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# Synthesis and Characterization of Chain-End Functionalization of Glycosaminoglycans

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# Synthesis and Characterization of Chain-End Functionalization of Glycosaminoglycans

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## Abstract

Chondroitin sulfate (CS) is a glycosaminoglycan (GAG) composed of two alternating sugars, glucuronic acid and *N*-acetylgalactosamine, with varying patterns of sulfation determining its type. Found in connective tissue extracellular matrices and on cell surfaces proteoglycans and is involved in a multitude of biological and chemical signaling events such as CNS development, coagulation, and cellular signal transduction. TM is a glycoprotein and its CS-containing domain contributes TM's thrombin binding and stability and plasminogen activation activities. Previous research has concluded that CS can inhibits the coagulation process by enhancing the binding affinity of the integral membrane protein thrombomodulin to thrombin 10- to 20-fold, subsequently activating Protein C and downregulating clotting Factors Va and VIIIa. We hypothesized that incorporation of CS into recombinant thrombomodulin (rTM), the active domains 4-6 of the native protein, should enhance the binding affinity to thrombin creating a more effective antithrombotic. This presentation reports the CSU Summer Undergraduate Research project, which is the synthesis and characterization of chain-end functionalized CS derivatives, which will be used to investigate various bio-orthogonal conjugation reactions in attempt to create a novel CS-rTM conjugate.