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### Role of Oncostatin M in Exercise-Induced Breast Cancer Prevention

Kara A. Negrini, Katherine Wehrung, Dhruvil Shah, Kathleen M. Sturgeon. Penn State College of Medicine, Hershey, PA

Epidemiologic studies and rodent models show moderate-intensity physical activity can decrease the risk of breast cancer. Proposed mechanisms of how physical activity impacts breast cancer progression range from minimizing risk factors to decreasing abnormal mammary cell proliferation. Muscle-derived cytokines, also known as myokines, are excreted by skeletal muscle following acute exercise. Specifically, the myokine oncostatin M (OSM), has been shown to decrease breast cancer cell proliferation *in vitro*. **PURPOSE:** To identify OSM involvement in physical activity-induced prevention of breast cancer *in vivo*. **METHODS:** Female, 22-day old, Sprague Dawley rats were injected with 50 mg/kg n-methyl-n-nitrosourea (MNU) to induce mammary adenocarcinoma. Rats were exercise (Ex) trained (MNU+Ex) or remained in standard cage conditions (Sedentary, Sed) (MNU+Sed). The study was powered with n=12 per group to observe a significant difference in tumor free survival time. Exercise training consisted of treadmill acclimation, and progressive increases in session duration, speed, and grade, until reaching 30 min/day, 20 m/min at 15% incline. Exercise training continued 5 days/week until tumor palpation or week 18, whichever came first. Rats completed a maximal endurance test (MET) after tumor palpation. Blood was drawn before, 30 min following, and 2 hr following MET to measure plasma OSM levels (pOSM). **RESULTS:** There were no significant differences between body weight growth curves of MNU+Sed and MNU+Ex groups during intervention. Tumor free survival was significantly higher ( $p=0.002$ ;  $p<0.05$ ) in MNU+Ex rats ( $52.2 \pm 4.5$  days post-MNU) compared to MNU+Sed rats ( $42.0 \pm 0.0$  days post-MNU). Following MET, pOSM levels were significantly higher compared to baseline pOSM levels in non-tumor bearing animals ( $p=0.046$ ). Ongoing studies include analysis of pOSM in tumor-bearing animals after MET. MNU+anti-OSM+Ex groups were also added to observe changes in tumor latency after OSM blockade. **CONCLUSION:** Independent of differences in energy balance, exercise training increased tumor free survival in a rat model of carcinogen induced

breast cancer. The observed protection may be modulated by acute exercise-induced increases in OSM levels.

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