

Cancer vaccine could use immune system to fight tumors

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Cincinnati Cancer Center (CCC) and UC Cancer Institute researchers have found that a vaccine, targeting tumors that produce a certain protein and receptor responsible for communication between cells and the body's immune system, could initiate the immune response to fight cancer.

These findings, published in the Feb. 27 online edition of the journal *Gene Therapy*, build on previously reported research and could lead to new treatments for cancer.

Principal Investigator John Morris, MD, clinical co-leader of the Molecular Therapeutics and Diagnosis Program for the CCC, co-leader of the UC Cancer Institute's Comprehensive Lung Cancer Program, professor in the division of hematology oncology at the UC College of Medicine and UC Health medical oncologist, says a number of antitumor vaccines have shown promise for causing immune responses against tumor antigens to improve patient outcomes.

"Recently, human Interleukin-15 (IL-15) has entered clinical trials for treatment of patients with melanoma, a type of skin cancer, and renal cancer. In this study, we examined the effectiveness of a vaccination targeting tumors that produced IL-15 and its [cell surface receptor](#) called IL-15R-alpha (℞) and examined their ability to up-regulate (or increase) immune responses to tumor antigens," Morris says. "We showed that the presence of both IL-15 with its receptor IL-15R α increased the cell-surface production and secretion of IL-15, and in turn, stopped tumor

cells from reproducing."

Researchers used IL-15 to develop a whole tumor cell vaccine to target breast (TS/A) and prostate (TRAMP-C2) cancer cells in animal models; results showed that tumor cells stopped growing after the vaccine was introduced and that beneficial effects were enhanced further when IL-15R α was co-produced by the vaccine cells.

Morris says vaccination with modified tumor cells producing IL-15 and IL-15R α slowed tumor growth and led to increased survival for animal models. Furthermore, the cells that control the immune responses (CD8+ T-cells and NK cells) were elevated in these tumors, showing evidence of a true [immune response](#).

"IL-15 is a powerful pro-inflammatory protein that can enhance immune responses," he says. "Our findings suggest that genetically altering tumor cells to produce IL-15 and IL-15R α can cause and enhance immune responses to [tumor antigens](#) found in these tumor cells and can be used as a vaccine to target these antigens.

"Additionally, this provides evidence needed to begin investigating a vaccine in human cancer clinical trials to determine whether genetically modified [tumor cells](#) producing IL-15 and IL-15R α may induce anti-cancer responses."

Provided by University of Cincinnati Academic Health Center

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