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Cognition and obesity

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Abstract

Background: Obesity is a worldwide problem. Some studies revealed that it leads to deterioration of the cognitive function, regardless of age.

Objective: We aim to explore the effect of obesity on cognitive function in a rat model of obesity highlighting the role of glial cells.

Method: Twenty adult male albino rats were assigned to two groups: group I: consumed normal diet, group II: consumed high-fat diet. Body Mass Index (BMI), serum glucose, insulin, HOMA IR and lipid profile were measured. Also, hippocampal expression of Brain derived neurotrophic factor (Bdnf), synapsin, Ionized calcium binding adaptor molecule 1 (Iba), nuclear factor erythroid -related factor 2 (Nrf2), Myelin basic protein (Mbp) were measured by real-time polymerase chain reaction. The Morris Water Maze is a test used to assess spatial learning and memory capacities of rats.

Results: There was a high significant increase in lipid profile, serum glucose, insulin serum levels and HOMA-IR in obese groups with impaired Morris water maze performance compared to control group. There was a significant downregulation in hippocampal Bdnf and synapsin mRNA expression. In addition to decrease in Mbp mRNA expression ($P < 0.001$). This could be explained by oxidative stress through significant downregulation of Nrf2 mRNA, and inflammation observed in significant upregulation Iba mRNA gene expression in the obese group.

Conclusion: Many factors contribute to obesity associated cognitive impairment. In our study, we figured out the crucial roles of glial cells including microglial activation and oligodendrocytes affection with other underlying mechanisms including oxidative stress and hippocampal inflammation.

Keywords: obesity, hippocampus, cognitive, glial cells.

Biography

I am a lecturer of human physiology at Zagazig faculty of medicine for 3 years, I conducted many research work. However, I found my passion in neuroscience, and my studies now focus on myelin plasticity, and cognitive function of the brain. Regarding teaching, I have a great experience with undergraduates, furthermore, I am a certified trainer in the Faculty and leadership development center in Zagazig University.

Regarding my professional administrative work, I was assigned as a director of the interns training program for 7 years after graduation, Through my work, I witnessed many problems in healthcare sector of our university hospitals that pushed me to get CPHQ and then master of quality management in 2020, so I was promoted later in 2019 to be the deputy manager of Zagazig university hospitals. Now I am a board member of Alsharqia medical syndicate to share effectively in enhancing healthcare system in Egypt.