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New Approach Could Make Immunotherapy for Blood Cancer More Precise

Researchers at the Faculty of Medicine – University of Freiburg have developed a new approach to specifically target an aggressive form of blood cancer while better sparing healthy immune cells. In what is known as T-cell acute lymphoblastic leukemia (T-ALL), cancer cells develop from the body's own immune defense cells. This complicates treatment, as immunotherapies studied to date can also destroy healthy immune cells. The research team has now identified a different marker on the surface of the cancer cells as a target. In preclinical studies, specially modified immune cells were able to effectively combat the leukemia cells, while important healthy immune cells were largely spared. The results were published on October 8, 2026, in the journal *Nature Communications*.

"The particular challenge with this type of leukemia is that cancer cells and healthy immune cells are very similar. With our new approach, we were able to specifically target the cancer cells while preserving more healthy immune cells. This could help develop treatments in the future that are both effective and gentler," says Dr. Semjon Willier, first author of the study and specialist at the Department of Pediatric Hematology and Oncology at the Medical Center – University of Freiburg.

When the Immune System Itself Becomes the Target

In T-ALL, T cells—which normally fight pathogens—transform into cancer cells and multiply uncontrollably. The disease primarily affects children and adolescents and is particularly difficult to treat when it recurs after an initially successful course of therapy.

One potential treatment approach involves so-called CAR-T cells. These genetically modified immune cells can specifically recognize and destroy cancer cells. With T-ALL, however, the challenge is that the cancer cells closely resemble healthy immune cells. As a result, healthy T-cells can also be attacked, which can significantly weaken the immune system.

New Target Spares Important Immune Cells

Researchers in Freiburg have now identified another marker that allows for a more targeted attack on cancer cells: the surface molecule CD28. Based on this, they developed specialized CAR-T cells that can recognize the molecule and specifically target and destroy the cancer cells.

In studies using cell cultures and animal models, the new CAR-T cells were just as effective against leukemia cells as previous approaches. At the same time, more healthy immune cells were preserved. This could pave the way for an effective treatment in the future that weakens the immune system less severely.

Further studies are needed before the treatment can be used in patients

"The results demonstrate the potential that lies in the targeted further development of immunotherapies," says study leader Prof. Dr. Tobias Feuchtinger, Director of the Department of Pediatric Hematology and Oncology at the Medical Center – University of Freiburg. "Our goal is to harness this potential to create treatment options that are both more effective and gentler in the long term for children and adolescents with hard-to-treat leukemias."

Further research is required before these cells can potentially be used in humans. In particular, clinical trials must assess how safe and effective the new CAR-T cells are in patients and what long-term effects they have on the immune system.

Originalpublikation:

Targeting CD28 on T lineage malignancies with chimeric antigen receptor T cells, Nature Communications

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Further information

- University Hospital Freiburg