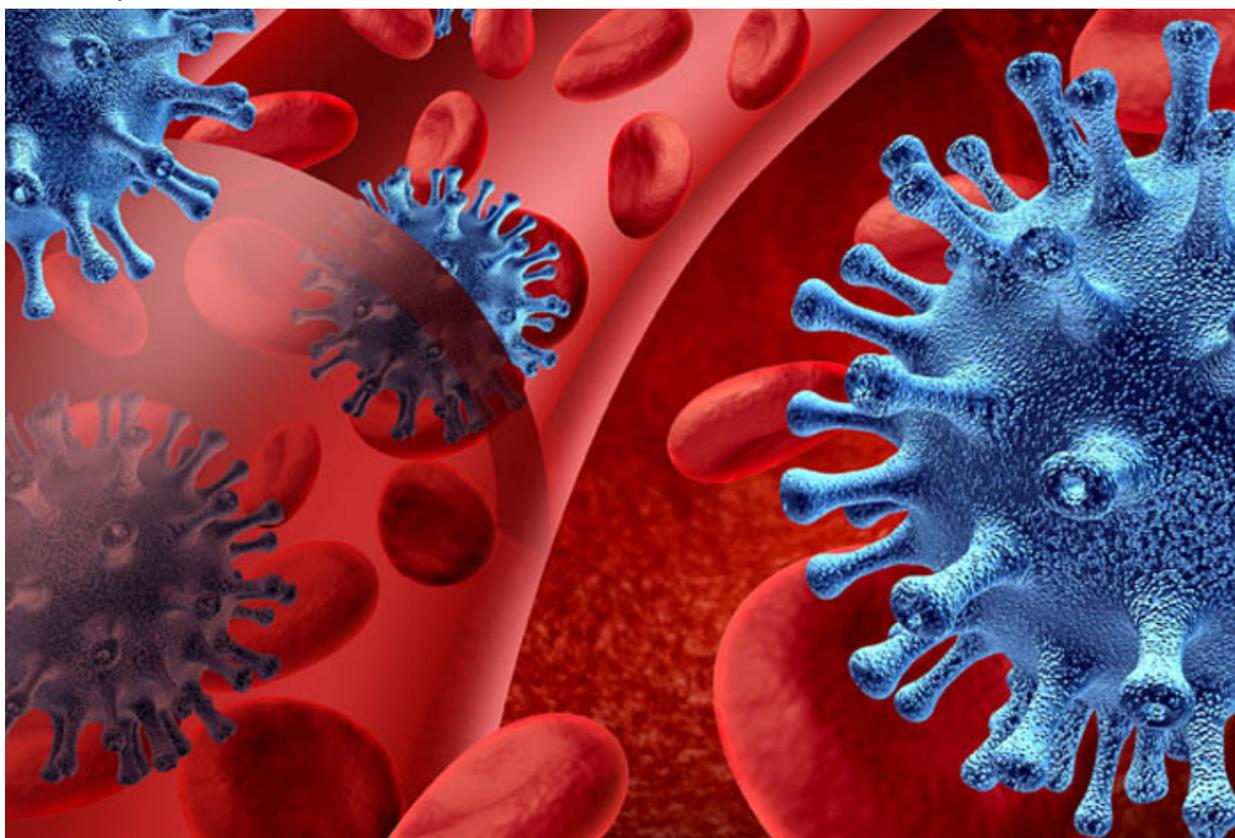


# Closer to HIV vaccine goal with new insight into viral factors

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## New insight into viral factors that facilitate HIV transmission

*Understanding viral factors that facilitate transmission of HIV infection is critical to developing vaccines*

The HIV-1 pandemic afflicts more than 34 million people worldwide, and more than 1.5 million people died in 2010 due to direct or indirect effects of HIV infection.

The best hope to relieve this humanitarian disaster is to develop an effective vaccine to prevent new infections. LANL is at the forefront of this research, which lies at the intersection of public health and global security.

## Understanding the genetic ‘bottleneck’

Understanding viral diversity early after infection, before the virus can evade host immunity, is important for the design of an effective vaccine. In general, a genetic “bottleneck” occurs during heterosexual transmission, in which a transmitted or “founder” virus from the genetically diverse population in the transmitting partner establishes a new infection.

To understand properties of the transmission bottleneck, LANL researchers and collaborators examined the HIV genetic diversity in heterosexual donor-recipient partners infected with HIV. Their findings indicate a minor genital tract HIV variant, with properties that favor transmission, is the founder of the new infection.

The scientists wanted to understand if the genetic bottleneck is driven by chance or whether particular viral variants are selected during transmission.

To detect new infections close to the time of transmission, the researchers studied discordant couples (those in which only one partner is infected at first) in Zambia and Rwanda, who had received counseling to prevent transmission. The researchers studied HIV genetic sequences from the blood and genital tract of the chronically infected transmitting partner and in the blood of the newly infected partner.

## A selective, and not random, process determines transmitted virus

They found that the infected donor’s predominant virus subpopulation in the genital tract differed from that in the blood. Comparing the HIV sequence population in each newly infected partner with that in the genital tract of the transmitting partner revealed that the transmitted variant was genetically distinct from the donor’s predominant genital-tract variants. The results imply that a selective process, rather than a random one, determines the transmitted or founder virus.

## Viral factors critical to developing vaccines

Understanding viral factors that facilitate transmission of HIV infection is critical to development of preventative approaches, including vaccines, to curtail the epidemic. The evidence of a selective process in epidemiologically linked transmission partners suggests possibilities of targeting the transmission bottleneck to prevent new infections.

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