Pancreatic Cancer Vaccine Shows Durable Response for Six Years

Most people who responded to a personalized neoantigen vaccine were alive and still had activated T cells up to six years after surgery.

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A custom-made messenger RNA (mRNA) vaccine plus an immune checkpoint inhibitor appears to reduce the risk of pancreatic cancer progression for at least six years after surgery, according to updated Phase I study results presented at the American Association for Cancer Research Annual Meeting (AACR 2026).

“These early results show this new immunotherapy approach has the potential to make a difference for one of the deadliest cancers,” principal investigator Vinod Balachandran, MD, director of the Olayan Center for Cancer Vaccines at Memorial Sloan Kettering Cancer Center, said in a news release. “The latest data from this small study suggest vaccines can meaningfully stimulate the immune system in some patients with pancreatic cancer—and these patients continue to do well years after vaccination.”

Pancreatic cancer is often diagnosed late, and it is difficult to treat. Standard treatment may include surgery, radiation, chemotherapy, targeted therapies and immunotherapy, but relapse and metastasis are common, and the five-year survival rate is only around 10%.

Balachandran and colleagues are testing a vaccine called autogene cevumeran (also known as BNT122 or RO7198457) being developed by BioNTech—the German biotech company that partnered with Pfizer to develop the most widely used mRNA COVID-19 vaccine—in collaboration with Genentech.

To create a personalized cancer vaccine, scientists genetically sequence a sample from a patient’s tumor after surgery and use computer algorithms to identify neoantigens—abnormal proteins unique to cancer cells—that are most likely to trigger a robust immune response. Genetic blueprints for these neoantigens are then packaged into mRNA nanoparticles. Compared with some other cancers, such as melanoma, pancreatic cancer has relatively few targetable mutations to work with.

“Designing cancer vaccines isn’t simple—it requires a systematic approach to select the right targets on each patient’s tumor and get the immune system to respond strongly and keep fighting

over time," said Olayan Center codirector Benjamin Greenbaum, PhD. "This is much harder than it sounds, especially in cancers where other immunotherapies have failed."

The Phase I trial (NCT04161755) included 16 patients with pancreatic ductal adenocarcinoma at Memorial Sloan Kettering. Their tumors were sequenced after surgery, and a vaccine containing up to 20 neoantigens was custom-made for each patient. The participants received primer and booster doses via IV infusion along with Genentech's PD-L1 immune checkpoint inhibitor Tecentriq (atezolizumab) and a combination chemotherapy regimen.

At the 2022 American Society for Clinical Oncology annual meeting, the researchers reported that half of the participants had strong T-cell responses against one or more of the neoantigens in the vaccine. Further results, reported in Nature in 2023, showed that these responders had no evidence of cancer recurrence during 18 months of follow-up. At AACR 2024 and in another Nature paper, the team reported that activated T cells lasted more than three years in responders. Patients with persistent vaccine-induced immune responses remained less likely than nonresponders to experience recurrence. Six of the eight responders remained cancer-free over a median 3.2 years of follow-up, while most of the eight nonresponders relapsed.

Now, Balachandran and colleagues report that the vaccine continues to offer benefits with longer follow-up. Of the eight responders, seven (88%) were still alive four to six years after surgery. One of the survivors, Donna Gustafson, was recently profiled by NBC News. In contrast, among the eight nonresponders, all but two (25%) had since died, with a median survival time of 3.4 years.

Responders still had activated CD8 killer T cells as well as CD4 helper T cells for up to six years. Scientists believe that an effective cancer vaccine must activate both cell types—CD8 cells to directly attack malignant cells and CD4 cells to boost and sustain the immune response, according to the Memorial Sloan Kettering news release.

The vaccine was generally safe and well tolerated. Adverse events were common in the trial, but these were mostly attributed to the checkpoint inhibitor and chemotherapy rather than the vaccine.

This study has some limitations. Only a select subgroup of patients were eligible for the vaccine: those whose cancer was detected early enough to be surgically removed and for whom adequate neoantigens could be identified. Just one in five pancreatic cancer patients are diagnosed with operable tumors. It is not clear how much the checkpoint inhibitor contributed to the observed effect, though prior studies have found that Tecentriq plus chemotherapy offers little or no improvement in pancreatic cancer survival.

"The results are encouraging," Balachandran said. "They fuel our efforts to test personalized mRNA vaccines in more patients and more cancers."

The findings were promising enough to advance the vaccine to a larger randomized Phase II trial (NCT05968326), which is now underway at dozens of sites worldwide, enrolling people with newly diagnosed pancreatic cancer who have not yet received systemic therapy. After surgical removal

of the tumor, they will be randomly assigned to receive autogene cevumeran, Tecentriq and mFOLFIRINOX chemotherapy or the chemo regimen alone.

Personalized cancer vaccines are also being developed for other malignancies, including melanoma, kidney cancer, liver cancer and glioblastoma brain cancer. Off-the-shelf vaccines that don't need to be customized for each patient are also in development. So far, therapeutic cancer vaccines appear to work better for keeping residual cancer in check after surgery or other types of treatment, as opposed to eliminating large established tumors.

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