

Heart derived stem cells develop into heart muscle

23 April 2008

Dutch researchers at University Medical Center Utrecht and the Hubrecht Institute have succeeded in growing large numbers of stem cells from adult human hearts into new heart muscle cells. A breakthrough in stem cell research. Until now, it was necessary to use embryonic stem cells to make this happen. The findings are published in the latest issue of the journal *Stem Cell Research*.

The stem cells are derived from material left over from open-heart operations. Researchers at UMC Utrecht used a simple method to isolate the stem cells from this material and reproduce them in the laboratory, which they then allowed to develop. The cells grew into fully developed heart muscle cells that contract rhythmically, respond to electrical activity, and react to adrenaline.

“We’ve got complete control of this process, and that’s unique,” says principal investigator Prof. Pieter Doevendans. “We’re able to make heart muscle cells in unprecedented quantities, and on top of it they’re all the same. This is good news in terms of treatment, as well as for scientific research and testing of potentially new drugs.”

Doevendans will use the cultured heart muscle cells to study things like cardiac arrhythmia (abnormal heart rhythms). Stem cells from the hearts of patients with genetic heart defects can be grown into heart muscle cells in the lab. Researchers can then study the cells responsible for the condition straight away. They can also be used to test new medicines. This could mean that research into genetic heart conditions can move forward at a much faster pace. In the future, new heart muscle cells can likely be used to repair heart tissue damaged during a heart attack.

For some time now, it has been known that the heart is a source of stem cells. Although in the past researchers from other countries have succeeded in using these cells to make heart muscle cells, this always required the presence of heart muscle cells

from newborn mice or rats in the growth medium. The stem cells discovered by the UMC Utrecht researchers are able to develop on their own. Heart muscle cells can also be made from embryonic stem cells. The disadvantage of this method is that the yield is low, because not all cells develop into muscle cells. Also, the ethical considerations of isolating stem cells from embryos are the subject of controversy.

Source: University Medical Center Utrecht

APA citation: Heart derived stem cells develop into heart muscle (2008, April 23) retrieved 4 August 2022 from <https://medicalxpress.com/news/2008-04-heart-derived-stem-cells-muscle.html>

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