

Enzyme explains angina in diabetics

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John Pernow. Credit: Ulf Sirborn

(Medical Xpress)—In a new study published in the scientific journal *Circulation*, scientists at Karolinska Institutet and Karolinska University Hospital show that an enzyme called arginase might have a key part to play in the development of cardiovascular disease in patients who already have type II diabetes. According to the team, arginase prevents the formation of protective nitrogen oxide in the blood vessels, and treatments that inhibit this enzyme reduce the risk of angina in diabetics.

"The fact that we could demonstrate the presence of arginase in several types of cell in the vessel wall gives us an entirely new explanatory model for the development of complications in these patients," says lead investigator Professor John Pernow.

Complications in [diabetes patients](#) result from constrictions of the blood vessels caused by plaque deposits on the vessel walls (atherosclerosis). The ensuing reduction in blood flow and [oxygen supply](#) can lead to angina, [myocardial infarction](#) or stroke, and possible amputation. Atherosclerosis is more common in people who smoke and who have high levels of [blood lipids](#), although the risk is most pronounced in patients with diabetes. The reason for this

correlation between diabetes and cardiovascular disease has largely eluded scientists and there is still no specific treatment for these complications.

In this present study, the researchers analysed the function of the arginase enzyme (or protein) in the blood vessels of patients with both [type II diabetes](#) and angina and found that it prevents the formation of protective molecule nitric oxide in the vessel wall. After introducing a substance already known to inhibit the enzyme, they observed a significant improvement in blood vessel function in these patients.

A comparative analysis showed that the arginase inhibitor did not have the same positive effect on patients with angina but without type II diabetes, and had no effect at all on healthy controls.

"Nitric oxide has a very important function to perform in the [vessel walls](#)," says Professor Pernow. "Apart from dilating them, it prevents the formation of plaque. For some reason, however, the mechanism is impaired in people with diabetes."

A total of 48 patients were included in the study and the team is now planning a larger follow-up study to confirm their results and develop treatments using arginase inhibitors. The study was financed by the Swedish Research Council, the Swedish Heart-Lung Foundation, the NovoNordisk Foundation, the European Foundation for the Study of Diabetes, and the Gustav V and Queen Victoria Foundation.

More information: Shemyakin, A. et al., Arginase inhibition improves endothelial function in patients with coronary artery disease and type 2 diabetes, *Circulation*, online 26 November 2012.

Provided by Karolinska Institutet

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