Chemical Biology of Nucleic Acids [Fundamentals and Clinical Applications /

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Monografía

This volume contains 29 engrossing chapters contributed by worldwide, leading research groups in the field of chemical biology. Topics include pre-biology; the establishment of the genetic code; isomerization of RNA; damage of nucleobases in RNA; the dynamic structure of nucleic acids and their analogs in DNA replication, extra- and intra-cellular transport; molecular crowding by the use of ionic liquids; new technologies enabling the modification of gene expression via editing of therapeutic genes; the use of riboswitches; the modification of mRNA cap regions; new approaches to detect appropriately modified RNAs with EPR spectroscopy and the use of parallel and high-throughput techniques for the analysis of the structure and new functions of nucleic acids. This volume discusses how chemistry can add new frontiers to the field of nucleic acids in molecular medicine, biotechnology and nanotechnology and is not only an invaluable source of information to chemists, biochemists and life scientists but will also stimulate future research

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Mención de serie: RNA Technologies

Contenido: RNA as Major Components in Chemical Evolvable Systems -- How the Early Genetic Code Was Established? - Inference from the Analysis of Extant Animal Mitochondrial Decoding Systems -- Isomerization of RNA Phosphodiester Linkages -- Effects of Ionic Liquid and Liposomes on the Structure, Stability and Function of Nucleic Acids -- Oxidative Damage on RNA Nucleobases -- Use of FRET to Study Dynamics of DNA Replication -- Design, Characterization and Application of Imidazopyridopyrimidine:Naphthyridine Base-Pairing Motifs Consisting of Four Hydrogen Bonds -- Creation of Unnatural Base Pair Systems Toward New DNA/RNA Biotechnologies -- Flexible Nucleobase Analogues. Novel Tools for Exploring the Nucleic Acids -- Sequence

Selective Recognition of Double-Stranded RNA -- Determining Transient Nucleic Acid Structures by NMR -- Diastereomer-Specific Repertoire of 7{u2032}R- or 7{u2032}S-Me-Carba-Locked Nucleic Acids (cLNAs) in Antisense Oligo/RNA Duplexes and Engineering of Physicochemical and Enzymological Properties -- Challenges and Opportunities for Oligonucleotide-Based Therapeutics by Antisense and RNA Interference Mechanisms -- Progress in Chemically Modified Nucleic Acid Aptamers -- Aptamers as Molecular Smugglers -- Biochemical Aspects of Subcellular RNA Transport and Localization -- Small Size, Big Impact: Bacterial Functional Nucleic Acids and Their Applications -- Towards Defined DNA and RNA Delivery Vehicles Using Nucleic Acid Nanotechnology -- Targeted Editing of Therapeutic Genes Using DNA-Based Transcriptional Activators: Scope and Challenges -- Interaction of DNA Intramolecular Structures with Their Complementary Strands: A Thermodynamic Approach for the Control of Gene Expression -- Site Directed Spin Labelling of RNA for Distance Measurements by EPR -- Chemo-Enzymatic Strategies to Modify RNA in vitro or in Living Cells -- Metal Dependence of Ligand Binding and Heavy-Atom Derivatization of Evolutionarily Distinct PreQ1 Riboswitches -- DNA G-Quadruplexes and I-Motifs in Therapeutics and Diagnostics -- Peptides Targeting G-Quadruplex Structures -- Synthesis of Site-Specifically Modified Long-Mer RNAs -- Synthesis and Exon-Skipping Activity of Chemically-Modified RNAs -- mRNA and snRNA Cap Analogs: Synthesis and Applications -- Innovative Chemistry for Synthesis of Regular RNA, 5'-Triphosphate RNA or 5'-Capped RNA

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