



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

Name(s) Jenny O. Ross	Project Number S1428
Project Title Herbal Remedies and Cell Division	
Abstract Objectives/Goals To see whether the introduction of herbal extracts causes the mitotic rate to increase or decrease in onion root cells. Methods/Materials Materials: 1.Onions; 2.Herbs 10 grams; 3.Water; 4.Pot in which to boil the water and herb; 5.Containers; 6.Knife; 7.1 M HCl; 8.Clothespin; 9.Slides and covers; 10.Bunsen burner; 11.Paper towel; 12.0.5% aqueous solution of toluidine blue; 13.Microscope; 14.Safety glasses Methods: 1.Bring 10 oz. of water to a boil. Turn off heat and add 1 oz. of plant material. Allow it to steep for one hour. 2.Water onion bulbs with solutions and one with water (control). 3.Cut off the first few mm of a root after roots emerge and lay it on your slide. 4.Cover the root with two drops of HCl. Using a clothespin to hold the slide then pass it back and forth over the flame of a Bunsen burner for five seconds. 5.Use the edge of a paper towel to remove excess HCl and cover the root with toluidine blue. Pass the slide above the Bunsen burner flame two times without boiling. Let stand for one minute. 6.Remove excess stain. Add a drop of toluidine blue and apply a cover. Place the slide between two layers of paper towel and apply pressure to spread the root tissue. 7.Examine the slide (40X) and identify various stages of mitosis. Results Water : Interphase: 75.24%, Mitosis: 24.76%; St. John's Wort : Interphase: 44.98%, Mitosis: 55.02%; Chamomile: Interphase: 64.87%, Mitosis: 35.13%; Echinacea: Interphase: 81.2%, Mitosis: 18.8%; Essiac: Interphase: 73.39%, Mitosis: 26.61% Conclusions/Discussion These results suggest that the average root spends 75% of the time in interphase and 25% of the time in mitosis. St. John's Wort greatly increases the rate of division (by 30%). In other words, this herb will increase the rate at which wounds heal, it encourages mitosis. Chamomile also increases the rate of mitosis (by 10%). Essiac, an herb recommended for cancer patients also increased the rate of division, by 2% which is insignificant by a chi square test. The only herb tested that lowered the rate of cell division was Echinacea (by 6%) which was also insignificant by a chi square test. These results were surprising, considering that Essiac is an herb prescribed to cancer patients and therefore expected to slow the rate of mitosis. Concentration may have altered these results, even a beneficial herb in high concentrations can cause damage.	
Summary Statement My project tests the effects of herbal extracts on the mitotic rates in onion root cells.	
Help Received Used equipment at PCS under the supervision of Mr. Stealy.	