

No impact of CMV or EBV seropositivity on the frequency of highly differentiated T-cells in Mexican-American adolescents

Guillaume Spielmann^{1, 2}, Craig A. Johnston³, Richard J. Simpson¹, Brian K. McFarlin¹ and John P. Foreyt³

¹Laboratory of Integrated Physiology, Department of Health and Human Performance, University of Houston, Houston, TX, 77204, USA.

²Biomedicine and Sports Science Research Group, Napier University, Edinburgh, EH10 5DT, UK

³Baylor College of Medicine, USDA/ARS Children's Nutrition Research Center, Department of Pediatrics-Nutrition, Houston, Texas, USA

Classification of first Author: Master Student.

Recurring activations of the prevalent latent herpes viruses Cytomegalovirus (CMV) and Epstein-Barr virus (EBV) induces immune cell division leading to the premature terminal differentiation of T-cells. Terminally differentiated T-cells are known to accumulate with age causing a reduction in the naïve T-cell repertoire, which compromises the ability of the adaptive immune system to respond to novel pathogens. Although CMV and EBV seropositivity are hallmarks of the "immune risk profile" and are known to influence the frequency of terminally differentiated T-cells and increase infection risk in adults, it is not known if CMV or EBV impacts on the frequency of these cells in a young subject cohort.

PURPOSE: To examine the impact of CMV and EBV seropositivity on the frequency of highly differentiated blood T-cells in Mexican-American adolescents. **METHODS:** Fasted resting blood samples were obtained from 77 adolescents consisting of both males and females. The presence of antibodies against CMV and EBV was determined in serum by ELISA. Lymphocytes isolated from peripheral blood were assessed for a combination of cell surface markers to determine their stage of differentiation. Monoclonal antibodies and four-color flow cytometry were used to identify senescent (CD27-, CD28-, CD57+), naïve (CCR7+, CD45RA+), memory (CCR7-, CD45RA-) and effector memory (CD27-, CD45RA+) T-cell markers on pan CD3+ T-cells, CD4+ T-cells and CD8+ T-cells. Differences in T-cell phenotype between the CMV/EBV seropositive and seronegative participants were compared using independent Student *t*-tests.

RESULTS: The prevalence of latent CMV and EBV infection among the subject cohort was 16% and 44% respectively, while 7% of all participants were carrying a latent infection for both. No differences in senescent and memory phenotypes were found between the CMV or EBV seropositive and seronegative groups. **CONCLUSION:** Despite the known influence of latent CMV and EBV infection on the frequency of senescent T-cells in adults, these preliminary data indicate that CMV and EBV seropositivity has no impact on the frequency of senescent T-cells in adolescents. These data suggest that the increased frequency of terminally differentiated T-cells that are associated with CMV and EBV seropositivity in adults is probably due to long-term infections. Future studies will assess the impact of CMV and EBV seropositivity on immunosenescence in association with other factors known to have an effect on T-cells differentiation, such as BMI and physical activity status.