量子生命科学コース　2023 年　研究成果

構造生物学研究室

Kuroki, C., Hirano, Y., Nakazawa, M., Sakamoto, T., Tamada, T., Ueda, M.
A single mutation Asp43Arg was increased 2.5-fold the catalytic activity and maintained the stability of cold-adapted endo-1,4-beta glucanase (Ef-EG2) from Eisenia fetida
Current Research in Biotechnology, 5, 100126, 2023.4.13, 10.1016/j.crbiot.2023.100126

Hiromoto, T., Nishikawa, K., Inoue, S., Ogata, H., Hori, Y., Kusaka, K., Hirano, Y., Kurihara, K., Shigeta, Y., Tamada, T., Higuchi, Y.
New insights into the oxidation process from neutron and X-ray crystal structures of an O2-sensitive [NiFe]-hydrogenase
Chemical Science, 14・35, 9306-9315, 2023.9.13, 10.3389/fmolb.2022.908394

Ura, T., Sakakibara, N., Hirano, Y., Tamada, T., Takakusagi Y., Shiraki, K., Mikawa, T.
Activation of oxidoreductases by the formation of enzyme assembly
Scientific Reports, 13・1, 14381, 2023.9.1, 10.1038/s41598-023-41789-9

Hanazono, Y., Hirano, Y., Tamada, T., Miki, K.
Description of peptide bond planarly from high-resolution neutron crystallography
Biophysics and Physicobiology, 20・3, e200035, 2023.9.6, 10.2142/biophysico.bppb-v20.0035

Yamamoto, S., Kono, F., Nakatani, K., Hirose, M., Hirai, K., Hippo, Y., Tamada, T., Suenaga, Y., Matsuo, T.
Structural characterization of human de novo protein NCYM and its complex with a newly identified DNA aptamer using atomic force microscopy and small-angle X-ray scattering
Frontiers in Oncology, 13, 1213678, 2023.11.23, 10.3389/fonc.2023.1213678

生体分子シミュレーション研究室

Ishida, H., Matsumoto, A., Tanaka, H., Okuda, A., Morishima, K., Paul, A. W., Kurumizaka, H., Sugiyama, M. and Kono, H., Structural and Dynamic Changes of Nucleosome upon GATA3 binding, Journal of Molecular Biology 435, 168308, 2023, 10.1016/j.jmb.2023.168308

最近の研究から「自由エネルギー計算による RNA 構造安定性の予測」アンサンブル, 25 (3), 231 (2023 Jul)

量子再生医工学研究室

Yamada S., Yukawa H., Yoshizumi Y., Kitamura K., Mizumaki T., Oohara T., Nanizawa E., Hirano F., Sato K., Sugawara-Narutaki A., Ishikawa T., Baba Y. *In Vivo* Real-Time Quantum Dots Imaging to Track Transplanted Adipose Stem Cells in Different Inflammatory States of Acute Liver Failure Mice, *Cell Transplant.,* 2023; 32: 1-11. https://doi.org/10.1177/09636897231176442

Yukawa H., Sato K., Baba Y. Theranostics applications of quantum dots in regenerative medicine, cancer medicine, and infectious diseases, *Adv. Drug. Deliv. Rev.,*2023, 200: 114863. https://doi.org/10.1016/j.addr.2023.114863

量子超偏極 **MRI** 研究室

1. Tomoto Ura, Nanako Sakakibara, Yu Hirano, Taro Tamada, Yoichi Takakusagi, Kentaro Shiraki, Tsutomu Mikawa
   “Activation of oxidoreductases by the formation of enzyme assembly”
   Sci Rep 13(1), 14381, 2023 doi: 10.1038/s41598-023-41789-9.

2. Yoichi Takakusagi, Ryoma Kobayashi, Keita Saito, Shun Kishimoto, Murali C Krishna, Ramachandran Murugesan, Ken-Ichiro Matsumoto
   “EPR and Related Magnetic Resonance Imaging Techniques in Cancer Research”
   Metabolites 1(13), 69, 2023 doi: 10.3390/metabo13010069.

生体構造化学研究室

1. Songshi Li, Daisuke Kawashima, Kennedy Omondi Okeyo, Takeshi Murata and Masahiro Takei
   "Assessment of anisotropic transmembrane transport coefficient vector of cell-spheroid under inhomogeneous ion concentration distribution fields by electrical impedance tomography"
   Meas. Sci. Technol, 34, 035701(2023).

