Scientists find potential genetic drivers behind male heart disease risk

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(Medical Xpress)—University of Leicester scientists have discovered a potential genetic contributor to the increased risk of heart disease among men.

A team of researchers including clinicians and scientists have made an important step forward in search of the mechanisms underlying increased risk of coronary artery disease in men who carry a particular type of the Y chromosome (haplogroup I).

The team, from the University's Department of Cardiovascular Sciences and Department of Health Sciences, have followed up their recent award-winning study showing that men with haplogroup I of the Y chromosome have a 50 per cent greater risk of developing the disease.

Their new paper goes further – and identifies the possible genes of the Y chromosome which could be responsible for its association with coronary artery disease.

Coronary artery disease is the name given to the narrowing of blood vessels delivering blood to the heart, meaning that not enough oxygen can reach it.

This can lead to angina symptoms, such as constriction of the chest, and heart attacks.

Coronary artery disease, also known as coronary heart disease, is

responsible for almost 80,000 deaths each year - over 200 people every single day – according to figures from the British Heart Foundation, who provided funding for the study.

The figures – collected between 2009 and 2011 – also show that one in six men and one in nine women die from heart disease.

The Leicester scientists' research, published in the journal *Arteriosclerosis, Thrombosis, and Vascular Biology*, used a sample of around 2,000 men from four European populations.

The study found that men in haplogroup I have lower numbers of copies of two important Y chromosome genes in macrophages – the type of white blood cells involved in both defence against infections and atherosclerosis.

Specifically, men with haplogroup I were shown to have decreased expression of 2 genes: the ubiquitously transcribed tetratricopeptide repeat, Y-linked gene (UTY) and protein kinase, Y-linked, pseudogene (PRKY) in macrophages.

The team found no association between haplogroup I and traditional cardiovascular risk factors – such as high blood pressure, smoking and obesity.

Principal investigator Dr Maciej Tomaszewski, a clinical senior lecturer at the University's Department of Cardiovascular Sciences, said: "I am very pleased with publication of this piece of research. It was conducted as a part of Lisa Bloomer's PhD studentship in my laboratory.

"I believe, we have made another step forward to deciphering the genetic background behind increased risk of coronary artery disease in men with haplogroup I.

"We now want to investigate whether and how the down-regulation of UTY and PRKY genes in macrophages may translate into increased risk of coronary artery disease.

"Ultimately, we wish to understand how human Y chromosome regulates susceptibility to cardiovascular diseases and if there is anything we can do to better diagnose, prevent or treat them."

Shannon Amoils, Senior Research Advisor at the British Heart Foundation, which part-funded the study, said: "This study continues prize-winning research into the Y chromosome and heart health.

"What's intriguing about these latest findings is the discovery of two specific genes that may be linked to an increased risk of coronary heart disease.

"This is the first time this connection has been made, so it will be interesting to find out more as scientists explore the area further."

More information: Bloomer, L. et al. Male-Specific Region of the Y Chromosome and Cardiovascular Risk: Phylogenetic Analysis and Gene Expression Studies, *Arterioscler Thromb Vasc Biol*, 2013 Jul;33(7):1722-1727.

Provided by University of Leicester

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