The Effects of a Ketogenic Diet on Behavior and Synaptic Transmission in a Drosophila Model.

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Abstracts will be considered for both poster and platform presentations

Neurophysiology

The ketogenic diet is commonly used to control epilepsy, especially in cases when medications cannot. The diet typically consists of high fat, low carb, and adequate protein which produces the metabolite acetoacetate. Seizure activity is characterized by glutamate excitotoxicity and therefore glutamate regulation is a point of research for control of these disorders. Acetoacetate is heavily implicated as the primary molecule responsible for decreasing glutamate in the synapse; it is believed that acetoacetate interferes with the transport of glutamate into the synaptic vesicles. The effects of synaptic transmission at glutamatergic synapses was studied in relation to the ketogenic diet in Drosophila larvae for this project. Survival rates, developmental curves, behavioral assays and measures of synaptic transmission were conducted. Higher fat diets decreased survival and reduced behavioral responses. We are currently measuring the size of the miniature postsynaptic responses as it relates to a change in quantal response and evoked synaptic responses. We are also addressing the effects on the kinetics of synaptic transmission as well as the effects of direct application of acetoacetate on synaptic transmission and larval behaviors. This research is significant in addressing the mechanism of action of acetoacetate on synaptic transmission and the developmental effects on neural systems.