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Adipose tissue depots compromise heart health

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Researchers from the Institute of Pharmacology of the Charité - Universitätsmediz in Berlin have shown that the release of fatty acids from body fat has a major impact on heart health. By interfering with the body's lipid metabolism, the researchers successfully reduced the risk of heart failure. The results of this study have been published in the journal *PLOS Genetics*.

Heart failure is a chronic disease that should not be underestimated. Between one and two-thirds of patients with heart failure die of the disease within five years. While researching the molecular causes of heart failure and new ways to treat it, a Charité-based working group, led by Prof. Dr. Ulrich Kintscher, found that changes in adipose (fat) tissue lipid metabolism affect disease development. Summarizing the results of his research, Prof. Dr. Ulrich Kintscher says, "We were able to show that the lipid composition of the heart is altered by non-cardiac body fat, and that these changes are likely to affect heart function."

For some time, researchers have suspected that the impact of body fat on heart function also exists on a molecular level. One of the key processes involved is the release of fatty acids from adipose tissue. In order to gain a better understanding of this process, the researchers used an animal model, which allowed them to interfere with the lipid metabolism, and to knock out the gene responsible for the relevant enzyme, adipose triglyceride lipase (ATGL). This resulted in all treated mice developing near-complete protection against heart failure. As part of this study, the researchers also analyzed blood samples from patients with and without

heart failure. Some aspects of the changes observed in the lipid composition of blood samples were comparable to those observed in the animal model.

The researchers are now planning to transfer these results into clinical practice. In doing so, they will be guided by one central question: how might a drug-based treatment target the gene responsible for the release of fatty acids and the enzyme ATGL, and how might it do so exclusively in adipose tissue? The researchers are also planning to conduct further analyses of patient samples to confirm their results, and are working with Charité-based cardiologists to determine the role of adipose tissue in patients with heart failure within the clinical setting. Summarizing, Prof. Kintscher says: "For patients, this means that we should be starting to pay greater attention to adipose tissue when making diagnostic and treatment decisions, even when our primary aim is to treat heart disease."

More information: Janek Salatzki et al, Adipose tissue ATGL modifies the cardiac lipidome in pressure-overload-induced left ventricular failure, *PLOS Genetics* (2018). DOI: 10.1371/journal.pgen.1007171

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