



# CALIFORNIA STATE SCIENCE FAIR 2012 PROJECT SUMMARY

<b>Name(s)</b> <b>Conner R. Bennett</b>	<b>Project Number</b> <b>S1504</b>
<b>Project Title</b> <b>Does Hippopotamus Skin Secretion Prevent E. coli Bacteria Growth and Protect the Skin from Harmful Sun Light?</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The hippopotamus (<i>Hippopotamus amphibius</i>) produces a skin secretion containing pigments that are thought to prevent infection and protect the skin from harmful UV spectra. This study seeks to collect enough volume to test un-synthesized hippo skin secretion's resistance to <i>E. coli</i> bacteria, measure the pH, and compare the UV-vis spectra to human sunscreen products. Research indicates, hippo skin secretion should resist <i>E. coli</i> bacteria, be alkaline, and absorb at least 50% of the harmful UVB light.</p> <p><b>Methods/Materials</b> Collaborating with the San Francisco Zoo, skin secretion samples were collected using tissue paper from the hippo. <i>E. coli</i> strain K-12 MG1655 bacteria were grown in the presence of raw skin secretion at different concentrations. A pH meter and UV-vis spectrophotometer was used to test the samples. The number of colonies was counted and the number of colony-forming units was calculated.</p> <p><b>Results</b> This study succeeded in collecting enough hippopotamus skin secretion volume to complete the experiment. The data shows that the skin secretion concentrations tested did not block <i>E. coli</i> bacteria growth. But, a 10% skin secretion concentration reduced the number of <i>E. coli</i> bacteria colony-forming units by 23.2% relative to the control. Over 21 days, the pH shifted from 9.5 to 8.5 at the same time the color changed from pink to red, like a halochromic substance. The hippopotamus skin secretion absorbed light in the burning range, but two human sunscreen products absorbed more light.</p> <p><b>Conclusions/Discussion</b> The data supported the hypothesis that hippo skin secretion would inhibit bacteria growth and be alkaline. The data did not support the hypothesis that skin secretion would absorb at least 50% of the harmful UVB light. This is only third scientific study that both collects samples and documents properties of hippopotamus skin secretion. The results indicate that additional research regarding hippo skin secretion preventing infection from microbes and protecting the skin from harmful UVB light is needed.</p>	
<b>Summary Statement</b> This study seeks to collect enough volume of hippopotamus skin secretion to test un-synthesized samples resistance to <i>E. coli</i> ( <i>Escherichia coli</i> ) bacteria, measure the pH, and compare the UV-vis spectra to human sunscreen products.	
<b>Help Received</b> Mr. Eric Teasley, Doctoral Student at Stanford University provided access to a lab and advice during the project. Also, San Francisco Zoo Staff Mr. Jim Nappi (Curator of Hoofstock and Marsupials) and Ms. Julie McGilvray (full-time Hippopotamus Keeper) gathered the hippopotamus skin secretion samples.	