



**CALIFORNIA STATE SCIENCE FAIR  
2007 PROJECT SUMMARY**

<b>Name(s)</b> Meenakshi T. Mukherjee	<b>Project Number</b> <b>S0509</b>
<b>Project Title</b> <b>Deterioration of Dopamine in Parkinson's Disease: The Effect of Curcumin and Ascorbic Acid on the Stability of Dopamine</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> Curcumin will have, if not a greater, a similar affect upon the dopamine structure as ascorbic acid. Because of curcumin's aromatic diketone structure it will have similar effects on removing free radicals and preventing the degeneration of dopamine. Curcumin forms complexes with metal ions as seen in our past studies. Because curcumin can complex metal ions, the dopamine iron interaction or complexation can be minimized by the addition of curcumin. This is a unique property of curcumin not present in the case of ascorbic acid. Agents, such as curcumin which can complex iron are assumed to help in reducing the effect it has on dopamine.</p> <p><b>Methods/Materials</b> Curcumin, Iron (II), Dopamine, HCl, Hydrogen Peroxide, Ethyl Alcohol, vials, spatula, mass spectrometer, analytical balance. Curcumin, Ascorbic acid, Dopamine, and iron were dissolved in ethyl alcohol. The nineteen various solutions were then made and analyzed after one week. Curcumin samples were put through a mass spectrometer in order to determine the makeup and composition. Data was then looked at and analyzed.</p> <p><b>Results</b> After one week all the curcumin solutes had changed color, or had become darker signifying curcumin forming complexes with dopamine and iron. Iron complexes show formation of the iron-curcumin complex which was isolated and confirmed by mass spectra. Formation of a dopamine-curcumin precipitate which gradually turned darker as shown earlier is seen. The precipitation in the iron solutes is most probably due to the iron-dopamine and iron-curcumin complexes, or possibly a triple complex of the three agents. Interestingly, when H<sub>2</sub>O<sub>2</sub> was also present the precipitate was considerably weaker. This may be due to interaction between iron and H<sub>2</sub>O<sub>2</sub> thus preventing iron from complexing with curcumin and dopamine. Due to the lack of precipitate that was formed in test tubes containing ascorbic acid along with the light coloration of the solutes, one must draw conclusions that ascorbic acid was effective in stabilizing dopamine.</p> <p><b>Conclusions/Discussion</b> Based upon the data gathered throughout the experiment, the hypothesis that curcumin will have a similar, if not greater effect upon the stabilization of dopamine as ascorbic acid does, is not supported. This is assumed to be due to the different ways in which curcumin and ascorbic acid react with dopamine and in the aiding of Parkinson's disease.</p>	
<b>Summary Statement</b> Comparison of the effects of curcumin and ascorbic acid on dopamine.	
<b>Help Received</b> Used the lab equipment at University of Irvine California	