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Singapore

Singapore doctors develop new cell therapy that saved patients from treatment-resistant cancer

Sixteen patients went into complete remission within a month of the treatment. They previously had a less than 10 per cent chance of survival as the cancer did not respond to chemotherapy and other treatments.



The National University Health System and National University of Singapore CAR T team of Dr Esther Chan (left), Dr Bernice Oh (centre) and Professor Allen Yeoh at the National University Hospital on Sep 30, 2024. (Photo: CNA/Ili Nadhirah...[see more](#))

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SINGAPORE: A team of doctors in Singapore has developed a new cell therapy for cancer patients who have otherwise exhausted all other forms of treatment.

For these patients with T-cell acute lymphoblastic leukaemia (T-ALL) that do not respond to chemotherapy or relapse after treatment, the prognosis is normally bad – they have a less than 10 per cent chance of survival.

However, 16 patients who underwent this experimental treatment went into complete remission within a month.

The new cell therapy was developed by researchers and clinicians from the Yong Loo Lin School of Medicine at the National University of Singapore (NUS) and the National University Health System (NUHS).

The treatment has now been published in the medical journal Nature Medicine.

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A NEW CELL THERAPY

T-ALL accounts for about 10 per cent of ALL cases in children. ALL is the most common blood cancer in children.

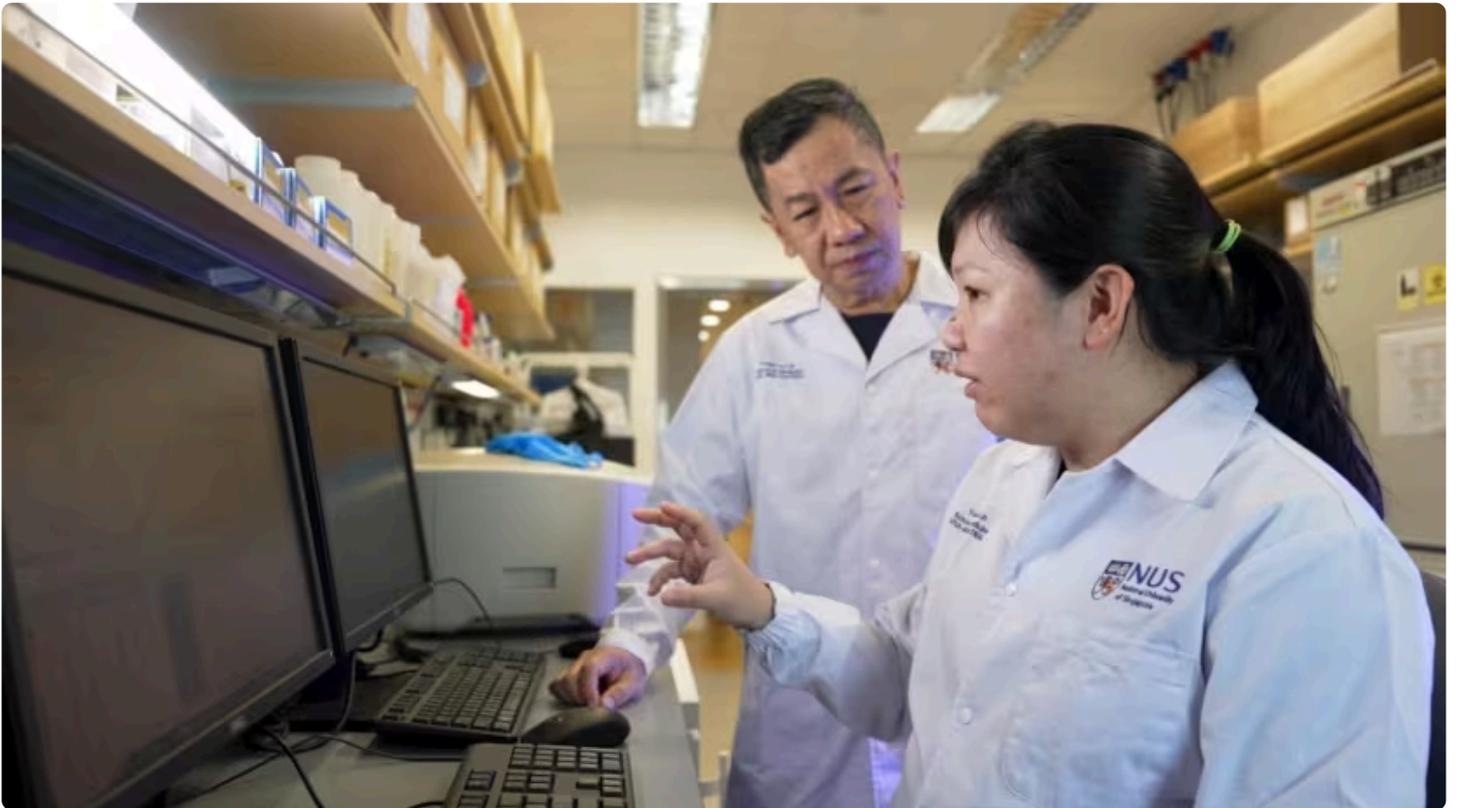
It uses CAR T-cells, which are a type of immune cell that has been genetically modified to attack cancer cells.

