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Grape skin powder mediates mitochondria function by autophagy activation and exhibits potential protective benefit in a *Drosophila* Parkinson's Disease Model

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Recent studies suggest that moderate red wine consumption may confer several health benefits: longer lifespan, protection against heart diseases, certain cancers and age-related neurological diseases. These health benefits are believed to come from a compound called resveratrol. Here we investigate the potential effect of grape skin from pure merlot on Parkinson's disease by incorporating grape skin powder into the daily food intake of *Drosophila melanogaster* with *PINK1* loss-of-function. The benefits of consuming this grape skin powder have featured not only the improvement of indirect flight muscle functions, as shown in the rescue of abnormal wing posture in *PINK1* mutant flies, but also prolonged the lifespan. The effect on WT flies' life span is not significant. Mitochondrial dysfunction is linked to the pathogenesis of Parkinson's disease, in particular, *PINK1* has been suggested to interact with mitochondrial fusion/fission machinery and the autophagy pathway. To underscore the beneficial qualities of the grape skin, we further showed that consumption of the grape skin powder demonstrated a rescue of mitochondria aggregation phenotype in the muscle of *PINK1* mutants. Moreover; results from western blots exhibited significantly elevated levels of LC3-II in the muscles of grape powder fed flies, indicating increased mitochondria autophagy. This effect is more obvious in flies fed with grape skin than the pure resveratrol compound. In addition, mutant flies appeared to be more sensitive than wild type flies. Our study suggested grape skin powder can induce autophagy activation, mediate the mitochondria function, and has potential protective benefit in a Parkinson's disease model.

Biography

Alan Wu is an intern student working in Dr. Bingwei Lu's lab in Stanford University School of Medicine. He is currently a Junior in the Crystal Springs Uplands High School. This study is done with the instruction and guidance from his mentor, Dr. Zhihao Wu, who is a post-doc in Dr. Lu's lab.

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