

Mayo Clinic researchers study immunity-boosting vaccine to target aggressive form of breast cancer

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Three-dimensional culture of human breast cancer cells, with DNA stained blue and a protein in the cell surface membrane stained green. Image created in 2014 by Tom Misteli, Ph.D., and Karen Meaburn, Ph.D. at the NIH IRP.

Treating breast cancer has long involved addressing two problems: the elimination of cancer cells from the tumor and potential disease recurrence. The key may be to harness the full capabilities of the body's immune system to do both jobs.

On Mayo Clinic's Florida campus, a team of researchers has a new anti-[cancer](#) vaccine in the works to help the body resist the return of Human Epidermal Growth Factor Receptor 2 (HER2) [breast cancer](#). The vaccine is intended to be used in combination with Trastuzumab, an immune-stimulating drug given to women following HER2 tumor removal surgery. If it works, the vaccine will address the return of the cancer, which can be hard to treat once it spreads to other parts of the body. Mayo Clinic researchers are addressing this unmet need of patients and recently received a grant of \$11 million from the Department of Defense to push the next studies of the vaccine ahead.

The combination approach will engage two types of immune cells. Trastuzumab works by activating the immune system's B-cells, which look for and attack [breast tumor cells](#) with HER2 proteins on the surface. The new vaccine stimulates another group of cells in the immune system, long-lasting T-cells that "remember" the proteins and promote resistance to the recurrence of the disease. "The vaccine provides a prevention strategy to deter cancer reformation," says Dr. Keith Knutson, a Mayo Clinic immunologist who is principal investigator of the study. "The body's T-cells and B-cells synergize with each other for a strong, durable, immune response."

In previous Mayo Clinic studies, the team studied the physical effects of the vaccine and looked for whether it stimulated an immune response. They found the vaccine promoted mild responses typical of any vaccination, such as fatigue. They also found that the vaccine promotes a measurable [immune response](#) in patients to the HER2 protein.

Future research, to be conducted at Mayo Clinic and in collaboration with other medical centers, will determine if the vaccine is effective against the recurrence of HER2 breast cancer. This research will determine how long immunity lasts and whether booster shots are necessary to help the immune system continue identifying the cancerous [cells](#). In addition, the study will help identify specific tumor subtypes that are good candidates for vaccine treatments.

"The standard approaches to treating cancer address the existing disease," Dr. Knutson says. "Our goal is to develop a strategy to address recurrence. We have good drugs, like Trastuzumab, that can interfere with the recurrence of HER2 breast cancer. Our hope is that a vaccine that engages multiple aspects of the body's own immune system will build on those successes."

Learn about additional [vaccine](#) studies for [breast](#) cancer at Mayo Clinic.

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