



Exercise Biochemistry Review

Proceedings of IBEC 2018, Beijing, China, October 23-25
PO-034

Effect of Voluntary Exercise on Cartilage Morphology of Knee Osteoarthritis in Obese Mice Induced by High-fat Diet

Wenhao Zong¹, Yang Liu², Lulu Dai¹, Guijun Dong¹
1. Shandong Sports University
2. Shanghai University of Sport

Objective To examine the effect of voluntary wheel-running exercise on cartilage morphology of knee osteoarthritis (KOA) in obese mice induced by high-fat diet, and explore the protective role of 4 weeks voluntary wheel-running exercise on KOA, finally providing effective experimental evidence for clinical treatment of knee osteoarthritis.

Methods C57BL/6J mice were randomly assigned to the C-Sed group, C-Ex group, HF-Sed group and HF-Ex group. The control groups were fed a control diet (13.5% kcal from fat), and the high-fat groups were fed a high-fat diet (60% kcal from fat). After feeding 8 weeks different diets, the exercise groups were starting running. In order to examine the effect of voluntary wheel-running exercise on cartilage morphology of KOA, the joint of knee were harvested to be fixed, decalcified and embedded in paraffin, and the four-micrometer-thick sections were stained with both HE and toluidine blue.

Results After feeding twelve weeks different diets, the body mass of the high-fat diet group mice has a significant increase, which demonstrates that high-fat diet could successfully induce the mice obese. From the results of HE and toluidine blue, in comparison to the C-Sed group, the surface of the knee articular cartilage in the HF-Sed group was not intact and smooth, and the thickness of articular cartilage has a significant decrease ($p < 0.001$); contrary to the HF-Sed group, the surface of the knee articular cartilage in HF-Ex group was slightly smooth, and there was significant increase in cartilage thickness.

Conclusions Four weeks voluntary wheel-running exercise can increase cartilage thickness, decrease the Mankin's score and delay the degeneration of knee cartilage in obese mice. To conclude, the short-term wheel-running exercise protects against obesity-induced KOA.