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Functions of nucleic acids with non-canonical structures

Water is the major solvent component in living cells, and the properties of water in the highly crowded media inside cells differ from that in buffered solution. As it is difficult to measure the thermodynamic behavior of nucleic acids in cells directly and quantitatively, we recently developed a cell-mimicking system using cosolutes as crowding reagents. In this presentation, I will show how the structures and thermodynamic properties of nucleic acids differ under various conditions such as highly crowded environments and discuss the major determinants of the crowding effects on nucleic acids. The effects of molecular crowding on non-canonical structures of DNA and RNA such as quadruplexes that play important roles in transcription and translation are also discussed.

Biography

Naoki Sugimoto received his PhD degree in 1985 from Kyoto University, Japan. After Post-doctoral work at University of Rochester, USA, he joined Konan University, Kobe, Japan in 1988 and is a Full Professor since 1994. From 2003, he holds a Director of Frontier Institute for Biomolecular Engineering Research (FIBER) at Konan University. He is a member of the Editorial Board of the Nucleic Acids Research from 2007 to the present, a member of the Review Committee of Human Frontier Science Program (HFSPO) from 2008 to 2012, a Chemical Researcher of Japan Society for the Promotion of Science (JSPS) from 2010 to 2013, and a Chairman of Division of Biofunctional Chemistry of the Chemical Society of Japan (CSJ) from 2011 to 2013. He received the Dr. Masao Horiba's Award in 2004, Distinguished Scientist Award from ICA (International Copper Association), New York, USA in 2005, the CSJ (the Chemical Society of Japan) Award for Creative Work in 2008 and so on. His research interests focus on biophysical chemistry, biomaterials, bio-nano engineering, molecular design, biofunctional chemistry, and biotechnology. He has published more than 500 scientific papers and books.

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