



Canadian Biomaterials Society

Winter 2025 Lunch Webinar Series



Featured Speaker

Prof. Jayachandran Kizhakkedathu, PhD

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Therapeutic Polymers and Surfaces in Prevention and Treatment of Thrombosis and Bleeding

Abstract

Thrombotic diseases remain the leading causes of morbidity and mortality with significant economic burden. Current treatments to prevent thrombosis, namely anticoagulants and platelets antagonists, remain complicated by the persistent risk of bleeding due to the inhibition of key enzymes that facilitate blood clotting. Improved therapeutic strategies that prevent thrombosis in different disease conditions and also diminish bleeding risk would have a huge clinical impact. In addition, medical device associated thrombosis is an unsolved issue impact a significant number of patients. In this presentation, I will discuss our new approaches to develop therapeutic inhibitors based on biocompatible charge switching polycations with a novel mechanism action by targeting procoagulant polyanions in blood (e.g., polyphosphate, extracellular nucleic acids) to achieve the goal of preventing thrombosis without bleeding risk. The design principle and synthetic development of these therapeutic macromolecules, and their evaluation in vitro and in animal models of thrombosis will be discussed. I will also show how this polymer inhibitor platform can be used to identify a universal heparin antidote to prevent bleeding associated with heparin, a very important polyanionic anticoagulant. Then, I will discuss the exploration of novel polycation inhibitors in the destabilization of immune complexes towards the management of heparin-induced thrombocytopenia (HIT). In addition, I will show the application such inhibitors on surfaces to prevent medical device associated thrombosis and the discovery of a new mechanism for preventing coagulation initiation on surfaces.

In-person

**Donadeo Innovation Centre
For Engineering
Room: 8-207**

April 28, 2025 (1:30 PM MDT)

FREE PIZZA !

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Virtual (Zoom)

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