University of Minnesota
Driven to Discover℠

Department of Chemistry

Seminar

4 p.m. Friday, April 18, 2014 • 331 Smith Hall

Postdoctoral Fellow

Eric Dane, Ph.D.

Departments of Chemistry & Biomedical Engineering
Boston University

Novel Bioinspired Carbohydrate Polymers: Synthesis, Characterization, and Bioactivity Studies

Research focuses on the preparation of bioinspired organic materials and reside at the interface of polymer chemistry and biology. Specifically, his research program centers on the synthesis of novel materials, their characterization, and their application to areas of unmet need in biology and medicine.

Abstract

Carbohydrate-based polymers retaining the enantiopure, cyclic backbone of natural polysaccharides are of interest for both basic studies and applications. However, accessing these bioinspired materials from a bottom-up approach using chemical synthesis is currently challenging. Naturally-occurring polysaccharides have various and essential roles in biology. The recognition and targeting properties of oligo- and polysaccharides as well as their ability to modulate protein interactions and activity are particulary interesting from a biomedical perspective. Inspired by the need for chemical methods to prepare synthetic carbohydrate-derived polymers with structural and chemical properties similar to those of natural polysaccharides, we recently reported a high-yielding method to synthesize poly-amido-saccharides (PASs) using the controlled anionic ring-opening polymerization of a beta-lactam sugar monomer. I will describe our synthetic approach, our characterization studies, and our use of the method to make a range of structures. As the PASs we have prepared possess a previously unreported main chain structure that is not found in nature, the properties of these new polymers will be compared to their natural counterparts. Finally, three bioactivity studies on the ability of PASs to bind lectins, stabilize proteins, and inhibit and promote biofilms will be described.

Host: William Tolman
Refreshments will be served prior to the seminar.