



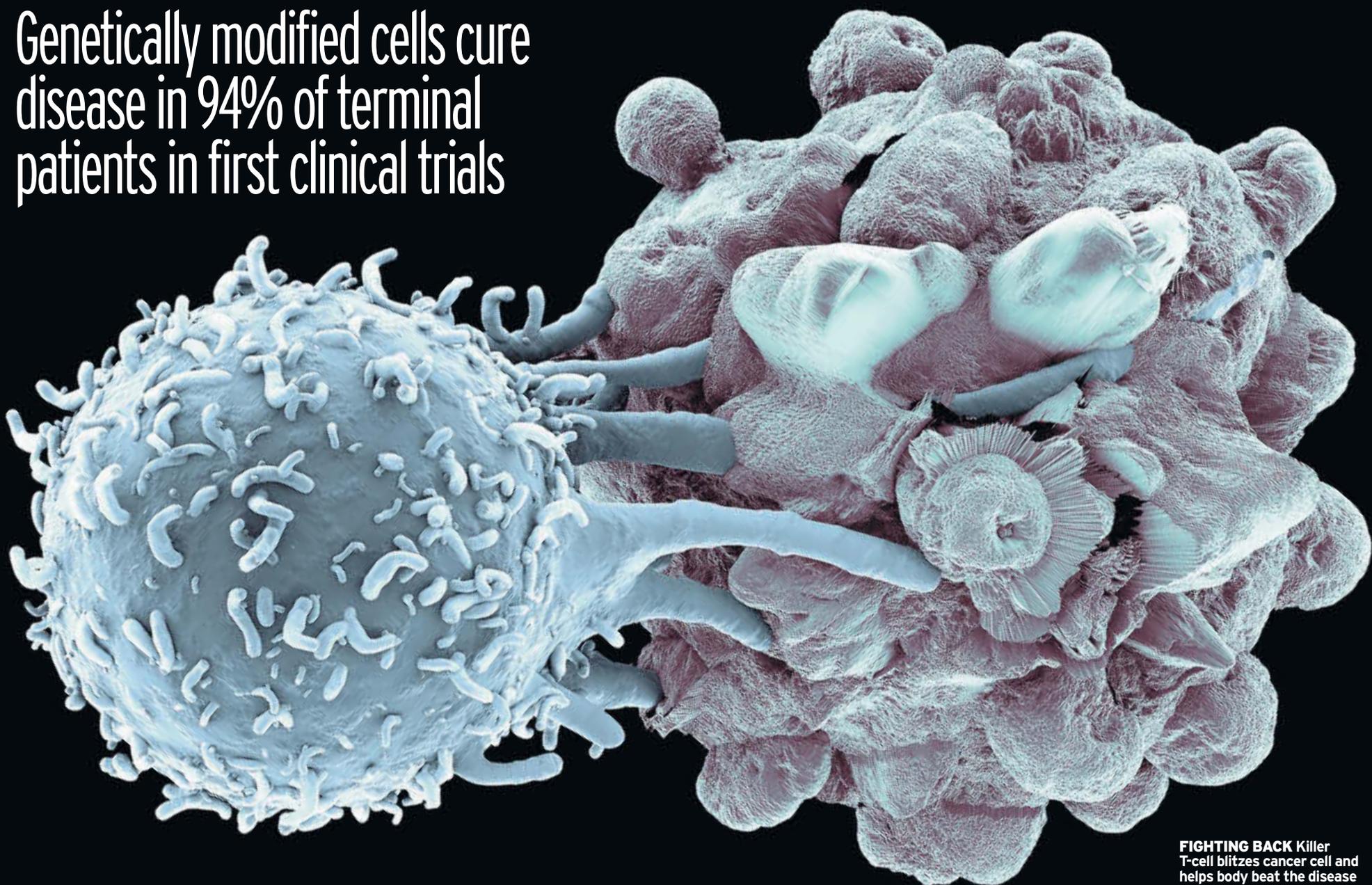
**CLOSE** John Paul II and woman enjoyed 30-year friendship

## The Pope and the married woman

SEE PAGE 3

# INCREDIBLE BREAKTHROUGH

Genetically modified cells cure disease in 94% of terminal patients in first clinical trials



**FIGHTING BACK** Killer T-cell blitzes cancer cell and helps body beat the disease

# THE GREAT CANCER HOPE

BY **ANDREW GREGORY**

**A PIONEERING cancer treatment left 94% of patients in a clinical trial disease free, after being told they had just months to live.**

In a major US study, white cells were taken from their blood and modified to fight leukaemia before being injected back in – with astonishing results.

