Protein test detects early-stage, asbestos-related pulmonary cancer

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Researchers investigating a novel biomarker test believe it is the most accurate yet in detecting proteins secreted from tumors caused by exposure to asbestos. Study results of this aptamer proteomic technology were presented at the AACR 102nd Annual Meeting 2011, held April 2-6.

In a blinded test performed under the auspices of the National Cancer Institute's Early Detection Research Network Biomarker Discovery Lab, the proteomic assay could detect 15 of 19 cases of malignant pleural mesothelioma that were in stage 1 or stage 2, making the test about 80 percent sensitive, a measure of how accurately a test can identify disease. In addition, the specificity of the test was 100 percent, meaning there were no false positives in this study.

Harvey I. Pass, M.D., director of the division of thoracic surgery and thoracic oncology at NYU Langone Medical Center and the NYU Cancer Institute in New York, and colleagues used the SomaLogic, Inc. aptamer proteomics platform to examine 170 blood samples from 90 patients diagnosed with malignant mesothelioma and 80 participants who had been exposed to asbestos. Three-fourths of the samples were used to derive 19 significant biomarkers for mesothelioma and the remaining 25 percent were used in the blinded test.

Malignant pleural mesothelioma is an aggressive, asbestos-related pulmonary cancer that is increasing in incidence. Experts believe this form of cancer will not peak for another 20 years due to a latency period

of 20 to 40 years from asbestos exposure. It currently causes an estimated 15,000 to 20,000 deaths per year worldwide. Once diagnosed, the disease is usually fatal (within 14 months) because of the advanced stage that it is typically found. The goal of a diagnostic test such as this one is to find the cancer early enough to effectively treat it, according to Pass.

"The only patients that seem to benefit from therapy in mesothelioma are those that are found in stage 1, and this is only 10 to 15 percent of patients," he said. "Moreover, when found early, the magnitude of the operation necessary to reduce the burden of disease may be less, making the patient better able to cope if the disease recurs and the patient needs more aggressive therapy."

The research team tested the assay produced by SomaLogic, Inc. Its "Multiplex SOMAmer Assay" currently measures more than 1,000 proteins simultaneously from a sample of blood as small as 0.003 of a teaspoon, and can handle 300 samples a day, according to Pass. The assay uses SOMAmers — chemically modified single-stranded DNA molecules that fold into different structures and bind specifically to target proteins — to identify and quantify proteins across a broad range of concentrations.

According to Pass, this platform combines the best qualities of an immunoassay, and is able to find and quantify low abundance proteins secreted by tumor cells. Ongoing studies are refining the test and validating the results in other patient blood samples, according to Pass.

Provided by American Association for Cancer Research

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