CHARACTERIZATION OF T CELL SPECIFICITY AND EXERCISE-INDUCED DYNAMICS OF SOLUBLE IMMUNOLOGICAL MARKERS BEFORE AND AFTER HIGH-INTENSITY AEROBIC EXERCISE (INHALE)

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Background Exercise improves immune surveillance and prevents cancer development and recurrence. It has been well studied that acute exercise induces mobilization of lymphocytes into the peripheral blood, consisting mainly of NK cells and antigen-experienced T cells. However, the mechanisms underlying these clinical benefits, in particular the antigen specificity of exercise-mobilized T cells and the secreted markers associated with their mobilization have only recently attracted research attention. Therefore, in this study we aim to gain a deeper knowledge of exercise-mediated T cell characteristics at a mechanistic level, which is highly needed to exploit the effects of exercise in cancer patients.

Methods 23 healthy participants were included in our INHALE study and completed one bout of supervised high-intensity exercise. Demographic and anthropometric data and the IPAQ-SF questionnaire were obtained. Peripheral blood samples were collected before exercise (bsl), 2 minutes after (ex02), and 60 minutes (ex60) after exercise to analyze the frequency of virus-specific CD8+ T cells by DNA-barcoded peptide-MHC multimer assay. Beyond that, comprehensive analysis of exercise-induced phenotypic changes will be assessed by CyTOF and flow cytometry. A selected panel of cytokines, myokines and catecholamines will be quantified by ELISA and Luminex.

Results The mean age of the 23 participants, 10 female and 13 male, was 37 years (25–65). The mean BMI was 23.4 kg/m² and fat percentage 24%. The participants completed a high-intensity exercise session on bicycle ergometers by a mean of 97% of their maximal heart rate on VO₂ max test and 118% of the maximal power on VO₂ max test, respectively. We found a marked increase of body temperature by a mean of 1.2°C (0–3.0) up to a maximum of 39.3°C. Leukocyte counts reached its maximum at the time point ex02. In parallel, serum catecholamines peaked significantly, specifically, norepinephrine increased 5.4-fold (2.2–11.6) and epinephrine 22.2-fold (3.4–156.6). At the time of SITC Annual Meeting, we will present data on the dynamics of T cell specificity against a panel of viral epitopes following high-intensity exercise.

Conclusions The INHALE study provides much needed data from a comparatively large cohort of 23 healthy participants on the effects of exercise specifically in the T cell compartment. This study will also provide a substantial physiological reference for our ongoing clinical exercise study in NSCLC patients (HI AIM). Prospectively, knowledge of circulating tumor-associated antigen-specific T cells following exercise may be used as a powerful boost to the anti-tumor response.

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REFERENCES

Ethics Approval This study was approved by the Capital Region’s Ethics Committee; approval number H-23006672. Written informed consent was obtained from all participants.

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