



Topic:

Re-build Nucleic Acid Molecule with Selenium Atom

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Abstract:

Nucleic acids play important roles in life processes, such as genetic material, gene regulation, signaling, catalysis, and viral infection. Nucleic acids are considered as ones of the keys to understand the cellular functions and disease mechanisms. Nucleic acid structure biology, especially RNA X-ray crystallography, can greatly accelerate the studies of nucleic acid-protein structures, functions and mechanisms. However, due to the crystallization, heavy-atom derivatization and phase determination, X-ray crystallography of nucleic acids (such as RNAs) is challenging and the structures of many nucleic acids and their protein complexes haven't been resolved. To address these challenges, we have developed the selenium-atom specifically derivatized nucleic acids (SeNA), which can not only enhance the derivatization and diffraction phase determination, but also facilitate crystal growth without significant structure perturbation. This method has huge advantages over the traditional methods, such as halogen derivatizations, heavy-metal soaking, and molecular replacement. Recently, our research laboratory has been further focusing on selenium nucleic acid (a new paradigm of nucleic acids), exploring nucleic acid molecules at the atomic level, and expanding its potential applications in 3D structure-and-function studies, gene re-design, bio-informatics, molecular diagnostics and especially bio-therapeutics, including mRNA, antisense, siRNA and other potential nucleic acid drugs.

Present	Professor and Director, SeNA Research Institute, Life Science College, Hubei University and Sichuan University, China
2009	Full Professor (tenured), Georgia State University
2004-2009	Associate Professor, Georgia State University
1998-2004	Assistant Professor, Brooklyn College, City University of New York
1994-1998	Postdoctoral Researcher, Harvard Medical School, Boston, USA
1988-1994	Ph.D., Swiss Federal Institute of Technology (ETH), Zurich, Switzerland
1984-1987	MS, Peking University, Beijing
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Research Interests: Nucleic Acid Therapeutics, Selenium Nucleic Acids (SeNA), Nucleic Acid Bioinformatics, Selenium Antisense, Ribozyme, DNzyme, CRISPRs & siRNA Therapeutics, Nucleic Acid-Protein Structural Biology, Nucleic Acid Diagnostics & Nucleic Acid Novel Drug & Target Discovery, Enzyme Structure and Function Studies, Direct RNA Detection & RNA Microchip