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Contact: Jeremy Moore
Jeremy.moore@aacr.org
267-646-0557
American Association for Cancer Research

Urine test may determine if a smoker is at risk for lung cancer

DENVER – Researchers may have uncovered why lung cancer afflicts some smokers and not others, according to data presented at the American Association for Cancer Research 100th Annual Meeting 2009.

"A history of smoking has always been thought of as a predictor of lung cancer, but it is actually not very accurate," said Jian-Min Yuan, Ph.D., M.D., associate professor of public health at the University of Minnesota. "Smoking absolutely increases your risk, but why it does so in some people but not others is a big question."

Yuan and colleagues hypothesized that the presence of the metabolite NNAL in a patient's urine might predict risk of lung cancer. This metabolite has been shown to induce lung cancer in laboratory animals, but the effect in humans had not yet been studied.

Researchers collected data from 18,244 men enrolled in the Shanghai Cohort Study and 63,257 men and women from the Singapore Chinese Health Study. In addition to in-person interviews to assess levels of cigarette smoking, dietary and other lifestyle factors, researchers collected blood and urine samples from more than 50,000 patients.

To evaluate the impact of NNAL, researchers identified 246 current smokers who later developed lung cancer and 245 smokers who did not develop lung cancer during the 10-year period following initial interview and collection of urine samples.

Levels of NNAL in the urine were divided into three groups. Compared to those with the lowest levels, patients with a mid-range level of NNAL had a 43 percent increased risk of lung cancer, while those at the highest level had a more than two-fold increased risk of lung cancer after taking into account the effect of number of cigarettes per day, number of years of smoking, and urinary levels of cotinine on lung cancer risk.

Levels of nicotine in the urine were also calculated. Those with the highest levels of nicotine and NNAL had an 8.5-fold increase in the risk of lung cancer compared with smokers who had the lowest levels after accounting for smoking history.

"Smoking leads to lung cancer, but there are about 60 possible carcinogens in tobacco smoke, and the more accurately we can identify the culprit, the better we will become at predicting risk," said Yuan.

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The mission of the American Association for Cancer Research is to prevent and cure cancer. Founded in 1907, AACR is the world's oldest and largest professional organization dedicated to advancing cancer research. The membership includes more than 28,000 basic, translational and clinical researchers; health care professionals; and cancer survivors and advocates in the United States and nearly 90 other countries. The AACR marshals the full spectrum of expertise from the cancer community to accelerate progress in the prevention, diagnosis and treatment of cancer through high-quality scientific and educational programs. It funds innovative, meritorious research grants. The AACR Annual Meeting attracts more than 17,000 participants who share the latest discoveries and developments in the field. Special conferences throughout the year present novel data across a wide variety of topics in cancer research, treatment and patient care. The AACR publishes six major peer-reviewed journals: *Cancer Research; Clinical Cancer Research; Molecular Cancer Therapeutics; Molecular Cancer Research; Cancer Epidemiology, Biomarkers & Prevention*; and *Cancer Prevention Research*. The AACR also publishes CR, a magazine for cancer survivors and their families, patient advocates, physicians and scientists. CR provides a forum for sharing essential, evidence-based information and perspectives on progress in cancer research, survivorship and advocacy.