Effect of transforming growth factor alpha of dentity jyrus neurons and pyramidal cells of CA1 subfiled of hippocampus following ischemia-reperfusion in Rats

Alipanahzade H (MSc)\(^1\), Soleimani M (PhD)\(^2\), Soleimani Asl S (PhD)\(^3\), Mehdizadeh M (PhD)\(^4\), Katebi M (PhD)\(^5\)

\(^1\)MSc in Anatomy, Department of Anatomy, Faculty of Medicine, Tehran University of Medical Sciences, Tehran, Iran.
\(^2\)Assistant Professor, Department of Anatomy, Faculty of Medicine, Tehran University of Medical Sciences, Tehran, Iran.
\(^3\)Assistant Professor, Department of Anatomy, Faculty of Medicine, Hamadan University of Medical Sciences, Hamadan, Iran.
\(^4\)Professor, Cellular and Molecular Research Center, Department of Anatomy, Faculty of Medicine, Tehran University of Medical Sciences, Tehran, Iran.
\(^5\)Assistant Professor, Department of Anatomy, School of Medicine, Hormozgan University of Medical Sciences, Bandar Abbas, Iran.

Abstract

Background and Objective: Ischemia-reperfusion invoke cell death in hippocampus. This study was carried out to investigate the effect of transforming growth factor alpha (TGF-alpha) of dentity jyrus neurons and pyramidal cells of CA1 subfiled of hippocampus following ischemia-reperfusion in rat models.

Materials and Methods: This experimental study was done on 40 male Wistar rats weighing 250-300gr. Animals were divided in four groups: control (n=7), sham (n=7), ischemia (n=14) and treatment (n=14). Sham group was just under surgical stress. In ischemia and treatment groups after induction of ischemia-reperfusion by obstruction of carotid arteries blocked for 30 minutes, reperfusion PBS (phosphate buffer salin) and subsequently TGF-alpha (50 ng) were injected stereotaxicaly in lateral ventricle, respectively. In 12 and 72 days after treatment the brains were fixated by transcardial perfusion and stained by immunohistochemistry and nissle methods. Furthermore, morris water maze was used to evaluate the learning memory. Data were analyzed using SPSS-16 and ANOVA test.

Results: Injection of TGF-alpha increased the cell number in hippocampus of treatment group compared to ischemic group. TGF-alpha increased expression of neuron in dentity jyrus of treatment group in comparison with ischemic group (P<0.05). Also spatial memory improved in treatment group in comparison with ischemia group.

Conclusion: TGF-alpha improves ischemia-induced neurodegenration and memory impairment.

Keywords: Ischemia-reperfusion, Spatial memory, Neurogeneis, Hippocampus, Transforming growth factor alpha

* Corresponding Author: Mehdizadeh M (PhD), E-mail: mehdizadehm@tums.ac.ir

Received 6 Sep 2011 Revised 19 Dec 2011 Accepted 8 Jan 2012