



**CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY**

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Project Title Protecting DNA (The Code of Life) from Oxidation Damage by using Antioxidant Pills	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Cancer is a genetic disease, and Genes are made of DNA. DNA is continually being damaged by oxygen free radicals generated in the air that we breathe. I sought a scientific way and direct method to prove if antioxidant supplements actually protected your DNA.</p> <p>Methods/Materials Three major components are required, (1) a liquid substance to damage and digest DNA, (2) pure chromosomal DNA, and (3) antioxidants to protect the DNA. My first method was to obtain a unique, natural and safe model system for damaging DNA. I researched, read and studied that Fluid in the Venus Fly Trap (VFT) plants could degrade proteins but discovered on my own that such fluid degrades DNA. I grew VFT plants and placed bugs or small objects in the "trap" to stimulate release of digestive fluid. Secondly, I isolated chromosomal DNA from onions, beef muscle and other cells. Thirdly, I made separate solutions from several antioxidant pills. I used an electric DNA gel to analyze my samples and a black/white camera to record the gel results. These pictures were scanned and made into numbers for graphs.</p> <p>Results To test my DNA damaging system I took VFT digestive fluid (sequential dilutions) and mixed it with mouse cell DNA in a small tube. These digested DNA samples and a negative control (without digestive fluid) were electrically moved within a 1% agarose testing gel to size separate the DNA into large undamaged pieces of DNA and small damaged, digested DNA fragments. It worked, VFT digestive fluid degraded DNA into small pieces. I now conducted my key experiments and produced a reaction by adding a panel of antioxidant solutions together with VFT digestive fluid and DNA. After a set time I revealed the extent of DNA protection by running the samples on a new 1% agarose testing gel. The DNA in the gel was large (Not degraded) in many of the exotic antioxidant solutions, but chopped up small (degraded) in many of the popular antioxidants tested.</p> <p>Conclusions/Discussion My experimentation provided surprising results. Commonly advertised antioxidant pills such as vitamins A and C exhibited weak DNA protection potency while more exotic antioxidants like green tea extract, grape seed extract and ginseng were extremely potent DNA protection agents. These experiments provide wise choices to those of us who want to save our DNA for years into the future.</p>	
Summary Statement To determine if antioxidant pills protect your DNA from oxidative damage and degradation.	
Help Received Mother helped isolate DNA and provided lab equipment and training, helped with calculations.	