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Stem-cell fix for damaged hearts could eliminate need to have a transplant

Scientists 'one step closer' to finding replacement for surgery with injection to kick-start organ's repair

By Sarah Knapton SCIENCE EDITOR

DAMAGED hearts could soon be repaired with an injection of stem cells after British scientists showed that vast improvements to tissue could be achieved in this way.

In Britain, there are nearly one million people living with heart failure, where the organ is too damaged to pump sufficient blood around the body, leading to shortness of breath, weakness and often death.

It can be caused by a heart attack that leaves the organ tissue scarred and unable to pump effectively, high blood pressure or narrowing arteries. Currently there is no cure, but scientists at the University of Cambridge have found that injecting a cocktail of heart

stem cells from different parts of the organ kick-starts the repair process.

The researchers used 3D heart tissue grown in a lab from human stem cells to test the cell combination and found it more than doubled the amount of heart muscle cells that grew and matured, improving the muscle cells' ability to contract and relax by 2.5 times.

Their animal testing also showed it renewed damaged tissue.

Dr Johannes Bargehr, first author of the study, said: "Our research shows the huge potential of stem cells for one day becoming the first therapy for heart failure. Although we still have some way to go, we believe we're one giant step closer, and that's incredibly exciting."

Scientists have been trying to use stem cells to repair damaged hearts for several years but the vast majority of transplanted cells die within a few days.

Researchers have found that by using both heart muscle cells and supportive cells taken from the outer layer

of the heart wall they were able to start the process of regeneration.

The scientists now hope to understand how the supportive epicardial cells work and they want to move to human trials within three years.

People suffering from heart failure cannot regenerate their damaged organ and the only cure is a transplant. But some patients have to wait up to nine years for the procedure and many die before a suitable heart is found.

It is hoped that by harnessing the regenerative power of stem cells scientists will one day be able to heal human hearts using a patient's own cells.

Dr Sanjay Sinha, leader of the study, said: "With only about 200 heart transplants performed each year in the UK, it's absolutely essential that we start finding alternative treatments."

The research, which also involved scientists from the University of Washington in the US, was published in *Nature Biotechnology* and was part funded by the UK Medical Research Council and the British Heart Foundation.