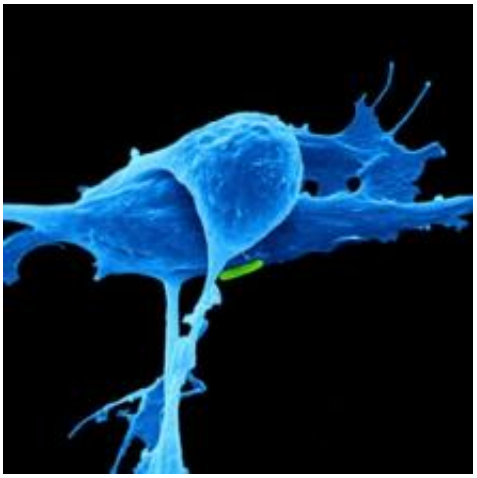
MicroRNA panel shows early potential as biomarker of pancreatic precancers

August 28 2015



Assessing blood plasma levels of certain micro-RNAs (miRNAs) distinguished individuals with noninvasive pancreatic precancers called intraductal papillary mucinous neoplasms (IPMNs) from healthy individuals and discriminated between patients with high-risk and low-risk IPMNs, according to a preliminary, proof-of-principle study published in *Cancer Prevention Research*, a journal of the American Association for Cancer Research.

"Pancreatic cancer is the fourth leading cause of cancer-related death in the United States," said Jennifer Permuth-Wey, PhD, assistant member in the Departments of Cancer Epidemiology and Gastrointestinal

Oncology at the Moffitt Cancer Center in Tampa, Florida. "It is typically diagnosed at a late stage because there are currently no accurate methods to diagnose pancreatic cancer early. Noninvasive tests are needed to accurately detect precancerous lesions of the pancreas so that personalized risk assessment and care can be provided.

"Our study shows that new, relatively inexpensive digital technology could reliably measure miRNAs in blood plasma from individuals newly diagnosed with pancreatic cancer precursors called IPMNs, and healthy individuals," continued Permuth-Wey. "This is promising news and could potentially lead to a noninvasive test for early detection of pancreatic cancer. However, the results are preliminary and much more research is needed to determine if a miRNA-based blood test could help diagnose pancreatic cancer earlier or more effectively than current methods."

Permuth-Wey explained that the main goals of the study were to measure miRNAs in the blood and determine whether a set of miRNAs could distinguish patients with IPMNs from healthy individuals, and whether a set of miRNAs could discriminate between patients with high-risk IPMNs that need to be surgically removed and those with low-risk IPMNs that can be monitored.

Using nCounter technology to measure the levels of 800 miRNAs in plasma samples obtained preoperatively from 44 patients who underwent surgery to remove IPMNs surgically and 25 healthy individuals, the researchers identified a panel of 30 miRNAs that distinguished individuals with IPMNs from those who were healthy with an area under the curve (AUC) value of 0.74. Permuth-Wey explained that AUC is a way to quantify the discriminative ability or accuracy of a diagnostic test and that a perfect diagnostic test has an AUC of 1.0 while a useless or nondiscriminating test has an AUC of 0.5, which is no better than chance alone.

The researchers also identified a panel of five miRNAs that discriminated between patients with high-risk and low-risk IPMNs with an AUC of 0.73. "To be able to distinguish between these two sets of patients is important clinically," said senior author Mokenge Malafa, MD, department chair and program leader for the Gastrointestinal Tumor Program at Moffitt Cancer Center. "It would help personalize care such that high-risk IPMNs that warrant resection are properly identified while individuals with low-risk IPMNs are spared the substantial risks associated with unnecessary surgery."

According to Permuth-Wey, limitations of the study include the small number of samples analyzed and the fact that the accuracy of the 30-miRNA panel and the five-miRNA panel were 74 percent and 73 percent, respectively, when many researchers think that accuracy greater than 90 percent may be needed for a test to be clinically useful. She went on to note that large-scale, multicenter studies with rigorous designs and incorporation of other types information, such as data from imaging scans and laboratory tests offered as part of clinical care, are needed to overcome these limitations and further explore the potential for miRNAs to be utilized clinically as markers for the early detection of pancreatic cancer.

More information: "Plasma MicroRNAs as Novel Biomarkers for Patients with Intraductal Papillary Mucinous Neoplasms of the Pancreas." *Cancer Prev Res* Published OnlineFirst August 27, 2015; DOI: 10.1158/1940-6207.CAPR-15-0094

panel-early-potential-biomarker.html