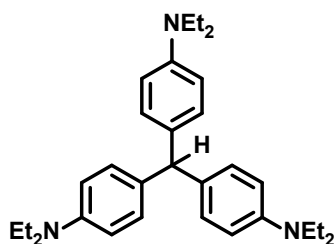


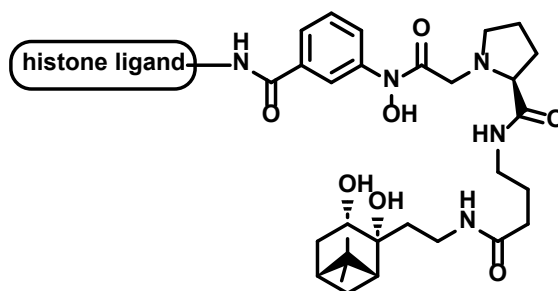
Motomu Kanai (The Univ. of Tokyo)

The living state emerges from chemical networks of molecules and reactions. Our goal is to participate into the chemical networks of living organisms by catalysts that surrogate or surpass enzymes. Such an approach will be constituting a new paradigm of medicine, *catalysis medicine*¹. This research direction in turn contributes to a greener in-flask synthesis of functional molecules with high structural complexity, such as drugs. Success requires powerful catalysts that can target stable, multifunctional organic molecules, ranging from small molecules to biomacromolecules, under mild conditions with synthetically/biologically valuable selectivity.

We are studying amyloid-selective photooxygenation *in vivo* for the treatment of amyloid diseases, including Alzheimer disease². The catalyzed photooxygenation promoted degradation and clearance of oxygenated-A β through lysosomal digestion, merging a chemical catalysis and biological protein degradation mechanism³. Furthermore, we developed chemical catalysts that regioselectively introduce lysine acylation to chromatin histones⁴. The synthetic epigenetic modifications introduced by chemical catalysis in living cells exhibited intriguing effects on the viability of cancer cells.



amyloid-selective photooxygenation catalyst



histone-selective acylation catalyst

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PROFILE

Motomu Kanai (The University of Tokyo, Professor)

Motomu Kanai received his master's degree from The University of Tokyo (UTokyo) in 1991 under the direction of the late Professor Kenji Koga. In the middle of his doctorate course, he obtained an assistant professor position at Osaka University under the direction of Professor Kiyoshi Tomioka in 1992. He obtained his PhD from Osaka University in 1995. Then, he moved to University of Wisconsin, USA, for postdoctoral studies with Professor Laura L. Kiessling. In 1997, he returned to Japan and joined Professor Masakatsu Shibasaki's group in UTokyo as an assistant professor. After being a lecturer (2000–2003) and an associate professor (2003–2010), he is a professor in UTokyo (since 2010). He acted as PI of JST-ERATO Kanai Life Science Catalysis Project (2011–2017) and the head investigator of MEXT Grant-in-Aid for Scientific Research on Innovative Areas, “Hybrid Catalysis” (2017–2022). He received Nagoya Silver Medal (2022), Advanced Technology Award (2022), and Thomson-Reuters The 4th Research Front Award (2016). His research interests entail the design and synthesis of functional molecules, especially homogeneous catalysts, and their applications to medicine.