



California Science Center  
**CALIFORNIA STATE SCIENCE FAIR**  
**2001 PROJECT SUMMARY**

<p><b>Your Name</b> (List all student names if multiple authors.) <b>Christopher K. Saroki</b></p>	<p><b>Science Fair Use Only</b></p>
<p><b>Project Title</b> (Limit: 120 characters. Those beyond 120 will be ignored. See pg. 9) <b>Using Chemiluminescence to Test the Effectiveness of Various Antioxidants</b></p>	<p style="font-size: 2em; font-weight: bold;">S0327</p>
<p><b>Preferred Category</b> (See page 5 for descriptions.) <b>3 - Biochemistry / Molecular Biology</b></p>	<p><b>Division</b> _ Junior (6-8) <u>X</u> Senior (9-12)</p>
<p><b>Abstract</b> (Include Objective, Methods, Results, Conclusion. See samples on page 14.) Use no attachments. Only text inside these boxes will be used for category assignment or given to your judges.</p> <p><b>Objective:</b> The objective of this experiment was to use chemiluminescence as an indicator of the strengths of various antioxidants at different concentrations.</p> <p><b>Materials and Methods:</b> A unique system and apparatus were designed for the experiment. Luminol, when mixed with the oxidant H<sub>2</sub>O<sub>2</sub>(hydrogen peroxide), produces light. To test substances, solutions of the substances were prepared at various concentrations and added to the hydrogen peroxide. The resulting solution was mixed with the luminol solution and the intensity of light produced by the reaction was measured in lux. The control was water.</p> <p><b>Results:</b> All of the substances tested, except for Coenzyme Q-10, showed an inverse relationship between the concentration of the substance and the light intensity produced by the reaction between hydrogen peroxide and luminol. For citric and ascorbic acid, the luminol reactions produced almost no light at 1M and .1M concentrations and progressively produced more light as the concentration was decreased. Pycnogenol also showed a similar inverse relationship, but Coenzyme Q-10 did not.</p> <p><b>Conclusion:</b> The data supports the conclusion that ascorbic acid, citric acid, blueberries and pycnogenol are effective antioxidants, as was hypothesized. The data also shows that the system used to determine to test the strengths of the antioxidants is effective. Coenzyme Q-10 did not have any antioxidant properties. The results revealed that citric acid is stronger than ascorbic acid. The data from this experiment suggests that ascorbic acid, citric acid, blueberries and pycnogenol should be included in each persons diet in order to help counteract the harmful properties of free radicals.</p>	
<p><b>Summary Statement</b> (In one sentence, state what your project is about.) The purpose of this project was to use chemiluminescence as an indicator of the effectiveness of various substances at different concentrations to counter-act the properties of the free radical hydrogen peroxide.</p>	
<p><b>Help Received in Doing Project</b> (e.g. Mother helped type report; Neighbor helped wire board; Used lab equipment at university X under the supervision of Dr. Y; Participant in NSF Young Scholars Program) See Display Regulation #8 on page 4.</p>	