Synthesis and characterization of glycodendrimersomes for bioimaging applications

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Bioimaging is a noninvasive process in which biological activity in the human body can be observed using fluorescent dyes and probes. Probes can be made safer by encapsulating them with biocompatible polymers. Glycodendrimersomes (GDs) are hollow spheres with a hydrophilic corona consisting of glycopolymers and a hydrophobic core consisting of dendrimers, which provide an optimal environment for fluorescent probes. Glycodendrons of appropriate composition prepared from reaction of a linear glycopolymer with a dendron will self-assemble to form GDs when exposed to water. In this work, thiol-ene click reactions of glycopolymers with PLA-based dendrons were explored. Glucose-functionalized glycomonomers were synthesized by reacting *N*-hydroxyethyl acrylamide (HEAm) and acetobromo-α-D-glucose (AcBrGlc) in a stereospecific glycosylation reaction. Linear glycopolymers were synthesized through reversible addition-fragmentation chain transfer (RAFT) polymerization and chain transfer agent (CTA) end groups were removed, resulting in a thiol group, post-polymerization. Dendrons with two focal points were synthesized using ring opening polymerization. The glycopolymer and dendrons were characterized using 600 MHz NMR for end group analysis. Gel permeation chromatography with multi-angle laser light scattering (GPC-MALLS) was utilized to compare changes in the molecular weights of the reagent polymers and the click reaction products.

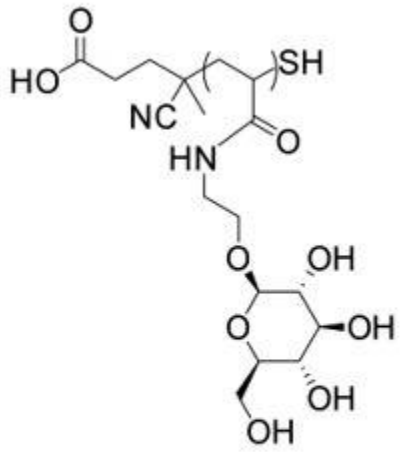

Figure: pGlcEAM glycopolymer