

Using viruses to fight viruses: New approach eliminates 'dormant' HIV-infected cells

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Researchers at The Ottawa Hospital and the University of Ottawa have discovered that the Maraba virus, or MG1, can target and destroy the kind of HIV-infected cells that standard antiretroviral therapies can't reach. Lead author Dr. Jonathan Angel, senior scientist and infectious disease physician at The Ottawa Hospital, and professor at the University of Ottawa. Credit: The Ottawa Hospital

While Ottawa researchers are known for their work on cancer-fighting viruses, one team is applying these viruses to a new target: HIV.

Researchers at The Ottawa Hospital and the University of Ottawa have discovered that the Maraba virus, or MG1, can target and destroy the kind of HIV-infected [cells](#) that standard antiretroviral therapies can't reach. This laboratory discovery was published in the *Journal of Infectious Diseases*. If this technique works in humans, it might possibly contribute to a cure for HIV.

While daily medications keep the level of HIV virus in the blood low, there is currently no way to totally eliminate dormant HIV-infected cells from the body. If a person living with HIV stops taking antiretroviral medications, these hidden viruses rapidly rebound.

These latently HIV-infected cells are hard to target because they are not distinguishable from [normal cells](#). Dr. Jonathan Angel and his team tried a new approach of identifying these dormant cells by using the MG1 virus. This virus attacks cancer cells that have defects in their interferon pathway, which makes the cells more vulnerable to viruses. Dr. Angel and his team previously found that latently HIV-infected cells also have defects in this pathway.

"We thought that because latently HIV-infected cells had similar characteristics to [cancer cells](#), that the virus would enter and destroy them," said Dr. Angel, senior scientist and infectious disease physician at The Ottawa Hospital, and professor at the University of Ottawa. "It turns out we were right."

Using a number of laboratory models of latently HIV-infected cells, the researchers found that the MG1 virus targeted and eliminated the infected cells, and left [healthy cells](#) unharmed.

While most of these cells in patients are in the lymph nodes and other organs, a tiny number are found in the blood. When the researchers added MG1 to relevant blood cells taken from HIV-positive individuals, the levels of HIV DNA in the sample dropped. This indicated that the HIV-infected cells had been eliminated.

"We know that the Maraba virus is targeting and killing the latently HIV-infected cells, but we don't know exactly how it's doing this," said Dr. Angel, who is also Head of the Division of Infectious Disease. "We think the virus is able to target the cells because of an impaired interferon pathway, but we need to do more research to know for sure."

The research team's next step is to try the [virus](#) in animal models of HIV or move directly to clinical trials pending funding and approvals.

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More information: Nischal Ranganath et al, The oncolytic virus, MG1, targets and eliminates latently HIV-1-infected cells: implications for an HIV cure, *The Journal of Infectious Diseases* (2017). [DOI: 10.1093/infdis/jix639](https://doi.org/10.1093/infdis/jix639)

Provided by The Ottawa Hospital

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