

T-Cell Activation is Affected by the Mobilization of Senescent T-Lymphocytes into the Peripheral Blood Compartment Following an Acute Bout of Exercise

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Int J Exerc Sci 2(1): S38, 2009. It is well recognized that individuals are at an increased risk of illness following an arduous exercise regime. Exercise may affect activation status of cells and play a pivotal role in defense against pathogenic invasion. CD69 is the earliest known expressed cell surface antigen of T-cell activation and is a reliable marker of cell activation status (Green *et al. Med. Sci. Sports Exerc.* **35**, 582-588: 2003). Exercise is known to alter the frequency of senescent cells in the blood expressing the cell surface glycoprotein killer cell lectin-like receptor G1 (KLRG1), and are antigen-experienced and unable to clonally expand upon further antigenic stimulation (Simpson *et al. J. Appl. Phys.* **103**, 396-401:2007), **PURPOSE:** To examine the contribution of senescent T-cells mobilized by exercise on the overall activation status of the peripheral blood T-cell pool following an acute bout of exercise. **METHODS:** Ten moderately trained males (age: 24.6 ± 4.8 ; height: 183.1 ± 6.7 cm; mass: 72.8 ± 7.9 kg; $\dot{V}O_{2max}$; 61.3 ± 5.9 ml·kg⁻¹·min⁻¹) ran at speeds corresponding to 80% $\dot{V}O_{2max}$ until volitional exhaustion (time: 36.1 ± 5.8 minutes). Blood lymphocytes isolated before (PRE), immediately after (POST) and 1 hour after (1HrPOST) exercise were stimulated for 4 hours in culture with and without the mitogen PMA and assessed for KLRG1 and CD69 expression and co-expression on CD3⁺, CD3⁺/CD4⁺ (CD4⁺) and CD3⁺/CD8⁺ (CD8⁺) lymphocyte subsets using 4-colour flow cytometry. **RESULTS:** No changes in CD69 GMFI were observed on total CD3⁺, CD4⁺ and CD8⁺ T-cells POST or 1HrPOST exercise. The proportions of KLRG1⁺ cells among the total CD3⁺, CD4⁺ and CD8⁺ T-cell populations increased by 172%, 107% and 169% respectively POST exercise and fell below baseline values 1h later ($p < 0.05$). At all sample time points, CD69 GMFI was greater on stimulated KLRG1⁺ T-cells compared to KLRG1⁻ cells ($p < 0.05$). **CONCLUSION:** We conclude that exercise does not affect the activation status of the total T-cell pool. Instead, the number of senescent cells expressing CD69 is greater than those that are not senescent at all times. This suggests that upon pathogenic invasion post-exercise.

