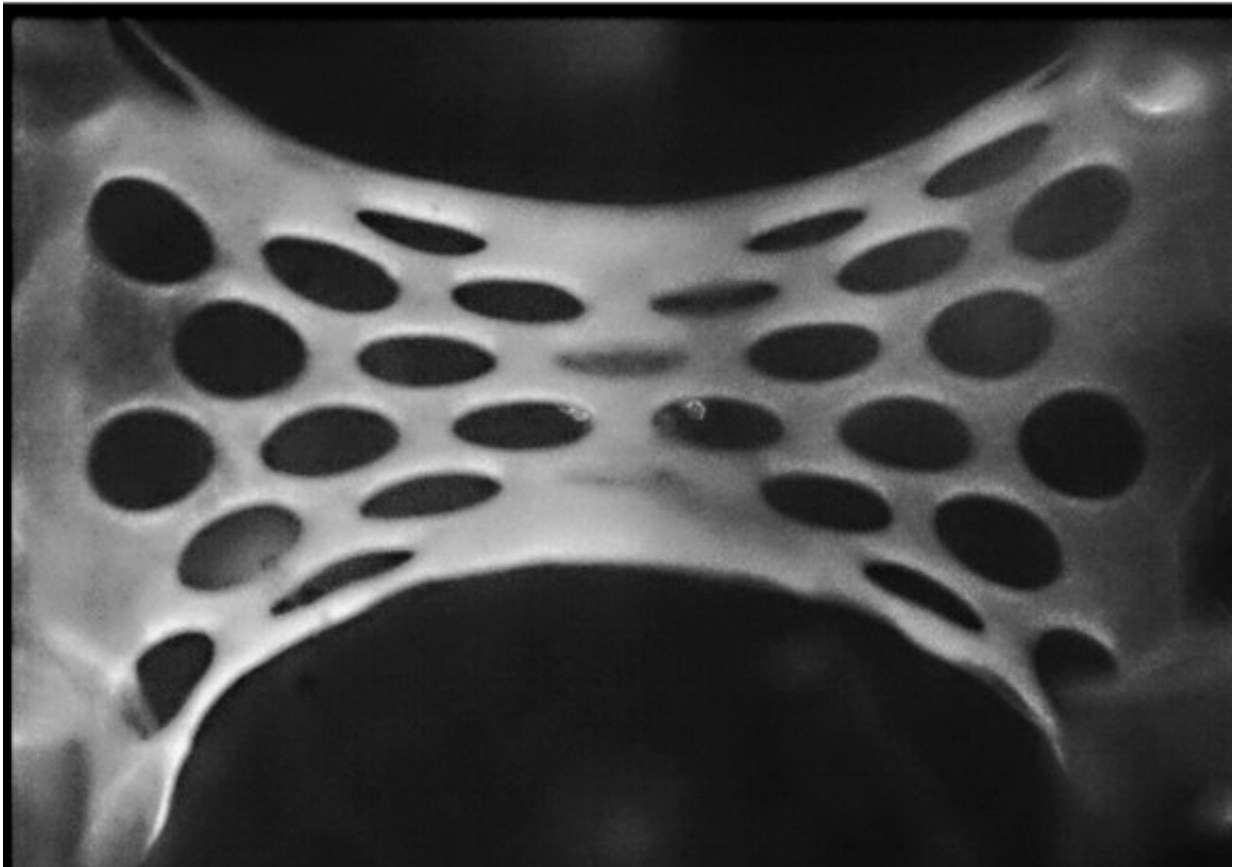


# Breakthrough as heart patches set for human trials

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The patch in the lab. Credit: British Heart Foundation/ Sian Harding

Researchers funded by the British Heart Foundation (BHF) have shown that heart 'patches' grown in the lab are safe to move on to trials in

people with hearts damaged after a heart attack, in research presented at the British Cardiovascular Society (BCS) Conference in Manchester today.

These patches could one day cure debilitating heart failure, which affects an estimated 920,000 people in the UK and is on the rise as more and more people survive a heart attack.

Researchers led by Professor Sian Harding at Imperial College London have developed a way to grow thumb-size patches of heart tissue (3cm x 2cm) that contain up to 50 million [human stem cells](#). The stem cells are programmed to turn into working [heart muscle](#) that can be seen 'beating'. One or more of these patches could be implanted on to the heart of someone after they've had a heart attack to limit, and even reverse, the loss of the heart's pumping ability.

During a heart attack, the heart is starved of vital nutrients and oxygen, killing off parts of the heart muscle. This weakens the heart and can eventually lead to heart failure, a debilitating condition that makes even every day simple tasks, like climbing the stairs or getting dressed, exhausting.

In this latest study, these patches have now been shown to be safe in rabbits and to lead to an improvement in the function of the heart after a heart attack. After a period of up to 4 weeks, detailed heart scans showed that the hearts' left ventricle (the chamber responsible for pumping blood out to the body through the aorta) was recovering without developing any [abnormal heart rhythms](#)—a potential side effect of other stem cell delivery methods. Importantly, the patches appeared to be nourished by blood vessels growing into them from the recipient heart.

Future steps will be to use these results to design clinical trials, first to

test safety and then to see whether similar levels of heart repair could be achieved in people.

Once sewn in place, the patches are intended to physically support the damaged heart muscle and help it pump more efficiently, while also releasing natural chemicals that stimulate the heart cells to repair and regenerate. Eventually, the patches would hopefully be incorporated into the damaged heart muscle and repair it.

The patches were developed in response to somewhat disappointing results from around the world when stem cells were just directly injected into damaged heart muscle. Without a fixed 'patch', [stem cells](#) are quickly cleared from the heart and aren't able to cause significant levels of repair.

This technology creates patches that start to beat spontaneously after three days and start to mimic mature heart tissue within one month. They can then be implanted into damaged hearts to help repair the muscle and recover the heart's vital pumping function.

Dr. Richard Jabbour who carried out the research at the London BHF Centre of Regenerative Medicine said:

"One day, we hope to add heart patches to the treatments that doctors can routinely offer people after a heart attack. We could prescribe one of these patches alongside medicines for someone with heart failure, which you could take from a shelf and implant straight in to a person."

Professor Metin Avkiran, Associate Medical Director at the British Heart Foundation, which funded this research, said:

"This is a prime example of world-leading research that has the potential to mend broken hearts and transform lives around the globe. If [clinical](#)

[trials](#) can show the benefits of these heart patches in people after a heart attack, it would be a great leap forward for regenerative medicine.

"Due in large part to research we've funded, more people are surviving heart attacks than ever before. But that means there's a growing number of people at risk of heart failure, as their hearts can't recover from the damage caused by the heart attack.

"Heart failure is a debilitating and life-changing condition with no cure, making everyday tasks incredibly difficult. If we can patch the heart up and help it heal, we could transform the outlook for these people."

Claire Marie Berouche 52 from Ealing in London developed heart failure after a [heart attack](#) when she was just 45: "Living with [heart failure](#) has changed my life. I can't do the everyday normal things I used to do like popping to the shops or even just stay out late with friends. New treatments like these potential heart patches give me hope that one day they could cure me and mend my broken [heart](#)"

Provided by British Heart Foundation

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