Clinical trial examines use of human immune system to fight aggressive lung cancer

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Researchers at the Cincinnati Cancer Center (CCC) and the UC Cancer Institute are conducting a clinical trial examining a method to stimulate the human immune system to destroy or block the growth of lung cancer cells.

This trial could lead to a new therapy, which uses natural biological processes within the body, to eliminate cancer growth and enhance the lives of patients with recurrent lung cancer.

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, is the co-principal investigator on the trial along with colleagues at the Alvin J Siteman Cancer Center at Washington University in St. Louis.

"Non-small cell lung cancer, the most common type of lung cancer, remains the leading cause of cancer death in men and women in the United States," Morris says. "Despite advances in the treatment of non-small cell lung cancer in the last decade, outcomes remain poor. Benefits from standard chemotherapy have reached a plateau, and further progress will depend upon identifying new treatments that specifically target tumor cells.

"Harnessing the human immune system to target lung cancer could result

in the development of effective treatment options against lung cancer and potentially enhance the effect of chemotherapy."

Morris says lung cancer cells produce a number of abnormal proteins or abnormal amounts of certain proteins found in normal lung cells, and in some cancers, the abnormal protein expression may lead to an immune response against the cancer cells in a similar way that the immune system responds to an infection.

"In progressive lung cancer, however, the immune system fails to identify or respond to these abnormalities, and the cancer cells are not attacked or destroyed for reasons not yet fully understood," he continues. "This clinical trial will examine a method to stimulate the human immune system to recognize the abnormal components found in lung cancer cells and hopefully to stimulate an immune response that will stop the growth of cancer, helping the immune system of patients with lung cancer to identify and target the cancerous tissue."

Morris says the idea behind this immunotherapy is similar to the reason that patients who have received a transplanted organ or tissue from another species, like a mouse or pig, will rapidly reject the foreign tissue.

In the study, researchers put an animal gene into cultured human lung cancer cells, which is thought to stimulate a strong immune response in humans.

"These cancer cells are irradiated to prevent any growth and are then injected into patients with lung cancer, which will then stimulate the patient's immune system to kill the injected immunotherapy cells as well as the patient's own cancer cells as well."

In the study, the immunotherapy is being compared to a Food and Drug

Administration-approved second-line chemotherapy drug, docetaxel, to see if the results of the immunotherapy are the same or better.

"As part of the process of destroying the immunotherapy cells, we believe the patient's immune system will be stimulated to identify as many differences between these cancer cells and normal human cells to encourage immune response against the cancerous cells based on shared abnormalities of lung cancer immunotherapy cells and the patient's lung cancer cells," Morris says.

Patients may be given up to 16 doses of the immunotherapy and will be monitored until any progression of their cancer is observed.

"We hope to test these treatments in patients with lung cancer who have progressed after initial chemotherapy to show that treatment of immunotherapy results in improved tumor stabilization or response and could potentially improve the patient's overall outcomes and survival," Morris says. "This could provide more options for patients who are in the later stages of lung cancer."

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