

Structural basis for nucleotide sugar transport across the ER and Golgi membranes

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Glycosylation is a fundamental cellular process that in eukaryotes occurs in the lumen of both the Golgi apparatus and endoplasmic reticulum. Nucleotide sugar transporters (NSTs) are an essential component of the glycosylation pathway, providing the diverse range of substrates required for the glycosyl-transferases. NSTs are linked to several developmental and immune disorders in humans and in pathogenic microbes play an important role in virulence. How NSTs recognise and transport activated monosaccharides however is currently unclear. In this talk I will present the crystal structure of the GDP-man-nose transporter Vrg4, in both the substrate free and bound states. A hitherto unobserved requirement for short chain lipids in activating the transporter supports a model for regulation within the highly dynamic membranes of the Golgi apparatus. Our results provide a structural basis for understanding nucleotide sugar recognition and provide insights into the transport and regulatory mechanism for the SLC35 family of intracellular transporters.