Siderophores: The Effects of YbtA and FyuA in Antibiotic Resistant *Enterobacteriaceae*

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Abstract

Siderophores, known as "iron carriers," are small molecules that bind and act as vehicles of ferric iron across the cell membrane of microorganisms. Siderophores are extremely important virulence factors and are known for foraging Fe (III) from their environment or host to produce the iron metal, keeping it readily available for use in the microorganism. Many microbes, such as *E. coli* (*Escherichia coli)*, use siderophores to sequester ferric iron for use in many of their metabolic pathways, ultimately enabling them to cause both systemic and/or localized infections within their host. Yersiniabactin, or ybt, is an extracellular siderophore found to be produced by the bacterial family *Enterobacteriaceae* and can function in iron-depleted conditions. Ferric yersiniabactin uptake receptor, FyuA, is necessary for biofilm formation and may have an indirect effect on antibiotic resistance by increasing the microbe's ability to survive in unfavorable conditions. In this project, students from two different research projects collaborated to understand the relation between two siderophore genes, yersiniabactin (YbtA) and ferric yersiniabactin receptor (FyuA), affect the antibiotic resistance of isolated extended-spectrum β-lactamase (ESBL)-producing *Enterobacteriaceae* from a local water source: Flat Creek located in Gainesville, GA. 36 isolates were tested for the presence of both YbtA and FyuA genes by polymerase chain reaction (PCR) and gel electrophoresis. Gel extraction was performed with the correct bands for both YbtA and FyuA and the bands then will be sent for sequencing for confirmation of correct genes. Future tests will be sequencing the isolated YbtA and FyuA genes for confirmation, gene deletion and insertion, and testing for relation to antibiotic resistance with and without the genes.

KEYWORDS: siderophore, microorganisms, microbiology, yersiniabactin, resistance