



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Michael T. Winslow	Project Number J1335
Project Title How Common Are Antibiotic-Resistant Bacteria?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of my project was to test the occurrence of antibiotic resistance bacteria in my local environment. I hypothesized that bacteria sampled from locations or food in our house that may have been exposed to antibiotics or antimicrobial agents will be more resistant than non-exposed areas.</p> <p>Methods/Materials I selected 10 sample sites within my house, and collected samples from them twice to test for antibiotic resistance in 2 separate experiments. In both experiments, the samples were cultured in agar with 3 different antibiotic discs: penicillin, tetracycline, and chloramphenicol (Kirby-Bauer test). The bacteria growth around the discs was measured and compared to antibiotic-sensitive gram-negative and gram-positive control strains. In Exp.2, new samples were also diluted and a colony count plate assay was performed in the presence and absence of the 3 antibiotics to detect subpopulations of resistant bacteria.</p> <p>Results The majority of bacteria for all the samples are gram negative and insensitive to penicillin. Bacteria growth from 4 sites exhibited resistance to tetracycline and chloramphenicol, relative to the control stains, for 50-75% of the 6-8 growth tests performed. These were the kitchen sink/countertop, toilet, yard dirt, and some of the commercial chicken. The samples from yard dirt were not predicted to be resistant, but exhibited the most consistent pattern of resistance in the antibiotic disc tests. Bacterial growth from 6 sites exhibited resistance for 0-25% of the 6-8 growth tests.</p> <p>Conclusions/Discussion Bacterial resistant growth from 3 sites and low resistant growth from 5 sites were consistent with the hypothesis that bacterial resistance could correlate with sample sites exposed to antibiotics or antimicrobial agents. The samples from yard dirt were not predicted to be resistant, but exhibited the most consistent pattern of resistance. The observed resistance could be due to unusual bacteria strains selected for enzymes that neutralize antibiotics or for multidrug resistance transporter genes. Or, they can represent more common strains with resistance due to mutation or plasmid uptake.</p>	
Summary Statement My project was to determine the prevalence of antibiotic resistance bacteria in my local environment.	
Help Received Use of incubators and a sterile culture hood at my father's work. My parents helped me with making some of the figures and the display.	