



# CALIFORNIA SCIENCE & ENGINEERING FAIR 2018 PROJECT SUMMARY

<b>Name(s)</b> <b>Lizzie D. Garcia</b>	<b>Project Number</b> <b>J1705</b>
<b>Project Title</b> <b>Foothill Pharmaceuticals: Assessing Antibacterial Potential of Sierra NV Flora &amp; Microflora for Use in Clinical Medicine</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective of this study is to determine if naturally occurring antibacterial agents can be derived from plants and soil-dwelling microorganisms in the Sierra Nevada Foothill Region and have the potential for application within the field of clinical medicine.</p> <p><b>Methods/Materials</b> Agar plates, mortar and pestle, sterile pipettes, paper discs, antibacterial solution, buffer, 5 bacteria, native plants, and native soil-dwelling bacteria and fungi. The materials were purchased from Odin. Bacteria were put on plates. Plant samples were made into extract. Soil-dwelling bacteria and fungi were placed in medium. Paper discs were dipped in plant extract and bacteria and fungi soil sample solution and placed as 5 replications on plates with 3 controls (paper disc, antibacterial, and buffer). Every 12 hours pictures were taken along with measurements in mm of the area cleared by the antibacterial control, plant extracts, and/or the bacteria and fungi soil samples.</p> <p><b>Results</b> Some plants had antibiotic qualities. Bee's Bliss was effective against Escherichia coli, clearing an area of 11.79mm<sup>2</sup>-452.39mm<sup>2</sup>, but compared to the antibacterial control, clearing an area of 1218.16mm<sup>2</sup>-1551.95mm<sup>2</sup>, there was little effectiveness. Bee's Bliss was effective against Micrococcus luteus, clearing an area of 40.06mm<sup>2</sup>-157.48mm<sup>2</sup>, but compared to the antibacterial control, clearing an area of 1551.95mm<sup>2</sup>, there was little effectiveness. Bee's Bliss had some effect on both gram-positive and gram-negative bacteria. In last year's study, plant extracts only had an effect on gram-positive bacteria. This year, the plants affected gram-positive and gram-negative bacteria.</p> <p><b>Conclusions/Discussion</b> The study found that naturally occurring antibacterial agents derived from plant or soil-dwelling microorganisms did not kill a broad spectrum of bacteria and were not fast-acting. Bee's Bliss had some effect on gram-positive and gram-negative bacteria. If more concentrated, Bee's Bliss might have more effect on bacteria. New antibiotics are needed due to antibiotic resistance and the possibility of catastrophic events with no antibiotic availability. New antibiotics could be found using plants and soil-dwelling microorganisms. In future studies, more plant and soil samples would be needed to find one that killed a broad spectrum of bacteria, would be fast-acting and a good candidate for application within the field of clinical medicine</p>	
<b>Summary Statement</b> I showed that naturally occurring antibacterial agents found in the Sierra NV Foothill Region had some effect on gram+ and gram- bacteria, but currently would not be good candidates for use in clinical medicine.	
<b>Help Received</b> I conducted all the steps of my experiment on my own under adult supervision. My former teacher, Mrs. Garcia, helped me determine how to measure my findings so I could properly record my data. I also received help from a college student, Andy Garcia, to input the data into a statistical program.	