

# NORTHWESTERN INTERNATIONAL HEALTH

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## Northwestern Medicine Chicago Proton Center is first in the United States to offer P-Cure upright diagnostic quality imaging breakthrough technology

P-Cure, Ltd has received a 510(k) letter from the U.S. Food and Drug Administration (FDA) permitting it to market its P-ARTIS CT scanner system, which is a computed tomography (CT) imaging system intended to scan patients while seated. The Northwestern Medicine Chicago Proton Center will be the first proton center in the U.S. to use P-Cure's innovative imaging technology for patients being treated for lung cancer.

"This technology is an important addition to our proton offerings," said William Hartsell, MD, radiation oncologist and Medical Director, Northwestern Medicine Chicago Proton Center. "We expect that imaging lung cancer patients in an upright position will allow us to more precisely target the tumor when we treat it with the proton beam."

Using a diagnostic CT scanning system, this new system will allow proton therapy treatment planning images to be taken with patients in a seated position. This system will allow for enhanced imaging of target tumors that will be treated with proton beams – which also occurs in the seated position. The seated position for imaging and treatment is expected to provide a greater degree of comfort for the patient during treatment and may decrease tumor motion making the proton treatments more precise.

"The P-Cure team is excited to work in collaboration with the Northwestern Medicine Chicago Proton Center, an internationally recognized center of excellence for cancer treatment. Our goal is to create more clinical flexibility for new and existing proton centers," said Michael Marash, MD, Chief Executive Officer, P-Cure, Ltd.



Until now, lung cancer patients undergoing CT scanning and proton therapy normally lie flat on their backs. Research shows that when patients are imaged in an upright position compared to a supine, or laying position, motion within the lung was reduced and absolute lung volumes were much larger.

"When a patient is in an upright position, the lungs expand more readily, which contributes to lower lung density and a better image," said Dr. Hartsell. "Since absolute lung volumes are larger in the upright position, we may be able to better treat the lung tumor while at the same time sparing more of the normal lung tissue."

Patients undergoing treatment for lung cancer, tumors in the middle of the chest (mediastinum), and possibly some head and neck cancers are initial candidates for use of the vertical CT in treatment planning.

### About Northwestern Medicine

To learn more about Northwestern Medicine, visit <http://news.nm.org/about-northwestern-medicine.html>.

### About P-Cure Ltd

To learn more about P-Cure, visit [www.p-cure.com](http://www.p-cure.com)

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## PIONEERING PRECISION MEDICINE IN CANCER

BY: ANNA WILLIAMS

THIS STORY ORIGINALLY APPEARED IN THE NORTHWESTERN BREAKTHROUGHS NEWSLETTER

It's a concept that seems simple, but it's poised to transform the field of cancer care and research: All patients, and their cancers, are unique.

It's also an approach that the physicians and scientists at OncoSET, the flagship clinical and research program of the Robert H. Lurie Comprehensive Cancer Center of Northwestern University, take to heart every day.

Launched in 2015, OncoSET is the Lurie Cancer Center's entry into the emerging precision medicine movement. Through an innovative three-step process — Sequence, Evaluate, Treat — the clinic combines oncology with genomic sequencing to provide cutting-edge cancer care personalized for each patient.

The OncoSET process begins with a blood draw from a patient for a liquid biopsy (in some cases, a tissue biopsy is available as well). Through its collaborations with commercial partners, OncoSET leverages next-generation genomic sequencing to produce a genomic profile of a patient's tumors and pinpoints changes in specific genes.

The program's Molecular Tumor Board, co-directed by Massimo Cristofanilli, MD, director of OncoSET and associate director for Translational Research and Precision Medicine at the Lurie Cancer Center and Amir Behdad, MD, assistant professor of Pathology, discusses and analyzes each patient's individual genomic profile, one by one. In this evaluation stage, it's all hands on deck: The multidisciplinary team includes medical, surgical and radiation oncologists, as well as pathologists, molecular scientists, radiologists, bioethicists, pharmacologists and cancer geneticists, among other experts.

With input from scientists across a range of specialties, the board draws up a comprehensive report for each patient, detailing the results of the sequencing and devising an optimal treatment plan. That treatment, based on the molecularly defined targets, might include an available drug or enrollment in an early-stage clinical trial being conducted at Northwestern.

