

Professor, Kyushu University (Japan)

Email: gohirai@phar.kyushu-u.ac.jp

Website: <https://gohirailab.com/home-en/>

Social Media: https://x.com/HiraiLab_chem



Research Keywords

Bioorganic chemistry, Organic synthesis, Glycans, Lipids

Academic Career

B.S., 1997, Tohoku University; Ph.D., 2002, Tohoku University (advisor: Masahiro Hirama); Assistant Professor, 2002-2004, IMRAM, Tohoku University; Research Scientist, 2004-2010, RIKEN; Senior Research Scientist, 2010-2016, RIKEN; Professor, 2016-present, Kyushu University

Selected Publications

Linkage-Editing of melibiosamine: Synthesis and biological evaluation of CH₂- and CHF-linked analogs, Moritsuka, N. et al. *J. Org. Chem.* 2024, 89, 11909–11920.

Linkage-Editing Pseudo-Glycans: A Reductive α -Fluorovinyl-C-Glycosylation Strategy to Create Glycan Analogs with Altered Biological Activities, Moriyama T. et al. *J. Am. Chem. Soc.* 2024, 146, 2237–2247.

Ligand-controlled Stereoselective Synthesis and Biological Activities of 2-Exomethylene Pseudo-glycoconjugates: Discovery of Mincle-Selective Ligands, Ikazaki, T. et al. *Angew. Chem. Int. Ed.*, 2023, e202302569.

Synthesis and biological activity of ganglioside GM3 analogues with a (S)-CHF-Sialoside linkage and an alkyne tag, Ota, E. et al. *Glycoconj. J.*, 2023, 40, 333-341.

Effect of Alkynyl Group on Reactivity in Photoaffinity Labeling with 2-Thienyl-Substituted α -Ketoamide, Moriyama, T. et al. *Chem. Eur. J.*, 2022, 28, e2021039.

β -Glycosyl Trifluoroborates as Precursors for Direct α -C-Glycosylation: Synthesis of 2-Deoxy- α -C-glycosides, Takeda, D. et al. *Org. Lett.*, 2021, 23, 1940-1944.

Ganglioside GM3 Analogues Containing Monofluoromethylene-linked Sialoside: Synthesis, Stereochemical Effects, Conformational Behavior, and Biological Activities, Hirai, G. *JACS Au*, 2021, 1, 137-146.

Why My Lab?

My lab can offer...

International students a stimulating environment to learn both cutting-edge synthetic methods and biological evaluation techniques. We focus on creating new molecules based on glycans and lipids, aiming to discover bioactive compounds with therapeutic potential. Importantly, the compounds we design and synthesize may serve as valuable tools for biological studies, providing new ways to probe cellular mechanisms. Through this approach, our research not only contributes to drug discovery but also has the potential to reveal previously unexplored biological phenomena. Students will have the chance to gain experience in advanced organic synthesis, purification, and structural analysis using state-of-the-art NMR, MS, and chromatography systems.