

Vaccine triggers immunity to prevent colon cancer

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(Medical Xpress)—A first-of-its-kind vaccine developed by University of Pittsburgh Cancer Institute (UPCI) researchers successfully prompted the immune system to respond to early indications of colon cancer in people at high risk for the disease.

The results of the first human clinical trials of the preventive [colon cancer](#) vaccine are reported in the January issue of the journal [Cancer Prevention Research](#) and available online. The research was funded in part by the [National Cancer Institute](#) (NCI) and the National Institutes of Health (NIH).

"This prophylactic colon cancer vaccine boosts the patient's natural [immune surveillance](#), which potentially could lead to the elimination of [pre-malignant lesions](#) before their progression to cancer," said Olivera Finn, Ph.D., distinguished professor and chair of the Department of Immunology at Pitt's School of Medicine, who developed the vaccine. "This might spare patients the risk and inconvenience of repeated invasive surveillance tests, such as [colonoscopy](#), that currently are used to spot and remove [precancerous polyps](#)."

Colon cancer takes years to develop and typically starts with a [polyp](#), which is a benign but [abnormal growth](#) in the intestinal lining. Polyps that could become cancerous are called [adenomas](#) and typically are removed before cancer develops.

The study involved people with a previous history of an advanced

adenoma, which places them at higher risk for subsequent colorectal cancer.

"Around 30 to 40 percent of these patients will develop a new polyp within three years," said Robert E. Schoen, M.D., Ph.D., professor of medicine and epidemiology with Pitt's Division of Gastroenterology, [Hepatology](#) and Nutrition, and clinical leader of the study. "In this study, we demonstrated the ability of the vaccine to boost immunity. Subsequent trials need to evaluate the vaccine for its ability to lower or prevent polyp recurrence and thus progression to colon cancer."

The Pitt vaccine is directed against an abnormal variant of a self-made cell protein called MUC1, which is altered and produced in excess in advanced adenomas and cancer. MUC1 also is abnormally present in pancreatic, breast, lung and prostate cancer and will be tested in the future in patients with premalignant lesions leading to some of those cancers.

To date, no vaccine based on cell proteins made by tumors has been tested in humans to prevent cancer. Preclinical models show the vaccine works by targeting the abnormal cells that grow the cancer.

The Pitt vaccine was tested in 39 patients ages 40 to 70 without cancer, but with a history of advanced adenomas. It produced a strong protective response in 17 of the patients, or 44 percent. Researchers said the lack of response in the other 22 patients was likely due to already high levels of cells that suppress the immune system's ability to fight cancer.

"This suggests that it might be better to vaccinate people against colon cancer at an even earlier stage, or vaccinate only people who do not already have suppressed immune systems," said Dr. Finn, co-leader of UPCI's immunology program.

The patients in the clinical trial received an initial dose of the vaccine and then additional shots two and 10 weeks later. Blood samples were drawn to measure immune response at those time points, as well as 12 weeks, 28 weeks and one year later. A booster injection was given at one year to confirm the durability of the immune response.

The vaccine was well-tolerated and safe. Side-effects included red skin and discomfort at the injection site and flu-like symptoms after the first injection. Safety of the vaccine and its ability to cause an immune response support plans for a larger randomized trial that will examine its efficacy at polyp prevention.

Colorectal cancer is the third-leading cause of cancer death in the United States. The American Cancer Society estimates that 2012 will end with 103,170 new cases of colon cancer and 40,290 new cases of rectal cancer. The overall lifetime risk of developing [colorectal cancer](#) is 1 in 20, and it is expected to cause about 51,690 deaths this year.

More information: [cancerpreventionresearch.aacrj.../content/6/1/18.full](#)

Provided by University of Pittsburgh Schools of the Health Sciences

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