Investigational brain cancer vaccine to be tested: Peptide vaccine targets cancer survival protein

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(Medical Xpress)—A new clinical research study at Roswell Park Cancer Institute (RPCI) will test a first-of-its-kind cancer "vaccine" that may prove effective against many forms of solid-tumor cancers. The vaccine, to be investigated in a trial involving patients with brain cancer, generates an immune response that appears to put the target molecule, the cancer survival protein survivin, into a bind it can't escape.

The peptide vaccine, developed at Roswell Park by Robert Fenstermaker, MD, and Michael Ciesielski, PhD, is based upon a specially engineered small protein molecule called a "peptide mimic." Dr. Fenstermaker is principal investigator of the phase I clinical research study, which will test the safety and immunological effects of the vaccine in patients with two types of brain cancer: glioblastoma multiforme (GBM) and anaplastic glioma. Called SurVaxM, the injectable vaccine will initially be given in four doses to nine patients.

Survivin, produced by at least 80% of cancers, is a protein that helps cancer cells to survive under stressful conditions. It is present only in diseased cells, which are caught in an unwinnable situation when exposed to the vaccine.

"SurVaxM puts cancer cells in a Catch 22," says Dr. Fenstermaker, who is Chair of RPCI's Department of Neurosurgery and Director of the Institute's Neuro-Oncology Program. "The vaccine kills tumor cells that

express survivin. If the cells turn survivin off to escape the vaccine, they're essentially committing suicide."

The engineered peptide used in the vaccine is able to stimulate an immune response because the cancer recognizes it as a foreign molecule.

"We arrived at this peptide through reverse immunology," notes Dr. Ciesielski. "We knew we wanted to target survivin because it is expressed by so many tumors. We looked at many survivin peptides trying to find the best one to use as our vaccine. Once we identified one that looked promising, we engineered it to be more potent and produce a better response by enlisting multiple arms of the immune system."

In preclinical studies, the vaccine was effective against several cancers, including gliomas and prostate, ovarian, breast and kidney tumors that produce survivin. Studies in which human glioma, lymphoma and leukemia cells were exposed to the vaccine outside the body also produced a strong response. "In those earlier studies, the response was persistent," Dr. Ciesielski says. "It appears that the vaccine continues to provide lasting immunity after the tumor has been eliminated."

Roughly 15,000 people are newly diagnosed with glioblastomas and anaplastic gliomas in the U.S. every year. These cancers are very difficult to treat, and are often fatal.

"Survival rates for malignant gliomas have improved modestly over the last two decades, but better therapies are desperately needed," Dr. Fenstermaker says. "We're anxious to move ahead with this study and, hopefully, go on to larger studies in the years ahead, but we first have to show that this is a safe and well-tolerated drug for a group of terrible diseases."

Because they enlist the body's own cells to fight cancer, immune-based therapies generally have few adverse side effects. The trial is the fourth clinical research study launched through RPCI's Center for Immunotherapy this year.

Provided by Roswell Park Cancer Institute