



Pharmaceutical Sciences Seminar Series

Wednesday, June 21, 2023
4:00pm
NCRC Building 10 South Atrium
Zoom

“Anticoagulation with circulating endogenous nitric oxide (NO) species”

Presented by:



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Abstract: Nitric oxide (NO) is an endogenous free radical that plays a prominent role in several physiological functions including vasodilation and maintenance of cardiovascular homeostasis. Free NO radical has a very short half-life in vivo and exists mostly in the form of its metabolites that can be converted back to NO. Extracorporeal membrane oxygenation (ECMO) is a form of life support used to provide cardiac and respiratory support to patients unable to maintain those functions independently, e.g., in acute respiratory distress syndrome (ARDS). The artificial surfaces in the ECMO circuits are thrombogenic, and this is typically mitigated with systemic anticoagulation. However, systemic anticoagulants increase the risk of uncontrolled bleeding in already high-risk patients. This project aims to quantify NO metabolites in blood, to modulate the concentrations of those metabolites, and to ultimately release the NO from those metabolites at the blood contacting surfaces so that it can act as a local anticoagulant in ECMO circuits, reducing both risks of thrombosis and bleeding. Nitrites and S-nitrosothiols (RSNOs) can be quantified using ozone chemiluminescence along with a reducing assay. NO delivered through the membrane oxygenator during ECMO therapy results in elevated levels of nitrites and RSNOs in circulation. These NO species can potentially be converted back to NO to produce a local antithrombotic effect using copper ligand-doped polymers, and thus providing an important alternative strategy to systemic anti-coagulation during ECMO.