Implantation of Autologous Adipose Tissue Derived Mesenchymal Stem Cells in Foot Fat Pad in Rats

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NO CONFLICT TO DISCLOSE

Presentation Title: Implantation of Autologous Adipose Tissue Derived Mesenchymal Stem Cells in Foot Fat Pad in Rats

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My disclosure is in the Final AOFAS Mobile App.

I have no potential conflicts with this presentation.
Introduction

- The foot fat pad (FFP) bears body weight and absorbs striking shocks during walking and running.
- FFP may become a source of foot pain during aging.
- This study investigated the regenerative effects of autologous adipose tissue derived mesenchymal stem cells (AT-MSCs) in the FFP of rats.
Materials and Methods

Rats
n=30

surgery
Fat tissue
AT-MSCs

characterization

Autologous AT-MSCs (5x10⁴)
FFP injection

Cell labeling

adipogenic differentiation

Oil red O staining for fat droplets
Histologic Results

- The fluorescence-labeled AT-MSCs were present in the FFPs throughout the 3-week experimental period.

- On histology, no evidence of direct differentiation of AT-MSCs to adipocytes.

- Injection

- Controls
The fat pad unit (FPU) consists of a cluster of adipocytes enclosed by elastin-containing septae and is the basic functional structure of FFP.

The area of FPUs in the fat pads that received AT-MSC injections was greater than that in the control fat pads at weeks 2 and 3.

**Histomorphometry**

![Graph A](image1.png)

![Graph B](image2.png)
Histology: focused on elastin fibers

- Elastic fibers passively recoil without energy input and make FFP flexible and resilient.

AT-MSC injection

Modified Verhoeff Van Gieson Staining (elastin fibers in black)
The thickness of septae was not changed by injections of AT-MSCs.

The density of elastic fibers in the septae was increased in the fat pads that implanted with AT-MSCs at weeks 2 and 3.
Conclusion & Significance

- The implanted AT-MSCs largely survived in the weight-bearing FFP. There was no evidence that AT-MSCs formed new FPUs, but they stimulated the growth of individual FPUs and the formation of elastic fibers in FFP.
- The data are promising for developing stem cell therapies for aging-associated degeneration in FFP.
Reference


