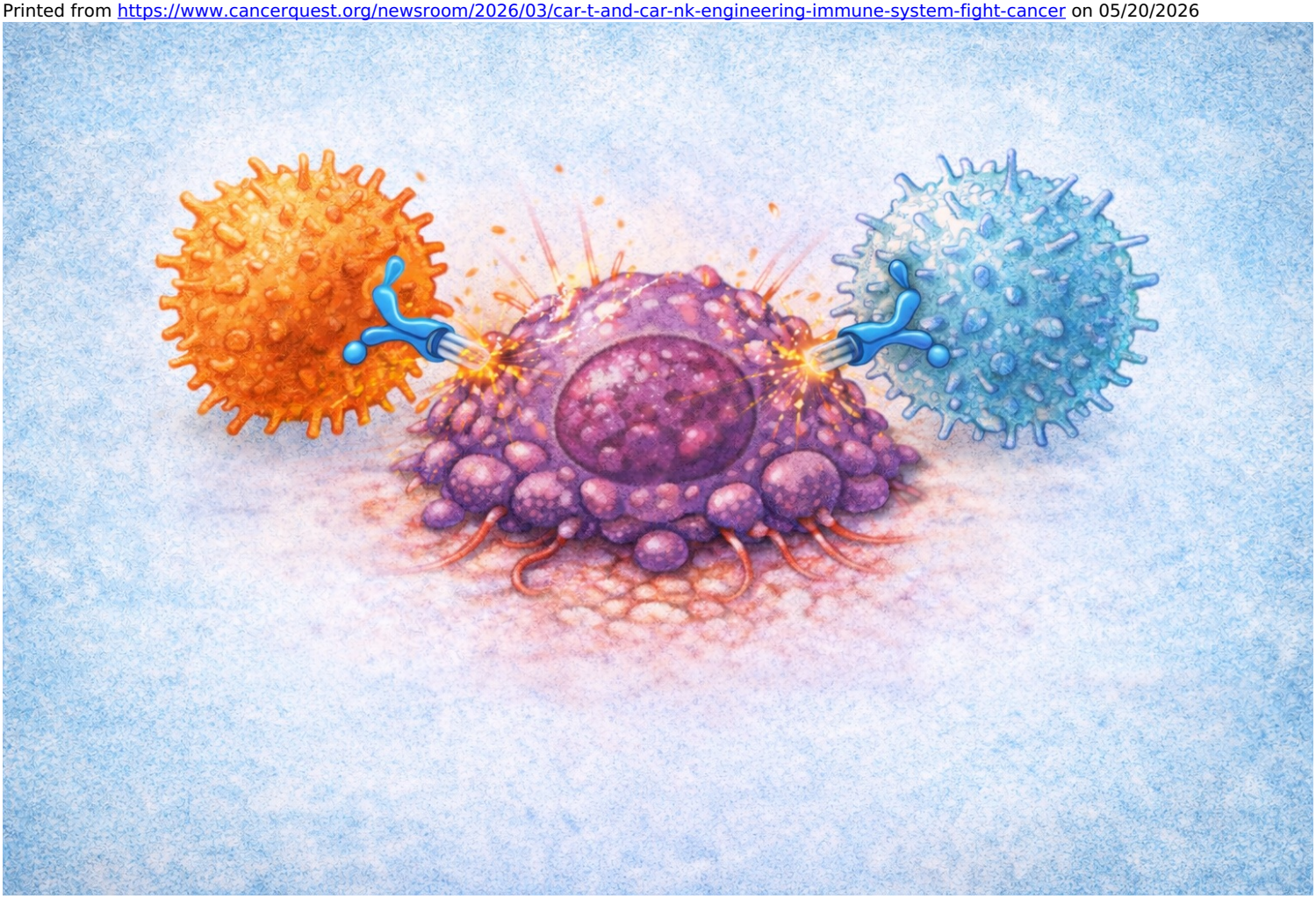
CAR-T and CAR-NK: Engineering the Immune System to Fight Cancer



One of the most exciting advances in cancer treatment involves reprogramming the body's own immune cells to recognize and attack cancer. A therapy known as CAR-T cell therapy does exactly that. In this approach, doctors collect a patient's T cells, an important type of immune cell, and genetically engineer them in the laboratory to better detect cancer cells. Once these enhanced cells are returned to the patient's body, they can seek out and destroy cancer more effectively. CAR-T therapy has already transformed treatment for several blood cancers, including leukemia, lymphoma, and multiple myeloma, helping some patients achieve long-lasting remission when other treatments have failed.

However, CAR-T therapy can cause powerful immune reactions, such as cytokine release syndrome, so patients receiving the treatment must be carefully monitored. Researchers are now developing a related approach called CAR-NK therapy, which uses natural killer (NK) cells, another type of immune cell that naturally attacks abnormal cells. Unlike CAR-T cells, CAR-NK cells can often be derived from healthy donors and prepared in advance, creating the possibility of "off-the-shelf" treatments that could be available more quickly and to more patients.

Scientists are also working to expand CAR therapies beyond blood cancers to treat solid tumors, improve their safety, and speed up their production. By combining CAR therapies with other immunotherapies and designing universal CAR-NK cells that could be used for multiple patients, researchers hope to make these treatments even more effective and accessible.

Together, CAR-T and CAR-NK therapies represent a new frontier in cancer medicine—one in which the immune system itself becomes a powerful, customizable weapon against cancer.

Source

https://www.cancer.gov/about-cancer/treatment/research/car-t-cells
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Single CAR-T cell can save or kill a cancer patient