

Researchers pinpoint how smoking causes cancer

Oregon Health & Science University Cancer Institute researchers have pinpointed the protein that can lead to genetic changes that cause lung cancer. The research will be published Tuesday, May 12, in the *British Journal of Cancer*.

Researchers discovered that the production of a protein called FANCD2 is slowed when lung cells are exposed to cigarette smoke. Low levels of FANCD2 leads to DNA damage, triggering cancer. Cigarette smoke curbs the production of ‘caretaker’ proteins, like FANCD2, which normally prevent cancer by fixing damages in DNA and causing faulty cells to commit suicide.

Research has shown that smoking is strongly linked to lung cancer, but this discovery may help scientists improve treatments for lung disease in the future.

“These findings show the important role FANCD2 plays in protecting lung cells against cigarette smoke, and may explain why cigarette smoke is so toxic to these cells,” said lead author Laura Hays, Ph.D., research assistant professor of medicine (hematology/medical oncology) and member of the OHSU Cancer Institute.

Senior author, Grover Bagby, M.D., further stated that: “Dr. Hays’ work shows that FANCD2 is an important protein in protecting against cancer, and cigarette smoke knocks out its production. Although there are probably other proteins involved in this process, we know this is a key one because cells with very high levels of FANCD2 were resistant to the toxic effects of the smoke.” Bagby is the founding and past director of the OHSU Cancer Institute and professor at the Northwest Cancer Veterans Affairs Research Center at the Portland Veterans Affairs Medical Center.

The authors created an artificial windpipe in the lab to replicate the environment of a smoker’s lung. They then studied the effects of cigarette smoke on different proteins in cells and found that FANCD2 levels were low enough to allow DNA damage.

FANCD2 is part of a family of proteins involved in an inherited condition called Fanconi anemia. People with the condition are more likely to develop cancers at a young age and have low levels of these proteins.

Lesley Walker, Ph.D., director of cancer information at Cancer Research UK, said: “This interesting piece of science adds to our understanding of why smoking is so deadly. Smoking is the single biggest preventable cause of cancer and causes nine out of 10 cases of lung cancer.

“But the good news is that quitting works – after five years without smoking, your risk of a heart attack will have fallen to half that of a smoker. And after 10 years, your risk of lung cancer will have halved too.”

Lung cancer is the most common cancer in the world, with 1.3 million people diagnosed every year.

Source: Oregon Health & Science University

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