

## Stem Cells from Adipose Tissue Turned Into Cardiac Myocytes: Achievement Paves Way for Future Heart Disease Therapies

ScienceDaily (May 19, 2010) - Spanish researchers have employed for the first time adult cells extracted from a human heart to turn stem cells from adipose tissue into cardiac myocytes. In other words, they have managed to "reprogram" adult stem cells -- an achievement that promises to improve treatments for heart disease.

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#### Reference

- · Embryonic stem cell
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- treatments for heart disease is becoming more common. However, working with stem cells without targeting heart tissue negatively affects the efficacy of treatments. Therefore, inducing cell

At present, the use of stem cells in

differentiation into cardiac muscle (cardiomyocytes) may be one of the best options in the treatment of these pathologies.

For the purpose of this study.

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stem cells from lipoaspiration. Subsequently, these cells were temporarily permeabilized and exposed to a human-auricle cell extract. Then, these cells were

## recovered in culture **Morphological Changes**

After 21 days in culture, the cells differentiated towards a cardiac myocyte phenotype, which was demonstrated by expression of morphological changes (appearance of binuclear cells with striated fibers and ramifications), detection of cardiospecific markers through inmunofluorescence, and the presence of cardiac muscle-related genes that were analysed through RT-PCR; and finally, by expression of reverse transcription. Thus, mesenchimal stem cells acquired a cardiac phenotype.

This study was conducted by Macarena Perán, Juan A. Marchal, Elena López, Manuel Jiménez-Navarro, Houria Boulaiz, Fernando Rodríguez-Serrano, Esmeralda Carrillo, Gema Sánchez-Espín, Eduardo de Teresa, David Tosh y Antonia Aránega, researchers from the University of Jaen (Spain), the University of Granada, the Hospital Clínico Universitario of Malaga and the University of Bath (United Kingdom). The research is being published in the journal Cytotherapy, the official reporting organ of the International Society for Cellular Therapy (ISCT).

This technique could be used in the future for regeneration of cardiac muscles through the use of cells directly extracted from the patient. However, physicians have remarked that, at present, this research is in its earlier stages, and it will be a long time until it has any therapeutic use.

Currently, researchers are preparing a new approach for introducing the cell extract into the target cell (by using a cell microinjector) that will allow them to obtain a larger number of viable differentiated cells, which is essential for their having any therapeutic use. The next step is to use animal models to validate differentiated cells' functionality. Finally, a number of clinical trials should be conducted to assess the viability of this technique in human patients.

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Adapted from materials provided by University of Granada.

## Journal Reference

Macarena Perán, Juan A, Marchal, Elena López, Manuel Jiménez-Navarro, Houria Boulaiz, Fernando Rodríguez-Serrano, Esmeralda Carrillo, Gema Sánchez-Espin, Eduardo de Teresa, David Tosh, Antonia Aranega. Human cardiac tissue induces transdifferentiation of adult stem

# researchers isolated adult human

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