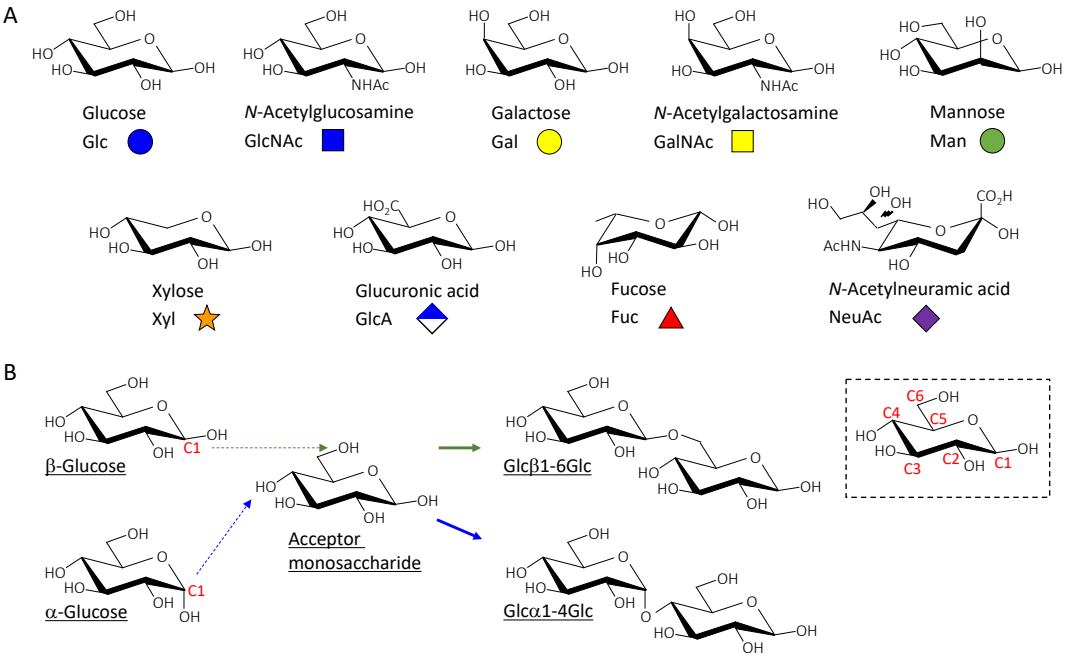
Supplementary Table I. Genes implicated in neuromuscular diseases associated with abnormalities in glycans.

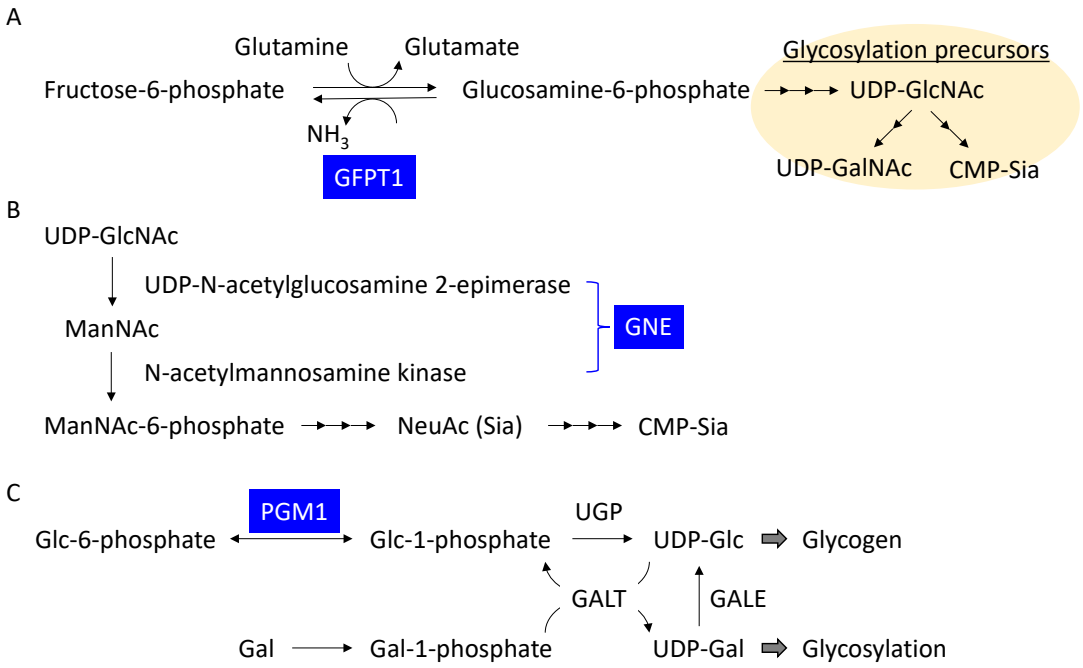
Diseases	Responsible genes
Congenital myasthenic syndrome	*GFPT1*, *ALG2*, *ALG14*, *DPAGT1*, *GMPPB*
GNE myopathy	*GNE*
Muscular dystrophy – dystroglycanopathy	*POMT1*, *POMT2*, *POMGNT1*, *FKTN*, *FKRP*, *LARGE*, *ISPD*, *POMGNT2*, *DAG1*, *TMEM5*, *B3GALNT2*, *POMK*, *B4GAT1*, *GMPPB*, *DPM1*, *DPM2*, *DPM3*, *DOLK*
Muscular dystrophy – others	*POGLUT1*
Pompe disease	*GAA*