Trial leader Professor Stanley Riddell said: "This is extraordinary."

**FULL STORY: PAGE 5**



**TREATMENT** Little Layla Richards

BY **ANDREW GREGORY**  
Health Editor, in Washington, DC

**DOCTORS battling to combat cancer have hailed a revolutionary treatment that teaches the body how to kill the disease itself.**

Trials of immunotherapy showed remarkable results with 94% of terminal leukaemia patients told they had just months to live going into remission.

And more than half of 40 suffering other blood cancers were left disease free, according to US researchers.

The treatment could reduce the reliance on chemotherapy, which has debilitating toxic side-effects.

In a second major breakthrough, an Italian study found the therapy could be used to develop a vaccine-style drug that stops the disease coming back after it has been successfully treated.

In the US trial, white blood cells – known as T-cells – were taken from patients suffering acute lymphoblastic leukaemia and genetically modified to target the cancer.

They were then injected back into the body – and specialists were amazed at the results. Trial chief Professor Stanley Riddell, of the Fred Hutchinson Cancer Research Center in Seattle, Washington, said: "This is extraordinary. It is unprecedented in medicine to be honest to get response rates in this range in these very advanced patients."

**DEFENCE**

"These are in patients that have failed everything. Most would be projected to have two to five months to live. This is potentially paradigm-shifting in terms of how we treat them."

"I think immunotherapy has finally made it to a pillar of cancer therapy."

The breakthrough was announced at the American Association for the Advancement of Science conference in Washington, DC.

The other major advance involving T-cells was revealed at the meeting. Italian experts said they had discovered memory T-cells that can stay in the body for at least 14 years.

This means they could also be trained to fight cancer, then "remember" the disease if it came back and beat it again. The findings could pave the way for a vaccine against the disease and spell a permanent cure.

So far, Prof Riddell's technique has only been tried on patients with "liquid" blood cancers. But his team are understood to be working on using T-cell technology on solid tumours.

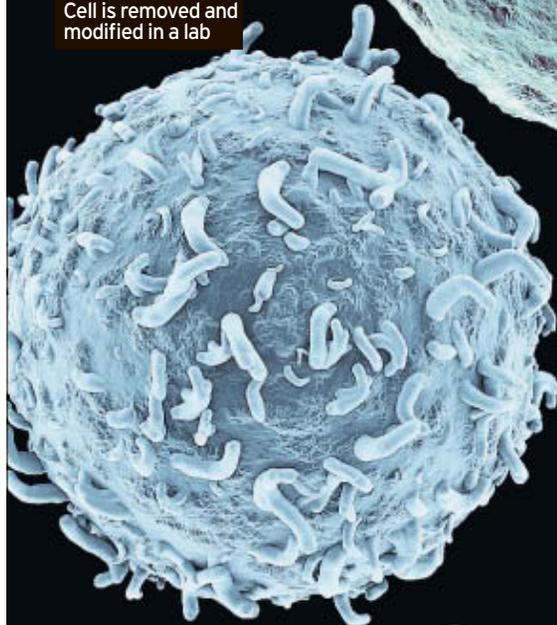
Professor Chiara Bonini, of the University of Milan, said the treatment would work in the same way as other vaccines such as flu. The haematologist

# Given months to live, 94% are cancer free

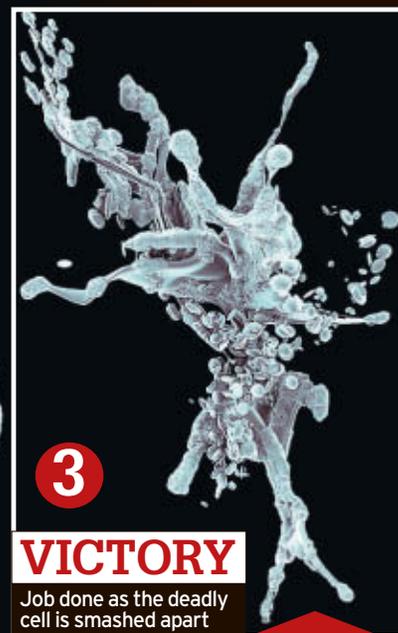
Hopes new cell therapy can combat killer disease

