Ginsenoside CK and RK1’s Effect on High Intensity Social Behaviors of Aggression in a Tauopathy Model of Alzheimer’s Disease in Drosophila melanogaster

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Alzheimer's Disease (AD) is a progressive neurodegenerative disorder, which causes memory loss and cognitive decline, and often leads to behavioral changes, increasing levels of agitation, and aggression. Human aggression is heavily influenced by the impact of hormones on neural circuits. Research studies show Panax quinquefolius (ginseng) effectively regulates the immune response and hormonal changes due to stress, thus helping to maintain homeostasis. Ginsenosides are the main bioactive compound found in ginseng. Compound K (CK) and Compound RK1 are secondary ginsenosides, meaning they are more bioavailable and soluble than its major ginsenoside. Because ginseng has been shown to exhibit antioxidant/anti-inflammatory effects, ginsenosides could help alleviate neuroinflammation and balance hormone levels, serving as an effective dietary supplement to improve behavior levels. In this experiment, a tauopathy model of AD in Drosophila melanogaster was used as the model organism as they exhibit high intensity aggressive behaviors. This study measured dominant and non-dominant aggressive behaviors and behavioral plasticity of Drosophila through aggression assays in an enclosed fighting chamber. Groups of flies with and without ginsenoside supplementation were tested. Following experimentation and data collection, preliminary results from this study suggest that ginsenosides reduce high intensity behavioral patterns of aggression in both Wild-type and tauopathy models of Drosophila melanogaster and are best used as a preventative treatment. Future experiments should compare the interactions of Wild-type flies in contact with Alzhemier's flies to see if this changes behaviors.

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