

# Novel treatment for liver cancer gets funding boost

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Singapore researchers have succeeded in coaxing the body's own cells to kill a strain of liver cancer in two patients, by finding a way to control the behaviour of HBV-specific T cells, a type of immune cell.

Researchers say this new treatment is a potential game-changer for sufferers of Hepatocellular carcinoma (HCC), a form of liver cancer common in Asia.

According to the National Cancer Centre Singapore, liver cancer affects 24 out of every 100,000 people here. HCC is currently the most common type of primary liver cancer.

The treatment was developed in a collaboration between the Duke-NUS Medical School, the Singapore General Hospital, and biotechnology firm Lion TCR.

In it, white blood cells from a cancer patient are extracted and infused with receptors through a process lasting 10 to 14 days. Akin to putting spectacles on a person, these receptors boost the white blood cells, which are injected back into the patient, where they will identify cancer cells and attack them.

The treatment is tailor-made for each patient, taking into account an individual's varying medical condition.

This project is a successful example of cell therapy, a field of study in which intact living cells are injected or implanted into a patient to restore tissue or organ function, or combat diseases such as cancer.

"White blood cells, in a patient with cancer, do not kill the cancer. We take out the white blood cells, and modify them in a laboratory under special, sterile conditions," said Professor Tan Anthony Tanoto, scientific co-founder of Lion TCR. "This changes the white blood cells from not being able to recognise cancerous tumours, to being able to target and kill cancerous growths."

HCC is highly associated with the chronic hepatitis B virus. While small to moderate-sized tumours may be treated with surgery, liver transplants and radiology treatments, there is no cure for larger tumours.

"Treatment with drugs only helps moderately in the survival rate of patients with more serious cases of HCC," said Dr Antonio Bertolletti, Professor of the Emerging Infectious Diseases Programme at Duke-NUS, and founder of Lion TCR. "We were able to select, design and engineer individualised T cells for therapy. Our studies showed that these engineered T cells were able to destroy the tumour."

During clinical trials, where over 20 cell infusions were performed on the two patients, the scientists found one patient had a reduction in his tumour size.

"Since white blood cells are produced in the human body, this form of treatment can not only destroy cancerous cells, but has no adverse side effects," said Dr Bertolletti. Neither patient experienced adverse reactions.

Dr Bertolletti said the team would now work on improving the treatment, while making it more affordable and widely available. And some of the funding has been secured. Lion TCR will benefit from \$80 million worth of funding from the Government for programmes that study, develop and scale up cell therapy projects.

"The therapy is expensive, as the cells are grown in a lab under absolutely sterile conditions. The cells will also be difficult to produce, as there is no 'one size fits all' version," said Dr Bertolletti.

"But it is our dream to make this treatment widely available, and affordable for more people."

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