During N-linked glycosylation of proteins, oligosaccharide chains are assembled on the carrier molecule dolichyl pyrophosphate in the following order: 2 molecules of N-acetylglucosamine, 9 molecules of mannose, and 3 molecules of glucose. These 14-residue oligosaccharide cores are then transferred to asparagine residues on nascent polypeptide chains in the endoplasmic reticulum. As proteins progress through the Golgi apparatus, the oligosaccharide cores are modified by trimming and extension to generate a diverse array of glycosylated proteins. Alg9p, which is an alpha 1,2 mannosyltransferase, catalyzes two steps in lipid-linked oligosaccharideassembly: the addition of the seventh and ninth mannose moieties to the growing oligosaccharidein the lumen of the endoplasmic reticulum. The sixth and eighth mannose moieties are added by Alg3p and Alg12p, respectively. Disruption of ALG9 causes accumulation of lipid-linked oligosaccharides with six mannose residues and hypoglycosylation of secreted proteins. Human ALG9cDNA complements the deletion of yeast ALG9 in a delta-alg9 wbp1-2 backgroundand has been found to be mutated in the congenital disorder of glycosylation CDG-1L.