Foreword	vii
Preface	ix
List of Contributors	xi
1 Chemical Synthesis of Modified RNA <i>Claudia Höbartner and Falk Wachowius</i>	1
2 Expansion of the Genetic Alphabet in Nucleic Acids by Creating New Base Pairs <i>Ichiro Hirao and Michiko Kimoto</i>	39
3 Chemical Biology of DNA Replication: Probing DNA Polymerase Selectivity Mechanisms with Modified Nucleotides <i>Andreas Marx</i>	63
4 Nucleic Acid-templated Chemistry <i>Michael Oberhuber</i>	73
5 Chemical Biology of Peptide Nucleic Acids (PNAs) <i>Peter E. Nielsen</i>	103
6 The Interactions of Small Molecules with DNA and RNA <i>Yun Xie, Victor K. Tam and Yitzhak Tor</i>	115
7 The Architectural Motifs of Folded RNAs <i>Valérie Fritsch and Eric Westhof</i>	141
8 Genesis and Biological Applications of Locked Nucleic Acids (LNAs) <i>Harleen Kaur and Souvik Maiti</i>	175
9 Small Non-coding RNA in Bacteria <i>Sabine Brantl</i>	199
10 MicroRNA-guided Gene Silencing <i>Gunter Meister</i>	223
11 Nucleic Acid-based Therapies <i>Britta Hoehn and John J. Rossi</i>	233

12	Innate Immune Recognition of Nucleic Acids	261
	<i>Stefan Bauer</i>	
13	Light-responsive Nucleic Acids for the Spatiotemporal Control of Biological Processes	279
	<i>Alexander Heckel and Günter Mayer</i>	
14	DNA Methylation	307
	<i>Albert Jeltsch and Renata Z. Jurkowska</i>	
15	Frameworks for Programming RNA Devices	323
	<i>Maung Nyan Win, Joe C. Liang and Christina D. Smolke</i>	
16	RNA as a Catalyst: The Diels–Alderase Ribozyme	339
	<i>Andres Jäschke</i>	
17	Evolving an Understanding of RNA Function by <i>In Vitro</i> Approaches	355
	<i>Qing Wang and Peter J. Unrau</i>	
18	The Chemical Biology of Aptamers: Synthesis and Applications	377
	<i>Günter Mayer and Bernhard Wulffen</i>	
19	Nucleic Acids as Detection Tools	401
	<i>Jeffrey C.F. Lam, Sergio Aguirre and Yingfu Li</i>	
20	Bacterial Riboswitch Discovery and Analysis	433
	<i>Tyler D. Ames and Ronald R. Breaker</i>	
	Index	455