Chemical Tools for Inhibiting Glycosylation and Glycans In Biotechnology and the Pharmaceutical Industry

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1. From a mechanistic point of view, how can an alkaloid that inhibits a glycosidase also block a glycosyltransferase?

2. Propose chemical modifications to make to galactose to create an inhibitor of specific sialyl-transferases.

3. Identify at least two enzymes that might be targets for designing inhibitors of selectin-mediated cell adhesion and propose a strategy for obtaining selective inhibitors by high throughput screening.

4. What would be the advantage of using a cell based assay for high throughput screening of glycosyltransferases. What would be the disadvantages.

5. Explain the mechanism of action of influenza neuraminidase inhibitors.

6. Design a therapeutic that acts by blocking the interaction of a host glycan with glycan-binding proteins on a microbe that mediates attachment prior to infection (e.g. influenza binding sialic acid).

7. A portion of erythropoietin (EPO) produced by CHO cells is not fully sialylated (i.e., some glycoforms have exposed galactose residues on their N-glycans). What are strategies to make sure that the product sold is consistently sialylated.

8. Explain how increasing the extent of glycosylation of recombinant glycoproteins could increase their half-life *in vivo*.

9. What are potential deleterious effects of producing recombinant therapeutic proteins in cultured animal cells of nonhuman origin.