Impacts of Levodopa and Traditional Medicines on the Locomotion of Alpha-Synuclein Caenorhabditis elegans

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Parkinson’s Disease is a slowly progressive neurodegenerative disorder caused by the death of dopamine-producing neurons. Due to a decrease in dopamine, patients suffer from both motor and nonmotor symptoms. Currently, the most common conventional medicine treatment is levodopa. However, as the body develops a tolerance after its long-term use, patients need a higher dosage to experience the same clinical benefits. As the levodopa dosage increases, it causes both motor and nonmotor complications that further lowers patients' quality of life. In order to address the various complications caused by levodopa, this study analyzed the combined effect of using both levodopa and traditional medicine as a complementary treatment. Specifically, the present study tested three combinations of medicine solutions including 1) ginkgo biloba and levodopa 2) turmeric and levodopa 3) velvet beans and levodopa on alpha-synuclein Caenorhabditis elegans (C. elegans). C. elegans were used as a model organism in this study because they have a short lifespan and are easy to both culture and maintain. Considering that one of the major symptoms of Parkinson’s is bradykinesia (slow movement) and alpha-synuclein C. elegans move significantly slower than wild-type C. elegans, the change in the mean number of body bends was analyzed to find the most ideal combination. This study showed that only the combined use of ginkgo biloba and levodopa led to a significant improvement in the locomotion of the C. elegans compared to the control group that received no treatment. Consequently, this suggests that in order to delay the motor and nonmotor complications that arise from long-term levodopa use, ginkgo biloba and a low dosage levodopa can be administered, thus improving patients’ quality of life.

Awards Won:

Fourth Award of $500

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