MORGAN RICE, NOAH TEAFF, JENNIFER HICKMAN, DONALD PRIMERANO, JAMES DENVER, Genomics and Bioinformatics Core Facility, Marshall University, Huntington, WV, and DEANNA M. SCHMITT. Department of Natural Sciences and Mathematics, West Liberty University, West Liberty, WV. Determining the Role of Francisella lipoprotein A (FlpA) in Francisella tularensis Susceptibility to Resazomycins.

Antibiotic resistance is one of the top threats to global public health. In the United States, over two million people each year are infected with antibiotic resistant bacteria which results in approximately 23,000 deaths. The development of new antibiotics is essential to combat this crisis and prevent the loss of additional lives. Our laboratory discovered that resazurin exhibits antimicrobial activity against a select family of Gram-negative bacteria including Neisseria gonorrhoeae, Helicobacter pylori, and Francisella tularensis. Resazurin and derivatives of this compound, resazomycins, can kill N. gonorrhoeae and F. tularensis in broth culture and inside host cells. One resazomycin, resorufin pentyl ether, reduces vaginal colonization by N. gonorrhoeae in a mouse model of infection. To identify potential targets of resazomycins, we performed a high throughput screen to select for resazurin-resistant F. tularensis isolates and performed whole genome sequencing on each isolate. Multiple F. tularensis isolates had a mutation in the gene FTL_0073 which encodes for Francisella lipoprotein A (FlpA). We hypothesized that this protein could be a target of resazomycins or may play a role in uptake of these antibiotics. To address these hypotheses, we generated a flpA disruption mutant. First, we evaluated the susceptibility of the flpA mutant to resazomycins and preliminary data indicates this mutant is resistant. Next, we will test the flpA mutant for changes in outer membrane composition and defects in uptake of resazomycins. Understanding the role of flpA in resazomycin susceptibility would facilitate further development of these compounds as potential treatments for tularemia and gonorrhea.