

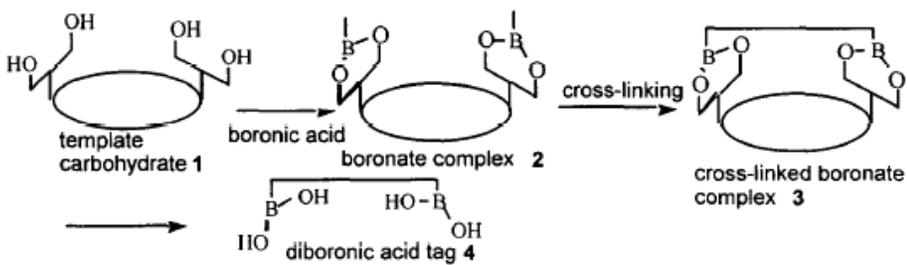


Boronic Acid-Based Sensors for Cell-surface Carbohydrates

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Description



Synthesis of the boronic acid based sensors

Boronic acid based molecules act as sensors and transport vehicle.

These recognize cell-surface specific carbohydrates that are over expressed as tumor markers.

The sensors can carry fluorescent markers, MRI contrast agents and even provide local treatment via boron neutron capture therapy

Molecular printing and combinatorial methods will be used to create the sensors and binding sites on the sensors for active agents.

Innovative Claims/NASA Significance

The sensors proposed in this applications are to target on specific carbohydrates which have been correlated with the progression, metastatic potential, invasiveness, and staging of certain cancers at the molecular level. These sensors could be used for (a) MRI profiling and detection of cancers over-expressing certain carbohydrates; (b) cell-specific delivery of boron compounds for BNCT of certain cancers; (c) delivery of therapeutic agents targeted on cancerous cells over-expressing certain carbohydrates; and (d) targeted delivery of other imaging agents to the cancerous cells. Furthermore, for easily accessible sites, such as the colon, optical sensing is also possible because some of these compounds can be made fluorescent.

As the sensors are small molecules, they are more stable than similar antibody based concepts and penetrate cell membranes more easily.

Plans

Year 1

1. Synthesize sensors
2. Begin addition of active agents

Year 2

1. Screening for binding to carbohydrates

Year 3

1. Continued refinement of synthesis
2. Imaging of delivered sensors