

Poster Presentation

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New Insights on Structure and Function of Sialyltransferases

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Sialic acids are a unique posttranslational modification at the terminus of glycoproteins and -lipids. Proteins modified with oligomers of sialic acid add a repellent charge to cell surfaces, which is a crucial feature in cell migration and axonal growth during early brain development. Varied expression levels of sialic acid are linked to tumor malignancy in neuroblastoma, schizophrenia, autism and bipolar disorder but the lack thereof is linked to impaired neuronal development. On the other hand, overexpression of sialic acid oligomers in Schwann cells promotes the peripheral regeneration of lesioned nerves and improves the ability of Schwann cells to migrate into damaged tissue and to remyelinate central nervous system axons. In order to understand the molecular mechanisms of sialylation, our project focuses on the structural characterization of enzymes of the mammalian and bacterial glycosyltransferase families 29 and 42. The proteins of interest were expressed in insect cells and structural studies were undertaken by x-ray crystallography. Kinetics, SEC MALS and glycan array data will shed light on mechanism of catalysis and acceptor specificity. Altogether, the results of this study will promote further understanding of the structure-function relationship of sialyltransferases.

[1] *Nat Struct Mol Biol.* 2009 Nov; 16(11):1186-8. *Structural insight into mammalian sialyltransferases.* Rao FV, Rich JR, Rakić B, Buddai S, Schwartz MF, Johnson K, Bowe C, Wakarchuk WW, Defrees S, Withers SG, Strynadka NC.

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