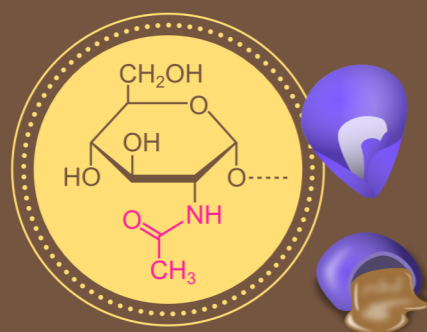


COMMONLY USED NUCLEOTIDE SUGARS IN GLYCAN SYNTHESIS

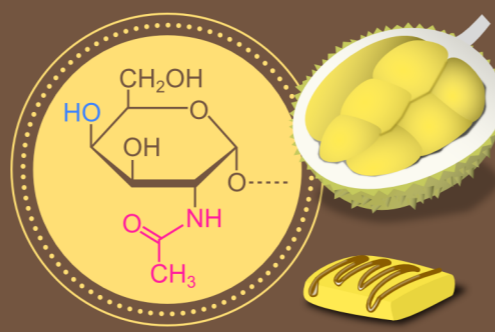


● **GLUCOSE (Glc)**

■ **N-ACETYLGLUCOSAMINE (GlcNAc)**

The presence of a glucose residue on N-linked glycans is necessary for the glycoproteins to dock with the chaperones calnexin and calreticulin for assisting with protein folding in the rough endoplasmic reticulum

C¹ of N-acetylglucosamine is directly bonded to the side chain nitrogen atom of asparagine in N-linked glycans

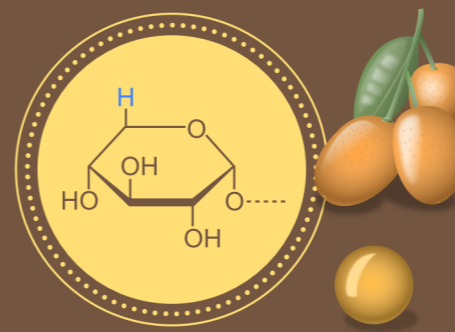


● **GALACTOSE (Gal)**

■ **N-ACETYL GALACTOSAMINE (GalNAc)**

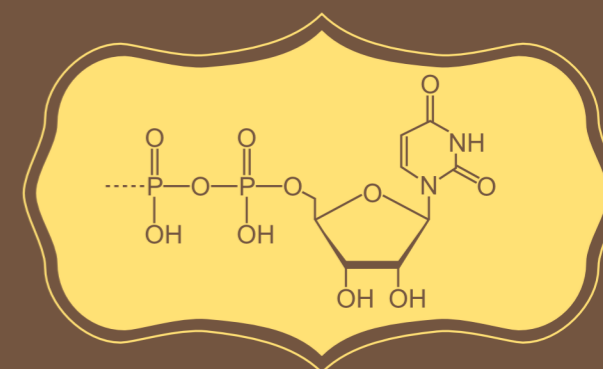
Galactose and N-acetylglucosamine are common residues in O-linked glycans

N-acetylgalactosamine is often the initial O-linked sugar added in the Golgi apparatus to serine or threonine by an ether bond with the amino acid side chain



★ **XYLOSE (Xyl)**

Xylose is often attached to the first mannose residue that is closest to the polypeptide chain of N-linked glycans



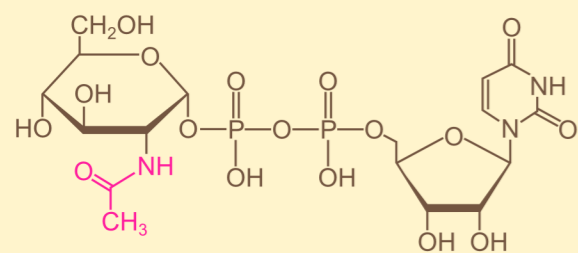
URIDINE DIPHOSPHATE (UDP)

Example

URIDINE DIPHOSPHATE GLUCOSE (UDP-Glc)

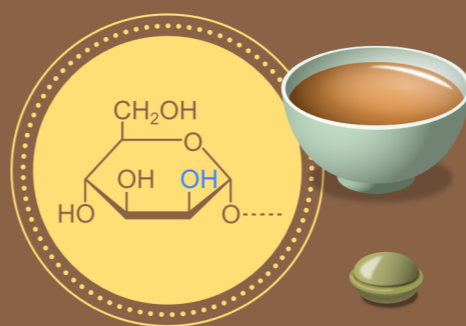
URIDINE DIPHOSPHATE

N-ACETYLGLUCOSAMINE (UDP-GlcNAc)



