

**Centennial Honors College
Thomas E. Helm Undergraduate Research Day 2024**

ABSTRACT

Major: Biology

Poster

Faculty Mentor(s): Sue Hum

The Impact of Acetaminophen on the Growth and Gene Expression of E. coli.

Tyler Polarek

The development, control, and treatment of antimicrobial resistant bacteria has been an ongoing topic of discussion within recent decades. Developing knowledge of how antimicrobial resistance arises is essential, as it allows for a better understanding of how to prevent prevalent pathogens from developing antimicrobial resistance. It has been known that overuse of antibiotics in healthcare and agriculture has led to an increase in antimicrobial resistance in the past few decades. It has also been recently reported that exposure to other common medications can increase antimicrobial resistance. Medications such as SSRI's, ibuprofen, and acetaminophen have all been shown to impact bacterial growth and induce various forms of resistance. Within this study, E. coli was exposed to various over the counter medications to observe changes in growth and antibiotic resistance development. Notable changes in growth were observed upon exposure to acetaminophen, and the effects of acetaminophen on growth and gene expression were further investigated. E. coli was grown in liquid cultures containing varying concentrations of acetaminophen and ampicillin. The absorbance of each culture was measured to determine changes in overall growth. Varying treatments underwent qPCR to identify changes in gene expression of eight genes related to cell growth and stress responses. However, there were no significant changes in overall growth or gene expression found in bacteria exposed to acetaminophen compared to the control group. This research may be continued further, as different medications as well as the expression of different genes may be investigated in the future.