Joint Department of

BIOMEDICAL ENGINEERING

UNC CHAPEL HILL | NC STATE UNIVERSITY

Coulter Seminar Series Presents

"Metals and Peptides and Polymers, Oh My! Following the Yellow Brick Road Towards a Universal Influenza Vaccine "

Kristy M. Ainslie, PhD
Eshelman Distinguished Professor and Chair
Division of Pharmacoengineering & Molecular Pharmaceutics
Eshelman School of Pharmacy
University of North Carolina at Chapel Hill

Kristy Ainslie is a Fred Eshelman Distinguished Professor in the University of North Carolina Eshelman School of Pharmacy and chair of the Division of Pharmacoengineering and Molecular Pharmaceutics. She received her PhD in Chemical Engineering from Pennsylvania State University and completed her Post Doc in Biomedical Engineering at University of California, San Francisco. Her research interests are focused on the development of mostly biopolymeric platforms for enhanced delivery of vaccines, autoimmune therapies, host-directed antimicrobials, and chemotherapeutics. She has nearly 100 publications focused on applying materials to biological systems has received over $22M in federal funding as PI to support her work. Her research has helped to shine a light on the role of degradation, and co-delivery of antigen/adjuvant in vaccine microparticles in the context of infectious disease prevention.

ABSTRACT

A universal influenza vaccine could shift the schedule of this intervention from yearly to more of childhood vaccine schedule. For this we use a hemagglutinin (HA) designer protein termed computationally optimized broadly reactive antigen (COBRA HA). Proteins alone are often not immunogenic enough to protect and require partnering with an adjuvant. To enhance delivery of these elements our laboratory has often employed acid-sensitive polymeric microparticles (MPs) and peptide complexes. One of our acid-sensitive platforms is comprised of MPs made of the biodegradable polymer acetalated dextran (Ace-DEX). Formulating HA with cGAMP Ace-DEX MPs, we have reported broad protection in both mouse and ferret models. Another acid-sensitive platform is a complexation polymer zinc carnosine (ZnCar) MPs. With ZnCar MPs we have shown strong immune responses and protection in a mouse model of influenza. Shifting to a needle-free intranasal vaccines, we have formulated COBRA HA with nanoparticles of mast cell agonist mastoparan 7 with CpG and evaluated it in a mouse model of infection. Overall, our results indicate that acid-sensitive polymer MPs and peptide complexes can serve as a viable vaccination option for delivery of a subunit broadly active vaccine.

Friday, January 27th
12:00 Noon

Presented From: 321 MacNider Hall (UNC)
Videoconferenced to: 4142 Engineering Building III (NC State)
& East Carolina University (ECU)