These CAR T-cells target a protein called CD7, which is found in cancer T-cells.

But normal T-cells, which form part of the immune system, also have CD7. This causes the CAR T-cells to attack each other.

To prevent this, the researchers included a blocker in the CAR T-cells so they only target cancer T-cells.

It uses a technology developed by Professor Dario Campana's lab under the Department of Paediatrics at NUS Medicine.



Professor Allen Yeoh with Dr Bernice Oh. (Image: National University Health System)

THE RESULTS

From April 2019 to October 2023, the therapy was given to 17 patients, aged between two and 72.

Of the 17 patients, 12 were at the National University Hospital while five were at the partner Ospedale Pediatrico Bambino Gesù hospital in Rome.

All of them had T-ALL and had undergone prolonged and intensive treatment, but to no avail. The cancer either did not respond to the chemotherapy or returned after treatment.

The treatment developed by the Singapore doctors achieved very different results.

Of the 17 patients, 16 went into complete remission within one month. The leukaemia cells became undetectable, even with ultra-sensitive tests that can detect one leukaemia cell among 10,000 normal cells.

The therapy was well tolerated and the side effects were mild.

The first patient who was treated with this therapy has now been in remission for five years, without the need for additional chemotherapy or a bone marrow transplant.

Of the 16 who went into complete remission, five later died, some due to underlying medical conditions not linked to the treatment.

Dr Bernice Oh, the first author of the study and a consultant at the Khoo Teck Puat – National University Children’s Medical Institute (KTP-NUCMI) said: “This CAR T therapy is a new and promising tool to treat T-ALL patients who have failed conventional treatment.

“These patients had exhausted all potentially curative options, and we are heartened that we could give them another clear chance at cure without severe side effects.



Maria Schreierer undergoing experimental treatment at the National University Hospital in Singapore. (Photo: Maria Schreierer's family)

“SHE CAN FINALLY BE A CHILD AGAIN”

One patient who was part of the clinical trials was Austrian Maria Schreierer.

After a bout of COVID-19 in February 2021, the then 10-year-old had gone back to school, but she continued to suffer from fatigue.

Her parents initially thought she was just recovering from the coronavirus.

“The teacher called us and said she was not well, so we took her home. This happened again several days later, and she came home yelling in pain, that her bones were aching,” said her mother, Mrs Vesna Schreierer.

A series of blood tests later, Maria was diagnosed with T-cell ALL. With no specialised paediatric oncology hospital in their hometown, they travelled 200km for treatment in Austria before moving to Switzerland for further therapy.

At St Gallen Hospital in Switzerland, Maria was declared leukaemia-free after treatment.

The doctors warned that if the cancer returned, there would be few options.

In 2022, she relapsed. The doctors at St Gallen told her parents that their daughter's chances of survival were less than 5 per cent.

But one doctor, Dr Jeannette Greiner, refused to give up hope and approached Prof Allen Yeoh in Singapore for help.

When the parents heard of the new treatment, they made an immediate decision to bring Maria to Singapore.

"It took us three seconds to decide because we knew there was no other way," Mrs Schreierer said.



Maria Schreierer undergoing experimental treatment at the National University Hospital in Singapore.
 (Photo: Maria Schreierer's family)

They arrived in Singapore in December 2022 for the experimental treatment and stayed for four months.

Worried about the side effects of the therapy, having seen their daughter go through intense treatments that left her in a wheelchair, they were relieved Maria only had a mild fever.

“By day 16, the bone marrow was clear. It was amazing. Maria took to the treatment like a fish to water,” said Mrs Schreierer.

After going into remission, she received a bone marrow transplant in Vienna. Today, Maria is back in school again.

“She can finally be a child again,” said Mrs Schreierer.



Hannah Thomas undergoing experimental treatment at the National University Hospital in Singapore. (Photo: Hannah Thomas)

CANCER IN ADULTS

The therapy was also used to treat adults, whose prognosis is worse than children's if they develop T-ALL.

One patient is Australian Hannah Thomas, who found out she had T-ALL during a routine fertility test.

To curb the progression of the cancer, she started a gruelling regimen of chemotherapy, underwent radiation therapy and had a bone marrow transplant.

Her wedding, which was originally supposed to be in September 2022, had to be shelved.

She then went into remission and got married in May 2023.

But soon after, Mrs Thomas found out the cancer had returned, and it was spreading quickly.



Hannah Thomas at the National University Hospital in Singapore. (Photo: Hannah Thomas)

After learning about the clinical trial in Singapore, Mrs Thomas and her husband decided to give it a shot and made the trip.

They arrived in Singapore in October last year and the treatment started after she was accepted into the trial.

In December, she received the CAR T therapy cells and she soon went into remission.

Nine months on, she continues to be cancer-free.

Professor Allen Yeoh, who led the clinical application of this new technology and is head of the Division of Paediatric Haematology and Oncology at NUH's KTP-NUCMI, said: "While we celebrate this wonderful milestone, we are only at the beginning of this exciting journey.

"There is a lot of scientific and medical enquiry to understand how to better use CD7 CAR T-cells.

"Each patient, in this series, taught us a lot. Ultimately, for every member of our team, seeing each patient smile and given another chance, after achieving remission, is priceless."

Source: CNA/mi(kg)

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