

The next big advance in cancer treatment could be a vaccine

June 26 2023, by Carla K. Johnson



Registered nurse Erika Obrietan administers the third dose of an experimental breast cancer vaccine to patient Kathleen Jade at University of Washington Medical Center - Montlake, Tuesday, May 30, 2023, in Seattle. Jade, 50, learned she had breast cancer in late February. She's getting the vaccine to see if it will shrink her tumor before surgery. "Even if that chance is a little bit, I felt like it's worth it," said Jade, who is also getting standard treatment. Credit: AP Photo/Lindsey Wasson

The next big advance in cancer treatment could be a vaccine.

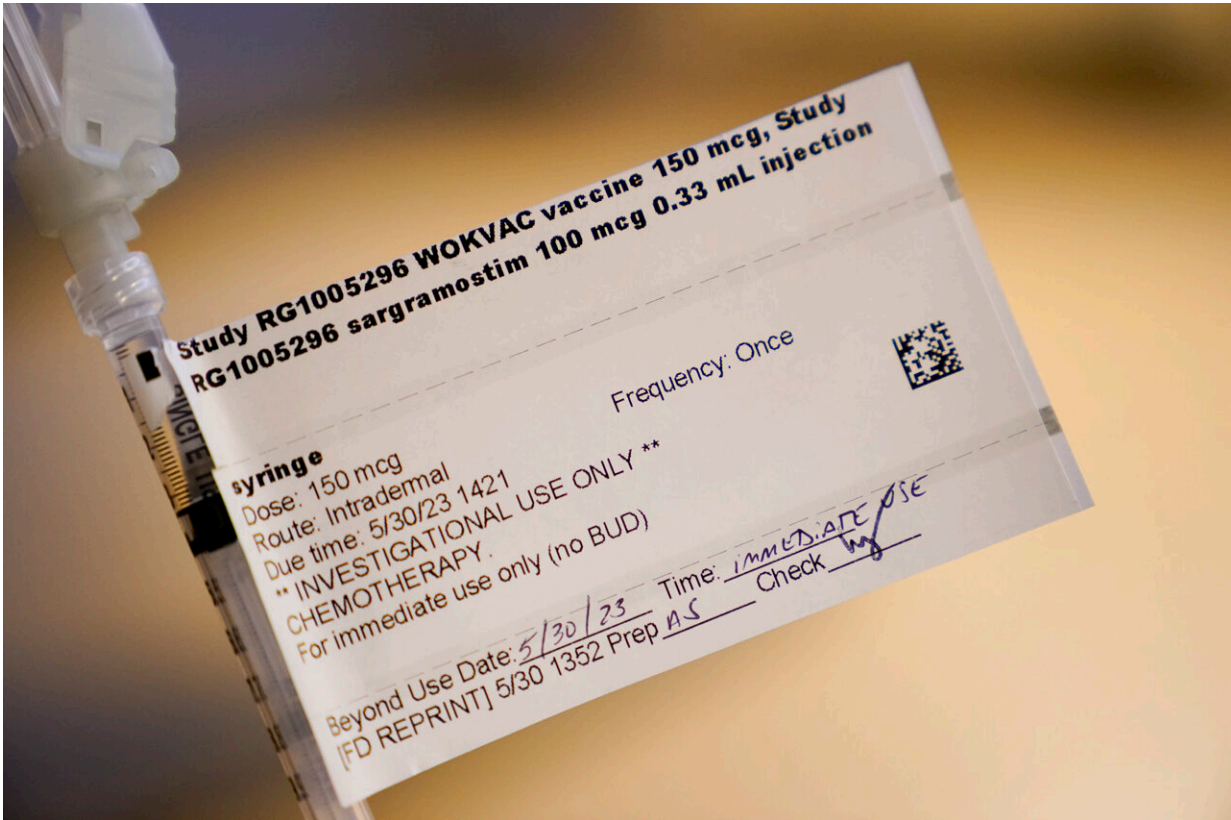
After decades of limited success, scientists say research has reached a turning point, with many predicting more vaccines will be out in five years.

These aren't traditional vaccines that prevent disease, but shots to shrink tumors and stop [cancer](#) from coming back. Targets for these experimental treatments include breast and lung cancer, with gains reported this year for deadly skin cancer melanoma and [pancreatic cancer](#).

"We're getting something to work. Now we need to get it to work better," said Dr. James Gulley, who helps lead a center at the National Cancer Institute that develops [immune therapies](#), including [cancer treatment vaccines](#).

More than ever, scientists understand how cancer hides from the body's immune system. Cancer vaccines, like other immunotherapies, boost the immune system to find and kill [cancer cells](#). And some new ones use mRNA, which was developed for cancer but first used for COVID-19 vaccines.

For a [vaccine](#) to work, it needs to teach the immune system's T cells to recognize cancer as dangerous, said Dr. Nora Disis of UW Medicine's Cancer Vaccine Institute in Seattle. Once trained, T cells can travel anywhere in the body to hunt down danger.



