

專題演講

3D Domain Swapping of Proteins: Basics and Recent Developments

Professor Shun Hirota

Nara Institute of Science and Technology

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Abstract: Three-dimensional (3D) domain swapping is a protein oligomerization phenomenon that exchanges the same domain or secondary structural element between molecules. Our research group has shown that various proteins can undergo domain swapping. We found by X-ray crystallographic and spectroscopic analyses that cyt c forms polymers by successive domain swapping, where the C-terminal helix is displaced from its original position in the monomer and cyt c loses its electron transfer function. We have also utilized domain swapping to construct various heme protein assemblies, including nanoring, nanocage, tetrahedron, heterodimer with different active sites, and amyloid fibril. In this lecture, basics and our recent developments of domain swapping will be introduced together with future prospects.

References:

1. Hirota, S.; Mashima, T.; Kobayashi, N. *Chem. Commun.*, 57, 12074-12086 (2021).
2. Sakai, T.; Mashima, T.; Kobayashi, N.; Ogata, H.; Duan, L.; Fujiki, R.; Hengphasatporn, K.; Uda, T.; Shigeta, Y.; Hifumi, E.; Hirota, S. *Nat. Commun.*, 14, 7807 (2023).



Shun Hirota

Shun Hirota received his PhD from the Graduate University for Advanced Studies in Japan in 1995. After postdoctoral studies at the Institute for Molecular Science in Japan and Emory University in the US, he joined Nagoya University as an assistant professor in 1996 and became an associate professor at Kyoto Pharmaceutical University in 2002. He was invited to Nara Institute of Science and Technology as a full professor in 2007. His research interests include structures, functions, and reaction mechanisms of metalloproteins.