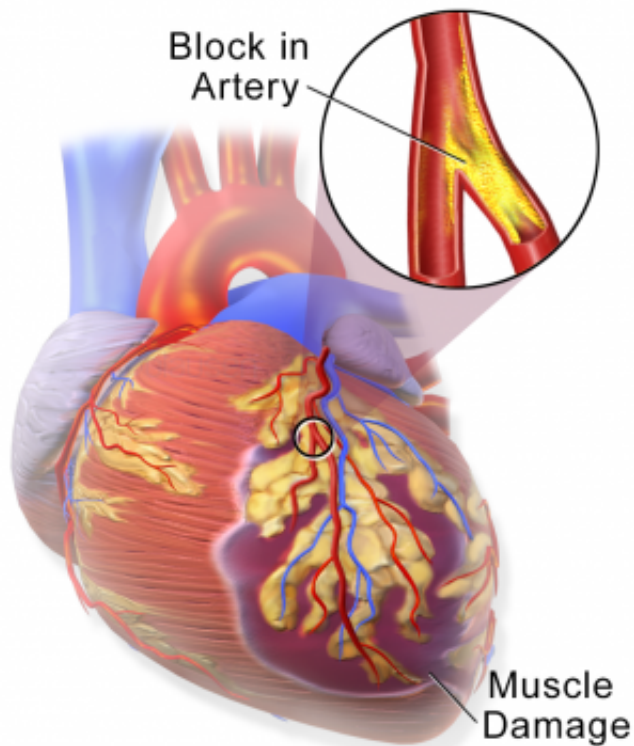


New discovery could reverse tissue damage caused by heart attacks

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Heart Attack

Myocardial Infarction or Heart Attack. Credit: Blausen Medical Communications/Wikipedia/CC-A 3.0

A new discovery by University of Bristol scientists helps to explain how cells which surround blood vessels, called pericytes, stimulate new blood vessels to grow with the hormone 'leptin' playing a key role. Leptin is

produced by fat cells which helps to regulate energy balance in the body by inhibiting the appetite. This study, described in *Scientific Reports*, may have important implications for the treatment of heart attacks and also for cancer, the two main killers in the UK.

The growth of new [blood](#) vessels, called 'angiogenesis', is an important process occurring both in health and disease. It is involved in the repair of tissues following injury but also has an essential role in the growth and spread of cancer.

The Heart Research UK-funded project studied how pericytes encourage the growth of new blood vessels and the role of [leptin](#), and provides important new information about the mechanisms involved.

One of the current treatments for [heart attack](#) is [coronary artery bypass](#) surgery. This uses blood vessels from the leg, or elsewhere in the body, to bypass the blocked artery and improve blood flow to the [heart](#) muscle. This is invasive and major surgery, with a long recovery time. In the longer term, these findings may help in the development of an alternative treatment to major surgery for [heart attack patients](#).

Importantly, the team found that pericytes produced 40-times more leptin when exposed to low levels of oxygen and that this continued until oxygen levels returned to normal. This may help tissues to build more blood vessels to increase blood flow and oxygen supply. Together with other findings, the research shows that leptin has several important actions which encourage new blood vessel growth in areas where tissues are deprived of oxygen.

In most cases, a heart attack is when a coronary artery becomes blocked and the resulting lack of blood supply to the heart muscle can lead to a damaged heart. Professor Madeddu's team has shown that by stimulating the growth of new [blood vessels](#), pericytes have the potential to restore

blood supply to damaged [heart muscle](#) after a heart attack.

Paolo Madeddu, Professor of Experimental Cardiovascular Medicine from the School of Clinical Sciences, who leads the project at the Bristol Heart Institute, said: "This new discovery could have important implications for the treatment of heart attacks, which is when a main [coronary artery](#) gets blocked, but also cancer. These results reveal a new signalling mechanism that may have a far-reaching and significant impact on cardiovascular regenerative medicine.

"Increasing leptin in pericytes in a damaged heart might help it to heal faster, whereas blocking the production of leptin in cancerous pericytes might starve the tumour of nutrients and force it to shrink."

Barbara Harpham, Chief Executive of Heart Research UK, added: "This translational research project is a good example of research that aims to benefit patients as soon as possible. Professor Madeddu and the team have made some important new discoveries. Understanding more about the processes involved may help pave the way for the development of new treatments for heart attacks which could replace coronary bypass operations."

Paper: 'The adipokine leptin modulates adventitial pericyte functions by autocrine and paracrine signalling' by Paolo Madeddu et al in *Scientific Reports*

Provided by University of Bristol

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