A Genetic Mechanism Underlying Bacterial Drug Resistance: Ampicillin Resistant Escherichia coli

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This experiment is about research that identified the process by which bacteria develop drug resistance. Seven generations of Escherichia coli were bred to be resistant to ampicillin. (Note that the original E.coli used was a laboratory based strain with no drug resistance). In this experiment the genetic makeup of the seven generations of E.coli was analyzed. The original purpose of this experiment was to identify the gene(s) responsible for the drug resistant genetic mutations. All seven generations of bacteria were isolated into single colonies and then tested through a series of genomic DNA extraction processes. Throughout a series of trial and error Polymerase Chain Reaction (PCR) tests looking for potential gene sequences, it was found that there were no genetic matches. None of the drug resistant genes were identified in the E.coli specimens yet the control identified positive. Later tests with 10 different antibiotics confirmed that the drug resistant E.coli was not only resistant to ampicillin but to multiple antibiotics. This experiment shows that bacteria can develop resistance to antibiotics that they haven’t been exposed to or that perhaps E. coli has co-resistant phenotypes that provide drug resistance to multiple antibiotics.

Awards Won: