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Chemistry Department Seminar Series

A Locomotor Activity Study of the Effects of L-serine to Neurodegeneration Impacts of Beta-Methylamino-L-alanine in Drosophila melanogaster

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Friday, October 25, 2019
1:00 P.M. - 1:50 P.M. | S2-107

Abstract

Amyotrophic Lateral Sclerosis-Parkinsonism Dementia Complex (ALS-PDC) is a neurodegenerative disease that described by loss of motor function, tremors, and dementia due to neurodegeneration. The disease is thought to be caused by Beta-Methylamino-L-Alanine (BMAA), a neurotoxin from blue-green algae. Since it has a structure that is similar to glutamate, BMAA act as an agonist to the glutamate receptor N-methyl-D-aspartate which lead to excitotoxicity and degenerate neurons. L-serine is an essential amino acid that has shown to interfere with the effect of BMAA in vivo studies. The purpose of this research is to further test the novel impact of L-serine to BMAA-induced fly in long-term study. The interaction of BMAA and L-serine was analyzed through circadian rhythm activity and viability of wild-type Drosophila melanogaster in ALS-PDC model. We used two Drosophila Activity Monitor (DAM) systems to measure activity of 64 fruit flies (Gender and Age-Match). The experimental groups were fed with L-serine, BMAA, BMAA+L-serine and the control group was fed with standard fly agar. Fly activity was recorded by the number of fly pass the IR beam in the monitor for 10-day (12L/12D at 22°C). The data from DAM shows the abnormal activity of flies in long term when inducing with BMAA such as abrupt sleep due to high activity during dark phase. L-serine shows to reduce down the high activity when cofed with BMAA. This supports our hypothesis of L-serine ameliorates the effects of BMAA in fly. The preliminary data is a starting point for further research to understand the disease pathway of ALS-PDC.

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