

Fat cells become useful stem cells in tissue reconstruction

December 23 2010

Two studies appearing in the current issue of *Cell Transplantation* 19(10) discuss stem cells derived from adipose (fat) cells and their potential use in plastic surgery and tissue reconstruction. The studies are now freely available on-line at <http://www.ingentaconnect.com/content/cog/ct/>.

Adipose-derived stem cells maintain their "stemness" and could be useful for cell-based therapies

A team of researchers from several institutions in Italy isolated and characterized adult fat cell-derived stem cells from patients undergoing lipoaspiration (surgical removal of fat deposits) in order to investigate the ability of the fat cells to maintain their stem cell characteristics in in vitro cultures to the point where once transplanted they could aid in [tissue regeneration](#).

According to the study's corresponding authors Dr. Stefami Bucher of the San Gallicano Institute (Rome) and Dr. Rita Falcioni of the Regina Elena Cancer Institute (Rome), adipose tissues share several biological properties with bone marrow, they can be found in abundance, they can be obtained from patients undergoing noninvasive lipoaspirate procedures, and they have the potential to be useful in a range of therapeutic applications.

"The use of lipoaspirate as filling material is a powerful technique for tissue repair in [plastic surgery](#)," said Dr. Falcioni. "Increasingly, it is used in oncology to repair tissue damaged by surgical treatments, such as

[mastectomy](#). The use of purified adipose-derived stem cells might improve this surgical procedure by shortening the time to achieve esthetic results and thereby improving patient quality of life."

The researchers described adipose tissues as "highly specialized connective tissues" that help provide the body with an energy source, yet little research has investigated the transplant potential of adipose-derived stem cells.

"We strongly suggest that the adipose-derived stem cells we purified in our study could be applied in the near future for cell therapy using the cell-assisted lipotransfer technique."

Plastic surgery meets regenerative medicine

"Progenitor, endothelial and mesenchymal stem cells derived from adipose tissues could be central to plastic and reconstructive surgery applications as well as represent the focus for therapies for a number of disease conditions, including those affecting bone, cartilage, muscle, liver, kidney, cardiac, neural and pancreatic tissue," said Dr. Camillo Ricordi, lead author on a paper by researchers from the University of Miami's Cell Transplant Center and Diabetes Research Institute.

According to Dr. Ricordi and colleagues, successful engraftment and long term survival of transplanted adipose tissue has increased interest in structural fat grafting, yet there is a high percentage (up to 70%) of tissue resorption over time. Adipose cells can also fall victim to trauma during harvesting. In contrast, progenitor cells have minimal metabolic requirements and tend to survive longer.

"Adipose-derived stem cells might very well represent the only tissue surviving transplantation," concluded Dr. Ricordi. "There is much more to be learned in tissue remodeling following adipose tissue

transplantation and it is time to carefully re-examine the potential implications of autologous fat grafting as being more than the filler concept for which it was originally utilized."

"These two articles highlight the considerable promise for therapeutic and cosmetic benefit from the relatively new derivation of [stem cells](#) from [fat cells](#)," said Dr. Paul Sanberg, co-editor-in-chief of the journal [Cell Transplantation](#) and executive director of the University of South Florida Center of Excellence for Aging and Brain Repair. "It will be of great interest to see how the clinical use of these cells will develop."

More information:

-- Folgiero, V.; Migliano, E.; Tedesco, M.; Iacovelli, S.; Bon, G.; Torre, M. L.; Sacchi, A.; Marazzi, M.; Bucher, S.; Falcioni, R. Purification and characterization of adipose-derived stem cells from patients with lipoaspirate transplant. *Cell Transplant.* 19(10):1225-1235; 2010.

-- Tremolada, C.; Palmieri, G.; Ricordi, C. Adipocyte Transplantation and Stem Cells: Plastic Surgery Meets Regenerative Medicine. *Cell Transplant.* 19(10):1217-1223; 2010.

Provided by Cell Transplantation Center of Excellence for Aging and Brain Repair

Citation: Fat cells become useful stem cells in tissue reconstruction (2010, December 23) retrieved 25 April 2024 from <https://medicalxpress.com/news/2010-12-fat-cells-stem-tissue-reconstruction.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.