

Scientists discover 'highly effective' new biomarker for lung cancer

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Lung CA seen on CXR. Credit: [CC BY-SA 4.0](#) James Heilman, MD/Wikipedia

Survival rates for patients with lung cancer increase dramatically the earlier the disease is diagnosed, underscoring the need for effective biomarkers that can be used for detection. Now, scientists at The Wistar Institute have found a protein that circulates in the blood that appears to be more accurate at detecting non-small cell lung cancer (NSCLC) than currently available methods used for screening.

The findings were published online by the journal *Oncotarget*.

If the accuracy of this biomarker can be confirmed in a larger trial, this could lead to the development of a simple blood test that could be used for annual screening. The authors of the study believe that this blood test would be easier to use, more accurate and less invasive than low-dose computed tomography (LDCT) scans, the method for [lung cancer](#) screening currently recommended by the U.S. Preventive Services Task Force (USPSTF). Because of its accuracy, it could also better distinguish between benign lung tumors that do not pose a threat and malignant tumors that have the potential to grow and spread.

Lung cancer is the leading cause of cancer deaths in both men and women in the United States. However, the five-year survival rate increases dramatically if the disease is caught and treated early. According to the American Cancer Society, if NSCLC is caught in its earliest stage, the five-year survival rate is 49 percent. However, patients who are diagnosed when the disease has metastasized - meaning that it has spread to other organs - have only about a 1 percent chance of achieving survival after five years.

In 2013, the USPSTF recommended annual screening to patients at least 55 years old who had a history of smoking and are therefore considered at high risk for developing lung cancer. This method of screening is considered invasive and relatively expensive while not being highly accurate or widely available on a global scale.

"There are many people who stand to benefit from a better diagnostic test for lung cancer," said Qihong Huang, M.D., Ph.D., associate professor in the Tumor Microenvironment and Metastasis Program at The Wistar Institute and lead author of the study. "If we can develop a simple blood test that's more accurate than low-dose CT scans, we can detect the cancer earlier with a less expensive, less invasive and more accurate blood test. Everyone stands to gain from such a test becoming available."

In this study, Huang and his colleagues focused on cancer testis antigens (CTAs), since they are often found in tumor cells that circulate in the blood. After analyzing 116 different CTAs, the researchers identified the protein AKAP4 as a potential biomarker that could effectively distinguish between patients with and without NSCLC.

The researchers then tested AKAP4 as a biomarker in a pilot cohort that contained 264 [blood samples](#) from patients with NSCLC and 135 control samples. Of the 264 NSCLC samples, 136 samples were from patients who received a stage I diagnosis. The researchers analyzed the effectiveness of the biomarker by looking at the area under the curve (AUC), a method that calculates the ability of the test to distinguish those with disease from those without it. An AUC value of 1 means that the test perfectly distinguishes between the patients who have and don't have a particular disease.

In this study, when the researchers compared all 264 of the NSCLC samples with the 135 control samples, the AUC was 0.9714. When the researchers looked at only the 136 samples with known stage I disease, the AUC was 0.9795. While the researchers noted that the presence of AKAP4 increased with the stage of the disease, AKAP4 was still detectable in the samples with early stage disease.

"The results of this study exceeded our expectations," Huang said.

"AKAP4 appears to be a highly effective biomarker for the detection of non-small cell lung cancer. If we are able to confirm these results in a more robust study, then we have the potential for a new, more accurate screening method that could help save many, many lives."

With the positive results of this study, Huang said that Wistar will conduct a larger study with a goal of analyzing at least 800 samples. Multiple hospitals have agreed to provide blood samples for analysis to Wistar for this next study.

"Qihong and his colleagues have found a target that could result in a more accurate test than any method that's been used to screen for non-small cell lung cancer to date," said Dario C. Altieri, M.D., President and CEO of The Wistar Institute and director of Wistar's Cancer Center.

"With the government recommending annual screening for high-risk populations, the identification of a promising target like AKAP4 comes at a critical time. Early detection is needed in order to have a meaningful impact on this devastating disease."

This is the second time Wistar has identified a potential method for creating a blood test to screen for lung cancer. Researchers at the Institute are also currently analyzing more than 600 blood samples to develop a [blood test](#) that identifies a 29-gene "signature" that distinguishes patients with NSCLC from those without the disease. Positive interim data for this test was recently presented at the American Thoracic Society International Conference.

Provided by The Wistar Institute

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