

Decreased Liver Tissue Wasting following High-Intensity Interval Training through Apoptosis Signaling Suppression in Breast Tumor-Bearing Female Mice

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Abstract

Introduction: Cachexia is a cancer complication that is associated with increased weight loss. Apoptosis has been known as one of the tissue-wasting pathways that cause weight loss and multiple organ failure in cancer-related cachexia. Various factors, including exercise training, can be effective in the reduction of cancer cachexia. In the present study, the effect of four weeks of high-intensity interval training (HIIT) on some biochemical indices of apoptosis in the liver tissue of breast tumor-bearing mice was investigated.

Methods: In the present experimental study, female BALB/c mice were randomly divided into two cancerous groups (control and HIIT) following the induction of breast cancer by the injection of the 4T1 cell line and sham group (phosphate buffer saline injection). Each HIIT session included 6 intervals of 3 minutes and 20 seconds (80%-95% of VO_2max) with 1-min active recovery (30%-35% of VO_2max), performed for 4 weeks, 5 days per week.

Results: The level of caspase-3 showed a reduction in the HIIT group compared with the control group ($P < 0.01$). The results also demonstrated an increase in the level of Bcl-2 and Bcl-2 to Bax ratio in the HIIT group compared with the control group ($P = 0.01$).

Conclusion: Based on the results, it seems that HIIT can reduce liver tissue wasting associated with breast cancer by decreasing caspase-3 and increasing Bcl-2 to Bax ratio.

Keywords: High-Intensity Interval Training, Cell Death, Breast Cancer