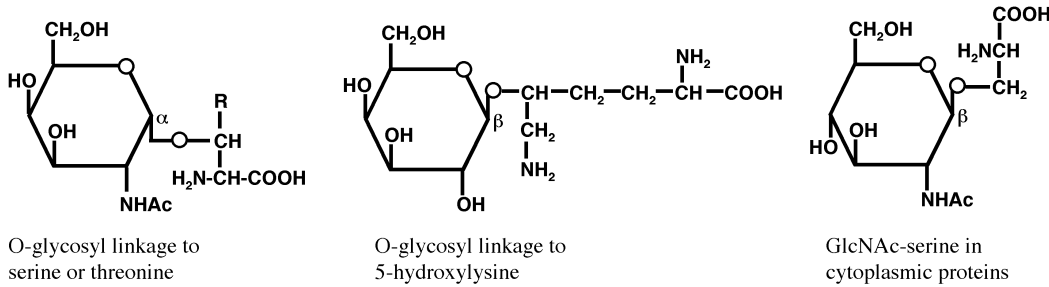


GLYCOPROTEINS

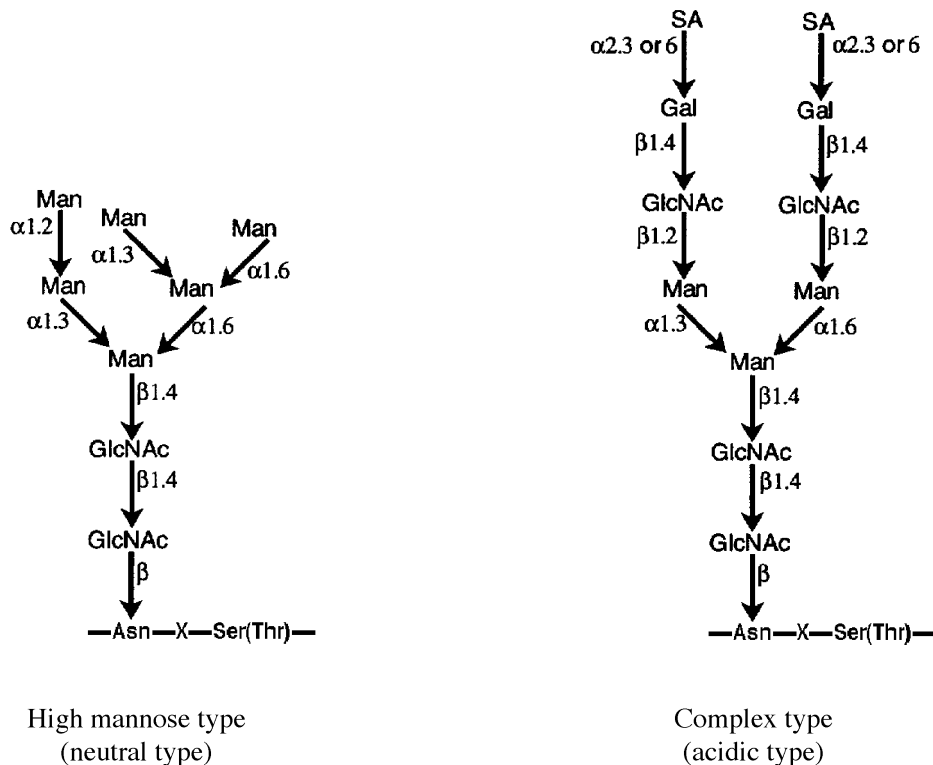
Glycoproteins can be simply defined as "glycosylated proteins". The process of covalently attaching oligosaccharide chains to peptide backbones is one of the most important post-ribosomal modifications of polypeptide chains. Glycoproteins differ from other proteins in having oligosaccharide chains covalently attached to their polypeptide backbones.

The Linkages Between Sugar Chains and Polypeptide Chain - O-Glycosyl linkage and N-glycosyl linkage are the two major types of linkage in glycoproteins.

