**Areas of Expertise**

- Creation of drug delivery systems to meet patient needs
- Bioavailability enhancement
- Synthesis of novel polysaccharide derivatives and biomaterials
- Chemistry of cellulose and its derivatives
- Polysaccharide chemistry
- Structure-property-performance relationships of biomaterials and derivatives

**Regioselective Modification of Polysaccharides**

We design novel polymers for amorphous solid dispersion delivery systems from benign polysaccharides.

**Cellulosic Backbone:**
- Biodegradable and non-toxic
- Hydrophobic side-chain
- For polymer-drug miscibility

**Terminal Carboxyl Groups**
- pH triggered drug release
- Polymer-drug interaction

**Select Synthetic Strategies**

**Olefin Cross Metathesis:** a mild and efficient approach to impart a wide range of functionality.

**Selective Oxidation:** Hydrophobic modification of hydroxyalkyl cellulose derivatives followed by TEMPO oxidation gives amphipilic and pH responsive polymers for ASD applications.

**Drug Delivery**

**Polysaccharide-Based Block Copolymers**

In this study, we focused on developing synthetic strategies which can regioslectively modify terminal ends of polysaccharide derivatives and build polysaccharide-based block copolymers. These approaches, including solvolysis, olefin cross-metathesis, amine alkylation and azide-alkyne cycloaddition, have generated series of trimethyl cellulose-based block copolymers and dextran-based block copolymers.

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