Device aims to decrease wait period for patients needing immunotherapy

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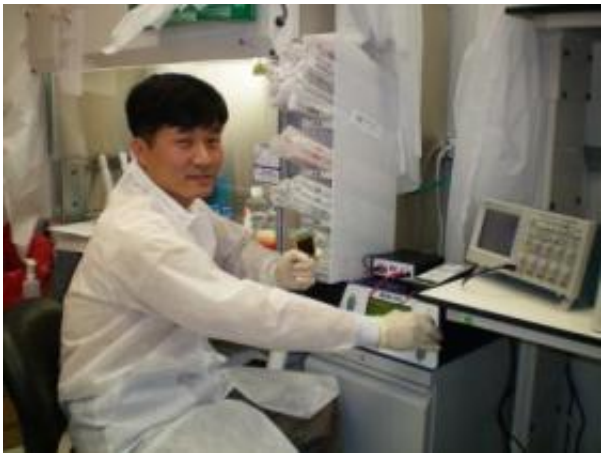

This is Paul (Yoonsu) Choi, Ph.D. of the Children's Cancer Hospital at the University of Texas M. D. Anderson Cancer Center. Credit: M. D. Anderson Cancer Center

Researchers from the Children's Cancer Hospital at The University of Texas M. D. Anderson Cancer Center have created a device that significantly decreases the time needed to produce genetically manipulated T cells in preclinical tests for leukemia.

Paul (Yoonsu) Choi, Ph.D., presented the device he engineered, along with supporting research, at the annual meeting of the American Society for Blood and Marrow Transplantation in Tampa, FL, today. Choi's device, called HitMeD (high throughput medical electroporation device),

has been used for preclinical studies in treatment of acute lymphocytic leukemia (ALL), with early results indicating it has the potential to decrease a patient's wait time to receive immunotherapy from weeks and months to days and weeks.

"This particular device is an automated system designed to work with the press of a button, which saves us time and resources," says Choi. "More importantly, it's a very safe method of gene transfer."

Multiple relapsed ALL in pediatric patients is a rapidly progressive cancer that is often resistant to chemotherapy, leading to poor survival prognosis. Since chemotherapy typically fails these patients, new approaches, such as cell-based therapy, are needed to combat the quickly spreading leukemia.

Choi, along with senior researcher Laurence Cooper, M.D., Ph.D., from the Children's Cancer Hospital, are studying ways to genetically manipulate T cells, an important component of a person's immune system, to specifically attack tumor cells while keeping risk to the patient at a minimum.

One method found to be effective in preclinical tests is taking a sample of human T cells, increasing their number through stimulation and then genetically transferring desired messenger RNA (mRNA) into the T cells. The mRNA, once inside the T cells, produces a protein called chimeric antigen receptor (CAR), which allows the T cells to recognize and specifically kill tumor cells. The HitMeD device carries out this entire process. Once the altered T cells are created, researchers use them to battle leukemia cells in the laboratory.

Although these manipulated T cells have shown to be effective against ALL in mice and cell lines, they lose their fighting power after a few days. For this reason, researchers engineered the new HitMeD, which

processes the T cells 100 times faster than the current standard commercial technologies.

"Our goal is to provide therapy to patients closer to their time of need," says Cooper. "The HitMeD processes a larger volume of T cells in a continuous fashion over a much shorter time than we can achieve with commercial devices. We hope that will translate to better treatment opportunities for relapsed patients."

Cooper and researchers are planning a Phase I trial that could open this year. This trial would allow multiple-relapsed ALL patients to receive manipulated T cells that have been processed by HitMeD. These special T cells will act like an army of antibodies rushing in to attack tumor cells, but quickly retreating after their ammunition is used. With HitMeD, doctors hope to infuse additional doses of T cells more rapidly to sustain the fight until the patient can receive additional treatment, such as a stem cell transplant.

Source: University of Texas M. D. Anderson Cancer Center