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Does Training Status Influence Myokine Levels and Cancer Cell Suppression In Vitro? Effects of a Single Bout of Exercise in Breast Cancer Survivors

Purpose. We investigated the impact of training status (untrained versus trained) on acute myokines with anti-cancer properties and cancer cell suppression before (untrained) and after (trained) a 12-week resistance training (RT) vs high-intensity interval training (HIIT) program.
Methods. Twenty-eight breast cancer survivors completed a single bout (defined as one complete exercise session) of RT or HIIT before and after a 12-week structured RT or HIIT program. Blood was collected before, immediately and 30 minutes after each acute RT or HIIT session to measure serum levels of myokines (decorin, interleukin 6 [IL-6], secreted protein acidic and rich in cysteine [SPARC], and oncostatin M [OSM]) and MDA-MB-231 cell growth *in vitro*.
Results. The acute session after a 12-week RT or HIIT significantly increased myokine levels compared to the acute session pre-training ($p < 0.05$), with elevations observed for IL-6 and OSM in RT (generalized eta squared [ges] = 0.029 to 0.131) and decorin and OSM in HIIT (ges = 0.016 to 0.031). The acute exercise session performed after 12 weeks of RT or HIIT induced significantly greater cancer-suppressive effects on MDA-MB-231 cells *in vitro* compared to the pre-training session ($p < 0.05$), with inhibitory effects observed in RT (ges = 0.156) and HIIT (ges = 0.052).
Conclusion. A single exercise bout, whether RT or HIIT, elevates myokines and suppresses breast cancer cell growth *in vitro*, with greater effects after 12 weeks of training (trained individuals). RT and HIIT showed comparable outcomes, highlighting that regular exercise enhances myokines with anti-cancer properties and reduces *in vitro* cell growth. Thus, higher levels of physical fitness (i.e., training status) may create a systemic environment less supportive of tumour growth, potentially contributing to a lower risk of cancer progression and recurrence.

Keywords

breast cancer, resistance training, high intensity interval training, myokine, cancer cell

Conflict of Interest & Ethical Approval

yes

Abstract submitters declaration

yes

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