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IN THE HELMHOLTZ ASSOCIATION

Contribution ID: **308** Type: **1 - Scientific Poster**

Exercise as combination partner for cancer immunotherapy

Thursday 23 July 2026 14:55 (20 minutes)

Background: It is widely recognized that exercise reduces the risk of cancer and disease recurrence. Yet the mechanisms behind these benefits remain to be elucidated. We previously showed that voluntary wheel running in tumor-bearing mice reduced tumor incidence and growth by more than 60% across different tumor models. Moreover, this effect was mediated via exercise-associated increases in serum epinephrine levels, which in turn led to immune cell mobilization and enhanced immune cell infiltration into tumors (Pedersen, 2016).
Aims: To assess the effect of exercise on tumor growth in murine cancer models, either directly or in combination with checkpoint inhibitor therapy.
Methods: We assessed the effects of voluntary wheel-running in two subcutaneous models (B16, MC38), one spontaneous model (Ret), and one chemically induced model (MCA). Mice were divided into exercising (free wheel access) and sedentary (no wheel access) groups. For combination assays, mice were treated with anti-PD1 therapy. Activity levels, tumor growth, and survival were monitored throughout the studies. Flow cytometric analyses of tumors and spleens were performed to assess immune responses.
Results: Voluntary exercise influenced tumor growth in a model-dependent manner. In the Ret spontaneous model, exercise was associated with improved survival, whereas in the chemically induced model it did not reduce tumor incidence or enhance survival. In the MC38 model, however, exercise significantly improved survival when combined with anti–PD-1 therapy. Ongoing analyses are being conducted to unravel the divergent outcomes and to correlate variations in exercise intensity observed across studies with tumor responses.
Conclusion: Integrating activity data with tumor outcomes may allow the identification of exercise intensity thresholds associated with tumor control, thereby informing the rational design of future translational and human exercise-oncology studies.

Keywords

Exercise, Immunology, Oncology, Checkpoint Inhibitor Therapy

Conflict of Interest & Ethical Approval

yes

Abstract submitters declaration

yes

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Session Classification: Poster Session