Original Paper

Effect of β-estradiol on traumatic memory after post-traumatic stress disorder induced by modified single-prolonged stress model in male Rats

Mirshekar M (BSc)1, Abrari K (PhD)*2, Goudarzi I (PhD)2, Rashidy-Pour A (PhD)3

1MSc Candicate in Animal Physiology, Faculty of Biology, Damghan University, Damghan, Iran. 2Assistant Professor, Department of Biology, Damghan University, Damghan, Iran. 3Professor, Department of Physiology, Research Center of Physiology, Faculty of Medicine, Semnan University of Medical Sciences, Semnan, Iran.

Abstract

Background and Objective: Post-traumatic stress disorder (PTSD) is an anxiety, which is induced by exposure to life-threatening trauma and produces memory dysfunctions. This study was done to evaluate the effect of β-estradiol on traumatic memory after post-traumatic stress disorder induced by modified single-prolonged stress model in male rats.

Materials and Methods: This experimental study was done on 70 male Wistar rats, weighted 200-250 grams. Initially 30 rats randomly allocated into control, shock and single prolonged stress accompanied shock (SPS&S). In SPS&S group immobilized for 2h, followed immediately with a 20 min forced swim conducted in a cylindrical filled with water. After recuperating for 15 min, animals anesthetized with ether. After 30 min recovery, stressed rats placed in the conditioned fear system (CFS). They received one 1mA, 4 second electric foot shock and remained in the chamber for another 60 second before being returned to their home cages. Shock group: Animals placed in CFS and only received the same shock as previous experiment. Naive group: Animals were removed from their home cages and exposed to chamber without receiving any foot shock. 1, 2 and 3 week later, animals in all groups were re-exposed to the shock chamber for 3 min, in order to examine conditioned fear response. In the second experiment rats were injected with β-estradiol (90 µg/kg), one and two week after training. Date were analyzed using SPSS-16, ANOVA and LSD tests.

Results: SPS&S significantly induced freezing response (traumatic memory) compared with controls and shock groups (P<0.05) following three weeks. This response significantly reduced due to repetitive injection of β-estradiol in rats (P<0.05). After three weeks causes of enhanced freezing response (traumatic memory) compare with both, shock and sham groups (P<0.001). β-estradiol significantly reduced this response in rats (P<0.001).

Conclusion: β-estradiol's administration following PTSD induction by modified single-prolonged stress, significantly decreased the freezing response. Therefore, β-estradiol can prevent the formation of traumatic memory.

Keywords: PTSD, SPS&S, β-estradiol, traumatic memory

* Corresponding Author: Abrari K (PhD), E-mail: abrari@du.ac.ir

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