New HIV-1 replication pathway discovered

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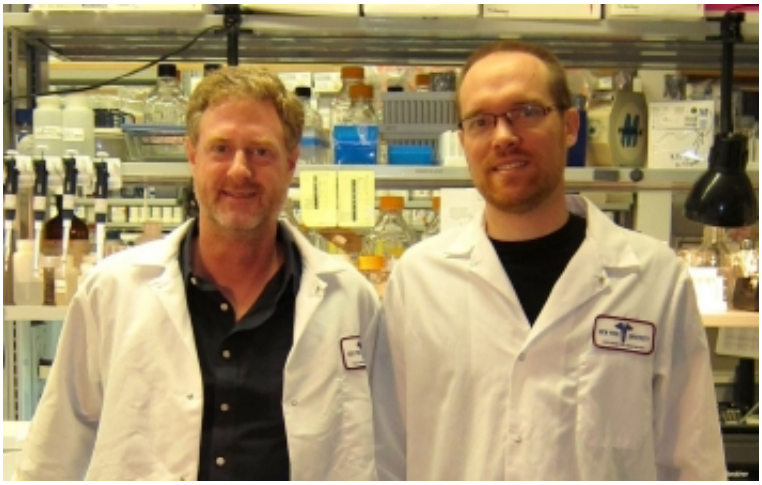

Dr. David N. Levy [LEFT] and Dr. Benjamin Trinité

Current drug treatments for HIV work well to keep patients from developing AIDS, but no one has found a way to entirely eliminate the virus from the human body, so patients continue to require lifelong treatment to prevent them from developing AIDS.

Now, a team of researchers led by Dr. David N. Levy, Associate Professor of Basic Science and Craniofacial Biology at the New York University College of Dentistry (NYUCD), have discovered a new way that HIV-1 reproduces itself which could advance the search for new ways to combat infection.

For decades, scientists have been confident that HIV-1, the virus that

causes AIDS, must insert its genetic material into a cell's DNA in order to reproduce. This process, called "integration," makes the virus a permanent part of the cell. Some of these infected cells can remain as long as the person is alive, and this is one reason why HIV+ individuals must remain on anti-HIV drugs for life.

Dr. Levy's National Institutes of Health (NIH) funded research, "HIV-1 replication without integration," published today on-line in the *Journal of Virology*, with lead author Dr. Benjamin Trinité, a post-doctoral fellow in Dr. Levy's laboratory, has shown HIV-1 can sometimes skip this integration step entirely.

"Although this is not the virus' main method for replicating, having this option available can help HIV survive," said Dr. Levy. "These new findings suggest one mechanism by which HIV may be surviving in the face of antiviral drugs, and suggests new avenues for research into eliminating infection."

The integration step is highly inefficient and actually fails up to 99% of the time, leaving most viruses stranded outside of the safe harbor of cell's DNA. It has been assumed that these stranded, or "unintegrated" viruses were unable to reproduce, but Dr. Levy's team has found that if the conditions are right they can generate new viruses that infect new cells.

The team also found that the unintegrated viruses can survive for many weeks in cells, allowing HIV to "hide out" in a dormant state. The ability of HIV-1 to go dormant helps it avoid elimination by antiviral drugs and immune responses.

"There is intense interest by researchers in the idea that new drugs might be developed to help to completely eliminate the virus from infected individuals," said Dr. Levy. "We think that the new replication

mechanism we have found could provide a target for drugs designed to eliminate infection."

Dr Levy notes, an interesting phenomenon which other researchers have observed is that some bacteria which live in our mouths can stimulate HIV-1 to emerge from its dormant state.

"NYUCD has some terrific groups of researchers who are expert in oral flora and HIV, so we'll be quite interested in working with them to find out how oral health might influence the new replication pathway my group has discovered," added Dr. Levy.

Provided by New York University