HIGH FAT DIET-INDUCED OBESITY IN MICE INHIBITS ENERGY METABOLISM IN BRAIN STRUCTURES RESPONSIBLE FOR MEMORY

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Introduction: Obesity is a multifactorial disease characterized by abnormal or excessive accumulation of body fat, which can adversely affect the health of the individual. Recent research has demonstrated the relationship of obesity with cognitive deficits as task performance, attention and spatial memory.

Objectives: Knowing that the process of acquisition and memory storage requires ATP, this study aimed to evaluate the activity of complex I, II and IV of the mitochondrial respiratory chain and creatine kinase in the hippocampus, striatum and prefrontal cortex of mice submitted the animal model of obesity induced by high fat diet.

Materials and Methods: Male Swiss mice (Mus musculus) with 40 days of age were divided randomly into two equal groups: one was fed with standard diet and the other with high-fat diet. After 10 weeks of the protocol for obesity induction, the animals were killed by decapitation, the brain was removed and the hippocampus, striatum and prefrontal cortex separated to perform biochemical analysis.

Discussion and Results: Our results show that animals subjected to animal model of obesity showed inhibition of the activity of complex I, II and IV of the mitochondrial respiratory chain as well as inhibition of creatine kinase activity in the hippocampus, striatum and prefrontal cortex.

Conclusions: Our results add to studies show that a diet rich in saturated fat may cause damages to the central nervous system as well as inhibit energy metabolism which contributes to the reduction in ATP production and, consequently lead to cognitive impairment.

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Keywords: obesity; hippocampus; energy metabolism.