

With a tailored approach to cancer treatment, doctors at Moffitt see more cures, fewer side effects

By Irene Maher, Times Correspondent
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Treatment at Moffitt Cancer Center has been more precise since doctors and researchers there began using targeted drug therapies nearly a decade ago. And soon they plan to expand on that approach, known as personalized medicine, to include radiation therapy.

Doctors already know how to more precisely deliver beams of healing radiation so they spare as much healthy tissue as possible. Their next step will be to tailor the dose and duration of radiation to each patient based on their tumor biology, genetics and complex mathematical equations.

Gail Porter credits personalized, targeted cancer treatments for keeping her alive for the last five years. A retired teacher from New Port Richey, she was diagnosed with Stage 4 lung cancer in 2010. The first chemotherapy she received worked for about six months; the second had to be stopped because of harsh side effects.

Then in 2012, her oncologist at Moffitt sent some of her tumor samples to a lab for special genetic analysis, to see if a drug existed that could fight Porter's tumor type. She remembers Dr. Eric Haura's meeting when the results came back a few months later.

"He said, 'I have good news and bad news. The bad news is you have a rare genetic mutation of cancer that is very aggressive. The good news is, we have a drug that targets that mutation.' I had a positive and quick response to (the drug)," said Porter, who is 66.

She benefited from the current direction of cancer research and treatment, which matches targeted therapies to patients. Tiny samples of a patient's tumor are analyzed for their biological and genetic characteristics. That information is factored in to mathematical models to predict which available drugs will target that patient's specific genetic abnormality and fight the cancer.

Before this approach was available and still today, most cancer patients received a standard regimen of chemotherapy drugs, sometimes combined with surgery or radiation. It's a one-size-fits-all approach.

But now drugs can be chosen based on more than just the patient's diagnosis of breast, lung or colon cancer.

"Treatment is less random," said Haura, director of the Lung Cancer Center of Excellence and a senior member in the department of thoracic oncology at Moffitt.

"We don't have so much of, 'Let's see how this drug works and that drug works.' We know more about whether it will work in a particular patient before we try it."

On Aug. 9, Moffitt announced a partnership with [Cvergenx Inc.](#) to change and perhaps revolutionize radiation therapy in cancer treatment. Early next year, Moffitt plans to begin enrolling patients and create personalized radiation treatment plans.

Before now, "most of the effort has been focused on drug therapy and not on radiation," said Dr. Louis Harrison, chairman of the department of radiation and oncology at Moffitt and deputy physician-in-chief. "This is a brand new area that is deserving of a lot of attention. Moffitt is a pioneer here."

The new focus will be on the individual biological properties of each patient's tumor, its genetic makeup, its growth and how it responds to radiation.

"We will be able to adapt the therapy as we deliver treatment, as the tumor changes and the biology of the cancer changes ... so the treatment evolves as the cancer changes," Harrison said. "These factors have never been taken into account before when planning and delivering radiation."

Using sophisticated mathematical equations developed by Cvergenx and Moffitt, the personalized approach will help doctors determine which patients will benefit from radiation therapy, the most effective dose to give them, the speed or rate at which it should be delivered and how often it should be given.

"A lot of patients will do well with much less radiation, some need more than we give with standard care," Harrison said. "If you personalize treatment, that should lead to curing more people, at a lower cost, with less toxicity."

Patty Virgilio was diagnosed with pancreatic cancer in 2012 and treated at Moffitt with chemotherapy and radiation.

In 2016, doctors found a tumor in her neck. She received chemotherapy and the standard 28 days of radiation. That meant making an hour-long drive from her home in Bradenton to Moffitt every weekday for a month, in addition to undergoing chemotherapy.

With the newer, targeted approach, the course of radiation treatment for patients like Virgilio may be less frequent, or the dose may be weaker, making it easier on patients. Or it may be stronger and given more frequently to prevent a future recurrence.

Some patients won't be put through radiation at all because the targeted analysis will tell them that their tumor won't respond to it.

All of that sounds good to Virgilio, a 55-year-old mother of three who helps run a family commercial tire business.

"It's promising and hopeful," she said. "I am so fortunate to be around to see this. It's a step in the right direction."

In a study published this month in *The Lancet Oncology*, Moffitt researchers demonstrated that personalized radiation therapy could successfully predict which breast, brain, lung and pancreatic cancer patients would benefit from radiation.

"This is taking a closer look at the fingerprint of a tumor, understanding the way it will behave with radiation," said Howard McLeod, medical director of the DeBartolo family Personalized Medicine Institute and a clinical pharmacologist at Moffitt.

Ten years from now, he said, personalized radiation will be routine. In 20 years, it will be available across the United States.

"The most exciting part of this is that the data we get back from sequencing patients helps us adjust the radiation treatment plan," McLeod said.

"And we may increase the chances for cure, at least for localized disease, dramatically."

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A personalized medicine initiative

The National Institutes of Health has begun the initial launch of a program aimed at advancing personalized medicine. More than 1 million volunteers will be recruited to participate in a landmark research program designed to help researchers understand more about the individual factors — genetic, biological, environmental, lifestyle — that influence how people respond to treatment. The All of Us Research Program will be formally launched nationwide this fall or in early 2018. To learn more and to sign up to receive notifications about when and how you can participate, go to allofus.nih.gov.