Infection with a mutated HIV strain results in better survival

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Persons infected with a mutated HIV strain, transmitted from those who have the genetic advantages to control the virus, results in improved survival according to a recent study by South African researchers. The study, published March 21st in the open-access journal *PLoS Pathogens*, looked for genetic mutations in the infecting virus in 24 newly infected people in Durban, South Africa.

The study was conducted by CAPRISA (the Centre for the AIDS Program of Research in South Africa) researchers at the Universities of Cape Town, KwaZulu-Natal, Western-Cape and the National Institute of Communicable Diseases in South Africa. According to Professor Salim Abdool Karim, Director of CAPRISA, “It is significant that the mutations to HIV which occur in a person with advantageous genes leads to a low viral load, even when the virus infects a new person who does not have these ‘good’ genes. Low viral load is a goal of several HIV vaccines as it means that these HIV infected people will be clinically well for longer and be less likely to spread the virus.”

HLA genes affect the rate of disease progression in HIV-infected individuals, alerting the immune system to HIV’s presence. HIV can evade the immune system by mutating into forms unrecognizable by the HLA. However, it is known that some people have versions of the HLA gene (for example HLA-B*57 and HLA-B*5801) that can only be evaded by the virus if it mutates to a form that has a reduced replication rate.

In this study the researchers identified two mutations, A146X and T242N, in the Gag sequences of acutely infected HLA-B*57/5801 negative women, that were associated with lower viral loads and higher CD4+ counts in these women up to a year post-infection. Both mutations have been previously identified as HLA-B*57/5801 immune evasion mutations and T242N has been shown to compromise viral replication capacity. This study now indicates time that HLA-B*57 or HLA-B*5801 negative people who are infected by such reproductively compromised viruses may also have better survival prospects.

“Disease progression is determined by a complex interplay between the host and the virus,” says team leader Carolyn Williamson. “While the role of host genetics is well established, this study shows that genetic polymorphisms in the transmitted virus can offer survival advantage to a newly infected person.”

The possibility that an interacting network of attenuating mutations may be responsible for better long-term survival could profoundly influence our understanding of the cause and development of HIV, Williamson says. This study has implications for HIV vaccine design and immunotherapeutics.

Chopera DR, Woodman Z, Mlisana K, Mlotshwa M, Martin DP, et al. (2008) Transmission of HIV-1 CTL Escape Variants Provides HLA-Mismatched Recipients with a Survival Advantage. PLoS Pathog 4(3): e1000033. doi:10.1371/journal.ppat.1000033

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