

Researcher finds increased risk of cardiovascular disease in people with hereditary lipid disorders

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Tigist Wodaje from the Endocrinology Unit at the Department of

Medicine, Huddinge (MedH), is defending her [thesis](#), "Hereditary hypercholesterolemia and cardiovascular disease: functional and epidemiological aspects," on 14 December, 2023. The main supervisor is Jonas Brink (MedH).

What is the main focus of your thesis?

The study focuses on [familial hypercholesterolemia](#) (FH) and high levels of lipoprotein(a) [Lp(a)], and their connection to cardiovascular disease. We conducted registry, clinical, and experimental studies on animals to investigate this topic further.

Which are the most important results?

In the registry studies, we observe that Lp(a) levels routinely measured in [clinical practice](#) in the Stockholm region, exceeding the 80th and 90th percentiles, are associated with aortic valve stenosis. This association is also evident in patients with type 1 diabetes monitored at Karolinska University Hospital, where elevated lipoprotein(a) levels routinely measured are linked to both atherosclerotic cardiovascular diseases and aortic valve stenosis.

In a [clinical study](#), we investigated the possibility of identifying early signs of atherosclerosis by measuring coronary flow reserve using a simple, non-invasive ultrasound technique (Doppler echocardiography) in individuals with familial hypercholesterolemia (FH) and high levels of Lp(a) without prior cardiovascular diseases. Our results show a high proportion of patients with FH, both with and without elevated Lp(a) levels, exhibiting subclinical microvascular dysfunction compared to healthy controls.

In the experimental study, we explored whether isolated red blood cells

taken from individuals with FH could induce disruption in the function of innermost layer of blood vessel walls, known as [endothelial dysfunction](#), in an ex-vivo animal model. We observed that isolated [red blood cells](#) taken from individuals with FH and high cholesterol levels induce endothelial dysfunction in blood vessels ex vivo. This effect appears to occur through a mechanism involving reactive oxygen species.

How can this new knowledge contribute to the improvement of people's health?

Our studies on patients with the hereditary lipid disorders FH and high Lp(a) indicate an increased risk of developing [cardiovascular disease](#). Our research provides a basis for the potential implementation of simpler tools to assess their coronary artery function. The implementation of such non-invasive and relatively risk-free tools in clinical practice can enable improved [risk assessment](#) and guidance for more aggressive primary preventive interventions for these high-risk individuals.

What are your future ambitions?

If I get the academic and financial possibility, I wish to continue research in the same field to gain a deeper understanding of vascular changes and their mechanisms. The goal is to potentially identify diagnostic and therapeutic opportunities that can contribute to advancements in the cardiovascular field.

More information: Hereditary hypercholesterolemia and cardiovascular disease : functional and epidemiological aspects.
openarchive.ki.se/xmlui/handle/10616/48819

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