HIV Can’t Hide From Specially Engineered CD8 Cells

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Specially engineered “killer” CD8 cells, modified to more easily recognize and bind to HIV-infected cells, were more effective in the laboratory at controlling HIV reproduction than CD8 cells typically found in the human body, according to a press release detailing a new online report published November 9 by *Nature Medicine*.

CD4 cells—HIV’s primary target in the human body—have the ability to alert other immune system cells, including CD8s, when they have become infected with the virus. CD4s do this by displaying small chunks of viral proteins on their surfaces. When the receptors on CD8 cells come into contact with these viral proteins, they recognize them as foreign to the body and act to kill the infected cell. Unfortunately, HIV is able to evade this defense because it mutates so rapidly.

James Riley, PhD, from the University of Pennsylvania, and his colleagues in Philadelphia and at Cardiff University in Wales were able to isolate a group of CD8-cell genes that make receptors that are 450 times more sensitive to HIV-infected cells than normal CD8 cell receptors. Riley’s team genetically engineered a population of CD8 cells to produce these more powerful receptors and then placed them in a cell culture along with HIV.

“Not only could [CD8] cells be engineered to express the strongly binding [CD8]-cell receptor to see HIV strains that had escaped detection by natural [CD8] cells,” Riley said, “but the engineered [CD8] cells responded in a much more vigorous fashion so that far fewer [CD8] cells were required to control infection.”

Riley and his colleagues hope to begin clinical trials next year in HIV-positive patients who are heavily treatment experienced, potentially followed by trials in people recently infected with HIV. The primary aim of the early trials will be to ensure the safety of the engineered CD8 cells and to determine how many a person may need to control HIV reproduction.