Thesis Defense - Katherine Besse, MS Biology

July 22, 2021, 3:00 - 5:00 PM
VIEW EVENT
All are invited to attend the defense. For more information please contact Graduate Coordinator at kharrism@gmu.edu.

Candidate: Katherine Besse
Program: Biology, M.S.

Date: July 22, 2021
Time: 3:00 PM

Place: frrnq8--eks,xmmk,sq-h-75477114714=nub;L.Pt_CvKR0PURCTwOjK2cEH3SwrXXx.7

Title: IDENTIFICATION AND ANALYSIS OF THE ROLE OF CHITINASE SUBSTRATE IN FRANCISELLA NOVICIDA
Committee Chair: Dr. Monique van Hoek

Committee Members: Dr. Ancha Baranova, Dr. Brett Froelich

ABSTRACT:

Francisella tularensis is a gram negative facultative intracellular pathogen which is a class A biothreat according to the CDC. This bacteria codes for two chitinases (ChiA and ChiB) and one chitin binding protein (CbpA). Chitin is the most abundant oligosaccharide in marine environments and in the exoskeleton of many insects. In order to digest this material, microorganisms produce chitinases capable of cleaving this polymer. The chitinases in Francisella novicida have previously been found by our lab to negatively regulate the bacterial biofilm, most likely cleaving the extracellular polysaccharide substance (EPS) with β-1,4 glycosidic linkages. These enzymes may enable the organism to use the resulting cleaved polymers as carbon and nitrogen sources for growth. Although Francisella encodes for several polysaccharide synthases, it has not been found to produce chitin. Therefore, we hypothesized that the chitinase-enzyme substrate that is self-produced in the F. novicida EPS and biofilm must be some other molecule also containing β-1,4 glycosidic linkages. The biochemical characterization of ChiB activity on various substrates will be evaluated and the role of the substrate in the biofilm will be examined.