

Virus Interactions in HIV-1 and HSV-2 Co-Infection

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The chronic stage of HIV-1 infection is characterized by high rates of production and clearance of virus. Antiretroviral therapy (ART) is used to prevent ongoing infection of CD4+ lymphocytes and monocytes, which serve as reservoirs for maintaining HIV-1's highly dynamic replicating state. When a patient is co-infected with HSV-2 during chronic HIV-1 infection, median HIV-1 viral loads are higher compared to HSV-2 negative patients, and antiviral therapy for HSV-2 reduces HIV-1 RNA in plasma and genital compartments by about 50%. However, antiviral therapy for HSV-2 did not decrease HIV-1 transmission from HSV-2+/HIV-1+ partners to the HIV-1 negative partner in a large serodiscordant couples trial. To gain a better understanding of how these two viruses interact, Dr. Jeffrey Schouten and Dr. Joshua Schiffer of the Vaccine and Infectious Disease Division utilized data from prior HIV viral dynamic studies to compare viral clearance rates in ART-treated HSV-2-positive or negative subjects.

The study used data from 149 total clinical trial patients from three antiviral treatment studies, and included samples obtained at enrollment and six time points throughout the first eight weeks of antiretroviral therapy. Infection serostatus and viral load were used in a parametric non-linear statistical model to derive estimates of first and second phase HIV-1 viral clearance rates. The study results confirm that HSV-2 co-infection leads to an increased baseline HIV-1 load. However, HSV-2 co-infection had no impact on the first or second phase clearance rates of HIV-1 during chronic therapy. Schouten and Schiffer hypothesize that because HSV-2 co-infection does not impact the clearance of HIV-1 infected cells, there could be a higher proportion of CD4+ T-cells that are activated and thereby HIV-1 infected during HSV-2 co-infection. Because the study results indicate that HSV-2 co-infection does not impact clearance rate of actively HIV-1 infected cells, the higher average HIV-1 viral load in co-infected persons is likely due to enhanced HIV-1 production during the co-infected state. Given these results, further study into the synergistic kinetics of HSV-2 and HIV-1 co-infection is necessary to determine how HSV-2 targeted therapies might positively impact HIV-1 treatment.

[Schouten JT, Schiffer JT](#). 2012. Equal HIV-1 Decay Kinetics in HSV-2-Infected and -Uninfected Clinical Trial Participants Treated with Antiretroviral Therapy. *J Acquir Immune Defic Syndr*. DOI: 10.1097/QAI.0b013e31824bed3f



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