# Breakthrough discovery could lead to ‘one-size-fits-all’ cancer treatment

New type of T-Cells can recognise and kill most types of cancer

A newly discovered type of killer immune cell has raised the prospect of a “universal” [cancer](https://www.independent.co.uk/topic/Cancer) therapy, scientists say.

Researchers at Cardiff University suggest the new [T-cell](https://www.independent.co.uk/topic/t-cell-cancer-therapy) offers hope of a “one-size-fits-all” cancer therapy.

T-cell therapies for cancer — where immune cells are removed, modified and returned to the patient's blood to seek and destroy cancer cells — are the [latest](https://www.independent.co.uk/voices/immunotherapy-the-secret-of-teaching-the-body-s-immune-system-to-attack-cancer-cells-a6875991.html) paradigm in cancer treatments.

The most widely used is known as CAR-T and is personalised to each patient.

However, it only targets a limited number of cancers and has not been successful for solid tumours, which make up the majority of cancers.

But scientists have now discovered T-cells equipped with a new type of T-cell receptor (TCR), which recognises and kills most human cancer types while ignoring healthy cells.

It recognises a molecule present on the surface of a wide range of cancer cells, and normal cells, and is able to distinguish between healthy and cancerous cells — killing only the latter.

Professor Andrew Sewell, lead author on the study from [Cardiff University's](https://www.independent.co.uk/topic/cardiff-university?CMP=ILC-refresh) School of Medicine, said it was “highly unusual” to find a TCR with such broad cancer specificity and this raised the prospect of “universal” cancer therapy.

He added: “We hope this new TCR may provide us with a different route to target and destroy a wide range of cancers in all individuals.

“Current TCR-based therapies can only be used in a minority of patients with a minority of cancers.

---“Cancer-targeting via MR1-restricted T-cells is an exciting new frontier — it raises the prospect of a 'one-size-fits-all' cancer treatment; a single type of T-cell that could be capable of destroying many different types of cancers across the population.

“Previously, nobody believed this could be possible.”

Conventional T-cells scan the surface of other cells to find anomalies and eliminate cancerous cells, but ignore cells that contain only “normal” proteins.

The scanning recognises small parts of cellular proteins that are bound to cell-surface molecules called human leukocyte antigen (HLA), allowing killer T-cells to see what is occurring inside cells by scanning their surface.

But the study, published in Nature Immunology, describes a unique TCR that can recognise many types of cancers via a single HLA-like molecule called MR1.

Unlike HLA, MR1 does not vary in the human population, meaning it is a hugely attractive new target for immunotherapies.

In the lab, T-cells equipped with the new TCR were shown to kill lung, skin, blood, colon, breast, bone, prostate, ovarian, kidney and cervical cancer cells, while ignoring healthy cells.

To test the therapeutic potential of these cells in living subjects, the researchers injected T-cells able to recognise MR1 into mice bearing human cancer and with a human immune system.

Scientists say this showed encouraging cancer-clearing, comparable to the now NHS-approved CAR-T therapy in a similar animal model.

They were also able to demonstrate that T-cells of [melanoma](https://www.independent.co.uk/topic/melanoma) patients modified to express this new TCR could destroy not only the patient's own cancer cells, but also other patients' cancer cells in the laboratory, regardless of the patient's HLA type.

The researchers are now experimenting to determine the precise molecular mechanism by which the new TCR distinguishes between healthy cells and cancer.

They hope to trial the new approach in patients towards the end of the year.

Professor Awen Gallimore, of the University's division of infection and immunity, and cancer [immunology](https://www.independent.co.uk/topic/immunotherapy) lead for the Wales Cancer Research Centre, said: “If this transformative new finding holds up, it will lay the foundation for a universal T-cell medicine, mitigating against the tremendous costs associated with the identification, generation and manufacture of personalised T-cells.

“This is truly exciting and potentially a great step forward for the accessibility of [cancer](https://www.independent.co.uk/topic/Cancer) immunotherapy.”