

Original Paper

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

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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 μ g/kg), one and two week after training. Data 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

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Received 14 December 2011

Revised 12 March 2012

Accepted 12 March 2012