

**Abstract of MSc.thesis No, Faculty of Veterinary Medicine, Urmia University.**

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**Title of thesis: Effect of moderate-intensity exercise training on detrimental effect of ketamine abuse on spermatogonial stem cells self-renewal in wister rat**

**Abstract:**

Ketamine abuse and/or widespread use in clinical practice has been shown to disrupt spermatogenesis. The current study tried to uncover the moderate-intensity continuous exercise training (MICT) induced effect on spermatogonial stem cells (SSCs) self-renewal disruption after ketamine withdrawal. For this purpose, the rats were divided into control, MICT-sole, ketamine-sole (received .... mg/kg of ketamine for 8-week), ketamine withdrawal (received ketamine for 8 weeks and continued for 8-weeks ketamine-free period, ketamine/W) and MICT+ketamine (received ketamine for 8 weeks, continued for 8-week ketamine free period by considering MICT) groups. Next, the spermatogenesis development process, sperm count, serum level of testosterone, and the steroidogenic activities of Leydig cells were assessed. The expression levels of GDNF, Gfr $\alpha$ -1, and c-RET were analyzed. The MICT (more evidently versus ketamine/W group) ameliorated the ketamine-suppressed SSCs self-renewing process (represented by improved repopulation index), germ cell differentiation and maturation (reflected in improved tubular differentiation and spermiogenesis indices) and sperm count. The MICT up-regulated the testosterone level and the steroidogenic activities of Leydig cells in post-withdrawal period. The MICT+ketamine group showed a remarkable increase in the expression levels of GDNF, Gfr $\alpha$ -1 and c-RET, when compared to the ketamine-sole and ketamine/W groups. In conclusion, long-term exposure to ketamine can adversely affect the self-renewal of SCCs, but it can be reversed after withdrawal. However, considering MICT in the post-withdrawal period boosts the self-renewal process more significantly by maintaining Leydig cells steroidogenic and endocrine activities and ameliorating GDNF and its receptors (Gfr $\alpha$ -1 and c-RET) expression.

**Key words:** Ketamine, Moderate-intensity continues exercise training, spermatogonial stem cells, self-renewal, Rat