

Research links heart disease with testosterone

April 22 2016



Human heart. Credit: copyright American Heart Association

Testosterone might be involved in explaining why men have a greater risk of heart attacks than women of similar age, according to a study funded by the British Heart Foundation (BHF) and the Biotechnology and Biological Sciences Research Council (BBSRC). The findings,

published in the journal *Scientific Reports*, could lead to new therapies to help reduce heart attack risk.

Each year in the UK 188,000 people visit hospital whilst suffering from a [heart attack](#), which is around one person every three minutes.

Scientists at the University of Edinburgh examined the effects of testosterone on blood vessel tissue from mice. They found that the hormone triggers cells from the blood vessels to produce bone-like deposits – a process called calcification.

When the mouse cells were modified, by removing the testosterone receptor, so they could no longer respond to testosterone, they produced far less of the calcium deposits.

The team also looked at blood vessel and valve tissue from people with [heart disease](#) who had undergone surgery for their condition. They found that cells from these tissues contained bone-like deposits and also carried the testosterone receptor on their surface. This suggests that testosterone may trigger calcification in people.

Calcification causes blood vessels to harden and thicken, which means the [heart](#) has to work harder to pump blood around the body. It is strongly linked to increased risk of heart attack and stroke. Calcification can also affect the heart's valves, meaning that the valves cannot open and shut properly and may need to be replaced.

Little is known about what triggers calcification and there are currently no treatments. The research team now hope to drill down into the exact mechanism behind this process.

Although naturally occurring, testosterone is also used to counteract low levels of natural testosterone production in a treatment known as

androgen replacement therapy. Synthetic substances similar to testosterone are also sometimes misused by athletes in order to enhance athletic performance.

Dr Vicky MacRae, of the University of Edinburgh's Roslin Institute, said:

"Calcification is particularly difficult to treat, as the biological processes behind the disease are similar to those used by our body to make and repair bone. By finding this link between testosterone and calcification we may have discovered a new way of treating this disease and also reducing heart disease."

Professor Jeremy Pearson, Associate Medical Director at the British Heart Foundation, which helped fund the research, said:

"The role of male sex hormones in the control of [vascular calcification](#) is poorly understood. This study, in cells taken from mice and human tissue, provides new evidence that [testosterone](#) can increase [calcification](#). But significantly more research is needed to understand whether the results have implications for patients with heart disease or those taking androgen replacement therapy."

More information: Dongxing Zhu et al. Ablation of the androgen receptor from vascular smooth muscle cells demonstrates a role for testosterone in vascular calcification, *Scientific Reports* (2016). [DOI: 10.1038/srep24807](#)

Find out more about heart attacks and the BHF's research into improving treatments at bhf.org.uk/doubtkills

Provided by British Heart Foundation (BHF)

Citation: Research links heart disease with testosterone (2016, April 22) retrieved 25 April 2024 from <https://medicalxpress.com/news/2016-04-links-heart-disease-testosterone.html>

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