Genetic cause of innate resistance to HIV/AIDS

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Some people may be naturally resistant to infection with HIV, the virus that causes AIDS. The results of a study conducted by Dr. Nicole Bernard of the Research Institute of the McGill University Health Centre (MUHC) bring us closer to a genetic explanation. Her study findings were published on July 16 in the journal *AIDS*.

The simultaneous expression of certain versions of two specific genes called KIR3DL1 and HLA-B*57 is thought to be at the root of some cases of this innate resistance to HIV infection. Depending on which versions of these two genes the patient has, he or she will resist HIV infection or develop AIDS at a slower rate.

These results were obtained by comparing the genetic profiles of people undergoing primary HIV infection (in their first year of infection) to those repeatedly exposed to HIV but non-infected. The group of exposed but non-infected patients came from a cohort studied by Dr. Julie Bruneau of the Centre hospitalier de l'Université de Montréal. The cohort of primary HIV infected patients is studied by Dr. Jean-Pierre Routy, from the MUHC. Analyses show that the "good" versions of both genes were present in 12.2% of exposed but non-infected subjects versus only 2.7% in patients in primary HIV infection.

As of yet, no study has clearly described the mechanism of this protection. The KIR3DL1 gene codes for a receptor on the surface of the immune system's natural killer (NK) cells, which when activated destroy infected cells in the body. The HLA-B*57 gene codes for a

protein normally found on the surface of all body cells that binds the KIR3DL1 and dampens NK cell activity. The most likely hypothesis is that HIV prevents the HLA-B*57-encoded protein from being expressed on the surface of the infected cells, making it unavailable to bind KIR3DL1. As a consequence, the NK cells retain their activity and destroy the virus-infected cells.

As this mechanism can occur very soon after the virus has started to infect the body cells, people carrying those versions of the 2 genes may be able to destroy more efficiently the infected cells following exposure to HIV, thus lowering their chances of developing AIDS.

"More research is needed to determine the exact mechanism behind the protection we have observed, but these findings have revealed a promising avenue," according to Dr. Bernard.

This study opens the way for new ideas in the fight against HIV infection. "In the future, our findings could be used to somehow 'boost' the innate immune system and thus fight the virus as soon as it enters the body," said Dr. Bernard.

Source: McGill University Health Centre