

Effect of HSV-1 Infection on the Exercise-induced Mobilization of T-cell Subsets

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ABSTRACT

Acute exercise mobilizes highly-differentiated memory and senescent T-cells into the blood compartment, which could have important implications for post-exercise immune surveillance. This response differs in individuals with latent cytomegalovirus (CMV) infection (a herpesvirus), but it is unknown if other latent herpesviruses, such as herpes simplex virus type 1 (HSV-1), also influence this exercise-induced immune response. As HSV-1 infects 50% of the US population, this could have implications for many athletes. **PURPOSE:** To examine the effects of an acute bout of exercise on the frequency and relative proportion of naïve, memory, and senescent T-cells in the peripheral blood in HSV-1 infected and non-infected participants. **METHODS:** Eleven HSV-1-infected and twelve non-infected men (mean±SD: Age: 28±5 yrs; VO₂max: 40.64±10.15 ml/kg/min) cycled at 85% of their estimated maximum power for 30 min. Blood samples were collected before and immediately after exercise, and mononuclear cells were isolated using density gradient centrifugation. Cells were labeled with monoclonal antibodies to identify naïve (CD28+CD57-KLRG1- or CD45RA+CCR7+), memory (CD28+CD57-KLRG1+, CD45RA+CCR7-, CD45RA-CCR7+, or CD45RA-CCR7-), and senescent (CD28-CD57+KLRG1+) subsets of CD3+CD4+ and CD3+CD8+ T-cells using four-color flow cytometry. HSV-1 serostatus was determined by an ELISA test. Main effects for exercise and serostatus, and exercise x serostatus interaction effects, were detected using maximum likelihood linear mixed models. **RESULTS:** A main effect for exercise was found on proportions of naïve (-8.82±8.49%), memory (+35.04±26.48%), and senescent (+64.12±56.12%) CD4+ T-cells, as well as on naïve (-21.02±11.56%) and senescent (+53.89±53.26%) CD8+ T-cells (p<0.05). There were main effects for serostatus on proportions of memory CD4+ and CD8+ T-cells, with decreased levels in HSV-1+ subjects in all memory phenotypes examined (p<0.05). Interaction effects between HSV-1 serostatus and exercise were found. HSV-1+ subjects had lower naïve cell counts, and a greater increase in the proportion of senescent cells, post-exercise (p<0.05) than HSV-1-non-infected subjects. **CONCLUSIONS:** HSV-1 infection led to a decrease of memory T-cell subsets found in peripheral blood. It also influenced the relative response of naïve and senescent T-cells to acute exercise, although this effect was not nearly as great as that seen with other herpesviruses (i.e. CMV). This indicates that individuals with and without latent HSV-1 infection may have a different lymphocyte mobilization in response to exercise.