O-Glycosyl linkages - The most common O-glycosyl linkages are the linkage between GalNAc and threonine (or serine) and the linkage between Gal and 5-hydroxylysine. Sugar chains linked through O-glycosyl linkages are called "O-linked sugar chains". O-Linked sugar chains are usually short and simple.

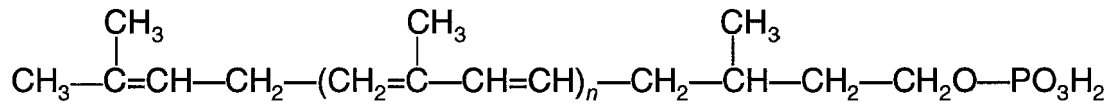


N-Glycosyl linkages - Sugar chains can be also linked to the asparagine (Asn) through N-glycosyl linkages. Sugar chains linked through Asn are called "N-linked sugar chains". Structures of N-linked sugar chains are very complex. They can be divided into "high mannose type (neutral type)" and "complex type (acidic type)" sugar chains. N-Linked glycoproteins are ubiquitous.

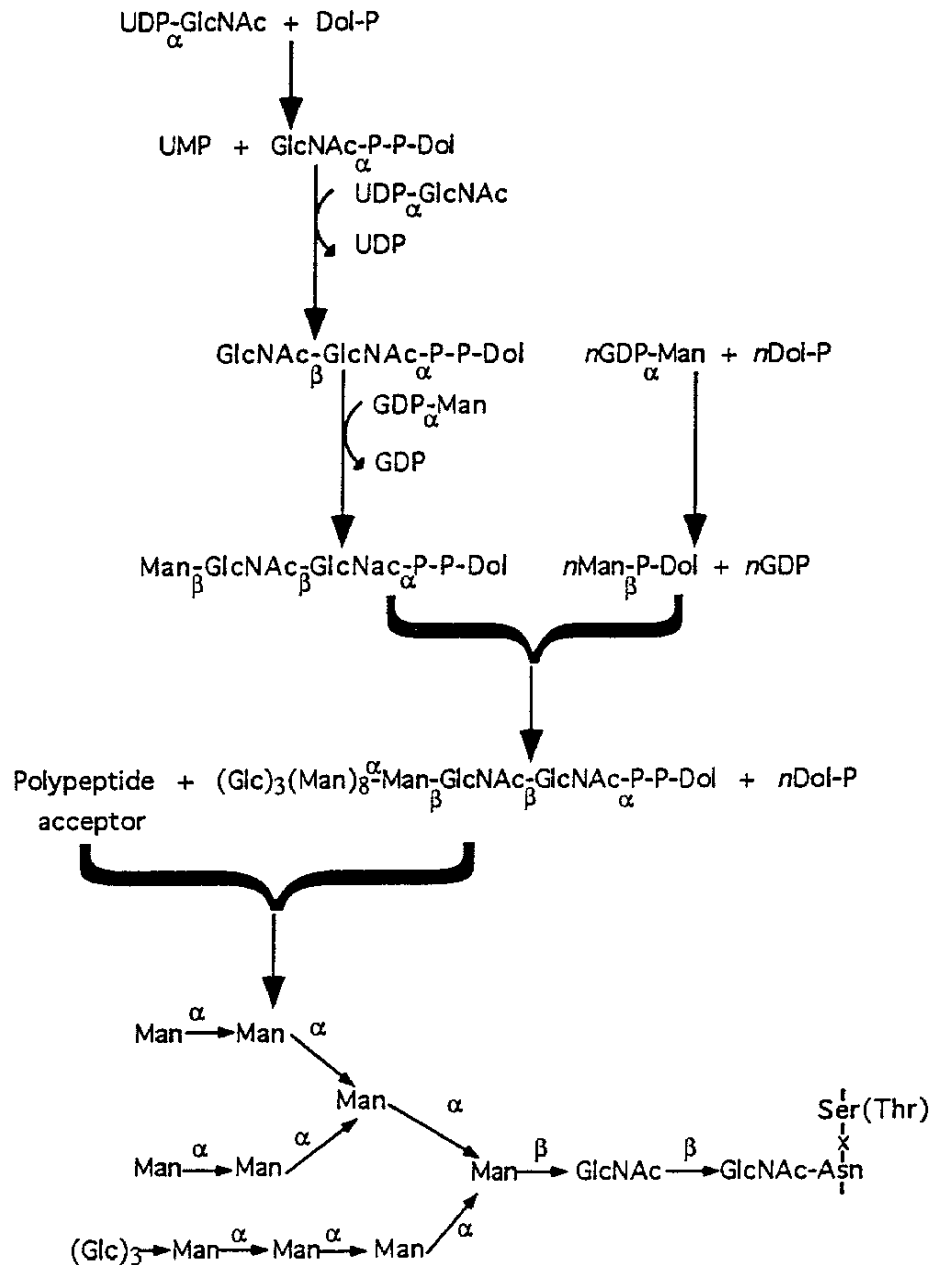


Biosynthesis – Biosynthesis of O-linked sugar chains are catalyzed by a series of glycosyl transferases, whereas the dolichol phosphate dependent-pathway synthesizes Asn-linked sugar chains.

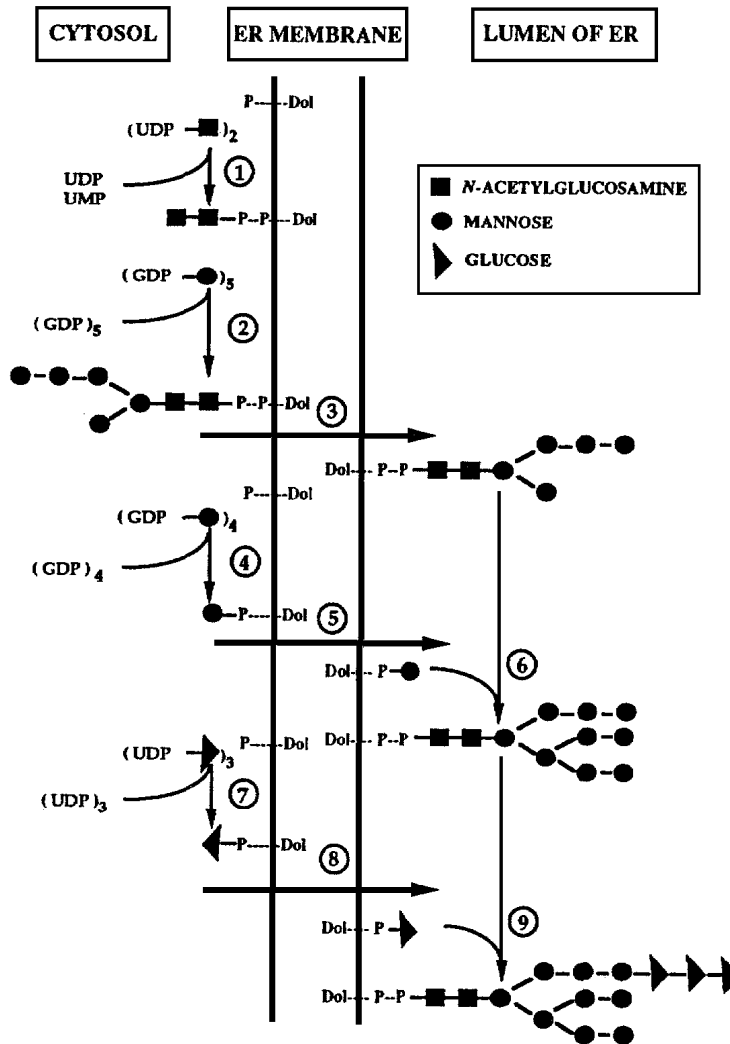
1. Structure of dolichol phosphate:



2. General scheme for the assembly of neutral type sugar chains:



3. Topography of the assembly of the dolichol-linked oligosaccharide in the endoplasmic reticulum.



4. Processing of asparagine-linked oligosaccharides in Golgi apparatus.

