



New Strategies Aim at HIV's Last Strongholds

Researchers collected and grew rare reservoir cells in the laboratory to gain insights that may ultimately lead to a cure.

February 27, 2026 By Weill Cornell Medicine

A new study has overcome a long-standing challenge—how to isolate and study elusive HIV-infected cells called authentic reservoir clones (ARCs) that evade the immune system, making the disease difficult to cure. Researchers from Weill Cornell Medicine, Rockefeller University, and collaborating institutions offer a unprecedented look into these hidden HIV-harboring cells and show that some may be more vulnerable to immune destruction than previously believed.

The [findings](#), published February 24 in *Nature*, detail how the researchers collected these rare cells from study participants with HIV and successfully grew them in the laboratory to gain insights that may ultimately lead to a cure.

“For decades, we have known that HIV hides in long-lived immune cells called T cells. But, we have not been able to study those extremely rare—one in a million—cells.” said senior author [Dr. Brad Jones](#), associate professor of immunology in medicine at Weill Cornell. “By isolating ARCs, we can now directly interrogate how they survive and how to eliminate them.”

The study was co-led by [Dr. Isabella Ferreira](#), post-doctoral associate, and [Alberto Herrera](#), a PhD candidate, both in the Jones lab.

“We discovered that finding a needle in a haystack is not always impossible,” Dr. Jones said. “It just takes a team effort.”

Needle in a Haystack

HIV can insert its own genetic material into the DNA of a human immune cell called CD4+ T cell and then go dormant. As long as the virus is inactive, the immune system cannot recognize or destroy the infected cells—a fitting hideout.

Antiviral therapies that can reduce the HIV virus to nearly undetectable blood levels, also cannot eliminate HIV because a subset of ARCs allows the virus to rebound if treatment stops. As a result, people must continue taking these drugs for their entire lives.

With the elusive ARCs in hand, the researchers could finally start looking for answers—how do they avoid detection, and why have experimental therapies designed to “wake up” and eliminate the ARCs not worked?

Very few of these lab-grown reservoir cells actively produced new virus particles at any given time, and it was very difficult to wake them up. The researchers tested what happens when immune cells called CTLs (cytotoxic T lymphocytes) — the body’s main HIV-killing cells — are placed in long-term contact with the ARCs.

Surprisingly, even though HIV was rarely expressed, most reservoir clones were gradually worn down and eliminated over time by strong CTLs. This suggests that if CTLs are potent enough and active long enough, they can catch reservoir cells during brief windows when HIV becomes visible, slowly shrinking the reservoir.

However, even under conditions of extreme CTL pressure, a subset of ARCs persisted through multiple rounds of proliferation, as well as non-proliferating survivors. Essentially, these cells could withstand the immune system’s blows without dying. “The problem is not only latency,” Dr. Jones explained. “It is latency plus resistance to death.”

Reversing Resistance

With this new information, the researchers tested a U.S. Food and Drug Administration-approved drug called deferoxamine to see if they could weaken the defenses of the resistant cells. Deferoxamine increased oxidative stress in these cells, allowing CTL cells to kill them more efficiently.

Dr. Jones believes there may be other therapies or therapeutic combinations that may work similarly and allow the immune system to wipe out latent reservoirs.

“By sensitizing cells to oxidative stress, we were able to restore the cell’s susceptibility to immune cell attacks,” he said. “That suggests rational combination strategies are within reach.”

Now, the team is working to improve their techniques for growing ARCs. They also plan to grow the cells to share with other labs or to teach other labs the techniques and help accelerate progress. Dr. Jones aims to develop a library of all the mechanisms the reservoir cells use to survive and find the best treatment targets.

“If we can properly arm the immune system to kill those cells when they are exposed, we may be able to tip the balance towards eliminating the reservoirs and curing infection,” he said.

This research was supported by the National Institute of Allergy and Infectious Diseases Innovative Strategies for Personalized Immunotherapies and Reservoir Eradication (INSPIRE) [grant](#). Martin Delaney Collaboratory [grant](#) from the National Institutes of Health also helped support these breakthroughs funding the REACH: Research Enterprise to Advance a Cure for HIV led by Dr. Jones.

This [news release](#) was published by Weill Cornell Medicine on February 24, 2026.