"We've created the first clinic in Chicago — and one of only a few in the country — where it doesn't matter where the tumor is located," explained Leonidas Plataniias, MD, PhD, director of the Lurie Cancer Center, and the Jesse, Sara, Andrew, Abigail, Benjamin and Elizabeth Lurie Professor of Oncology. "What matters now is the composition of the tumor, and the patient's genomic analysis."

Since its inception last year, the Molecular Tumor Board has evaluated the genetic profiles of more than 80 patients, all of whom had advanced disease or cancer that was unresponsive to standard treatment. Not only has the model helped to make a real difference in individual outcomes, but the hope is that data collected through the clinic may eventually serve as the building blocks of tomorrow's cures.

To refer a patient or request a consultation contact:

312-472-6392 or 844-662-6738 (toll-free)

E-mail: [OncoSET@northwestern.edu](mailto:OncoSET@northwestern.edu)

<http://news.feinberg.northwestern.edu/2017/04/pioneering-precision-medicine-in-cancer/>



Massimo Cristofanilli, MD, is the director of OncoSET at the Lurie Cancer Center.

### DEMONSTRATING THE VALUE OF PRECISION APPROACH

In just the few years since its launch, OncoSET has also emerged as a national leader in advocating for a precision medicine approach to cancer care and research. "There were a couple of major goals we wanted to accomplish very quickly," said Cristofanilli, who joined Northwestern Medicine in 2015. "One, of course, was to be more precise in treatment planning for patients and establish the clinical service. But at the same time, we wanted to do so in a way that also advances translation and feeds our research purpose."

"One important area of success for this program is in educating physicians on the value of this," said Cristofanilli, also a professor of Medicine in the Division of Hematology and Oncology. "We want to be on the forefront in demonstrating the utility of this model."

While OncoSET is currently centered on genomics and molecular diagnostics, in the future, new tools like epigenetic analysis, proteomic analysis and metabolomics may also play a role in helping to match patients with the individualized treatment plan that might benefit them most.

"The more we understand in science, the more we will be bringing it back to OncoSET to optimize our analysis," Plataniias, added. "We think this is the future, and we are moving fast."

## NORTHWESTERN RESEARCHERS REWIRE CELLS TO ATTACK CANCER

A new study offers a possible look at the future of fighting cancer and other diseases that suppress the immune system.

Researchers at Northwestern University spent three years developing a method to genetically rewire cells to attack cancer cells rather than be suppressed by them.

Cancer's ability to suppress the immune system is a "challenging barrier in efforts to try and harness the immune system to treat cancer," said Joshua Leonard, associate professor of chemical and biological engineering at Northwestern University.

Past research has shown that immune system stimulants can be injected into the body to activate cells and overcome immunosuppression. However, the process can lead to a host of side effects including blood poisoning, sepsis and inflammation, according to Leonard, because these stimulants lead to cells being activated throughout the body, rather than targeting specific cells.

"What you want is just to activate the immune cells that are sitting next to the cancer," Leonard said. "There was just no way to do that with standard or existing drug delivery technologies."

Because scientists can't control where all of the cells travel in the body, they chose to focus on creating a mechanism that would activate a cell only when it's near a tumor.

When cancer is present in the body it emits specific proteins that can manipulate and suppress the immune response. Researchers genetically engineered changes to the input and output of T cells, a specific type of white blood cell, to only

activate an immune response when cells detected a specific tumor-derived protein found in many types of tumor.

