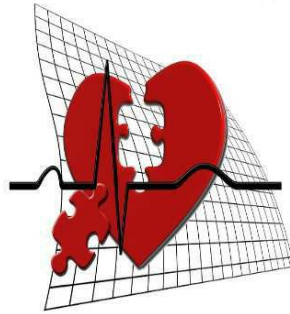## Two Biomarkers Linked to Severe Heart Disease

Researchers at the UNC School of Medicine have created a first-of-its-kind animal model that pinpoints two biomarkers that are elevated in the most severe form of coronary disease. The study is published in *PLoS One*.

The study suggests two targets - oxidised LDL cholesterol and glycated proteins and believe that researchers should further investigate and target these through medications to help people with insulin resistance avoid the worst kind of heart disease.

"If these correlations were also found in insulin resistant humans, then we would want to do everything we could to treat them because they would be at a very high risk of developing severe cardiovascular disease," said Timothy Nichols, MD, professor of medicine and pathology and first author of the *PLoS One* paper.

These findings are completely accidental because Nichols and his colleagues were creating an insulin resistant animal model that mimicked human heart disease. They chose pigs and fed them a diet high in fat and salt. Over the course of one year, the animals became insulin resistant and developed coronary and aortic atherosclerosis. However, only about half of the pigs developed the most severe form of the disease. On examination, no correlation was found between high levels of insulin resistance and the most severe atherosclerosis. This was a surprising and unexpected finding.

Scientific literature suggests a correlation between atherosclerosis and glycated proteins. David Clemmons, MD, the Sarah Graham Kenan Professor of Medicine, professor of biochemistry and biophysics, and senior author of the *PLoS One* paper, tested the pigs for high levels of fructosamine and oxidised LDL cholesterol and found that all the pigs with severe heart disease had elevated levels of both. He and his colleagues also found that this correlation was more common in females. 14 of the 20 pigs that developed severe atherosclerosis were females and 14 of the 17 pigs that did not develop severe atherosclerosis were male. On analysis of previous literature, Clemmons found that another study showed a close association between elevated glycated protein levels and advanced disease as well as increased mortality in women but not in men.

"The underlying causes of this correlation are unknown," Clemmons said. "But now we have a unique animal model that very much mimics what we see in humans. Our model is a good predictor of diet-induced atherosclerosis in females."

Future research should study the affected heart tissue to find abnormal biochemical reactions in the cellular pathways involved in glycated proteins and severe coronary disease as this could help identify new treatment approaches or tailored dietary interventions.

Source: University of North Carolina Health Care

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