

Nucleic Acid Crystallization and Phase Determination Facilitated by Selenium Functionalization

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Selenium atom-specific functionalization can offer nucleic acids with many unique and novel properties (such as facilitated crystallization and phase determination) without significant perturbation of 3D structures of nucleic acids and their protein complexes. Nucleic acids possess not only the ability to store genetic information and participate in transcription and translation, but also the capacity to adopt well-defined 3D structures, which can be readily adjusted to meet various functional needs (such as catalysis and therapeutics). Although the importance of numerous nucleic acids in catalysis, gene expression, protein binding and therapeutics has been acknowledged by the entire scientific society, current understanding of nucleic acid-protein functions and structures is still limited, especially high-resolution structures. This novel Se-atom-specific functionalization will provide important tools to investigate nucleic acid structure/folding, recognition and catalysis, to study nucleic acids and their protein interactions, to improve biochemical and biophysical properties of nucleic acids, and to explore potential nucleic acid therapeutics and diagnostics. Our presentation will focus on the most recent selenium-atom functionalization of nucleic acids and their potential applications in 3D structure-and-function studies and anticancer therapeutics in molecular medicine.

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Selected Publications:

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