

Antimicrobial Resistance of a Biofilm-Forming Pathogen Probed With Antipyretic Pharmaceuticals and Antibiotics

Bonogofsky, Jada (School: Flasher High School)

Experiment using in vitro science to offer an intelligence on the most synergistic combination between antibiotics and antipyretics against a familiar biofilm-forming pathogen, *Staphylococcus epidermidis*. Biofilms are bacteria clusters that produce a protective layer of an extracellular substance. Common objects affected by biofilm are catheters, prosthetics, and water receptacles. In a clinical biofilm environment, bacteria are 100 times more resistant to antimicrobials. Recently, antipyretics have been collated with various antibiotics and tested against various other biofilm-forming bacteria. What is the most synergistic combination of antibiotics and antipyretics in treating a recurrent biofilm-forming pathogen? Experiment and study resistance in a well known biofilm forming pathogen by utilizing three antibiotics, at full dose and half dose, that are commonly prescribed in medical region 8, two antipyretics, and *Staphylococcus epidermidis*, with the intentions of contaminating tryptic soy broth and incorporating one antibiotic with one antipyretic over the course of 7 days. After hypothesis testing and analyzing averages, it was determined that the bacteria created a full resistance by day four to 10 µg/mL of gentamicin with 500 µg/mL of ibuprofen. A slight resistance was created with all combinations including gentamicin. The experiment showed the most synergistic combination was 7 µg/mL of levofloxacin and 500 µg/mL of ibuprofen and the least synergistic combination was 10 µg/mL of gentamicin and 2500 µg/mL of acetaminophen. Further experimentation will involve larger varieties of antibiotics and antipyretics, water quality tests of livestock and pet water receptacles, and tests with methicillin-resistant *Staphylococcus aureus*.

Awards Won:

