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P17. IMPACT OF A SHORT TERM FRUCTOSE DIET ON REDOX HOMEOSTASIS, AUTOPHAGY, AND SYNAPTIC FUNCTION MARKERS IN FRONTAL CORTEX OF YOUNG AND ADULT RATS: AN INTRIGUING MENAGE A TROIS

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The use of fructose as sweetener for beverages and processed food is strongly increased in the last decade. A high consumption of this sugar has been related to the onset of obesity, metabolic diseases and reduced synaptic plasticity. Since adolescents make a widespread consumption of added sugars, we decided to investigate the early risks of a short-term fructose-rich in frontal cortex of both young and adult rats, focusing on the effects on redox homeostasis, autophagy and synaptic function. We focused on this region, as its maturation continues until late adolescence, and includes areas critically implicated in higher-order cognitive functions. Short term fructose feeding was associated with an imbalance of redox homeostasis, as lower amount of Nuclear factor (erythroid derived 2)-like 2, lower activity of Glucose 6-phosphate dehydrogenase and Glutathione reductase as well as lower Glutathione/Oxidized Glutathione ratio were found. Furthermore, the activation of autophagy and a decrease of synaptic function markers were evidenced in fructose-fed young and adult rats. Interestingly, two key markers of brain functioning, BDNF signaling and Acetylcholinesterase, were affected by fructose diet in age dependent manner. Intriguingly, an increase of Acetylcholinesterase activity, which was previously associated with impaired learning and memory functions, was found only in young treated rats, suggesting a more detrimental effect of fructose feeding in young animals. Overall, our findings suggest that even young animals may severely suffer from the deleterious influence of fructose on brain health as the adults and suggest the need of targeted nutritional strategies to reduce its amount in foods.