A dose of an experimental breast cancer vaccine is pictured at University of Washington Medical Center - Montlake, Tuesday, May 30, 2023, in Seattle. The medication is being tested to shrink tumors and stop cancer from coming back. Targets for these experimental treatments include breast and lung cancer, with gains reported this year for deadly skin cancer melanoma and pancreatic cancer. Credit: AP Photo/Lindsey Wasson

"If you saw an activated T cell, it almost has feet," she said. "You can see it crawling through the blood vessel to get out into the tissues."

Patient volunteers are crucial to the research.

Kathleen Jade, 50, learned she had [breast cancer](#) in late February, just weeks before she and her husband were to depart Seattle for an around-

the-world adventure. Instead of sailing their 46-foot boat, Shadowfax, through the Great Lakes toward the St. Lawrence Seaway, she was sitting on a hospital bed awaiting her third dose of an experimental vaccine. She's getting the vaccine to see if it will shrink her tumor before surgery.

"Even if that chance is a little bit, I felt like it's worth it," said Jade, who is also getting standard treatment.

Progress on treatment vaccines has been challenging. The first, Provenge, was approved in the U.S. in 2010 to treat prostate cancer that had spread. It requires processing a patient's own immune cells in a lab and giving them back through IV. There are also treatment vaccines for early bladder cancer and advanced melanoma.



Kathleen Jade poses for a portrait while waiting to receive her third dose of an experimental breast cancer vaccine at University of Washington Medical Center - Montlake, Tuesday, May 30, 2023, in Seattle. Jade, 50, learned she had breast cancer in late February. She's getting the vaccine to see if it will shrink her tumor before surgery. "Even if that chance is a little bit, I felt like it's worth it," said Jade, who is also getting standard treatment. Credit: AP Photo/Lindsey Wasson

Early cancer vaccine research faltered as cancer outwitted and outlasted patients' weak immune systems, said Olja Finn, a vaccine researcher at the University of Pittsburgh School of Medicine.

"All of these trials that failed allowed us to learn so much," Finn said.

As a result, she's now focused on patients with earlier disease since the experimental vaccines didn't help with more advanced patients. Her group is planning a vaccine study in women with a low-risk, noninvasive breast cancer called ductal carcinoma in situ.

More vaccines that prevent cancer may be ahead too. Decades-old hepatitis B vaccines prevent liver cancer and HPV vaccines, introduced in 2006, prevent cervical cancer.

In Philadelphia, Dr. Susan Domchek, director of the Basser Center at Penn Medicine, is recruiting 28 healthy people with BRCA mutations for a vaccine test. Those mutations increase the risk of breast and [ovarian cancer](#). The idea is to kill very early abnormal cells, before they cause problems. She likens it to periodically weeding a garden or erasing a whiteboard.



Kathleen Jade poses for a portrait while waiting to receive her third dose of an experimental breast cancer vaccine at University of Washington Medical Center - Montlake, Tuesday, May 30, 2023, in Seattle. Jade, 50, learned she had breast cancer in late February. She's getting the vaccine to see if it will shrink her tumor before surgery. "Even if that chance is a little bit, I felt like it's worth it," said Jade, who is also getting standard treatment. Credit: AP Photo/Lindsey Wasson

Others are developing vaccines to prevent cancer in people with precancerous lung nodules and other inherited conditions that raise cancer risk.

"Vaccines are probably the next big thing" in the quest to reduce cancer deaths, said Dr. Steve Lipkin, a medical geneticist at New York's Weill

Cornell Medicine, who is leading one effort funded by the National Cancer Institute. "We're dedicating our lives to that."

People with the inherited condition Lynch syndrome have a 60% to 80% lifetime risk of developing cancer. Recruiting them for cancer vaccine trials has been remarkably easy, said Dr. Eduardo Vilar-Sanchez of MD Anderson Cancer Center in Houston, who is leading two government-funded studies on vaccines for Lynch-related cancers.

"Patients are jumping on this in a surprising and positive way," he said.



Kathleen Jade is examined by Dr. Will Gwin before receiving her third dose of an experimental breast cancer vaccine at University of Washington Medical Center - Montlake, Tuesday, May 30, 2023, in Seattle. Jade, 50, learned she had

breast cancer in late February. She's getting the vaccine to see if it will shrink her tumor before surgery. "Even if that chance is a little bit, I felt like it's worth it," said Jade, who is also getting standard treatment. Credit: AP Photo/Lindsey Wasson

Drugmakers Moderna and Merck are jointly developing a personalized mRNA vaccine for patients with melanoma, with a large study to begin this year. The vaccines are customized to each patient, based on the numerous mutations in their cancer tissue. A vaccine personalized in this way can train the immune system to hunt for the cancer's mutation fingerprint and kill those cells.

But such vaccines will be expensive.

"You basically have to make every vaccine from scratch. If this wasn't personalized, the vaccine could probably be made for pennies, just like the COVID vaccine," said Dr. Patrick Ott of Dana-Farber Cancer Institute in Boston.

The vaccines under development at UW Medicine are designed to work for many patients, not just a single patient. Tests are underway in early and advanced breast cancer, lung cancer and ovarian cancer. Some results may come as soon as next year.



