

Despite COVID-19 pandemic, first patient undergoes new personalized immunotherapy

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On Dec. 8, 2020, Bernard Thurman became the first patient to undergo an investigational cell therapy that uses a patient's own, lab-grown tumor infiltrating lymphocytes (immune cells) to destroy his cancer. Credit: UC San Diego Health Sciences

Since 2016, Bernard Thurman has undergone traditional treatments, experimental therapies and surgeries to counter the cancer within him, but nothing has successfully eradicated the disease. Earlier this year, the oncologists in Los Angeles who were treating him referred Thurman to a personalized cancer therapy trial being developed at Moores Cancer Center at UC San Diego Health.

"Truly, I am running out of options, as far as treatment goes," said Thurman, whose [cancer](#) developed in his tonsils and has since spread to his lungs.

"The latest immunotherapies, both the FDA-approved and the experimental, were proving ineffective. Obviously, it was time to go in a different direction."

Thurman met with Ezra Cohen, MD, associate director for translational science at Moores Cancer Center, in mid-March to discuss an investigational cell [therapy](#) that uses a patient's own immune cells—specifically tumor infiltrating lymphocytes (TIL)—to seek and destroy their own unique cancer cells.

Days after this meeting, COVID-19 swept the country, forcing hospitals to rethink which procedures could continue and which would need to be paused. Because the TIL trial requires that patients be hospitalized, it was put on hold.

"At that time, we did not know what to anticipate in terms of the number of patients that would be admitted because of COVID-19," said Cohen. "We made a conscious decision that any clinical trial that required an inpatient stay would be temporarily suspended."

Thurman was disappointed.

"Don't let the pandemic make you decide to put off cancer treatment," said Thurman. "You may or may not get COVID, but cancer will kill you if you don't treat it. So, don't delay it."

Knowing the urgency of treatment, Cohen, a head and neck oncologist, suggested an alternative trial.

"We treated Mr. Thurman on an initial clinical trial with a different type of immunotherapy, an antibody, and he did fairly well at the beginning," said Cohen. "But, again his cancer began to grow and, unfortunately, progressed."

While the COVID-19 pandemic continues to sicken people worldwide, UC San Diego Health has resumed previously paused [medical services](#). This allowed Cohen, and colleagues Gregory Daniels,

MD, Ph.D., and Aaron Miller, MD, Ph.D., to reinstate the Phase I TIL trial.

After seeing that Thurman's cancer was unabated on the immunotherapy trial, he was enrolled as the first patient and received a personalized TIL therapy on Tuesday.

"Treating our first patient with his own cells generated at UC San Diego marks a milestone following years of preparation leveraging the core strengths of the cancer center—[patient care](#), research and collaboration," said Daniels, an oncologist specializing in skin and head and neck cancers and protocol principal investigator for the TIL trial.

TIL therapy has been around for decades, with some success in treating melanoma—the most serious form of skin cancer.

Together, UC San Diego and La Jolla Institute for Immunology (LJI) researchers are taking TIL therapy a step further by selecting the T-cells that are most likely to be responsive against an individual's cancer. They are also expanding the therapy to treat melanoma and head and neck cancers.

"Cell therapy has been proven effective for a number of different patients, but we want to improve upon it," said Miller, a medical oncologist. "We want to make it more effective, less toxic and more applicable to a broader population of cancer patients."

Engineering Thurman's TIL therapy involved a weeks-long, personalized process that began with Thurman undergoing a tumor biopsy at Jacobs Medical Center at UC San Diego Health in October.

Tissues samples were then sent to LJI where a team led by Stephen Schoenberger, Ph.D., and Bjoern Peters, Ph.D., developed a novel technology platform to identify mutations recognized by the patient's own immune system. Early funding support from the Immunotherapy Foundation created the infrastructure to develop the process, which was first used to develop a personalized cancer vaccine trial in 2018.

An algorithm is used to isolate tumor-infiltrating lymphocytes, a type of T-cell, with the strongest response against Thurman's cancer mutations.

"We are taking the patient's tumor, sequencing the protein coding portion of the genome, finding out which mutations can be recognized by the patient's immune system, and then looking for the TIL fragments that contain those T-cells," said Schoenberger, an adjunct professor of medicine at UC San Diego School of Medicine. "If we can identify which TIL can recognize the mutations that are selectively expressed in the tumor, selectively grow those and reinfuse them to the patient, we will hopefully have a more potent and more effective therapy. That's our advance."

Once the T-cells that appeared to be initiating the strongest immune system response to Thurman's cancer are identified, a team led by Dan Kaufman, MD, Ph.D., at the Advanced Cell Therapy Laboratory at UC San Diego multiply the specified T-cells by the billions.

The cells are autologous: They are the patient's own cells, simply lab-grown.

At Jacobs Medical Center, Thurman underwent an infusion of these engineered cells and a high-dose interleukin-2, a biologic therapy used to boost T-cell response in cancer therapy. Ideally, within weeks, the TIL therapy will shrink tumors.

"All of us involved in this research project want one thing, and one thing only, and that is for patients to get better and to offer new effective therapies to patients with cancer," said Schoenberger.

Thurman wants that too. He is optimistic, but also understands that he is the first patient to receive this experimental, personalized cancer therapy. He thinks others should enroll in [clinical trials](#) too.

"Clinical [trials](#) are a lifeline. Give it a shot. You may literally have nothing to lose," said Thurman. "It may be beneficial, personally. It may not. But it will further research for other patients down the road and hopefully help others in the future."

Provided by University of California - San Diego

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