



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Michelle K. Reed	Project Number J0413
Project Title Purified Antioxidants Protect DNA and Life from Oxygen Free Radicals	
Abstract Objectives/Goals Oxygen naturally creates free radicals in our bodies and in water. Oxygen free radicals damage DNA and cause disease, cancer and aging. I tested such free radical DNA damage and planarian worm lifetime effects. I used a related series of pure antioxidants (Tannic, Ellagic and Gallic Acid) to test if they would block free radical DNA damage and protect the worms lifetime. Methods/Materials To copy free radical generation, speed up and control it, I am using the Fenton reaction, in which adding certain amounts of copper sulfate and hydrogen peroxide in water creates free radicals. I exposed DNA that I made in the lab using PCR and planarian worms to free radicals made in the Fenton reaction. I measured the oxidative damage to DNA by gels and worms by scoring. I used many Dilutions of fenton and antioxidant chemicals to find out their toxicity to worms. I used the lowest toxic concentrations of each Fenton chemical. I tested non-toxic concentrations of Gallic, Tannic, Ellagic acid, and Pomegranate juice. All antioxidants were tested to see if they could protect the DNA from damage and worms lifetime. Results Both Tannic and Ellagic acid protected both the worms lifetime and DNA from damage, but Tannic acid itself is toxic to worms. Gallic Acid protected the worms but not the DNA. Conclusions/Discussion Gallic , Ellagic and Tannic acid are a Family of antioxidants. Gallic is the single unit. Ellagic is two Gallics. Tannic is five or more Gallics. If More is better, tannic should be the best antioxidant. Tannic is toxic, maybe for the same reason it TANS leather. Ellagic is a very strong antioxidant protects the worms and DNA and is not toxic. Gallic is a good antioxidant by protecting the worms, but not the DNA. Gallic acid may be complementing antioxidant genes in the Worm.	
Summary Statement I am trying to find out which pure antioxidant protects DNA and Planarian worms from oxygen free radicals made in a Fenton reaction.	
Help Received Mother- Planarian worm care and note book format. Father- PCR, DNA, Computers, poster, Lab tools and supplies, practice speaking.	