

A Combination Therapy Drives Long-Lived T-Cell Responses to Cancer Vaccines

Combining a HER2-targeting breast cancer vaccine and a CD27-activating antibody boosted anti-tumor T cell responses.

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A combination therapy that stimulates immune memory and delivers a cancer vaccine can boost antitumor responses, according to new research involving human patient data and mice. These findings, [published in Science Immunology](#), could inform new strategies for cancer vaccines, which have shown limited efficacy in early clinical trials.

Despite ongoing research, there is a lack of effective therapeutics that can induce long-term immune memory for potent antitumor immunity.

Here, Bin-Jin Hwang, of Duke University, and colleagues investigated the relationship between tumor antigen-specific vaccine efficacy and long-lasting T-cell responses.

The researchers analyzed samples from seven patients with advanced HER2+ breast cancer who received HER2-targeting, dendritic cell-based vaccines – all of whom survived more than 18 years after vaccination. The analysis revealed a population of HER2-specific T cells that express CD27, which plays an important role in long-term T cell memory.

In mice that express human CD27, simultaneous delivery of a HER2 vaccine and , with the largest effect on long-lived CD4 memory T cells.

Mice bearing HER2+ breast cancer tumors also showed much higher antitumor immunity in response to combined treatment with the vaccine and the CD27 agonist, when compared with the vaccine alone as a control. Tumor growth in mice was further inhibited when the two treatments were combined with anti-PD-1 checkpoint inhibition therapy.

Using RNA sequencing, Hwang et al. determined that the combination therapy changed the immune cell makeup in the tumor microenvironment and drove CD4 T cells towards a more activated, effector-like profile.

The authors speculate that activated CD4 T cells may stimulate CD8 T cells, suggesting that CD27 agonized vaccination might rely on both cell groups.

“Future studies will also be required to dissect how CD27 signaling drives vaccine-induced immunity [...], with the aim of extending this approach to other cancers and infectious diseases,” Hwang et al. write.

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