Podcast: Genetically engineered CAR-T cell therapies destroy cancer cells. Here's how they work

Many millions of words have been written about GMO crops. As a result, most people know they can now buy GMO Impossible Burgers at the grocery store, and they've likely heard that CRISPR gene editing might save one of our favorite fruits from extinction. But biotechnology is changing more than just the way we produce food. In the field of biomedicine, for instance, scientists are using genetic engineering to develop CAR-T (chimeric antigen receptor) cell therapies, in which immune cells are reprogrammed to identify and destroy cancer cells. The National Cancer Institute elaborates:


Joseph Fraietta

> As its name implies, the backbone of CAR T-cell therapy is T cells, which are often called the workhorses of the immune system because of their critical role in orchestrating the immune response and killing cells infected by pathogens. The therapy requires drawing blood from patients and separating out the T cells. Next, using a disarmed virus, the T cells are genetically engineered to produce receptors on their surface called chimeric antigen receptors, or CARs ….
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> These special receptors allow the T cells to recognize and attach to a specific protein, or antigen, on tumor cells. The CAR T cell therapies furthest along in development target an antigen found on B cells called CD19 (see the box below, titled "The Making of a CAR T Cell").

The Food and Drug Administration has already approved two such treatments since 2017, one for lymphoma and another for leukemia. Both have shown great efficacy against these devastating diseases with fewer side effects than traditional chemotherapy or radiation. While in their infancy, these techniques show great promise for future therapies. On this episode of Talking Biotech, Dr. Joe Fraietta, a leader in CAR-T cell research, explains how the technology works and discusses the effort to overcome its weaknesses as researchers further develop these innovative cell-based therapies.

https://geneticliteracyproject.org/wp-content/uploads/2019/11/210-fraietta.mp3

Joseph A. Fraietta is an assistant professor of microbiology at the University of Pennsylvania. He focuses on the generation of innovative immunotherapy strategies involving T cells and their impact on immunity

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