

Division of Biochemistry

– Biofunctional Design-Chemistry –



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Scope of Research

The ultimate goal of our research is the regulation of cellular functions by designed peptides and proteins. Current research subjects include (1) development of novel intracellular delivery systems aiming at elucidation and control of cellular functions using designed membrane permeable peptide vectors, (2) elucidation of the DNA or RNA binding modes of nucleic acid binding proteins, and design of artificial regulators of gene expression, (3) elucidation and control of membrane curvature, and (4) design of stimulation-responsible artificial peptides and proteins.



KEYWORDS

Membrane-Permeable Peptides
Intracellular Delivery
Peptide Design
DNA/RNA Binding Protein
Membrane Curvature

Recent Selected Publications

Michibata, J.; Kawaguchi, Y.; Hirose, H.; Eguchi, A.; Deguchi, S.; Takayama, K.; Xu, W.; Niidome, T.; Sasaki, Y.; Akiyoshi, K.; Futaki, S., Polysaccharide-Based Coacervate Microgel Bearing Cationic Peptides That Achieve Dynamic Cell-Membrane Structure Alteration and Facile Cytosolic Infusion of IgGs, *Bioconjug. Chem.*, **35**, 1888-1899 (2024).
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Kawaguchi, Y.; Kawamura, Y.; Hirose, H.; Kiyokawa, M.; Hirate, M.; Hirata, T.; Higuchi, Y.; Futaki, S., E3MPH16: An Efficient Endosomolytic Peptide for Intracellular Protein Delivery, *J. Controlled Release*, **367**, 877-891 (2024).
Hirai, Y.; Kawaguchi, Y.; Kasahara, C.; Hirose, H.; Futaki, S., Liquid Droplet-Mediated Formulation of Lipid Nanoparticles Encapsulating Immunoglobulin G for Cytosolic Delivery, *Mol. Pharmaceutics*, **21**, 1653-1661 (2024).
Tanaka K.; Suda A.; Uesugi M.; Futaki S.; Imanishi M., Xanthine Derivatives Inhibit FTO in an L-ascorbic Acid-Dependent Manner, *Chem. Commun.*, **59**, 10809-10812 (2023).