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The Effects on Mitochondria of Exercise Intervention PINK1 RNAi Drosophila Model of Parkinson's Disease Progression

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Objective This research were using PINK1 RNAi drosophila model as object to investigate the effects of the 3 weeks duration exercise intervention drosophila model of Parkinson's disease progression. Including mitochondria gather situation and mitochondria complex I activity and climbing activity and wing posture. Trying to prove that Exercise-training can help with the Parkinson disease's symptom, and also to find out the mechanism of the result.

Methods Two genotype were used in this research, the normal type VAS-mtGFPo Mhc/Mhc and the Parkinson type VAS-mtGFP/Cyo Mhc-RNAi/TM2 and all with fluorescent labeling mitochondria by GFP. The exercise-training last for 3 weeks, 5 times per week, we separated the Parkinson type in 4 groups by different training time: 0min per day, 30min per day, 60min per day and 90min per day. The healthy type was control group. We measured the climbing ability and the wings posture every week, also used confocal microscope to watch the aggregation of mitochondria of the chest muscle every week. After 3 weeks training, we grinded all the drosophila to get the mitochondria, and measured the activity of mitochondria complex I. At last, we compared every index of each group with T-text by using SPSS 17.0 and the significance level as the criterion.

Results 1) The climbing ability: No significant difference found in first week, there was a significant difference between 0min group and 30min group in second week and there was a very significant difference between 0min group and 30min group in third week. ($P < 0.01$). 2) Wing posture: There was a very significant difference between 0min group and 30min group in third week. ($P < 0.01$). 3) Activity of mitochondria complex I: Because of the small sample of this experiment, we can't get a appropriate concentration of mitochondria, but we still got some changes between 30min and 0min. 4) The pictures of mitochondria by confocal microscope: The 30min group has the least aggregations of the mitochondria but a lot aggregations were found in other pictures of other group.

Conclusions 1) The suitable Exercise-training can improve the climbing ability and the account of wing posture and extend the life span of drosophila model of Parkinson's disease. 2) The suitable Exercise-training can relieve the situation of mitochondrial gathering and improve the activity of mitochondrial complex I.