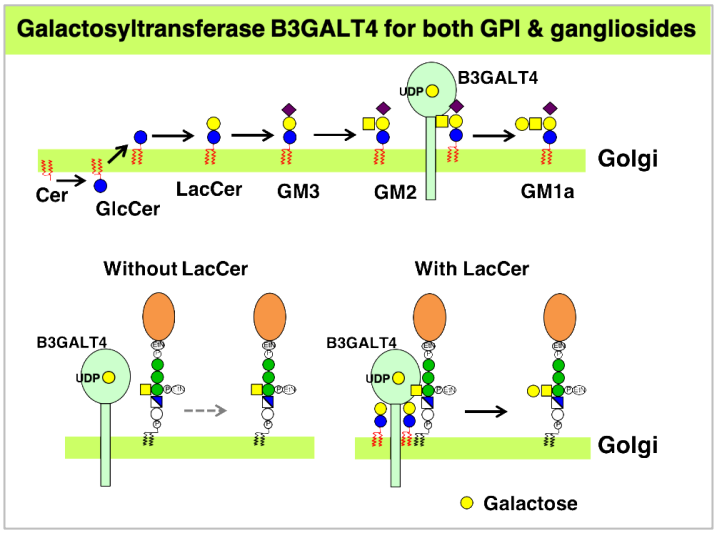
Cross-talks of glycosylphosphatidylinositol biosynthesis with glycosphingolipid biosynthesis and ER-associated degradation

Glycosylphosphatidylinositol (GPI) is a glycolipid for post-translational modification of many cell-surface proteins in eukaryotic cells. The structure of the core backbone of GPI is conserved whereas the structural variation of GPI anchors is introduced by side-chain modifications. In some mammalian GPI-APs, the N-acetylgalactosamine side-chain linked to the first mannose is further modified with galactose by an unknown galactosyltransferase (GPI-Gal-T). The research group of Taroh Kinoshita (Research Institute of Microbial Diseases/IFReC, Osaka University) performed genome-scale CRISPR-Cas9 knockout screening for GPI-Gal-T and found that B3GALT4, known as GM1 synthase, is GPI-Gal-T. They also demonstrated the requirement of lactosylceramide for efficient galactosylation of GPI side chain. In addition, we show that GPI biosynthesis in the endoplasmic reticulum (ER) is regulated by ER-associated degradation system to prevent GPI accumulation. Thus, our work demonstrates cross-talks of GPI biosynthesis with glycosphingolipid biosynthesis and the ER quality control system.



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