

Double duty: Anti-HIV topical gel also protects against herpes virus

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HIV infection is commonly associated with other sexual infections, such as herpes simplex virus (HSV). Infection with HSV facilitates the risk of HIV infection and negatively impacts the clinical course of HIV disease. Therefore, it would be highly beneficial to identify multi-faceted microbicide compounds that are efficient against HIV-1 and other sexually transmitted infections.

Now, a new study published by Cell Press in the October 20th issue of the journal [Cell Host and Microbe](#) explains why a change in the delivery method of an established anti-HIV drug results in dual protection against both HIV and HSV. The research is the result of an [international collaboration](#) between Belgian, Italian and American laboratories; senior authors Prof. Jan Balzarini from the Rega Institute for Medical Research in Belgium, Prof. Carlo-Federico Perno from the University of Rome "Tor Vergata" in Italy and Dr. Leonid Margolis from the National Institute of Child Health and Human Development, Bethesda, MD, USA.

There has not been much success in generating new clinically useful microbicide compounds, so, recently, a substance called "tenofovir", which has been widely used in [HIV therapy](#) as an oral tablet, was formulated as a topical [vaginal gel](#) and tested in a large study of nearly 900 South African women. Tenofovir works by inhibiting an enzyme that HIV needs to make copies of itself. Surprisingly, not only did the microbicide significantly reduce HIV-1 transmission, it also caused a dramatic reduction in the risk for infection with HSV.

The effect of tenofovir gel on HSV was unanticipated because the drug had previously shown very minimal activity against HSV. "We hypothesized that the discrepancy between the earlier reported lack of significant anti-HSV activity and the new data might be explained by the striking differences in drug concentrations between the oral tenofovir delivery system and topical application of the gel," explains Prof. Balzarini.

Prof. Balzarini and colleagues demonstrated in a variety of experimental models that when tenofovir was applied at concentrations similar to those obtained in the gel, the drug had a potent and direct anti-HSV activity. The researchers went on to unravel the molecular mechanism of the anti-HSV activity and found that, like the effect on HIV, tenofovir efficiently inhibits an enzyme needed for herpes viral replication.

Taken together, the results demonstrate that topical administration of tenofovir achieves drug concentrations that exert both anti-HIV and anti-HSV activity. "Our data and the therapeutic principles emerging from our study are important for the design of new drug formulations and administration protocols to develop and/or optimize future microbicide trials," concludes Dr. Margolis.

Provided by Cell Press

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