Elite Controllers of HIV Have Low Level of Virus Capable of Replicating

A new test determines how many of the copies of viral DNA integrated into cells are likely capable of replicating.

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People whose immune systems control HIV replication without the use of antiretroviral (ARV) treatment, known as elite controllers, have a low level of virus integrated into their cells that is likely capable of replicating, aidsmap reports.

The development of a new test led to this finding. The assay determines the levels of virus in an HIV-positive person's body that is integrated into cells and is likely capable of producing new, infectious virus as well as the levels of integrated HIV that is likely defective and therefore incapable of giving rise to new copies of HIV with the capacity to infect other cells.

A recent study presented by Michael Peluso, MD, of the University of California, San Francisco at the International AIDS Conference (AIDS 2020), which was held virtually last week, also found that low levels of viral DNA that can likely replicate are associated with the presence of immune system factors associated with protection against HIV.

Peluso and his colleagues assessed the new test by drawing from 74 elite controllers 10 million peripheral blood mononuclear cells (PBMC), immune cells that, when infected with HIV, constitute a major part of the viral reservoir that frustrates efforts to cure the virus. They compared these individuals with HIV-positive people who were taking ARVs and had a fully suppressed viral load.

Forty-one (55%) of the elite controllers had undetectable levels of viral DNA encoded in their PBMCs that was likely capable of replicating, while a much lower proportion had undetectable levels of defective encoded viral DNA.

Those who were not elite controllers were much less likely to have such undetectable levels on either count.

Among those elite controllers who had detectable levels of encoded viral DNA likely capable of replicating, the levels ranged between 10 to 3,430 copies per million PBMCs. (These levels were similar among those who were not elite controllers.) Overall, the levels of detectable defective encoded DNA in elite controllers was higher.

The elite controllers with undetectable integrated viral DNA likely capable of replicating tended to have what are known as protective human leukocyte antigen (HLA) alleles. HLA molecules sit on the surface of cells and signal to the immune system that the antigens are the body's own rather than those of a pathogen's. Research has indicated that elite controllers are protected from the virus by three HLA alleles in particular, known as HLA B*27, B*57 and B*58.

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