

Effects of a tart cherry enriched diet on obese rats brain

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Increased food intake, reduced physical activity, and altered metabolic processes are the variables that affect energy balance inducing obesity. High Body Mass Index is associated with the development of cardiovascular risk factors such as hypertension, dyslipidemia, insulin resistance and diabetes mellitus leading to cardiovascular and cerebrovascular diseases promoting cognitive decline. Obesity has been suggested as a risk factor for Alzheimer's disease and vascular dementia and has been associated with poorer cognitive performance in population-based studies. Evidence suggests that overconsumption of high-energy foods and the associated obesity negatively influence brain function. This study has evaluated the potential effects of tart cherries (*Prunus Cerasus* L.) on the brain rats with Diet-Induced Obesity (DIO). They were fed for 17 weeks with a hypercaloric diet with the supplementation of tart cherries seeds powder (DS) and seeds powder plus tart cherries juice (DJS). DIO rats were compared to the control rats feed with standard diet (CHOW). Food consumption, body and fat mass weight, fasting glycemia, insulin, cholesterol, and triglycerides levels were measured. Immunohistochemical, immunohistochemical and qRT-PCR techniques were used to determine neuronal and glial alterations. No differences in body weight were found in treated rats compared to control group. In DS and DJS a decrease of blood pressure and glycemia and of serum levels of thiobarbituric reactive substances were found. Glial fibrillary acid protein expression decreased in the hippocampus and in the frontal cortex of treated rats. A reduction of microglial activation was also found. Moreover, neurofilament increased in treated rats compared to DIO. Tart cherries did not modify synaptic protein and TRP channels expression in DIO rats. Vascular tree and blood-brain barrier were also affected in DIO rats, with modulation in DS and DJS. These findings indicate that tart cherries, although did not affect body weight values prevent the development of related risk factors. In the brain tart cherries reduced inflammation. The results may represent the first step to clarify the possible use of tart cherries supplementation to prevent obesity-induced brain damage. Further studies are needed to better understand the specific mechanisms of action of tart cherry components.

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Key words

Obesity, high-fat diet, brain damage, antioxidants, tart cherries.