Defective POMGNT1 does not transfer GlcNAc from UDP-GlcNAc to Man-O-Ser-DAG1

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Introduction

Reactome is open-source, open access, manually curated and peer-reviewed pathway database. Pathway annotations are authored by expert biologists, in collaboration with Reactome editorial staff and cross-referenced to many bioinformatics databases. A system of evidence tracking ensures that all assertions are backed up by the primary literature. Reactome is used by clinicians, geneticists, genomics researchers, and molecular biologists to interpret the results of high-throughput experimental studies, by bioinformaticians seeking to develop novel algorithms for mining knowledge from genomic studies, and by systems biologists building predictive models of normal and disease variant pathways.

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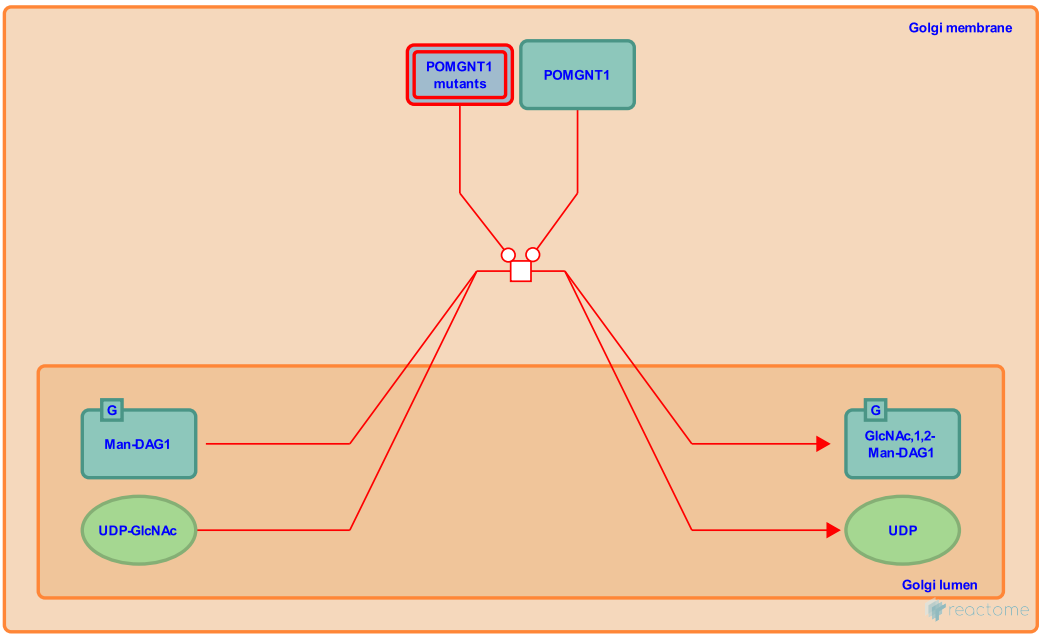
Stable identifier: R-HSA-5617096

Type: transition

Compartments: cytosol, Golgi membrane

Diseases: muscular dystrophy-dystroglycanopathy



Protein O-linked-mannose beta-1,2-N-acetylglucosaminyltransferase 1 (POMGNT1; CAZy family GT61; MIM:606822) mediates the transfer of N-acetylglucosaminyl (GlcNAc) residues to mannosylated proteins such as mannose-O-serine-dystroglycan (man-O-Ser-DAG1). DAG1 is a cell surface protein that plays an important role in the assembly of the extracellular matrix in muscle, brain, and peripheral nerves by linking the basal lamina to cytoskeletal proteins. Defects in POMGNT1 (MIM:606822) result in disrupted glycosylation of DAG1 and can cause severe congenital muscular dystrophy-dystroglycanopathies ranging from a severe type A3 (MDDGA3; MIM:253280), through a less severe type B3 (MDDGB3; MIM:613151) to a milder type C3 (MDDGC3; MIM:613157) (Bertini et al. 2011, Wells 2013). Several mutations in POMGNT1 are known (MIM:606822) and mutations causing the severest type A3 include S550N, P493R, R605Vfs*29 (Yoshida et al. 2001), R63* (Taniguchi et al. 2003, Mercuri et al. 2009) and W475* (Godfrey et al. 2007).

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