Research Week 2023

Metabolic patterns in female SIV-infected rhesus macaques after consistent antiretroviral therapy

H. Hofmeister, D. Takahashi, K. Sauter, G. Webb, O. Varlamov, J. Sacha and P. Kievit

Cardiometabolic Health Division; Oregon National Primate Research Center

Keywords

HIV, SIV, antiretroviral, ART, NHP, primate, PLWH, WLWH, metabolic

Abstract

Background

HIV/AIDS is a chronic disease that causes increased inflammation and decreased immune function within people living with HIV (PLWH). A majority of PLWH are women; however, very little research has focused on the unique metabolic changes that occur in women living with HIV (WLWH). While HIV was once considered fatal, current antiretroviral therapy (ART) treatments can effectively control viral loads and allow PLWH to have near-normal life expectancy. This causes WLWH to experience age-related hormonal changes known to have systemic metabolic effects, such as estrogen deficiency associated with menopause. Increased age, inflammation, and hormonal changes are all associated with similar comorbidities, leaving WLWH at higher risk for developing chronic metabolic disorders such as obesity, diabetes, and cardiovascular disease.

Methods

In order to understand the impact of infection on WLWH, a non-human primate (NHP) model was developed utilizing female rhesus macaques. The animals were infected with simian immunodeficiency virus (SIV) and an ART regimen began two weeks post-infection. The female macaques are monitored weekly for weights, viral load, and complete blood count. Additional metabolic measurements include longitudinal food intake, biopsies, and dual x-ray absorptiometry scans for the analysis of body composition.

Results

Average body weights significantly decreased by 10% within seven weeks of infection and rebounded as viral loads became undetectable. Although fluctuation in average weights occurred, no notable difference was recorded in food consumption, lean mass, or fat mass compositions between or at infection and suppression, respectively.

Conclusion

This model demonstrates that the viral infection decreases body weight in female NHPs, with a rebound in body weight as viral load decreases. Currently, further research is underway to explore the post-menopausal hormone deficiency on these NHP subjects. This complex model allows for a unique insight into the metabolic changes that occur when hormone- and viremia-related changes occur in WLWH.