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Visualizing Trimming Dependence of Biodistribution and Kinetics with Homo-and Heterogeneous N-Glycoclusters on Fluorescent Albumin

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Abstract

A series of N-glycans, each sequentially trimmed from biantennary sialoglycans, were homo-or heterogeneously clustered efficiently on fluorescent albumin using a method that combined strain-promoted alkyne-azide cyclization and 6Ï -azaelectrocyclization. Noninvasive in vivo kinetics and dissection analysis revealed, for the first time, a glycan-dependent shift from urinary to gall bladder excretion mediated by sequential trimming of non-reducing end sialic acids. N-glycoalbumins that were trimmed further, in particular, GlcNAc-and hybrid biantennary-terminated congeners, were selectively taken up by sinusoidal endothelial and stellate cells in the liver, which are critical for diagnosis and treatment of liver fibrillation. Our glycocluster strategy can not only reveal the previously unexplored extracellular functions of N-glycan trimming, but will be classified as the newly emerging glycoprobes for diagnostic and therapeutic applications.

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