

Novel Non-Antibody-Based Chimeric Antigen Receptor Against HIV That Also Protects Cells From Infection

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SUMMARY

UCLA researchers in the Department of Medicine have developed a novel chimeric antigen receptor (CAR) that targets T cells against HIV while protecting T cells from HIV infection.

BACKGROUND

Chimeric antigen receptors (CARs) are artificial T cell receptors that are designed bind to certain proteins on diseased cells, thus helping the T cells find and kill the target diseased cells such as virus-infected or cancer cells. A typical CAR has a binding domain, a segment of protein that binds to the target disease biomarker, that composes of a single chain antibody. However, other types of binding domains that interact with the viral envelope may have additional advantages for effective immunotherapy against HIV infection.

INNOVATION

UCLA researchers in the Department of Medicine have developed a novel CAR against HIV infection. In place of a single chain antibody, a viral decoy sequence serves as the binding domain. This sequence inhibits the coil-coil interaction of heptad repeat sequence in the viral envelope required for fusion of the virus to a cell during infection. This decoy sequence allows both function of the CAR to direct killing of an infected cell, as well as protection of the CAR-transduced T cells from infection by HIV, and thus serves dual purposes.

APPLICATIONS

- ▶ HIV immunotherapies
- ▶ HIV cure

ADVANTAGES

- ▶ Novel binding mechanism
- ▶ Demonstrated efficacy in killing HIV-infected cells with lentiviral transduced CD8+ T cells
- ▶ Demonstrated protection of lentiviral transduced CD4+ T cells against HIV infection

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	20210252068	08/19/2021	2018-576
European Patent Office	Published Application	3807317	04/21/2021	2018-576

RELATED MATERIALS

- ▶ [Yang, Otto O., et al. "Lysis of HIV-1-infected cells and inhibition of viral replication by universal receptor T cells." Proceedings of the National Academy of Sciences 94.21 \(1997\): 11478-11483.](#)

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- ▶ [Endogenous Human Protein Nanoparticle-Based Immune-Focusing Antiviral Vaccine](#)
- ▶ [Covalent Bi-Specific Monoclonal Antibodies that Expand Selective T Cell Subsets](#)

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OTHER INFORMATION

KEYWORDS

HIV, AIDs, chimeric antigen receptor, CAR, CAR-T, immunotherapy

CATEGORIZED AS

- ▶ **Biotechnology**
 - ▶ Health
- ▶ **Materials & Chemicals**
 - ▶ Biological
- ▶ **Medical**
 - ▶ Disease: Infectious Diseases
 - ▶ Therapeutics

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