



# CALIFORNIA STATE SCIENCE FAIR 2016 PROJECT SUMMARY

<b>Name(s)</b> <b>Elizabeth M. Salmond</b>	<b>Project Number</b> <b>S2209</b>
<b>Project Title</b> <b>Livin' the Hydra Life: Hydra Regeneration as Affected by Various Symbiotic Algae</b>	
<b>Abstract</b>	
<b>Objectives/Goals</b> To determine if speed and extent of regeneration of brown Hydra heads is affected by exposure to three different types of green algae.	
<b>Methods/Materials</b> Obtain three different species of green algae such as Chlorella Vulgaris, Arthrospira Platensis, and Nannochloropsis. Obtain 4 Petri dishes. Fill each dish with Hydra Media. Using digital microscope, dissect a Hydra at mid-body, separating foot end and place it in first dish. Repeat until there are 5 Hydra foot ends in each of the 4 dishes. First dish is the control. Add 75 ml of first algae to dish 2, 75 ml of next algae to dish 3, and 75 ml of last algae to dish 4. Place lids on all. Using the microscope, check each of the dishes at regular intervals post amputation: 6, 9, 18, 24, and 36 hours. Using a regeneration chart, track counts of Hydra at each of the 6 regeneration stages.	
<b>Results</b> I did 2 trials of 10 total per dish. Tracking the final head count regeneration, Chlorella Vulgaris algae had 9 out of 10 heads fully regenerated with tentacles. Control group had 6 of 10 heads regenerated as did the Nannochloropsis dish. The Arthrospira Platensis dish was last with only 3 heads. Most Hydra take between 24-36 to become fully regenerated. But Chlorella Vulgaris was the first and only algae to have a fully regenerated Hydra by 18 hours. Next best was a tie between control group and Nannochloropsis algae, although the algae group was a bit faster. Slowest rate of regeneration was Arthrospira Platensis algae. It regenerated only 3 heads, half of what control did. Arthrospira was also the only one that after 36 hours still had Hydra in the 4th stage. All of the other groups had regenerated to at least the 5th or 6th stage at this time.	
<b>Conclusions/Discussion</b> The different kinds of algae had major effects on Hydra regeneration. Chlorella Vulgaris algae had positive symbiotic relationship with the Hydra # the Hydra took on the green color of the algae and grew to much larger proportions. The worst was Arthrospira Platensis algae which surprised me as it underperformed even the control group. Upon further study, I learned that because of the peculiar shape of the particular strain of cyanobacteria known as Arthrospira Platensis, having a symbiotic relationship with another microorganism can be very difficult. The spiral shape of the Arthrospira Platensis could be the reason why the Hydra did not thrive in this environment, but more research is needed.	
<b>Summary Statement</b> Recognizing the symbiotic relationship between Hydra and green algae, this projects tracks both the speed and effects of regeneration of Hydra heads when exposed to three different species of algae.	
<b>Help Received</b> Felix Grün, Ph.D., at the Center for Complex Biological Systems at University of California, Irvine, provided me the Hydra and the Hydra media. I obtained the algae from Algae Research Supply in Carlsbad, California. My mom helped me set up the Excel file for making the charts.	