Comparative Study Of The Effects Of Type I And Type II Diabetes On Hippocampal Neuronal Population In Male Wistar Rats

Momeni Z., Behnam Rasouli M, Fereidouni M, Rostami S, Rouholamin S

Department of biology, Faculty of science, Ferdowsi university of Mashhad

Introduction: Diabetes mellitus is a metabolic disorder characterized by hyperglycemia due to defect in the secretion of, or resistance to insulin, or both. Diabetes causes neuronal loss in different areas of the brain specially hippocampus. The aim of this study was to investigate the effects of type I and type II diabetes on hippocampal neuronal density in rats.

Methods and Materials: Male wistar rats were divided into 3 groups (n=7) as follows; control, diabetes mellitus type I and diabetes mellitus type II. Type I diabetes mellitus was induced by a single subcutaneous injection of alloxan (130 mg/kg). For type II diabetes mellitus, drinking water containing fructose (10%) had been given to rats for 8 weeks. Two months after the induction of both types of diabetes mellitus, all brains were removed and the number of neurons was measured via stereological methods in all groups.

Results: Although type II diabetic rats showed a remarkable decrease in neuronal density compared to control group, it was not meaningful. Type I diabetic rats showed a meaningful reduction compared to control group. There was not a significant difference between experimental groups as well.

Conclusion: Neuronal loss in experimental groups can be due to oxidative stress induced by hyperglycemia and subsequent neuronal death. It should be noted, however, that development of type 2 diabetes complications is duration-dependent; and perhaps for such a reason type II diabetic rats did not show any meaningful differences compared to control ones.