CALIFORNIA STATE SCIENCE FAIR
2016 PROJECT SUMMARY

Name(s)

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Project Number

S1523

Project Title

Transformation of Antibiotic Resistance in E. coli

Abstract

Objectives/Goals

Develop resistance to Gentamicin and Ciprofloxacin in one strain of E. coli, then transform the resistance to the wild type E. coli.

Methods/Materials

Tested the transference of antibiotic resistance through transformation of plasmids by first creating an antibiotic strain, calculating visual plate coverage, then killing it and transforming the plasmids into a wild type E. coli strain using a heat shock method, and once again calculating visual plate coverage.

Results

Transformation of the Ciprofloxacin resistant E. coli was successful but transformation of the Gentamicin resistant E. coli was not. Aminoglycocides, the drug class of Gent., is less likely to have a resistance built and less likely to transform because of the rapid loss of cell functions from the protein inhibiting properties of Gentamicin.

Conclusions/Discussion

The difference is Aminoglycocides, drug class of Gentamicin, attach to multiple places on the target cell kill the cell very fast while Fluoroquinolones, drug class of Ciprofloxacin, only stop one enzyme function and kill slowly. This means that transformation could occur quick enough to resist Ciprofloxacin but not Gentamicin.

Summary Statement

I created antibiotic resistant E. coli, killed the bacteria and transformed the genes leftover using a heat shock transformation into a new generation of E. coli to see if the wild type E. coli would exhibit the same resistance as before.

Help Received

After researching the project, I discussed which antibiotics I wanted to use with Dr. Fernandez who suggested a few others and helped procure them. I reviewed my procedure with Dr. Park and he suggested methods of transformation, I researched the methods suggested and choose Heat Shock.