

Researchers find tie between fat outside of the arteries and cardiovascular disease

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Researchers at the University of Cincinnati (UC) have found that fat around the outside of arteries may lead to the development of cardiovascular disease and could be linked to its onset in individuals with diabetes.

David Manka, PhD, a researcher in the division of cardiovascular diseases, and his team found that this [fat](#)—known as perivascular adipose tissue—could possibly lead to the formation of fatty buildup inside of arteries and could cause existing buildup to break loose, leading to stroke or heart attack.

These findings are being presented at the American Heart Association's Russell Ross Memorial Lectureship in Vascular Biology: Emerging Concepts in Vascular Disease on Nov. 16.

"Obesity is a growing problem, but most information that is coming from scientists and clinicians involves visceral adipose tissue—or the beer belly—which leads to a higher risk of cardiovascular disease," Manka says. "The fat that grows around the larger arteries throughout the body has been largely ignored. With this study, we wanted to see if it had any effect on the onset of cardiovascular disease, particularly in diabetics or those who are at risk."

Manka and his team transplanted fat tissue around the arteries of knockout mouse models that were predisposed for cardiovascular disease and [diabetes](#).

"Your typical mouse doesn't naturally have that perivascular adipose tissue outside of the artery," he explains. "We found that disease and buildup formed right inside of the artery next to the transplanted fat in these mice models. Besides the disease, we found that this fat tissue caused smaller blood vessels to grow around the larger blood vessels, called the vasa vasorum, which we don't see otherwise. Both of these effects are local effects on the adjacent artery."

Manka says this is the first time this development has been observed.

"Before this, we didn't know which came first—the vasa vasorum formation or the fat formation in the [arteries](#)," he says. "If you don't have the fat outside of the vessel, you won't have the activation of the vasa vasorum, which is thought to cause fat deposits to rupture, leading to stroke or heart attack. We are trying to establish cause and effect between the vasa vasorum and plaque instability, and now we have the model to test this."

Manka says these results show that perivascular fat is sensitive to metabolic cues and could be the link between metabolic dysfunction and vascular disease.

"This may be one of the reasons diabetics have increased rates of cardiovascular disease," he says. "We still don't know exactly what that link is. The perivascular fat is sensing these metabolic stimuli and is becoming dysfunctional itself, translating to local inflammation of vessel."

Manka says the next step for researchers is to identify the molecular pathways that are differentially regulated in the various kinds of fat to see which cause disease and which are linked to inflammation.

"We can then try to find ways to target them and stop or reverse the

adverse effects of this perivascular fat on vascular disease," he says. "These findings will help us discover targeted therapies and may lead to quicker diagnosis, impacting the way physicians diagnose and treat [cardiovascular disease](#)."

Provided by University of Cincinnati Academic Health Center

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