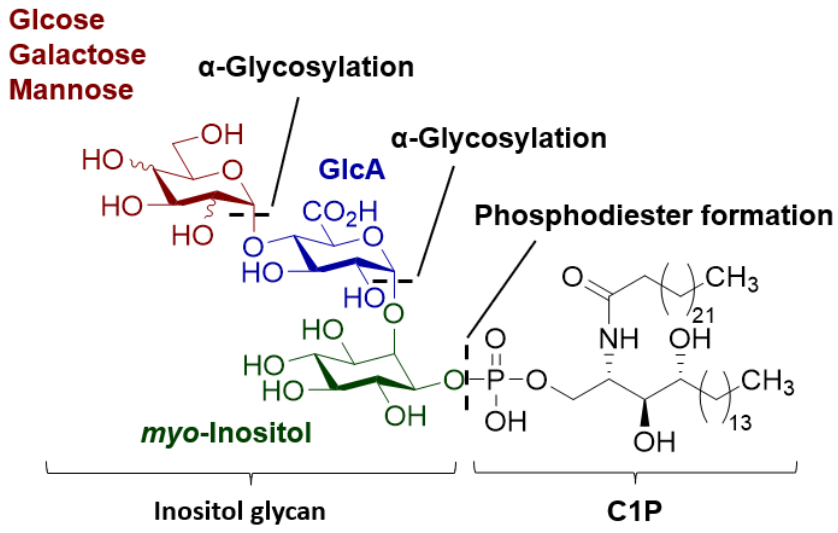
# Synthetic study on plant glycosphingolipid GIPC

Hide-Nori TANAKA [1], Yuta UMEMURA [2], Naoko KOMURA [1], Akihiro IMAMURA [1,2], Hideharu ISHIDA [1,2], Rumana Yesmin HASI [3], Toshiki ISHIKAWA [4] Tamotsu TANAKA [3], Hiromune ANDO [1]

*[1] iGCORE, Gifu University, Gifu, Japan, [2] Department of Applied Bioorganic Chemistry, Gifu University, Gifu, Japan, [3] Faculty of Bioscience and Bioindustry, Tokushima University, Tokushima, Japan, [4] Graduate School of Science and Engineering, Saitama University, Saitama, Japan*

htanaka@gifu-u.ac.jp

Glycosyl inositol phosphoceramides (GIPCs), consisting of an inositol glycan headgroup and a ceramide 1-phosphate tail, are the major sphingolipids in plants and present on the outer leaflet of the plasma membrane. The inositol glycan has a common structure of glucuronic acid (GlcA) linked to inositol at the 2 position with α-glycosidic bond. In contrast, the monosaccharide attached to GlcA differs depending on plant species and cell tissues. Recent studies have demonstrated that GIPCs behave as lipid raft molecules like mammalian gangliosides and play an important role in biological processes such as signal transduction [1]. For instance, GIPCs have been identified as a receptor for a toxin from the plant pathogen *Phytophthora infestans* [2] and as a salt sensor for the plasma membrane $Ca^{2+}$ influx channel [3]. However, molecular-level insights into the relationship between their chemical structures and functions have not been intensively studied because of the difficulty in obtaining homogeneous GIPCs from nature. Chemical synthesis enables providing structurally well-defined GIPCs to elucidate their detailed functions at the molecular level. Herein, we report our synthetic efforts toward three GIPCs that differ in the monosaccharide at the non-reducing end. By utilizing temporary boronate ester protecting groups for both both glycosyl donor [4] and acceptor [5], the inositol glycan frameworks have successfully been synthesized. Currently, we have been working on the first total synthesis of GIPCs.




Chemical structure of GIPCs

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