Early Sign of Pancreatic Cancer Identified

A multi-institution team of researchers has discovered a sign of the early development of pancreatic cancer—an upsurge in certain amino acids that occurs before the disease is diagnosed and symptoms appear. The research is published online ahead of print in *Nature Medicine (**doi:10.1038/nm.3686**)*.

"In this study, we asked whether pancreatic ductal adenocarcinoma [PDAC], by far the most common form of pancreatic cancer, produces metabolic changes that can be detected before the disease is diagnosed," said Brian Wolpin, MD, MPH, of Dana-Farber Cancer Institute, co-senior author with Matthew Vander Heiden, MD, PhD, of MIT and Dana-Farber.

The researchers utilized blood samples collected years earlier from 1,500 people participating in large health-tracking studies. The samples were analyzed for approximately 100 different metabolites, and the results were compared with those from participants who had gone on to develop pancreatic cancer and those who had not.

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"We found that higher levels of branched chain amino acids were present in people who went on to develop pancreatic cancer compared with those who did not develop the disease," Wolpin said in a news release, explaining that branched chain amino acids are one family of amino acids.

The amount of time that would elapse before those individuals were diagnosed with pancreatic cancer ranged from two to 25 years, although the highest risk was in the several years before diagnosis, the researchers found.

"These findings led us to hypothesize that the increase in branched chain amino acids is due to the presence of an early pancreatic tumor," Wolpin said, a theory that was confirmed in laboratory experiments performed by Vander Heiden's group at the Koch Institute for Integrative Cancer Research at MIT. Those experiments showed that mice with newly formed pancreatic tumors had above-normal blood levels of these amino acids.

The increase was found to be due to a breakdown of muscle tissue, which caused branched amino acids to be released into the bloodstream, a process similar to what occurs in patients with cancer cachexia. "What was surprising about our results was that it appears the breakdown of muscle protein begins much earlier in the disease process than previously appreciated," Vander Heiden noted.

The researchers say that the findings provide an important lead to scientists studying how pancreatic tumors interact with patients' normal tissues, and provides a glimpse into how pancreatic cancer changes the way the rest of the body handles nutrients. "This work has the potential to spur progress in detecting pancreatic tumors earlier and identifying new treatment strategies for those with the disease," Vander Heiden said.