

The effects of aerobic training on microRNA let-7a expression and levels of tumor tissue IL-6 in mice with breast cancer

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Abstract

Background: IL-6 cytokine acts as a pro inflammatory factor in the tumor microenvironment in the breast cancer. As there is a positive feedback loop between IL-6 and microRNA let-7a, which is postulated to function as a tumor suppressor in most cancers, we investigated the effects of aerobic training on microRNA let-7a expression and levels of tumor tissue IL-6 in mice with breast cancer.

Methods: Twenty BALB/c mice (4-5 weeks old) were injected estrogen-dependent receptor breast cancer cells MC4-L2 and divided into two groups: tumor-training (TT) and tumor-control (TC) group. Then TT group performed progressive aerobic training for 6 weeks, 5 days per week (14-18 m/min). After tumor emersion, tumor width and length were measured by digital caliper every week. 48 hours after the last exercise subjects were killed. Tissue sampling were collected and stored in -70°. Tumor tissue was homogenized and let-7a expression and IL-6 levels were accounted with Real time-PCR and ELISA Kit respectively. Statistical analysis of let-7a was conducted by the REST software. Repeated measures and independent t tests were used to assess tumor size and IL-6, respectively.

Results: Tumor size and IL-6 levels were significantly decreased in TT group compared with TC group ($p < 0.05$). MicroRNA let-7a was increased significantly in TT group following aerobic training compared with TC group ($p < 0.05$).

Conclusion: Reduction in tumor size in BALB/c mice and, followed by aerobic exercise can be attributed to the loss of inflammatory factors such as IL-6 and also up regulation of microRNA let-7a. These data provide strong support for a beneficial effect of exercise training on tumor progression in mouse model of breast cancer that may be partly mediated by its anti-inflammatory potential.

Keywords: Breast cancer, Aerobic training, microRNA let-7a, IL-6.