Cancer GLUTtony: The use of glycopolymers and a deadly sin worth exploiting

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A plethora of cancers show increased glucose uptake and thus overexpression of GLUT receptors because of dysfunctional metabolism known as the Warburg effect. This observation laid the foundation for monosaccharide conjugated analogues, which demonstrate improved pharmacodynamics and kinetics[1] but fail to protect the drug from enzymatic degradation and to deliver hydrophobic drugs to cancers locked behind a very tightly regulated border, such as the blood brain barrier. [3,4] A way to combat this is using a system that can act as a reservoir for drugs, while also showing selective delivery, such as glycopolymeric nanoparticles. However, while there is some study on structural requirement of monosaccharide-conjugates for binding to the glucose transport system,[2,5] it remains largely unexplored, and in the case of a bulkier systems, such as glycopolymers, the requirements for binding to the sugar transport system are yet to be identified. This study aimed to examine the effect of glucose based glycopolymers of different glucose analogues (C1, C2, C6 conjugated sugars) in in vitro models. Their binding affinity and specificity were evaluated by flow cytometry against several healthy and cancer cell lines. Preliminary results (**see Fig. 1**) indicated similar report and structural requirement for binding to that of studies completed on glucose molecules, paving the way to a promising drug delivery system. [2,5]

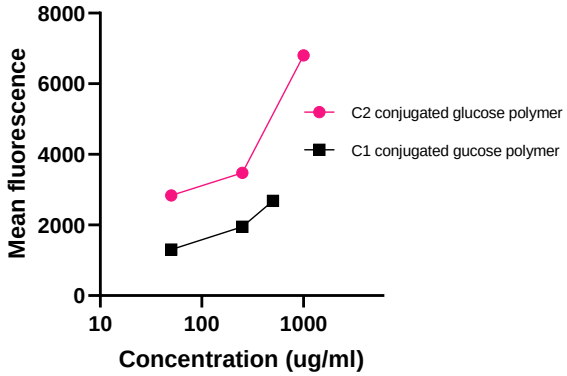

Figure 1: Library of glycopolymers and preliminary quantitative, comparative study of C2 and C1 glucose conjugated polymers against U87 cells

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