

# HIV exploits a human cytokine in semen to promote its own transmission

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A new report suggests that the concentration of one human cytokine, interleukin 7 (IL-7), in the semen of HIV-1-infected men may be a key determinant of the efficiency of HIV-1 transmission to an uninfected female partner. In their study published February 7 in the Open Access journal *PLOS Pathogens*, a research group from the Eunice Kennedy-Shriver National Institute of Child Health and Human Development (NICHD) led by Leonid Margolis report that the increased IL-7 concentration in semen facilitates HIV transmission to cervical tissue *ex vivo*.

[Semen](#) is a complex biological fluid containing not only spermatozoa but also cytokines, a group of extracellular proteins that modulate immune responses. As a result of [HIV infection](#), the concentrations of various cytokines in semen is profoundly modified, in particular the concentration of interleukin 7 (IL-7) is greatly increased. Despite this evidence of strikingly elevated IL-7 levels in [seminal plasma](#), there was limited knowledge about any effects this cytokine might have on HIV-1 sexual transmission.

To investigate the question about the effects of this increased IL-17 on HIV-1 sexual transmission, Andrea Introini and colleagues from the Margolis lab developed a system of explants of cervico-vaginal tissue that can be maintained outside of the body in culture for up to two weeks while preserving the cytoarchitecture of the tissue. In this system, [HIV transmission](#) can be simulated and studied under controlled laboratory conditions. When researchers added IL-7 in concentrations comparable

to that found in the semen of HIV-1 infected men, HIV was transmitted more efficiently and replicated to a higher level than without IL-7. Normally, HIV-1-infected cells quickly die as the result of apoptosis, a [programmed death](#) triggered by HIV infection. IL-7 inhibits apoptosis of infected cells, allowing them to produce more virus and thus increasing the chances of the incoming virus to disseminate through the tissue. Also, IL-7 stimulates T cell proliferation, thereby also providing to HIV even more potential targets to infect.

The authors speculate that IL-7, together with other cytokines, may determine [sexual transmission](#) rates of HIV-1 and that changes in the seminal cytokine load may explain differences in HIV transmission from different individuals. However, whether the effect of IL-7 that has been demonstrated ex vivo occurs also for sexual partners in vivo, is a subject for future research. If this increase does occur in vivo, then it should be investigated whether HIV-1 infected individuals that have been treated systemically with IL-7 in order to increase their T cell counts may have also resulted in the unintended increase of their seminal IL-7 levels. Finally, this study suggests that seminal cytokines may become new targets for HIV-preventive strategies.

**More information:** Introini A, Vanpouille C, Lisco A, Grivel J-C, Margolis L (2013) Interleukin-7 Facilitates HIV-1 Transmission to Cervico-Vaginal Tissue ex vivo. PLoS Pathog 9(2): e1003148.  
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