

SIALIC ACID AS A TOOL FOR VACCINE DEVELOPMENT

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ABSTRACT

Influenza and cancer are conditions that affect humankind worldwide. Both of these maladies are related to polysialic acid, a long, linear polymer of neuraminic acid. PSA has been associated with a number of biological processes, including intercellular aggregation, cell membrane permeability, metastasis and tumor progression, glycoprotein proteolysis, and developmental biology. Evidence also illustrates that PSA occurs on the cell surface of several cancers and is associated with the binding and spread of influenza. The robustness of polysialic acid makes it a desirable target for vaccine development. Natural PSA is oxygen linked, leading to enzymatic and chemical instability in mildly acidic environments. Herein is a synthetic analysis of C-linked and triazole-linked PSA mimics. A disaccharide length sialic acid was synthesized using samarium(II) iodide mediated coupling reactions, and a functional linker was coupled to this disaccharide. Additionally, a clickable sialic acid monomer was synthesized, containing both azido and propargyl moieties; this material will be subjected to click chemistry techniques to form a polysialic acid. After the synthesis is complete, the oligomers will be submitted for biological testing to gauge their efficacy as vaccine candidates.