

Rare case explains why some infected with HIV remain symptom free without antiretroviral drugs

August 12 2008

AIDS experts at Johns Hopkins say they have compelling evidence that some people with HIV who for years and even decades show extremely low levels of the virus in their blood never progress to full-blown AIDS and remain symptom free even without treatment, probably do so because of the strength of their immune systems, not any defects in the strain of HIV that infected them in the first place.

Their conclusions about so-called elite suppressors, published this month in the *Journal of Virology*, come from rigorous blood and genetic studies from a monogamous, married, African-American couple in Baltimore, in which the wife was infected through sex with her husband more than a decade ago.

Unlike her husband, the wife remains symptom free, has consistently had viral counts of fewer than 50 copies per cubic milliliter of blood, and has not needed any treatment to keep the disease in check. The husband, as a so-called progressor, takes a potent drug cocktail to keep his infection from developing into full-blown AIDS, as demonstrated by viral counts in the hundreds of thousands per cubic milliliter of blood. The couple has been married for two decades and the husband was an intravenous drug user.

The scientists say the case study disproves some suspect theories about elite suppression that suggest it always involves a defective or

"weakened" viral strain, which is easier for the immune system to attack, or that genetic variants confer a protective effect in suppressors.

"This is an extremely rare case of co-infection in a controlled, monogamous relationship, which showed us how a strong immune system in the elite suppressor kept the virus from replicating and infecting other cells," says senior study investigator and infectious disease specialist Joel Blankson, M.D., Ph.D.

"Our findings offer hope to vaccine researchers because they reveal that the immune system's primary offense, known as CD8 killer T-cells, can effectively halt disease progression by a pathogenic form of HIV," says Blankson, an assistant professor at the Johns Hopkins University School of Medicine.

"Moreover, the strength of the immune response was not dependent on infection by a weakened form of the virus. And if we can harness the means by which these elite white blood cells stop the virus, then we can hopefully 'teach' or reprogram white blood cells in others to also target HIV," he says.

Included in the blood analysis was genetic testing which confirmed that both husband and wife were infected with the same pathogenic strain of HIV and ruled out the possibility that there were genetic deficiencies in the virus that infected the wife.

Genetic testing also confirmed that both husband and wife had an overactive strand of genetic material tied to gene HLA B57, found in previous studies to be more common in those whose HIV infection was suppressed or slowed.

"The presence of this genetic spot is a discordant result that strongly contradicts theories that various genetic factors alone play a protective

role in suppression," says Blankson.

He notes that study findings revealed a beneficial side effect to spurring the immune system cells to attack HIV.

Using new laboratory tests that precisely measure the immune response to various strains of HIV, researchers first tested T-cells from both the wife and husband to see if their immune system cells suppressed viral replication. They found that activated T-cells from the wife stalled HIV replication by as much as 90 percent, while the husband's T-cells stopped it by only 30 percent.

In subsequent genetic analyses, the viral strain in the wife's blood was found to have at least two mutations known to weaken the virus, while the viral strain in the husband's blood had fewer mutations affecting fitness.

According to Blankson, the stronger immune system in elite suppression not only lowers the viral count in the body, but also exerts selective, evolutionary pressure on the original strain of HIV to mutate away from the strong version that initially infected the couple, and towards weaker, less-fit forms.

"Elite suppression offers clues to vaccine researchers on many fronts: how CD8 killer T-cells can attack HIV and how a stronger immune response can force HIV into a permanent defensive state," says Blankson.

Antibody-based HIV vaccines have generally failed to work, and Blankson says, a new approach is needed and may be based on T-cell action.

He also plans to study differences in CD8 T-cells in elite suppressors and

progressors, with the goal of retooling and activating T-cell action in progressors to act more like those in elite suppressors.

Source: Johns Hopkins Medical Institutions

Citation: Rare case explains why some infected with HIV remain symptom free without antiretroviral drugs (2008, August 12) retrieved 18 April 2024 from <https://medicalxpress.com/news/2008-08-rare-case-infected-hiv-symptom.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.