



CALIFORNIA STATE SCIENCE FAIR 2013 PROJECT SUMMARY

Name(s) Justin S. Chang	Project Number J1705
Project Title The Prevention of the Cancer, Crown Galls	
Abstract Objectives/Goals The objective of this experiment is to find the best antioxidant to prevent the common plant cancer, crown galls, in English Primroses. Methods/Materials To grow and reproduce the bacteria, <i>Agrobacterium Tumefaciens</i> , six petri dishes were used to create a culture for the <i>Agrobacterium Tumefaciens</i> . Over a period of five days, five English Primroses were treated to 500 mg of beta-carotene; five English Primroses were treated to 500 mg of lycopene; five English Primroses were treated to 500 mg of Vitamin C, and five English Primroses were treated to 400 IU (approx. 500 mg) of Vitamin E. Also, five English Primroses were treated with only water (this was the control group). After five days, all of the English Primroses were exposed to the <i>Agrobacterium Tumefaciens</i> . The bacteria were injected into all of the English Primroses with a needle and syringe. Results The plants treated with beta-carotene had a total of three infected plants. The plants treated with lycopene had a total of five infected plants. The plants treated with Vitamin C had a total of five infected plants. The plants treated with Vitamin E had a total of three infected plants. The control group, which was treated with only water, had four infected plants. Conclusions/Discussion As proven by the results, the antioxidant that best prevented the cancer was beta-carotene. Of the five plants treated with beta-carotene, only three were infected with the crown gall disease. Beta-Carotene and Vitamin E had a total of three plants infected. Results showed that beta-carotene was the most efficient antioxidant because it was best in suppressing the cancer for a longer time. It took beta-carotene five weeks to reach a number of three infected plants. It took Vitamin E only four weeks to reach this number. As shown by the evidence, beta-carotene was proven to be the best antioxidant that most efficiently prevents this disease. After the third week of testing, the control group had three infected plants with the crown gall disease while the other groups had one or less infected plants. This shows that the use of antioxidants can delay the crown gall disease.	
Summary Statement To prevent the common plant cancer, crown galls, beta-carotene, lycopene, Vitamin C, Vitamin E, and water were tested against the cancer.	
Help Received My science teacher, Mr. Briner ordered the bacteria and answered questions; My parents bought me materials.	