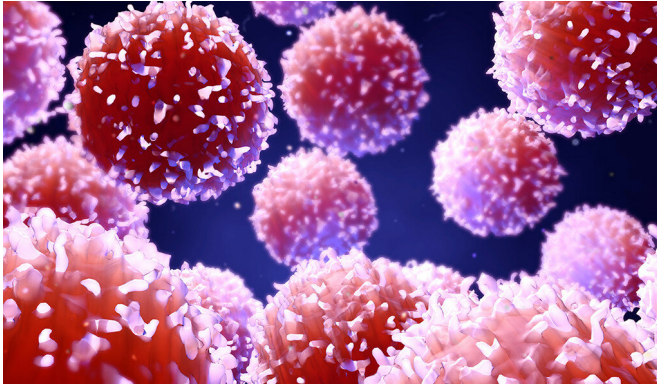


Researchers develop modular approach to engineering immune cells

26 February 2019, by Bara Badwan



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Yale researchers have developed a new way to efficiently engineer immune cells, an advance which enhances the ability to fend off cancer and other diseases, they report in the Feb. 25 issue of the journal *Nature Methods*.

A number of new life-saving therapies rely on reconfiguring human [immune cells](#) to act as living drugs within the body. For instance, CAR-T therapies rely on genetically modifying T cells, a subset of a patient's immune cells, to recognize and destroy cancers.

However, the reengineering process has been cumbersome and inefficient. This led a Yale team headed by Sidi Chen, assistant professor of genetics and in the Systems Biology Institute, to utilize a system that relies on the cell's own repair machinery to integrate new genes into its genome. They used a single protein capable of snipping sections of the genome at multiple points and a repurposed virus to introduce modified genes at specific locations.

The major advantage that this approach provides is the capacity to introduce multiple genetic

modifications concurrently.

"Cancer cells are capable of evolving and shedding the marker that we are engineering the T cell to target so there was a lot of interest in having T cells that can target more than one [cancer](#) marker," Chen explained.

With this new method of T cell engineering, researchers can use multiple viral vectors to engineer more sophisticated CAR-T cells that could target several cancer markers simultaneously.

"As we gain more knowledge of genes that enhance T cell proliferation, cancer-killing function, and persistence, we can make these new therapies more robust and less toxic," Chen said.

More information: Xiaoyun Dai et al. One-step generation of modular CAR-T cells with AAV-Cpf1, *Nature Methods* (2019). [DOI: 10.1038/s41592-019-0329-7](https://doi.org/10.1038/s41592-019-0329-7)

Provided by Yale University

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