Title: Pulmonary surfactant fortified with Cath-2 as a novel therapy for bacterial pneumonia

Background: Bacterial pneumonia is a leading cause of death worldwide, with high mortality rates persisting even after antibiotic treatment. Current treatments for pneumonia involve administration of antibiotics, however after the bacteria are killed they release toxic substances that induce inflammation and lung dysfunction. Host defense peptides represent a potential solution to this problem through their ability to down regulate inflammation. However, effective delivery to the lung is difficult because of the complex branching structure of the airways. My study addresses this delivery problem by using exogenous surfactant, a pulmonary delivery vehicle capable of improving spreading of these peptides throughout the lungs. We hypothesize that exogenous surfactant fortified with host defense peptides will improve outcomes associated with bacterial pneumonia.

Methods: A mouse model of lung inflammation, induced by bacterial toxins from antibiotic-killed bacteria, will be used to test the effects of supplementing antibiotics with host defense peptides.

Results: We anticipate that exogenous surfactant fortified with host defense peptides will significantly downregulate pulmonary inflammation when co-administered with antibiotic-killed bacteria.

Discussion & Conclusion: Our strategy of utilizing host defense peptides with a spreading agent represents a novel supplementary therapy, that if promising in these animal studies may ultimately be explored in clinical trials.

Interdisciplinary Reflection: This project requires interacting with clinicians treating patients with the bacterial pneumonia, physiologists to develop suitable animal models, and biochemists & immunologists to understand the mechanisms of action of our new therapy. Working in this interdisciplinary environment is needed to ultimately make our novel therapy a clinical reality.