Discovery could help doctors to spot cardiovascular disease at an earlier stage

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Advanced technologies provide researchers with new insights into the warning signs for cardiovascular disease.

Screening methods for cardiovascular diseases such as heart attacks and strokes could be improved by measuring different biological signposts to those currently being tested, a new study led by researchers from King's College London suggests.

Published in the *Journal of the American College of Cardiology*, the study could allow doctors to better predict the development of cardiovascular disease at an earlier stage.

The research, which was supported by the National Institute for Health Research (NIHR) Biomedical Research Centre at Guy's and St Thomas' NHS Foundation Trust and King's College London, explored the role of a family of proteins called apolipoproteins.

Currently, the main focus is on apolipoprotein A1 (apoA1), the main component of high-density lipoproteins (HDL) or 'good' cholesterol, and apolipoprotein B (apoB), which is present on low-density lipoproteins (LDL) or 'bad' cholesterol.

However, for the first time, researchers have used a technology called mass spectrometry to measure an unprecedented number of apolipoproteins in a population-based study and discovered that another group of apolipoproteins might complement the signposts of good and bad cholesterol: apoE, apoC2 and apoC3.

These apolipoproteins are associated with very low-density lipoproteins (VLDL) and predominantly linked to another type of fat called triglycerides. ApoE, apoC2 and apoC3 have shown a stronger association with cardiovascular disease than apoA1 and apoB, suggesting

that currently some of the most predictive apolipoproteins are not measured in patients who may be at risk of cardiovascular disease.

The findings could lead to a change in the way patients all over the world are screened for cardiovascular disease, a condition which affects seven million people and causes more than 160,000 deaths in each year in the UK. It could also pave the way for more personalised treatments.

Lead author of the study Professor Manuel Mayr from King's College London said:

"We directly compared the association of a broad panel of apolipoproteins to new onset of cardiovascular disease over a 10-year observation period, and found that while apoB was predictive, other apolipoproteins, namely apoE, apoC2 and apoC3, were even better.

"These unexpected strong associations of VLDL-associated apolipoproteins with cardiovascular disease provide support to expanding the current measurements of apolipoproteins and to the concept of targeting additional apolipoproteins to reduce risk."

The study identified apoC3 as a prime therapeutic target for lowering VLDL, which might reduce excess cardiovascular risk related to high VLDL.