



CALIFORNIA STATE SCIENCE FAIR 2014 PROJECT SUMMARY

Name(s) Jasmeet S. Dhaliwal	Project Number 34115
Project Title Antibiotic Resistance Patterns of Staphylococci from the Human Skin	
Objectives/Goals The objective of this project is to determine if staphylococci gathered from different regions of the human skin show patterns of resistance to different antibiotics. My hypothesis is that staphylococci isolated from the surface of the human skin will show resistance to some of the antibiotics yet display sensitivity to the others and that staphylococci from the fingers will show the highest resistance to antibiotics. Abstract The objective of this project is to determine if staphylococci gathered from different regions of the human skin show patterns of resistance to different antibiotics. My hypothesis is that staphylococci isolated from the surface of the human skin will show resistance to some of the antibiotics yet display sensitivity to the others and that staphylococci from the fingers will show the highest resistance to antibiotics. Methods/Materials First collect samples from the arms, fingers, and nose using sterile swabs. Then rub these swabs on sterile Material Salt Agar (MSA) petri dishes; place the petri dishes in an incubator at 37 °C for 48 hours. Take a colony from each Petri dish and isolate a pure culture by quadrant streaking on new sterile MSA Petri dishes. Incubate the petri dishes at 37°C for 48 hours. After determining that the colony is a pure culture, stain the Staphylococcus and view under the microscope. Gram staining involves the use of crystal violet, gram's iodine, alcohol decolorizer, and safranin. Then inoculate NA and TSA Petri dishes densely with the pure Staphylococcus culture. Dispense the various antibiotic disks (penicillin, methicillin, oxacillin, kanamycin, and bacitracin) onto the Petri dish in a wide circle. Allow the bacteria to grow in the incubator for about 24 hours. Afterwards, using the Kirby-Bauer method, measure and record the zone of inhibition of each antibiotic using a millimeter ruler, and determine the effectiveness of each antibiotic against Staphylococcus. Results Data from the three different areas of the human skin indicates that the average zone of inhibition for penicillin, methicillin, oxacillin and kanamycin was above the susceptible limit specified by the Kirby-Bauer method. Statistical analysis, however, reveals that the results of only three of these antibiotics (methicillin, oxacillin, and kanamycin) were statistically significant. More trials must be performed using penicillin in order to verify its effectiveness as an antibacterial agent. Because the zone of inhibition for bacitracin was consistently 0 mm, it is safe to say that the staphylococci were resistant to bacitracin. Conclusions/Discussion Staphylococcus was resistant to bacitracin and possibly penicillin, yet susceptible to oxacillin, methicillin, and kanamycin. Staphylococci from the nose were the most resistant to antibiotics, followed by the fingers, and finally the arms.	
Summary Statement My project is an investigation of the antibiotic resistance patterns of staphylococci from the human skin.	
Help Received I used lab equipment at CSUB, where I received help and guidance from Dr. Antje Lauer in regard to proper lab techniques. Also, my parents helped design the project board.	