



**CALIFORNIA STATE SCIENCE FAIR  
2008 PROJECT SUMMARY**

<b>Name(s)</b> <b>Hannah S. Kintzle</b>	<b>Project Number</b> <b>J1415</b>
<b>Project Title</b> <b>Do Natural or Pharmaceutical Antibiotics Work Better at Preventing Antibiotic Resistance from Occurring within Bacteria?</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective was to determine whether natural or pharmaceutical antibiotics would be better at preventing antibiotic resistance from occurring within bacteria.</p> <p><b>Methods/Materials</b> Materials included 30 each of the following: Easygel bottles, Easygel pretreated Petri dishes, Chloramphenicol, Tetracycline and Penicillin disks; honey; garlic; 6 sterile 1 ml. droppers; 10 forceps; and 5 sheets of graph paper. I gathered twelve Petri dishes and labeled each with the pharmaceutical or natural antibiotic to be used in it, bacteria type, and experiment number. Next I inoculated four easygel bottles with two drops of Enterobacter Aerogenes, four easygel bottles with two drops of Bacillus Cereus, and four easygel bottles with two drops with Sarcina Lutea. I poured the easygels into their respectively labeled Petri dishes. I let the inoculated Petri dishes sit. I placed three Chloramphenicol disks into three of the four Petri dishes. I repeated this procedure with the Penicillin and Tetracycline disks. I then placed honey and garlic in the fourth dish. I placed the lids on the Petri dishes and let them sit for 45 minutes, then moved them to a consistent temperature to sit for 60 hours.</p> <p><b>Results</b> Of the pharmaceutical antibiotics, Chloramphenicol was the most effective. Of the natural antibiotics honey was most effective. These two antibiotics demonstrated greater zones of inhibition, therefore greater effectiveness at inhibiting the growth of microorganisms.</p> <p><b>Conclusions/Discussion</b> I believed that the pharmaceutical antibiotic Penicillin would be best at preventing antibiotic resistance within bacteria. The experimental data did not support my hypothesis. Chloramphenicol was most effective. Of the natural antibiotics honey was most effective. My conclusions were based upon observations of greater zones of inhibition in these two antibiotics. Comparing Chloramphenicol to honey, honey had larger zones of inhibition, although I did not consider volume. An additional consideration is that the sugar levels in the honey could be killing the bacteria rather than creating resistance.</p>	
<b>Summary Statement</b> I wanted to determine whether natural or pharmaceutical antibiotics would be better at preventing antibiotic resistance from occurring within bacteria.	
<b>Help Received</b> Mr. Don Scott provided guidance and project review work; Mother assisted with experiments and editing.	