



## Exercise Biochemistry Review

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### **A Comparative Study of Different Intervention Methods on Protein Expression of ER $\alpha$ in Uterus of Ovariectomized Osteoporosis Rats**

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**Objective** The aim of this study was to compare the effects of different intervention methods on the protein expression of estrogen receptor alpha (ER $\alpha$ ) in the uterus of ovariectomized osteoporosis rats.

**Methods** Eighty healthy female SD rats, aged 3 months, were randomly divided into the following two groups by body weight: sham-operation (Sham) and ovariectomized (OVX). After ten weeks, the OVX groups were randomly divided into the following six groups by body weight: OVX; 17 $\beta$ -estradiol (E<sub>2</sub>); Genistein (G); treadmill exercise (TE); Lithium chloride (LiCl); Whole-body vertical vibration (WBVV). Then the rats were began to be treated with different intervention methods. The WBVV group rats were vibrated on a vibration platform twice per day for 7 weeks according to the following schedule: 90 hertz a minute and 15 minutes a time. The TE group rats were running on 5-uphill treadmills 45 minutes per day, 4 times a week, at a speed of 18 meters per minute. The G group rats were lavaged by genistein once per day according to body weight (dose 1mg/kg). The E<sub>2</sub> group rats were treated with neck subcutaneous injection with 17 $\beta$ -E<sub>2</sub> three times a week according to their body weight (dose 25ug/kg). At the end of 8 weeks intervention, during 36-48 hours, took blood from the abdominal aorta, and extracted the protein. The protein expression of ER $\alpha$  in uterus was detected by western blot.

**Results** After OVX, the uterus weight index and serum E<sub>2</sub> was significantly decreased. Both the uterus weight index and the serum E<sub>2</sub> level were significantly increased after treatment with E<sub>2</sub>. However, no significant differences were seen after treatment with the other four methods. As revealed by the western blot results, the protein expression of ER $\alpha$  in the OVX groups was significantly higher than that of in the Sham group. After treatment with E<sub>2</sub>, treadmill exercise, whole-body vertical vibration, and lithium chloride, the protein expression of ER $\alpha$  was significantly lower than that of in OVX group. However, the genistein treatment had no significant difference.

**Conclusions** Apart from genistein treatment, the other four interventions had inhibitive effects on the protein expression of ER $\alpha$  in uterus of OVX osteoporosis rats.