

DuoCAR-T cells found to be effective against HIV in human mouse models

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Microscopic image of an HIV-infected T cell. Credit: NIAID

A team of researchers affiliated with several institutions in the U.S., working with biotech firm Lentigen, has found that duoCAR-T cells they created were effective against HIV in human mouse models. In

their paper published in the journal *Science Translational Medicine*, the group describes how the duoCAR-T cells were created and how well they worked in human mouse models.

Chimeric antigen receptor (CAR)-T cells are T cells that are removed from a patient and genetically altered to give them new properties. In recent cases, they have been altered in ways that push them to more effectively attack [cancer cells](#). The technique involves adding a gene for a type of receptor that binds to proteins found only in cancer cells. Several years ago, a team of researchers tried the technique with HIV patients. It proved effective under certain circumstances, but the researchers found that the CAR-T cells themselves were easily infected by the virus.

In this new effort, the researchers took an updated approach to using CAR-T cells to combat HIV, doubling up their [chimeric antigen receptor](#) molecules. The resultant cells have been named duoCAR-T cells. The researchers report that the advantage of the new approach is that instead of altering T cells to use the CD4 receptor as a targeting site, multiple sites on the HIV envelope can be targeted. The two particular molecules that were used were found by developing over 40 [lentiviral vectors](#) and testing them to see which were the most effective.

The researchers report that when tested in the lab, their duoCAR-T cells eliminated approximately 99 percent of 11 strains of infected immune cells. When tested on human mouse models, doses of duoCAR-T cells were able to suppress HIV infections by 97 percent after just a week of treatment—far better than traditional CAR-T cells. The team reports also that the duoCAR-T cells proved to be resistant to infection, overcoming the main problem with traditional use of CAR-T cells for treatment of HIV patients. And finally, they report that [clinical trials](#) aimed at testing the effectiveness and safety of the new approach are scheduled to start as early as this spring.

More information: Kim Anthony-Gonda et al. Multispecific anti-HIV duoCAR-T cells display broad in vitro antiviral activity and potent in vivo elimination of HIV-infected cells in a humanized mouse model, *Science Translational Medicine* (2019). [DOI: 10.1126/scitranslmed.aav5685](https://doi.org/10.1126/scitranslmed.aav5685)

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