

Vitamin E modifies high-fat diet-induced reduction of seizure threshold in rats: Role of oxidative stress

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Abstract: There is increasing evidence that oxidative stress is a causal factor in different neurodegenerative disorders such as Alzheimer's disease and epilepsy. High-fat diet (HFD) has been shown to induce oxidative stress and neuronal damage that may increase susceptibility to seizures. The present study was undertaken to investigate the relationships between vitamin E, a potent antioxidant, HFD, and chemically induced seizures, using the PTZ seizure model in rats. Animals were randomly assigned into four groups: control, HFD, vitamin E (Vit E), and high-fat diet with vitamin E (HFD+Vit E) group. Vitamin E and/or HFD were administered to animals for 6 weeks. Thereafter, PTZ seizure threshold was measured in control and treated rats, and different brain regions were analyzed for levels of oxidative stress biomarkers. Current results revealed a significant reduction in PTZ seizure threshold in rats consuming HFD, which could be prevented by vitamin E supplement. Alongside, vitamin E supplement prevented HFD induced changes in oxidative stress biomarkers and capacity enzymes. Therefore, current results suggest that prolonged consumption of HFD increases susceptibility to PTZ induced seizures, which may be related to HFD induced oxidative stress. This increase in the PTZ susceptibility could be prevented by the administration of vitamin E, probably through its antioxidant effect, particularly at the brain hippocampal region.