CALIFORNIA STATE SCIENCE FAIR
2017 PROJECT SUMMARY

Name(s)
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Project Number
S2319

Project Title
Grape Skin Powder Exhibits Potential Protective Benefit in a Drosophila Parkinson's Disease Model

Abstract

Objectives/Goals
The objective of this study is to investigate the potential beneficial effect of grape skin on Parkinson#s disease by incorporating grape skin powder into the daily food intake of a Drosophila Melanogaster model of Parkinson's disease.

Methods/Materials
Grape Skin Powder
Fly strains: Wt and PINK1B9 flies were raised according to standard procedures.
Life span analysis: 2 types of flies were used: wild type (WT, W-/Y; MHC/+) and mutant PINK1 (B9/Y; MHC/+). The flies of the same type/same age were randomized to bottles of either standard food, or food plus grape skin powder. All bottles were renewed every 3 days to maintain a healthy environment, and the number of surviving flies was recorded until there were none left.
Mitochondrial morphology analysis: Flies were fed with different food for one week. Thorax was removed by dissection, and indirect fly muscle was examined using mitoGFP by live imaging.
Abnormal wing posture analysis: PINK1 fly eggs were laid in tubes with different food and the newly born flies were fed with fresh food every 2-3 days. After a week, the number of normal and abnormal wing flies were counted.
LC3 Western Blot: UAS-LC3-GFP was expressed in the muscle of flies with the indicated genetic background, and the level of autophagy was determined by Western Blot using anti-GFP antibody.

Results
Grape skin powder not only rescued abnormal wing posture in the PINK1 mutant flies, but also prolonged the lifespan of the mutant flies. I further showed that grape skin powder was able to partially rescue the abnormal mitochondrial aggregation phenotype through induction of autophagy in these mutant flies.

Conclusions/Discussion
The study suggested grape skin powder has potential neuroprotective benefit on Parkinson's disease through autophagy activation to mediate the mitochondria function.

Summary Statement
I showed that grape skin powder exhibits potential protective benefit in a Drosophila Parkinson#s Disease model through mediating mitochonrial function..

Help Received
I got help in scientific discussion and some experimental design, fluorescence microscopy, from Dr. Zhihao Wu in the Dept. of Pathology at Stanford University.