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2024-present	Distinguished Professor, Konan University
2003-2024	Director, FIBER, Konan University
1994-2024	Professor, Konan University
1991-1994	Associate Professor, Konan University
1988-1991	Assistant Professor, Konan University
1985-1988	Research Associate, University of Rochester, NY, USA

1985 PhD	Kyoto University
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Research Interests:

Biophysical Chemistry on Central Dogma; DNA, RNA, and their related proteins

Selected Publications (2023-2024):

1. Development of a Pseudocellular System to Quantify Specific Interactions Determining the G-Quadruplex Function in Cells.; H. Tateishi-Karimata, K. Kawauchi, S. Takahashi, and N. Sugimoto; ***J. Am. Chem. Soc* 2024,** *146,* 8005–8015.
2. In-Cell Stability Prediction of RNA/DNA Hybrid Duplexes for Designing Oligonucleotides Aimed at Therapeutics; D. Banerjee, H. Tateishi-Karimata, M. Toplishek, T. Ohyama, S. Ghosh, S. Takahashi, M. Trajkovski, J. Plavec, and N. Sugimoto; ***J. Am. Chem. Soc* 2023,** *145,* 23503-23518.
3. Choline dihydrogen phosphate destabilizes G-quadruplexes and enhances transcription efficiency in vitro and in cells; H. Tateishi-Karimata and N. Sugimoto; ***ACS Omega* 2024**, *9*, 5675-5682.
4. Nearest-neighbor parameters for the prediction of RNA duplex stability in diverse in vitro and cellular-like crowding conditions; S. Ghosh, S. Takahashi, D. Banerjee, T. Ohyama, T. Endoh, H. Tateishi-Karimata, and N. Sugimoto; ***Nucleic Acids Res.* 2023,** *51,* 4101-4111.
5. Theranostic approach to specifically targeting the interloop region of BCL2 i-motif DNA by crystal violet; Sinjan Das, Shuntaro Takahashi, Tatsuya Ohyama, Sudipta Bhowmik, and Naoki Sugimoto; ***Scientific Reports* 2023,** *13*, 14338.
6. Endogenous G-quadruplex-forming RNAs inhibit the activity of SARS-CoV-2 RNA polymerase; T. Endoh, S. Takahashi, and N. Sugimoto; ***Chem. Commun.* 2023**, 59, 872-875
7. Cladogenetic Orthogonal Light-Up Aptamers for Simultaneous Detection of Multiple Small Molecules in Cells; T. Endoh, J. H. Tan, S. B. Chen, and N. Sugimoto; ***Anal. Chem.* 2023**, 95, 976-985.
8. Pressure-temperature control of activity of RNA polymerase ribozyme; S. Takahashi and N. Sugimoto; ***Biophys. Chem.* 2023**, 292, 106914-
9. N. Sugimoto ed., **"Handbook of Chemical Biology of Nucleic Acids"** ***SPRINGER NATURE,* 2023,** Vols 1, 2, and 3.

Beyond the Watson-Crick Double Helix:

Make New History of Nucleic Acids (9)

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Abstract

Nucleic acids (DNA and RNA) are genetic materials in living organisms and formed by a sequence of nucleobases. The stability of nucleic acids structures cannot be determined from only the sequence composition, as this property critically depends on the surrounding environment of the solution. The intracellular condition is greatly different from that of the diluted buffer typically used for standard experiments and is not constant in each local area of the cell. Thus, to make excellent nanomaterials with nucleic acids working in cells, stability predictions should reflect the situation under intracellular conditions and are required importantly. In this lecture, I will provide an overview of the basic concepts, methods, and applications of predicting the stabilities of nucleic acid structures. I explain the theory of the most successful prediction method based on a nearest-neighbor (NN) model. To improve the versality of prediction, corrections for various solution conditions considered hydration have been investigated. I also describe advances in the prediction of non-canonical structures of G-quadruplexes and i-motifs. Finally, studies of intracellular analysis and stability prediction are discussed for the application of NN parameters for human health and diseases.

Acknowledgements：The author is grateful to the colleagues named in the cited papers from my laboratory, institute (FIBER), and others. This work was supported by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) and the Japan Society for the Promotion of Science (JSPS) (Grant No. JP17H06351, 18KK0164, 19H00928, and 20K21258), especially for Grant-in-Aid for Scientific Research (S) (22H04975), JSPS Core-to-Core Program (JPJSCCA20220005), The Hirao Taro Foundation of Konan Gakuen for Academic Research, and The Chubei Itoh Foundation.