

## Study examines repeated exposure to HIV in treatment-suppressed HIV patients

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A new study looking at unprotected intercourse within gay couples when each partner has established HIV-infection found a correlation between anti-HIV immune response and sexual activity.

Study results showed that individuals who had regular unprotected receptive anal intercourse with partners with significant levels of HIV in their blood showed a stronger anti-HIV immune response. In addition, the magnitude of anti-HIV specific immune response correlated with their exposure to HIV through sex.

Published in the October 24th, 2008 issue of *PLoS Pathogens*, the study paper is authored by a research team from UCSF and the Gladstone Institute for Virology and Immunology.

The researchers found no evidence of systemic superinfection (re-infection with another strain of HIV) in the receptive partners, whose virus had been successfully suppressed through antiretroviral therapy for at least five months. In a comparison group of HIV-infected couples in which both partners' viruses had been suppressed by therapy, researchers did not find the same strength of immune responses correlations or the same correlations with sexual exposure.

"We found HIV-specific immune responses in the treatment-suppressed partners that correlated with the level and route of exposure. The individuals with no detectable virus who were on antiretroviral therapy and who were exposed to HIV through receptive intercourse with a

partner with detectable virus, had the stronger anti-HIV immune responses in comparison to individuals exposed to partners whose virus was also suppressed by antiretroviral therapy, where no effect was seen," said study lead author, Christian B. Willberg, PhD, post-doctoral fellow in the UCSF Division of Experimental Medicine.

Notwithstanding the intriguing HIV specific findings, the findings also reveal an important general mechanism occurring in infectious diseases.

"We found that immune responses to chronic viral infections are influenced not only by the chronic infection existing in an individual or host, but also by exposures to exogenous virus from outside the individual or host," said study co-senior author, Douglas F. Nixon, MD, PhD, professor of medicine in the UCSF Division of Experimental Medicine.

The investigators were unable to determine from these findings whether there is any benefit from this type of repeated exposure to HIV—i.e., a type of therapeutic vaccination for HIV-infected patients with suppressed virus. Some HIV patients on antiretroviral regimens lose many of their HIV-specific immune responses over time due to the successful suppression of viral replication by therapy.

"Indeed, our hypothesis had been that in the context of these waning anti-HIV responses among the suppressed partners and the expected level of exposure from repeated unprotected receptive intercourse, we would find evidence of superinfection. While we did not find systemic superinfection, we cannot exclude limited or localized superinfections in the gut. And, antiretroviral therapy may have been the factor that prevented superinfection in these patients," said study co-senior author Robert M. Grant, MD, MPH, senior investigator at the Gladstone Institute of Virology and Immunology and associate professor of medicine at UCSF.

The study involved 49 HIV-infected gay men from the San Francisco Positive Partners Program study—a cohort of couples in which both partners are HIV-positive that began enrolling participants in 2000. Viral suppression in this study meant viral loads less than 50 copies. Among those participants whose virus had not been suppressed, the lowest viral load was 9,420 copies.

The team that designed this study benefited from its unique multidisciplinary composition. Immunologists working with social researchers were able to design a study that managed to distinguish between different levels of viral suppression and different patterns of sexual contacts and correlate the immunological aspects with the behavioral variables.

"We call the interaction between these two scientific communities together: 'social immunology'. It may be true that patterns of social activities shape immune responses generally, as we observed for people with HIV having contact with other HIV infected persons. Obviously more study is needed and we would like to see whether social immunology will continue to offer important insights," said Grant.

"While we have not found a case of superinfection in our cohort of chronically infected HIV couples, a handful of cases of superinfection verified by linkage to a known partner's virus have been reported in chronically infected HIV patients. It is also important to stress, these findings do not address the negative consequences of acquiring other sexually transmitted diseases through engaging in unprotected sex or the potentially positive consequences that unprotected sex may have in partnerships where both individuals are HIV-positive," said study co-author, J. Jeff McConnell, MA, director of the Positive Partners study at the Gladstone Institute for Virology and Immunology.

Source: University of California - San Francisco

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