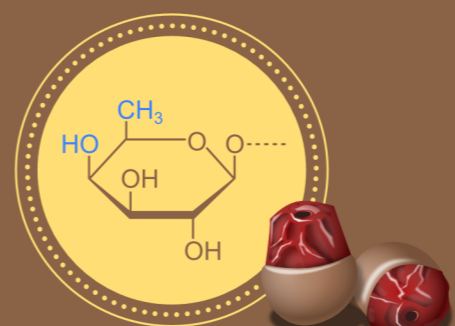
Sugar (glucose / N-acetylglucosamine) Phosphate(s) Ribose Nitrogenous base (uracil)

Nucleotide (uridine diphosphate)



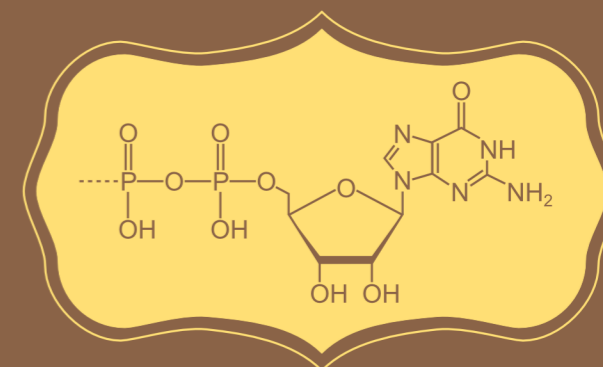
● **MANNOSE (Man)**

N-linked glycoproteins leave the rough endoplasmic reticulum having a branched structure of eight mannose residues joined to the protein by a two-residue N-acetylglucosamine linker



▲ **FUCOSE (Fuc)**

Fucose is often added in the Golgi apparatus to the first N-acetylglucosamine residue of N-linked glycans or to the tips of N- and O-linked glycans



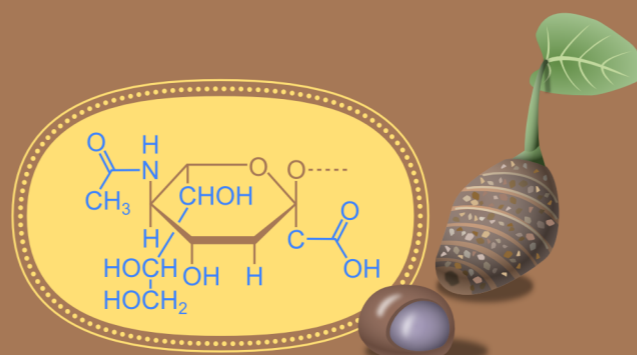
GUANOSINE DIPHOSPHATE (GDP)

Substituents in blue are different from that of glucose at the corresponding ring position

Substituents in pink belong to the N-acetylated C² amine derivative of the parent monosaccharide

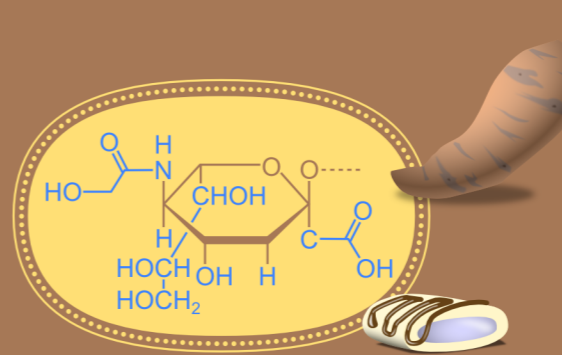
The shape beside each sugar name is the monosaccharide code in the Kyoto Encyclopedia of Genes and Genomes and in the standardized Symbol Nomenclature for Glycans

The drawings beside each sugar is for decorative purposes to match the colour of the monosaccharide code



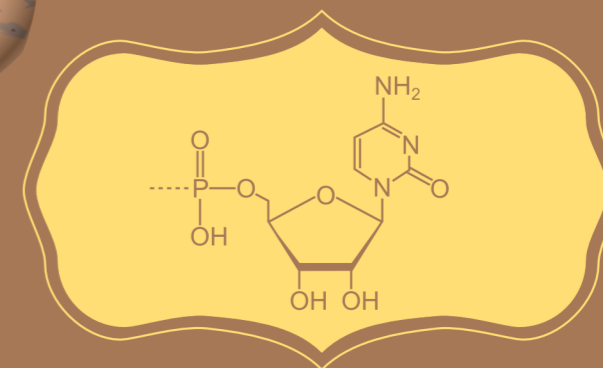
◆ **N-ACETYLNEURAMINIC ACID (Neu5Ac)**

Sialic acid is a family of nine-carbon alpha-keto acid sugars including N-acetylneuraminic acid and often appears at the tips of both N- and O-linked glycans



◆ **N-GLYCOLYLNURAMINIC ACID (Neu5Gc)**

N-Glycolylneuraminic acid is similar to N-acetylneuraminic acid but has a glycolyl group instead of an acetyl group attached to the amine



CYTIDINE MONOPHOSPHATE (CMP)