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

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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.

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