

**WIU CENTENNIAL HONORS COLLEGE**  
**Thomas E. Helm Undergraduate Research Day 2023**

**Abstract**

Poster

Major: Microbiology

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**The Impact of Over-the-Counter Medication on Antibiotic Resistance Development in *Escherichia coli***

**Tyler Polarek**

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Antibiotic resistance is becoming an increasing dilemma within the field of microbiology. It has led to the emergence of diseases that are difficult to treat, such as Methicillin-Resistant *Staphylococcus aureus* and Multidrug-Resistant *Pseudomonas aeruginosa*. Understanding the mechanisms of antibiotic resistance development has become essential in drug development and patient treatment. Recent studies have shown that various medications, such as Selective Serotonin Reuptake Inhibitors (SSRIs) and ibuprofen, can also further the development of antibiotic resistance by inducing the formation of broad spectrum efflux pumps within bacterial cells. Such efflux pumps are incredibly potent and are effective against many varieties of antibiotics. The goal of this research is to identify whether or not generic over-the-counter medications, such as acetaminophen, ibuprofen, benadryl, etc., impact genetic expression in *E. coli*. Additionally, we wish to determine if the tested medications can induce formation of antibiotic resistance. Methods that are to be used include plate inoculation, mcfarland standardization, kirby-bauer disk diffusion, and quantitative PCR. *E. coli* cultures will first be grown on plates containing a single medication. The cultures will then be subjected to Kirby-Bauer Disk Diffusion tests, which will help to determine if antibiotic resistance has been developed. *E. coli* grown on standard media not containing any medication will be used as a control group. The cultures will then be subjected to quantitative PCR, which will illustrate how gene expression has been affected in the cells grown on medium.