

# Stem cell heart patches could offer alternative to transplants

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Stem cell patches grown in laboratories could be used to repair weakened hearts, offering an alternative to pacemakers and reducing the need for transplants.

The thumb-sized patches would be stitched into hearts after attacks, researchers said. Once in place they would strengthen the cardiac muscle, which pumps blood around the body.

Researchers believe that the technique could reverse heart failure, which is estimated to affect about 920,000 people in Britain and is on the rise as more people survive heart attacks.

During an attack the heart is starved of vital nutrients and oxygen, which results in parts of the muscle dying. The condition, known as heart failure, can make everyday tasks such as getting dressed or climbing stairs exhausting.

At present the only means of reversing the damage is a heart transplant. Medicines, pacemakers and defibrillators can help to keep a patient alive but do not repair the injured tissue.

To offer an alternative, researchers led by Sian Harding at Imperial College London developed a method of growing patches of heart tissue that measure 3cm by 2cm. They start off as tens of millions of stem cells, which are grown on a watery gel and have the potential to become almost any type of cell used in the body.

Using a blend of chemicals the cells are coaxed to transform into working heart muscle. Within a few days they twitch independently. Within a month the entire patch pulsates, the cells contracting in unison, in the petri dish in which it is made.

The researchers believe that one or more patches sewn into a heart after an attack could limit, and perhaps reverse, the loss of pumping ability. The tech-

nique is to be trialled in humans after success in rabbits.

Heart scans showed that damaged left ventricles in rabbits—the chamber responsible for pumping blood out to the body—showed signs of recovery within weeks of a patch being implanted. Importantly, the patches appeared to be nourished by blood vessels growing into them from the recipient heart.

The rabbits did not develop abnormal heart rhythms, which has been a side-effect of other stem cell delivery methods.

The technique was developed after disappointing results from experiments in which stem cells were directly injected into damaged heart muscle. Without a fixed “patch” the cells seem to be washed away, failing to bring about significant levels of repair.

Richard Jabbour, who carried out the research at the BHF Centre of Regenerative Medicine in London, 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.”

Metin Avkiran, associate medical director at the British Heart Foundation, which funded the research, said: “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.

“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.

The research was presented yesterday at the British Cardiovascular Society Conference in Manchester.