2. Takeshi Murata
   "Introduction of Session 7, “Functional diversity and evolution in microbial rhodopsins”"
   Biophysics and Physicobiology, 20, e201012 (2023).

3. Takeshi Murata
   "Introduction of Session 8, “Structural mechanism of animal rhodopsins and GPCR”"
   Biophysics and Physicobiology, 20, e201015 (2023).

4. Kazuhiro Kobayashi, Kouki Kawakami, Tsukasa Kusakizako, Atsuhiro Tomita, Michihiro Nishimura, Kazuhiro Sawada, Hiroyuki H. Okamoto, Suzune Hiratsuka, Gaku Nakamura, Riku Kuwabara, Hiroshi Noda, Hiroyasu Muramatsu, Masaru

Shimizu, Tomohiko Taguchi, *Asuka Inoue, *Takeshi Murata, *Osamu Nureki
"Class-B1 GPCR activation by an intracellular agonist"
Nature, 618, 1085-1093 (2023).

5. Rika Suzuki, Toshio Nagashima, Keiichi Kojima, Reika Hironishi, Masafumi Hirohata, Tetsuya Ueta, Takeshi Murata, Toshio Yamazaki, Yuki Sudo, *Hideo Takahashi
"NMR detection of hydrogen bond network in a proton pump rhodopsin RxR and its alteration during the cyclic photoreaction"
J. Am. Chem. Soc., 145, 15295-15302 (2023).

6. Raymond N. Burton-Smith, Chihong Song, Hiroshi Ueno, Takeshi Murata, Ryota Iino, *Kazuyoshi Murata
"Six states of Enterococcus hirae V-type ATPase reveals non-uniform rotor rotation during turnover"
Commun. Biol. 6, 755 (2023).

7. Satoshi Yasuda, Tomohiko Hayashi, *Takeshi Murata and *Masahiro Kinoshita
"Physical pictures of rotation mechanisms of F1- and V1-ATPases: Leading roles of translational, configurational entropy of water"
Front. Mol. Biosci. 10, 1159603 (2023).

8. Fuhito Nakagawa, Marin Kikkawa, Sisi Chen, Yasuomi Miyashita, Norie Hamaguchi-Suzuki, Minami Shibuya, Soichi Yamashita, Lisa Nagase, Satoshi Yasuda, Mitsunori Shiroishi, Toshiya Senda, Keisuke Ito, *Takeshi Murata and *Satoshi Ogasawara
"Anti-nanodisc antibodies specifically capture nanodiscs and facilitate molecular interaction kinetics studies for membrane protein"
Sci. Rep. 13, 11627 (2023).

9. Koya Sakuma, Naohiro Kobayashi, Toshihiko Sugiki, Toshio Nagashima, Toshimichi Fujiwara, Kano Suzuki, Naoya Kobayashi, Takeshi Murata, Takahiro Kosugi, Rie Tatsumi-Koga, and *Nobuyasu Koga

"Design of complicated all-α protein structures"
*Nat. Struc. Mol. Biol.*31, 275-282 (2023).

遷移金属触媒有機化学研究室

Synthesis of [1]Benzothieno[2,3-b][1]benzothiophenes from 3-Arylbenzo[b]thiophenes through Iodine-Mediated Sulfur Insertion Reaction
J. Org. Chem. 2023, 88, 14797-14802.
Kazuki Ito, Shuta Sakai, and Kazuhiro Yoshida

精密有機反応化学研究室

Dual Functionalization of Organic Compounds via Oxidation of Halogen (ハロゲンの酸化を利用した二重官能基化反応)
Katsuhiko Moriyama
Journal by The Society of Synthetic Organic Chemistry, Japan, 2023, 81, 951-962
DOI:10.5059/yukigoseikyokaishi.81.951

Deep eutectic solvents based on ammonium iodide and iodine possessing high electrical conductivity
Maharoof Koyakkat, Katsuhiko Moriyama, Satoshi Asakura, Hiroyuki Kawamoto, Hideaki Shirota
Journal of Molecular Liquids, 2023, 384, 122250
DOI: 10.1016/j.molliq.2023.122250

Facile preparation of deep eutectic solvents having highelectrical conductivities
Hideaki Shirota, Maharoof Koyakkat, Mengjun Cao, Masako Shimizu, Satoshi Asakura, Hiroyuki Kawamoto, Katsuhiko Moriyama
Journal of Molecular Liquids, 2023, 372, 121176
DOI:10.1016/j.molliq.2022.121176