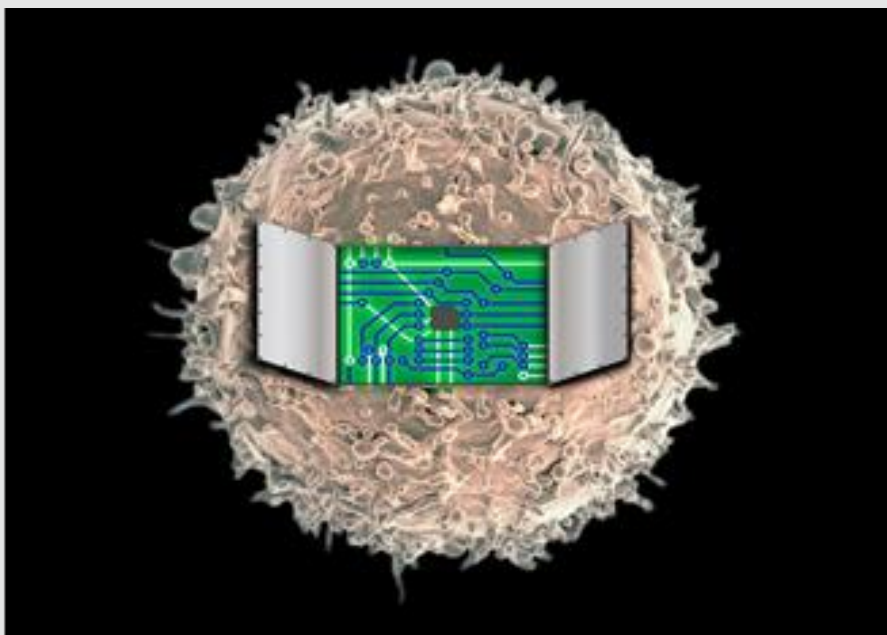
Researchers were "thrilled" when the genetically rewired cells activated an immune response when they sensed the tumor-derived protein in a culture, Leonard said. "That's exactly what we wanted to see."

The study was published recently in the journal *Nature Chemical Biology*. According to Leonard, studies in animal models have started and are ongoing.

While this particular study examined how rewired cells could be used in targeted cancer immunotherapy, Leonard and his colleagues are interested in exploring how cell rewiring could be used to treat other conditions that are "the consequence of the immune system being a little out of balance," like chronic inflammation, he said.

Scientists developed the method in such a way that it could be customized per each researcher's needs. Leonard likens the development of the rewiring technique to that of an operating system.

"If you're developing an operating system, a lot of times you're developing an operating system that works well [and] if you do that well then all different kinds of people can pick it up and use it for their own applications," he said. "That's really the spirit of what we're doing."



Northwestern University synthetic biologists have developed a technology for engineering customized immune cells to build programmable therapeutics. (Image: Joshua Leonard, Kelly Schwarz/ Northwestern University. Cell Image: NIAD/NIH/Flickr)

**MESSAGE FROM DR. DANIEL DERMAN,**

President of International Patient Services,  
Sr. Vice President, Northwestern Memorial HealthCare



Welcome to our May Newsletter. We hope you are doing well! As springtime is upon us, and the flowers are in full bloom in Chicago, our awareness is on new beginnings. Fittingly, our newsletter has highlighted some new beginnings at Northwestern.

- We are very happy to be the first health system in the United States to offer P-CURE's upright innovative imaging technology for patients being treated for lung cancer. This new technology may be able to better treat the lung tumor while at the same time sparing more of the normal lung tissue.
- We are also one of the very first Comprehensive Cancer Centers in the United States to have a Precision Medicine Program which develops more precise treatment plans for patients based on their genomic profiles and highlighting changes in specific genes.
- Our researches continue to make incredible gains in their work to attack cancer. Researchers at Northwestern University spent three years developing an innovative method to genetically rewire cells to attack cancer cells rather than be suppressed by them.

As always please free to contact me if you have any questions or comments.  
[dderman@nm.org](mailto:dderman@nm.org)

We know that Ramadan is beginning at the end of May this year. We wish you and your family Ramadan Kareem!

Our warmest regards,

Dr. Daniel Derman



Photo was taken a few blocks from Northwestern Hospital by one of our international coordinator.

**NORTHWESTERN IN THE MIDDLE EAST**

In May 2016, Orchid Reproductive and Andrology Services in Dubai, UAE, entered a unique affiliation agreement with Northwestern Medicine, a recognized leader in fertility treatment, research and education in Chicago, USA. Northwestern Medicine offers an array of comprehensive services, advanced technologies and exceptional facilities. Its medical staff includes some of the finest physicians dedicated to providing excellent patient care and remaining at the forefront of medicine by pioneering research into the causes and cures of disease. Our successful affiliation allows our team of experts to cross-train and share knowledge with leaders in their field.

**Services Provided:**

- Assisted Reproduction Techniques (IVF/ICIS/IUI)
- Management of PCOS
- Male Factor Subfertility
- Sperm Recovery (Biopsy Needle/ TESA/PESA)
- Pre Implantation Genetic Screening (PGS) to rule out the presence of genetic disorders
- Gynecology & Reproductive Surgery (Laparoscopy & Hysteroscopy)
- Sperm and Egg Freezing
- Fertility Preservation
- Testicular Mapping
- Semen Analyze
- Varicocele

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