

# Jordan University of Science and Technology

## The effect of high-fat diet on seizure threshold in rats: Role of oxidative stress

**Authors:** Karem H Alzoubi, Zuhair A Hasan, Omar F Khabour, Fadia A Mayyas, Omar N Al Yacoub, Saleem A Ranihani, Mohammad A Azab, Naer Alrahadi

**Abstract:** There is increasing evidence advocating for the causal association between oxidative stress and different neurodegenerative disorders such as Alzheimer disease and epilepsy. We have previously shown that consumption of High-fat diet (HFD) induces oxidative stress, which results in hippocampal neuronal damage hence impairment of learning and memory. This impairment was prevented by antioxidants. The reported damage in the hippocampus caused by oxidative stress following consumption of HFD could alter synaptic transmission in the hippocampus and may increase susceptibility to seizures. The present study was undertaken to determine if chronic consumption of HFD changes susceptibility to chemically induced seizures using the pentylenetetrazol (PTZ) seizure threshold model in rats. In this study, HFD was administered to animals for 6 weeks. Thereafter, the PTZ seizure threshold was measured in control and HFD rats. Different brain regions were analyzed for the levels of oxidative stress biomarkers. Results revealed a significant reduction (50.0??2.5%) in PTZ seizure threshold in rats consuming HFD. This was accompanied by a decrease in the oxidative stress biomarkers and capacity enzymes such as reduced/oxidized glutathione (GSH/GSSG) ratio, glutathione peroxidase (GPx) and catalase activities and increase in oxidized glutathione (GSSG) levels in the hippocampus and cortex regions of the brain of HFD rats. Collectively, current data suggest that prolonged consumption of HFD increases susceptibility to PTZ-induced seizures. Such an effect may be related to HFD-induced oxidative stress in the brain.