Supplementary Figure 1. Schematic representation of monosaccharides and a glycosidic bond.

A, Nine common monosaccharides shown with their abbreviations and symbolic representations. NeuAc is the most common form of Sia.

B, Schematic representation of a glycosidic bond. The numbering of carbon atoms is illustrated using Glc as an example (inset). The aldehyde carbon is referred to as C1. When cyclized into rings, an asymmetric center is termed the anomeric carbon (C1).

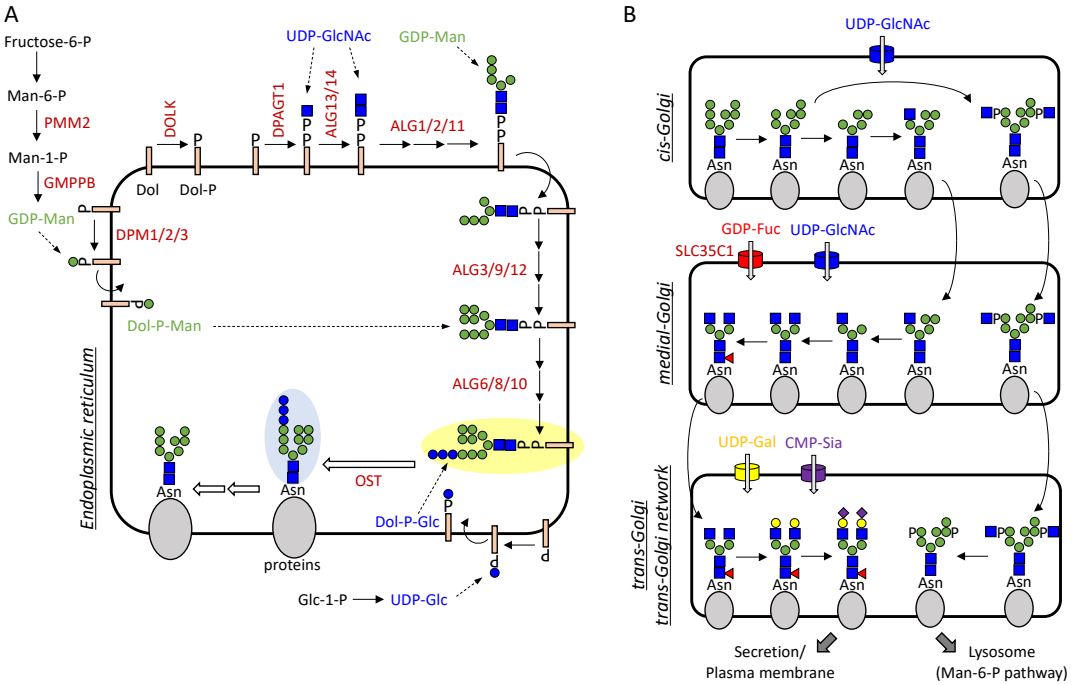


Supplementary Figure 2. Schematic representation of disease-associated genes in sugar nucleotide metabolism.

A, A role of GFPT1 in the synthesis pathway of glycosylation precursors.

B, Roles of GNE in the synthesis pathway for Sia precursors.

C, Schematic representation of the role of PGM1 in sugar nucleotide metabolism. Dietary Gal can be converted to Gal-1-phosphate, and then to UDP-Gal by Gal-1-phosphate uridyltransferase (GALT). UDP-Glc can be produced from UDP-Gal by UDP-Gal epimerase (GALE) or from Glc-1-phosphate by UDP-Glc pyrophosphorylase (UGP) [25].



Supplementary Figure 3. Schematic representation of the N-glycosylation pathway in the ER (A) and the Golgi (B).

An N-glycan precursor is first synthesized on Dol-P (light yellow ellipse) and then transferred to Asn residues on proteins by OST (light blue ellipse). Characteristic intermediates during the process of sugar decoration and trimming are represented with colored symbols (see Supplementary Fig. 1). Donor substrates for glycosylation are indicated in blue, green, red, yellow, and purple. Some enzymes involved in N-glycan or sugar donor synthesis are indicated in brown. Sugar nucleotide transporters are indicated by colored columns.