Plant Sphingolipid Glycosylation And Its Role In Immunity And Cell Wall Organization

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Project Goals: Short statement of goals. (Limit to 1000 characters)

Glycosylinositol phosphorylceramides (GIPCs) are a class of glycosylated sphingolipids found in plants, fungi and protozoa. They are extremely abundant in the plant plasma membrane, estimated to form ~25-40 % of total lipids, but almost nothing is known about their function. GIPCs consist of a ceramide attached to a glycan headgroup via a phosphate group. Recently we have identified the first three Arabidopsis proteins involved in the headgroup biosynthesis - IPUT1 (a UDP-glucuronic acid glycosyltransferase), GONST1 (a GDP-mannose transporter) and GMT1 (a GDP-mannose glycosyltransferase. Plants lacking functional copies of these proteins are either pollen lethal (iput1) or have extreme developmental defects (gonst, gmt1), despite the lipid portion of the GIPC being unaffected. This implies a critical function for the GIPC glycan headgroup in membrane function. Here, we identify a new Golgi-localized protein involved in GIPC headgroup biosynthesis in both Arabidopsis and rice - GINT1 (GLUCOSAMINE INOSITOLPHOSPHORYLCERAMIDE TRANSFERASE1), and have described its role. We are now using our collection of GIPC biosynthetic genes as a toolbox with which to explore GIPC function. Two examples will be presented.

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