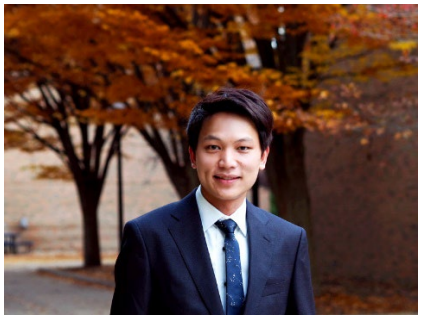
COLLEGE OF PHARMACY
PHARMACEUTICAL SCIENCES
UNIVERSITY OF MICHIGAN

Pharmaceutical Sciences Seminar Series

Wednesday, April 17, 2024
4:00pm
2548 North University Building
Zoom

"Use of Natural Cationic Macromolecules for the Stabilization and Delivery of Inhaled Drug Particles"

Presented by:



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Abstract Respiratory infections pose significant healthcare challenges, claiming millions of lives worldwide and imposing substantial economic burdens. These infections can be caused by several factors that decrease the therapeutic effect of drugs. Mucus presents a major obstacle to drug delivery to the airway epithelium. It plays an important role in mucociliary clearance, and the major functional components of mucus are mucins, which can form a mucin fiber mesh to slow diffusion of the drugs. Moreover, mucus provides a suitable environment for bacteria to thrive. Some bacteria have a strong capacity to form biofilms, and once formed, bacteria become resistant to antimicrobials and the body's immune response. This results in decreased efficacy of the drug due to slow and incomplete drug penetration into the biofilm matrix. Furthermore, gram negative bacteria exhibit intrinsic resistance to many antibiotics stemming from the properties of their outer membrane. It is therefore crucial for pulmonary delivery to design formulations that interact with mucus and the gram negative outermembrane. Cationic macromolecules such as chitosan have been widely used as polymer composites in various forms of drug delivery, including mucoadhesive and sustained release delivery systems. In this study, I will examine the utility of chitosan as a stabilizer in the formation of curcumin nanocrystals using antisolvent precipitation. Future studies will examine the effectiveness of cationic macromolecules like chitosan in preventing chemical degradation of curcumin in physiological fluids and enhancing the permeation of lipophilic small molecules through the mucus gel barrier.