

British team lead stem cell heart surgery that could end need for transplants

A major advance in treatment for millions of heart patients has been heralded by revolutionary stem cell surgery, developed by a British-based team of scientists.

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The researchers at Imperial College London are perfecting a technique to rebuild a heart severely damaged and scarred by disease or cardiac arrest.

They have discovered a way to extract, grow in the laboratory and then graft on a patient's own muscle-building cells which then can be used to patch up the heart and increase its pumping power.

Eventually it could end the need for transplants, revolutionise heart surgery and reduce the 238,000 lives lost every year to heart disease, the UK's biggest killer.

What is more, it could increase the quality of life for the million or so people who suffer a heart attack every year.

The world-leading research, which is being led by the American Professor Michael Schneider, was last night awarded The Medical Futures Innovation Award, otherwise known as a medical Oscar.

Dr Nicholas Boon, President of the British Cardiovascular Society and one of the judges for the awards, said: "This could transform the care for patients who have had heart attacks or have heart disease.

"Because the cell therapy uses a patient's own cells, it negates the risks or complications associated with other treatment options such as rejection linked to transplantation."

Andy Goldberg, an orthopaedic surgeon who founded the awards, said: "It is early stages but if this research does what it says on the tin it will be absolutely massive.

"It will be the biggest breakthrough in heart disease treatment."

In a cardiac arrest, heart muscle cells die but existing treatments do not repair the damage to the muscle and have a limited effect on heart function.

At the moment, there is no cure because the heart cannot heal itself, although medication can ease the symptoms. A last resort is a transplant which is incredibly risky and not always successful.

The team at the Cardiovascular Science at the National Heart and Lung Institute have discovered a way to rejuvenate hearts using a specialist versions of heart stem cells - known as "progenitor" cells - found in small quantities in human hearts.

Professor Schneider was among the first to show that stem or "progenitor" cells exist in heart muscle, and then developed techniques to purify progenitor cells from a patient's heart and grow them in the laboratory.

Naturally there are only around 300 of these special cells for every million normal heart cells. The team thinks they are just there to help the heart recover from normal wear and tear.

The research team has solved the problem, however, by isolating the special cells from human hearts and cloning them in the lab. Then, using a proprietary, non-toxic technique, they have multiplied them.

So far, they have tested the heart cells successfully on mice and found that they do cause new heart tissue to form.

Professor Schneider, who holds the British Heart Foundation's Simon Marks Chair, said the team now wants to test human heart progenitor cells on pigs, which have similar anatomy to humans. Human trials could follow in two to three years.

"It's very exciting - and we could be doing human trials within three years," said Professor Schneider.

"This is pretty cutting edge stuff, In an ideal world, we could have a situation where patients with heart disease have their disease reversed as healthy tissue grows back.

"We hope that at the very least this will make the lives of those suffering from heart disease easier - allow them to get up stairs and do more things in their daily lives.

"The more ambitious hope is that will eventually keep people out of hospital and make them live longer."

Last month, it was revealed British doctors helped to perform the world's first transplant of a whole organ grown from stem cells.

Surgeons replaced the damaged windpipe of Claudia Castillo, a 30-year-old mother of two, with one created from stem cells grown in a laboratory at Bristol University.

Professor Martin Birchall, from the University of Bristol, who was involved in the transplant, said: "This does appear to be an incredible step forward in stem cell research.

"It is extremely exciting. It is a massive step forward to be able to grow functioning heart muscles and to be able to beat in time.

"This would open the way to replacing parts of the heart that have died after a heart attack, that would seem like the biggest potential market."