Development of multivalent glycopolymers for anti-viral applications

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Multivalent glycopolymers are widely used in the study of a variety of biological interactions, including host-virus early-stage binding. In our lab, glycopolymers are synthesized using a combination of green techniques such as: using minimal to no protecting groups, employing water as a solvent, using microwave-mediated reactions and incorporating a variety of chemoselective reactions. [1-4] The resultant glycopolymers are being designed as molecular mimics of host cell surface receptors to disrupt early-stage host-viral interactions, such that viral infections can be prevented. To evaluate the properties of the glycopolymers as anti-viral agents, we employ a variety of bioassays ranging from ELISA (enzyme-linked immunosorbent assay), MST (microscale thermophoresis) and live cell luciferase reporter gene assays. We have also incorporated molecular dynamics (MD) simulations of the glycopolymers with viral surface proteins to obtain more information about where specifically the glycopolymers interact with the surface of the proteins. Our results thus far have provided important information as to the overall glycopolymer size, degree of polymer branching, and sugar type/density needed for viral binding and inhibition of viruses such as HIV. This presentation will provide a report on our progress to date in this area. The long-term goals for this work entail the development of multivalent glycopolymers as topical anti-viral agents.

Bibliographic references:

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