



# CALIFORNIA SCIENCE & ENGINEERING FAIR 2018 PROJECT SUMMARY

<b>Name(s)</b> <b>Christina Ngo; Nikki Nguyen; Christina Tran</b>	<b>Project Number</b> <b>S1615</b>
<b>Project Title</b> <b>Investigating the Effect of Makeup Primer Bases on the Growth of Staphylococcus epidermidis and Escherichia coli</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective of this study is to determine which makeup primer base (oil, silicone and water) will cause an increased growth rate in bacteria (S.epidermidis and E.coli).</p> <p><b>Methods/Materials</b> A single bacterial colony of S. epidermidis/E.coli was picked and placed into 2 separate test tubes containing LB broth. A 3rd tube was used as the control, containing only 2 mL of broth. The test tubes were incubated for an hour at 37 C. While the tubes were incubating, 6 different makeup primers were each spread onto 3 plates each. Distilled water was spread onto 3 plates and used as another control group. When the tubes finished incubating, the bacteria (S. epidermidis/E.coli) and control culture were spread onto 7 separate plates. Each culture was spread onto a different makeup primer/control plate once, The plates were incubated for 48 hours. After 48 hours, our data was quantified by counting colonies. The experiment was repeated 2 more times, for a total of 3 biological replicates and 63 plates.</p> <p><b>Results</b> All the primers except for the Benefit Cosmetics (silicone-based) primer had approximately increased the S. epidermidis bacterial colony growth by 1,200-4,000 when compared to the control culture. All of the primers increased the amount of E. coli bacterial colony growth by approximately 200 colonies when compared to the control culture. The Physician's Formula primer (oil-based) grew the most colonies compared to other primers when cultured with both, S.epidermidis and E.coli. The primer grew 4,000 more colonies than the S.epidermidis control culture and 300 more colonies than the E.coli control culture.</p> <p><b>Conclusions/Discussion</b> After identifying that the oil-based primers grew the most colonies of S. epidermidis and E. coli, our hypothesis was supported because it meant the oil-based primers produced more bacterial colonies than the water and oil based primers. We concluded that oil, whether it is found naturally on our face or derived from a plant, is a factor in bacterial growth because opportunistic bacteria like S.epidermidis and E.coli like to grow within oily conditions in order to easily cause inflammation/infection in our skin. Inflammation/infection in our skin occurs due to the overproduction of oil, so opportunistic bacteria like S.epidermidis and E.coli like to grow within these oily conditions.</p>	
<b>Summary Statement</b> Our project was finding out which makeup primer base (oil, water and silicone) would produce the most bacterial growth when cultured with S.epidermidis and E.coli.	
<b>Help Received</b> We were mentored by a Stanford graduate student (Auora) that helped us turn our ideas into a testable research question.	