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Autore	Sugimoto N (Naoki)
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Nota di contenuto	High-Pressure Single-Molecule Studies on Non-canonical Nucleic Acids and Their Interactions -- Stability Prediction of Canonical and Noncanonical Structures of Nucleic Acids -- The Effect of Pressure on the Conformational Stability of DNA -- Quadruplexes are everywhere…on the other strand too: the i-motif -- i-Motif Nucleic Acids -- NMR Study on Nucleic Acids -- Z-DNA -- Structures of DNA G-quadruplexes and Their Drug Interactions -- In cell 19F NMR for G-quadruplex -- Structures and Catalytic Activities of Complexes between Heme and DNA -- Studying nucleic acid-ligand binding by X-ray crystallography -- Predicting the 3D structure of RNA from sequence

-- XNA in Synthetic Biology -- The Effects of FANA Modifications on Non-Canonical Nucleic Acid Structures -- Isomorphic Fluorescent Nucleoside Analogs -- Bridged Nucleic Acids for Therapeutic Oligonucleotides -- Mesyl Phosphoramidate Oligonucleotides: A New Promising Type of Antisense Agents -- Chemistry of Cyclic Dinucleotides and Analogs -- Labeling and Detection of Modified Nucleic Acids -- Cross linking Duplex of Nucleic Acids with Modified Oligonucleotides -- Enzymatic Synthesis of Base-Modified Nucleic Acids -- Charge Transfer in Natural and Artificial Nucleic Acids -- Nucleic Acid Aptamers: From Basic Research to Clinical Applications -- LNA in Medical Biology -- Targeting Quadruplex Nucleic Acids: The Bisquinolinium Saga -- Compound Shape and Substituent Effects in DNA Minor Groove Interactions -- Macrocyclic G-Quadruplex Ligands of Telomestatin Analogs -- Cyclic Naphthalene Diimide Derivatives as Novel DNA Ligands -- Imaging study of small molecules to G-quadruplexes in cells -- Bivalent Nucleic Acid Ligands -- DNA/Metal Cluster–Based Nano-Lantern -- Interaction of Poly (ethylene glycol)-b-poly-L-lysine Copolymers with DNA Structures: A Thermodynamic Investigation -- Chemical tools to target non-coding RNAs -- Targeting DNA junctions with small molecules for therapeutic applications in oncology -- DNA Damage and Repair in G-quadruplexes Impact Gene Expression -- DNA Structural Elements as Potential Targets for Regulation of Gene Expression -- Effects of molecular crowding on structures and functions of nucleic acids -- Structure-guided Optimization of siRNA and anti-miRNA Properties -- Tools for understanding the chemical biology of the tRNA epitranscriptome -- Sulfur and Selenium modified bacterial tRNAs -- Chemical-assisted Epigenome Sequencing -- Epitranscriptomics. Telomeres and Telomerase -- Genetic Alphabet Expansion of Nucleic Acids -- Unnatural Base Pairs to Expand the Genetic Alphabet and Code -- OGG1 at the crossroads between repair and transcriptional regulation -- Phosphorothioate Nucleic Acids - Artificial Modification Envisaged by Nature -- Aptamer Molecular Evolution for Liquid Biopsy -- Functions and Applications of Riboswitches -- PNA and Quadruplex -- Peptide Ribonucleic Acid (PRNA)-Programmed Assemblies -- Structure and Function of Aptamer and Catalytic DNA -- Origin and Evolution of RNA -- Targeting RNA with Small Molecules.

Sommario/riassunto

This handbook is the first to comprehensively cover nucleic acids from fundamentals to recent advances and applications. It is divided into 10 sections where authors present not only basic knowledge but also recent research. Each section consists of extensive review chapters covering the chemistry, biology, and biophysics of nucleic acids as well as their applications in molecular medicine, biotechnology and nanotechnology. All sections within this book are: Physical Chemistry of Nucleic Acids (Section Editor: Prof. Roland Winter), Structural Chemistry of Nucleic Acids (Section Editor: Prof. Janez Plavec), Organic Chemistry of Nucleic Acids (Section Editor: Prof. Piet Herdewijin), Ligand Chemistry of Nucleic Acids (Section Editor: Prof. Marie-Paule Teulade-Fichou), Nucleic Acids and Gene Expression (Section Editor: Prof. Cynthia Burrows), Analytical Methods and Applications of Nucleic Acids (Section Editor: Prof. Chaoyong Yang), Nanotechnology and Nanomaterial Biology of Nucleic Acids (Section Editor: Prof. Zhen Xi), Nucleic Acids Therapeutics (Section Editor: Prof. Katherine Seley-Radtke), Biotechnology and Synthetic Biology of Nucleic Acids (Section Editor: Prof. Eriks Rozners), Functional Nucleic Acids (Section Editor: Prof. Keith R. Fox). The handbook is edited by outstanding leaders with contributions written by international renowned experts. It is a valuable resource not only for researchers but also graduate students working in

areas related to nucleic acids who would like to learn more about their important role and potential applications.