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SUBMAXIMAL AEROBIC EXERCISE INDUCES MAIT CELL LYMPHOCYTOSIS BUT DOES NOT ALTER HOMING AND ACTIVATION MARKERS

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KEY WORDS: MAIT cells, aerobic exercise, chemokines, activation

Mucosal associated invariant T (MAIT) cells occupy a unique niche, having properties of both the innate and adaptive immune systems⁽¹⁾. Identified by expression of the semi-invariant T cell receptor V α 7.2 and CD161, MAIT cells are an understudied population within exercise immunology with only minimal data indicating these cells are affected by exercise⁽²⁾. These innate-like lymphocytes aggregate at the mucous membranes, however it is unknown if exercise alters their activation status or aids in their trafficking to the mucosa.

PURPOSE

To determine circulating MAIT cell number and frequency along with activation (CD69 expression) and tissue homing marker (CCR4, CCR5, CCR6) expression before and after submaximal aerobic exercise.

METHODS

17 healthy young males (age 22⁽⁴⁾, VO₂max 51.6 (10.2) mL/kg/min, V_T 2.7 (0.6) L/min, % fat 18.0 (5.0%)) performed a graded exercise test on a cycle ergometer until volitional fatigue. Ventilatory threshold (V_T) was determined and on the next visit, participants cycled

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for 40 min at 90-98% of V_T following an overnight fast. Venous blood samples were obtained at rest, 0h and 1h after exercise. Peripheral blood mononuclear cells were isolated using density gradient centrifugation and were labelled to identify specific MAIT cell populations using flow cytometry. Data are expressed as mean (SD).

RESULTS

Vα7.2⁺CD161⁺ MAIT cells were 3.1 (1.7%) of all T cells at rest and significantly increased to 4.0 (2.4%; $P=0.005$) at 0h. MAIT cell numbers increased by 68% following exercise (Rest: 40^(2,5) 0h: 67 (54 cells/mL); $P=0.012$) before returning to resting levels at 1h. CCR5⁺ MAIT and CD69⁺ MAIT cell numbers increased by 84% (Rest: 31^(2,6), 0h: 57 (58 cells/mL); $P=0.018$) and by 67% (Rest: 3⁽¹⁾, 0h: 5 (1 cells/mL); $P=0.05$) with exercise, respectively. CCR5⁺ expression (74.2 (34.1%); mean fluorescence intensity: 7367 (4977 a.u.)) and CD69⁺ expression (12.1 (18.1%)) were all unchanged over time. **CONCLUSIONS:** MAIT cell numbers transiently increase after exercise, follow a biphasic response, and appear to be preferentially mobilized with T cell subsets. These findings support and extend our previous work; however, the magnitude of the submaximal response was attenuated relative to maximal exercise. MAIT cell numbers expressing activation and homing markers following exercise are higher but are driven by the exercise-stimulated lymphocytosis, rather than intrinsic cellular changes.

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