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Fat outside of arteries may influence onset of coronary artery disease

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Researchers at UC have confirmed that fat surrounding the outside of arteries in humans—particularly the left coronary artery—may influence the onset of coronary artery disease, or atherosclerosis, which is the leading cause of death in the U.S.

These findings, being presented at the American Heart Association's Arteriosclerosis, Thrombosis and Vascular Biology (ATVB) 2012 Scientific Sessions in Chicago April 20, 2012, may help in identifying the molecular culprit, with the goal of creating targeted therapies for atherosclerosis before the disease forms.

Coronary artery disease is a narrowing of the small blood vessels that supply blood and oxygen to the heart.

Tapan Chatterjee, PhD, and researchers in the division of cardiovascular diseases at UC found through global gene expression analysis (measurement of the activity of thousands of genes at once) that this outer fat tissue—known as perivascular fat tissue—is different from subcutaneous (beneath the skin) fat tissues in other parts of the body.

Research has previously shown that perivascular fat tissue in humans with coronary artery diseases is highly inflamed, leading to the belief that dysfunctional perivascular fat is the real culprit in the formation of coronary artery diseases.

Chatterjee's team was able to replicate this inflammation in animal

models.

"The proximity of the perivascular fat to the artery easily influences the function of the coronary blood vessel wall," Chatterjee says. "The perivascular fat is very sensitive to high-fat diet induced inflammatory changes in mice. We found that by transplanting perivascular fat from high-fat diet fed obese mice to the carotid artery of lean mice, the tissue was detrimental to the blood vessel wall and promptly caused disease to form there.

"Our next steps will be to identify various secreted factors, or signals, from perivascular fat tissue of obese mice that could negatively influence the functions of the blood vessel wall," he continues. "We believe this cross-talk between perivascular fat and the coronary artery is very important in triggering coronary artery diseases. We hope this knowledge helps in targeting the molecules before the onset of coronary artery diseases and treating patients before they ever experience the disease."

Provided by University of Cincinnati Academic Health Center

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