



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Gregory J.C. Brostek	Project Number J1505
Project Title Plant Cancer: Can It Be Treated?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My objective was to see if I could effectively treat the Agrobacterium tumefaciens bacteria caused tumors on tomato plants with natural and pharmaceutical agents, and which would work best. My hypothesis was that Amoxicillin would be most effective.</p> <p>Methods/Materials Innoculate 5 healthy tomato plants with the Agrobacterium tumefaciens bacteria. Document and observe for 9 days the growth of tumors on the plants stems. Measure the diameter of each tumor on day 10, puncture the tumor to allow penetration, and treat each plant's tumor topically with a different agent every other day. Agents used were garlic, tea tree oil, Vitamin C, Amoxicillin and distilled water as a control. Every 4 days tumors were measured and results noted and documented.</p> <p>Results Control tumor increased in size 300%, Garlic treated tumor increased in size 233%, Amoxicillin treated tumor increased in size 167%, Vitamin C treated tumor increased in size 100%. Tea Tree Oil killed the tomato plant so there were no comparative results. Vitamin C was the most effective in limiting the size of the tumor.</p> <p>Conclusions/Discussion My hypothesis was wrong. Vitamin C was the most effective treatment. Amoxicillin did have a favorable response but it is not practical since the antibiotic would enter the fruit and be ingested by people which is not healthy, nor cost effective. Garlic was slightly effective and may have worked better in a stronger concentration, but the garlic taste would transfer to the tomato which is an undesirable side effect. The terpenes in the tea tree oil applied topically were too strong of an agent for the tender tomato plant. Agrobacterium tumefaciens bacteria is unique because it transfers part of its DNA to the plant and integrates into the plant's genome. I believe the Vitamin C worked best because after doing research I found that it is an antioxidant. Antioxidants neutralize the free radical and nitrate cells and minimize the oxidative damage to the DNA. Knowing my results I would like to do this experiment again but I would only use Vitamin C, at different concentrations and I would administer it systemically through the soil. The challenge would be to reduce the size of the tumor without causing the tomato to take on a strong acidic taste from the Vitamin C. The findings in my experiment lend credence to the practice of using natural antibiotics with possible benefits of suppressing the formation of tumors in people.</p>	
Summary Statement My project is about the effectiveness of various natural and pharmaceutical antibiotics in treating the Agrobacterium tumefaciens bacteria .	
Help Received Mom helped with applying for the USDA live pest permit and took photos.	