

# CALIFORNIA STATE SCIENCE FAIR 2015 PROJECT SUMMARY

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### **Project Title**

A Novel Treatment For Parkinson's Disease: Preventing Exidative **Stress with Chocolate** 

## Objectives/Goals

My objective was to provide a treatment for Parkinson's Disease by preventing exida chocolate. Parkinson's disease, a neurodegenerative disease, is a progressive disorder **b**f the nervous system that affects one#s movement, thereby causing significant disability

**Abstract** 

#### Methods/Materials

I worked with 2 different Parkinson's Disease mutated Caenorhabditis elegans, V treated both the strains of C. elegans with 5 different chocolate compounds and 2 controls. The chocolate compounds that I used were EGCG, found in green tea, Palmitic and Linoley Acid, found in milk chocolate, Theophylline, found in tea, and Trigonelline, found in coffee. Ny 2 controls were Ascorbic acid (Vitamin C) and Water. I induced oxidative stress, by feeding juglove, a chemical, to the worms. The assays that I performed were:

- 1. SOD assay to measure the Superoxide Dismutase arrivity and measure and compare the levels of oxidative stress.
- 2. I looked at the changes in the gene expression with the genes ND4 and SOD3.
- 3. I performed the chemotaxis assay.
- 4. I assessed the markers of neurological health, which includes the lifespan, growth rate, locomotion, and progeny production.

### **Results**

- Based on my data and analysis, the chocolate compounds reduced levels of oxidative stress.

  1. Theophylline reduced the most levels of SOD activity, which corresponded with the reduction of the levels of oxidative stress.
- 2. Mitochondrial damage is an effect of oxidative stress that contributes to the neurodegeneration caused by Parkinson's Disease. Linoleic Acid, EOCG, Trigonelline, and Palmitic Acid induced high concentrations of the mitochondrial gene ND4 which helps prevent mitochondrial damage, which shows that using chocolate has an added by us of decreasing mitochondrial damage.

#### Conclusions/Discussion

In conclusion, my hypothesis was fully supported, because the chocolate compounds reduced the oxidative stress levels, and could be used as treatments for Parkinson's Disease. Theophylline helped reduce SOD levels, which meant that the oxidative stress levels were reduced. In addition, EGCG, Linoleic Acid Palmitic acid and Trigonelline induced high concentrations of the mitochondrial gene preventing mitschood al damage, which ultimately treats Parkinson's Disease. ND4. thereby

### **Summary Statement**

My project provided a treatment for Parkinson's Disease using chocolate by preventing oxidative stress and reducing mitochondrial damage.

#### Help Received

I used lab equipment from Schmahl Science Workshops under the supervision of Dr. Elaina Chambers.