1

**T-CELL**  
Cell is removed and modified in a lab

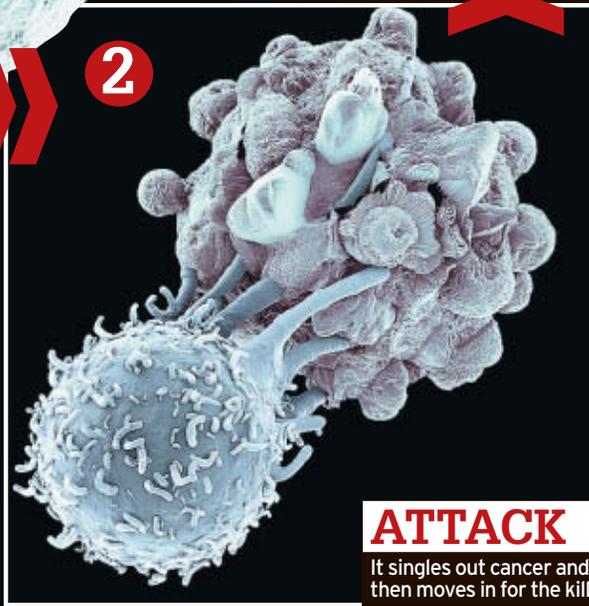


**CANCER CELL**  
Body cannot fight disease on its own



**3 VICTORY**  
Job done as the deadly cell is smashed apart

2



**ATTACK**  
It singles out cancer and then moves in for the kill

**AFTER** removing T-cells from the patient's body, scientists add genes which make a protein that detects diseased cancer cells then kills them. The modified T-cells are transfused back into the patient's body but do not cause harm to healthy cells. The patient is normally given an infusion of around 50 million of the modified cells. The treatment is very complex so that is why it is given as a last resort at the moment, when all conventional therapies have failed. In leukaemia patients in the US trial, the special genes added to the T-cells specifically targeted leukaemia cells. And experts believe in future they will be able to tweak cells to target other cancers.

added: "This really is a revolution. I think we're at the beginning of a road and this means that the products will be available very soon. T-cells are a living drug, and they have the potential to persist in our body for our whole lives. "Imagine when you are given a vaccine as a kid and you are protected against flu or whatever for all of your life."



Why is that? When a T-cell encounters the antigen and gets activated, it kills the pathogen but also persists as a memory cell. "So if the same strain of flu comes back 10 years later

then you have T-cells that remember it and kill it so quickly you don't even know you're infected. "Imagine translating this to cancer immunotherapy, to have memory T-cells that remember the cancer and are ready for when it comes back" Prof Bonini carried out a trial in Milan with 10 patients who had bone marrow transplants and infusions of T-cells. They tracked the cells for between two and 14 years and, in a world first,

found low but stable levels were still in the blood at the end of the study. British experts hailed the findings from both trials. Manchester University immunologist Professor Daniel Davis said: "Immunotherapy has great potential to revolutionise cancer treatments. This research area is hot, no doubt about it." Cancer Research UK's Dr Kat Arney called the results "exciting" but warned: "The treatment comes with a risk of potentially severe side effects, and doesn't yet work for all patients. "We still need more trials to know for sure how well they work and whether they can be used in other cancers too. But there's hope that this type of therapy could save lives." Prof Riddell's trial took place over two years. Patients have had at least 18 months' remission but seven people had an over-powerful immune system response from which two died. Experts are trying to combat the side-effects.

## 'IVF kids may have shorter life', says doc

IVF babies are an "evolutionary experiment" that could be as bad for health as junk food, a scientist claims. Dr Pascal Gagneux believes the technology may be storing up serious trouble for ageing populations of IVF children. Of the estimated five million IVF offspring alive today, the oldest is

Briton Louise Brown, 37. And Dr Gagneux, an evolutionary biologist from the University of California, pointed out it took 50 years for the dangers of fast food to become clear. Speaking at the AAAS conference, he said of IVF: "I think we can't rule out it could be shortening life span." But

British fertility expert Geoffrey Trew, of Hammersmith Hospital, last night accused Dr Gagneux of "not good, nor responsible, science" that could cause "unnecessary worry" for IVF parents. And Sheffield University professor Allan Pacey said: "I don't share the concerns raised by Dr Gagneux."