CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Ryan S. Steinberg

Project Number
S1326

Project Title
Bacterial Resistance to Multiple Generations of Ophthalmic Antibiotics

Abstract

Objectives/Goals
The objective of my experiment is to compare the bacteriostatic and bactericidal effectiveness of first, second and third generation antibiotics on Staphylococcus epidermidis in order to examine and test the development of bacterial resistance.

Methods/Materials
40 petri dishes with agar were inoculated with Staphylococcus epidermidis using a sterile loop. 4 dishes was damaged omitted from testing. The dishes were then separated into 2 groups; one group for bacteriostatic tests and the other group for bactericidal testing.

In the bacteriostatic dishes were divided into 5 groups of 4 dishes each. Each received one drop of Ocuflox, Tobrex, Sulfacetamide, or Saline, with one group left to grow as a control. The dishes were left for 7 days at 37° C, then were removed and analyzed.

In the bactericidal test group dishes were first placed in an incubator for 5 days to grow. After 5 days they were removed and divided into 5 groups of 4 dishes, and one drop of Ocuflox, Tobrex, Sulfacetamide, or Saline was added, leaving the last group to continue growing as a control.

Results
In the bacteriostatic test group Ocuflox was effective at stoping bacterial growth. Tobrex was partially effective. Sulfacetamide had little effect on preventing bacterial growth. The saline control group proved inconclusive.

In the bactericidal test group Ocuflox was again the most effective antibiotic. The Tobrex and Sulfacetamide experienced similar results. The Saline control group showed similar growth to the control group with no drop.

Conclusions/Discussion
Ocuflox, the newest drug, was the most effective and Sulfacetamide, the oldest, was the least effective. Tobrex was partially effective. One explanation is that it was assumed that the culture was a pure strain of bacteria. If the strain was impure some may have been resistant while others were not.

One result of the bactericidal test was that the only area effected by the antibiotic was the area covered by the drop. This suggests that instead of time of exposure, quantity of the drop was the main factor in the

Summary Statement
This project is to examine and test for the development of bacterial resistance to common antibiotics and see if newer second and third generation antibiotics are more effective than older first generation antibiotics.

Help Received
My father helped me organize my procedures and obtain the drugs and my science teacher helped me organize and prepare my report.