

Chemistry and Biology of Artificial Nucleic Acids

Thirty years of investigations on the chemistry and biology of non-natural nucleic acids have provided us with a wealth of new information, ranging from a deeper understanding of the parameters that influence nucleic acid structure and stability to the complex interactions of these artificial nucleic acids with cellular factors. There is no part of the nucleic acid structure that has not been touched by chemists, and every chemical modification has resulted in an altered property. The nucleic acid structure, as originally defined by the *Watson-Crick* double helix, has now been expanded into an entire landscape of new structures adopted by artificial pairing systems. Countless strategies have been developed for the chemical synthesis of these modified nucleic acids. The resulting polymers have found applications in diagnostics, therapeutics, biotechnology, catalysis, sequencing, and nanotechnology, and have had a major impact in the quest for a better understanding of the origin of life. There is hardly another area in bioorganic chemistry that has contributed so much to progress in biology throughout the last decades.

This book combines the contributions of many of the major players in this research field, and covers the synthesis of sugar-, base-, and backbone-modified nucleic acids, their structural characteristics studied by X-ray crystallography, and NMR in solution as well as their chemical and biological properties.

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