Improving Drug Delivery with Boronic Acids

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Inventors: Ronald Raines, Gregory Ellis, Michael Palte

The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing methods of boronating cargo molecules like proteins and drugs to enhance their uptake in cells.

Overview

The utility of many biologic drugs is limited by inefficient delivery into cells. Strategies to overcome this limitation have included enhancing the attraction between positively charged drug agents and the negatively charged cell surface. Other efforts have focused on natural ligands to target and bind agents to specific receptors on the cell surface.

Such methods have been used to deliver pharmaceuticals, proteins, peptides, nucleic acids and other particles into cells. While this has yielded some success, there remains a need for additional delivery strategies.

One promising approach takes advantage of the dense forest of polysaccharides, known as the glycocalyx, found on the surface of many cells. Targeting therapeutic agents to the glycocalyx could boost their cellular uptake.

The Invention

UW–Madison researchers have developed methods for boronating cargo molecules to mediate their entry into mammalian cells via the glycocalyx. 'Cargo' molecules include drugs, proteins, labels, amino acids or any other desired molecule.

Boronation methods include ligating, crosslinking or otherwise bonding phenylboronic acids/oligopeptides to the cargo molecule. It is believed that the boronates undergo complexation with glycans on the cell surface. This facilitates the molecule's entry into cell endosomes, where the cargo is released by enzyme action.

Applications

- Boronate-mediated delivery of drugs, proteins, nucleic acids and other molecules

Key Benefits

- Cellular uptake of molecules is enhanced significantly.
- Delivery could take place *in vivo* or *in vitro*.
- Method is straightforward.

Tech Fields

Drug Delivery > Other drug delivery technologies

For current licensing status, please contact Jennifer Gottwald at jennifer@warf.org or 608-960-9854