

New blood markers for diabetes may help to identify patients at risk

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For the first time, scientists have found that blood levels of some ribonucleic acids (microRNAs) are different among people with type 2 diabetes and those who subsequently develop the disease compared to healthy controls, according to research reported in *Circulation Research: Journal of the American Heart Association*.

“We think that some of these microRNA changes may precede the onset of diabetes,” said Manuel Mayr, M.D., Ph.D., corresponding author of the study. “Future studies will need to confirm whether these new markers can help to actually target therapies and assess patients.”

Previous studies have linked microRNAs to numerous diseases, including diabetes. MicroRNA comprises shorter molecular chains than so-called [messenger RNA](#), which takes the genetic information contained within the DNA and allows it to be turned into proteins with various functions. While microRNAs don't translate [genetic information](#), they help regulate [protein expression](#) by binding to the longer messenger RNAs.

Although they're found throughout the body, this investigation focused on microRNAs that circulate in the blood. The investigators analysed microRNAs in blood samples of the Bruneck study, a large population-based survey of heart and other major diseases, including diabetes. Initial blood-sample screens in 1995 yielded 13 microRNAs with distinct differences among diabetics compared to non-diabetics.

The scientists further analyzed these 13 microRNAs to identify the ones that showed the most variation between diabetics and healthy controls. Study participants underwent follow-up screening in 2000 and 2005. Of note, changes in five microRNAs occurred before the onset of [Type 2 diabetes](#). The levels of one microRNA in particular, microRNA 126, which helps to form new blood vessels and regulates their maintenance, was measured in all participants of the Bruneck study and was among the most reliable predictors of current and subsequent diabetes.

Using an [animal model](#) of obese mice, the scientists reproduced their results from the blood sample screening. They also replicated their findings in cultured human blood vessel cells exposed to high glucose concentrations to mimic the effects of diabetes.

People with diabetes have a higher risk of cardiovascular complications, and current blood tests have limited utility in identifying patients who are most likely to develop cardiovascular events, said Mayr, Senior fellow of the British Heart Foundation in the Cardiovascular Division at King's College London, U.K.

Cellular changes in the lining of the blood vessels sometimes begin before diabetes is diagnosed by the standard glucose-tolerance test, he said. "This is the first study to investigate specific changes in blood microRNA levels as an early indicator of [diabetes](#) and its associated cardiovascular risk."

"It's very important for the clinician to define those diabetic patients who are at the highest risk of developing cardiovascular complications," said Mayr. "We hope that this new class of blood markers may give additional insight that we're currently not getting from the other clinical tests."

More information: The study is available online at

circres.ahajournals.org

Provided by American Heart Association

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