Dr. Nora Disis, director of the UW Medicine Cancer Vaccine Institute, poses for a portrait Thursday, May 25, 2023, at the institute's campus in Seattle. For the experimental cancer vaccine to work, it needs to teach the immune system's T cells to recognize cancer as dangerous, says Disis. Once trained, T cells can travel anywhere in the body to hunt down danger. Credit: AP Photo/Lindsey Wasson



Dr. Nora Disis, director of the UW Medicine Cancer Vaccine Institute, poses for a portrait Thursday, May 25, 2023, at the institute's campus in Seattle. For the experimental cancer vaccine to work, it needs to teach the immune system's T cells to recognize cancer as dangerous, says Disis. Once trained, T cells can travel anywhere in the body to hunt down danger. Credit: AP Photo/Lindsey Wasson



Research scientist Kevin Potts uses ovarian cancer cells to set up an experiment at UW Medicine's Cancer Vaccine Institute Thursday, May 25, 2023, in Seattle. Vaccines under development at UW Medicine are designed to work for many patients, not just a single patient. Tests are underway in early and advanced breast cancer, lung cancer and ovarian cancer. Some results may come as soon as next year. Credit: AP Photo/Lindsey Wasson



Research scientist Kevin Potts looks at ovarian cancer cells under a microscope at UW Medicine's Cancer Vaccine Institute Thursday, May 25, 2023, in Seattle. Vaccines under development at UW Medicine are designed to work for many patients, not just a single patient. Tests are underway in early and advanced breast cancer, lung cancer and ovarian cancer. Some results may come as soon as next year. Credit: AP Photo/Lindsey Wasson



Research scientist Yi Yang retrieves samples at UW Medicine's Cancer Vaccine Institute Thursday, May 25, 2023, in Seattle. Vaccines under development at UW Medicine are designed to work for many patients, not just a single patient. Tests are underway in early and advanced breast cancer, lung cancer and ovarian cancer. Some results may come as soon as next year. Credit: AP Photo/Lindsey Wasson



Jamie Crase, who participated in a phase 1 ovarian cancer vaccine trial 11 years ago, poses for a portrait, Wednesday, June 7, 2023, in Mercer Island, Wash. While she doesn't know whether the vaccine helped, Crase is now 50 with no signs of cancer. Credit: AP Photo/Lindsey Wasson



Research scientist Kevin Potts uses a multichannel pipette to dissociate ovarian cancer cells with the enzyme trypsin at UW Medicine's Cancer Vaccine Institute Thursday, May 25, 2023, in Seattle. Once dissociated, the cells can then be either analyzed or re-seeded to conduct additional experiments. Credit: AP Photo/Lindsey Wasson



Principal Scientist Denise Cecil retrieves supplies while working at UW Medicine's Cancer Vaccine Institute Thursday, May 25, 2023, in Seattle. Vaccines under development at UW Medicine are designed to work for many patients, not just a single patient. Tests are underway in early and advanced breast cancer, lung cancer and ovarian cancer. Some results may come as soon as next year. Credit: AP Photo/Lindsey Wasson



Jamie Crase, who participated in a phase 1 ovarian cancer vaccine trial 11 years ago, displays a favorite necklace, Wednesday, June 7, 2023, in Mercer Island, Wash. Crase, who was diagnosed with advanced ovarian cancer at 34, had made a will that bequeathed the necklace to her best friend. While she doesn't know whether the vaccine helped, Crase is now 50 with no signs of cancer and still wears the necklace. Credit: AP Photo/Lindsey Wasson



Jamie Crase, who participated in a phase 1 ovarian cancer vaccine trial 11 years ago, walks on a path near her home, Wednesday, June 7, 2023, in Mercer Island, Wash. While she doesn't know whether the vaccine helped, Crase is now 50 with no signs of cancer. Credit: AP Photo/Lindsey Wasson



Jamie Crase, who participated in a phase 1 ovarian cancer vaccine trial 11 years ago, poses for a portrait, Wednesday, June 7, 2023, in Mercer Island, Wash. While she doesn't know whether the vaccine helped, Crase is now 50 with no signs of cancer. Credit: AP Photo/Lindsey Wasson

Todd Pieper, 56, from suburban Seattle, is participating in testing for a vaccine intended to shrink [lung cancer](#) tumors. His cancer spread to his brain, but he's hoping to live long enough to see his daughter graduate from nursing school next year.

"I have nothing to lose and everything to gain, either for me or for other people down the road," Pieper said of his decision to volunteer.

One of the first to receive the ovarian cancer vaccine in a safety study 11 years ago was Jamie Crase of nearby Mercer Island. Diagnosed with advanced ovarian cancer when she was 34, Crase thought she would die young and had made a will that bequeathed a favorite necklace to her best friend. Now 50, she has no sign of cancer and she still wears the necklace.

She doesn't know for sure if the vaccine helped, "But I'm still here."

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Citation: The next big advance in cancer treatment could be a vaccine (2023, June 26) retrieved 29 April 2024 from

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