A Comparative Study of Different Intervention Methods on Protein Expression of ERα 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 (ERα) 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; 17β-estradiol (E2); Genisteine (G); treadmill exercise (TE); Lithium chloride (LiCl); Whole-body vertical vibration (WBVV). Then the rats was 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 E2 group rats were treated with neck subcutaneous injection with 17β-E2 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 ERα in uterus was detected by western blot.

Results After OVX, the uterus weight index and serum E2 was significantly decreased. Both the uterus weight index and the serum E2 level were significantly increased after treatment with E2. However, no significant differences were seen after treatment with the other four methods. As revealed by the western blot results, the protein expression of ERα in the OVX groups was significantly higher than that of in the Sham group. After treatment with E2, treadmill exercise, whole-body vertical vibration, and lithium chloride, the protein expression of ERα 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 ERα in uterus of OVX osteoporosis rats.