



Office of Technology Management

Adult Stem Cell Driven Tissue Constructs for Soft Tissue Reconstruction and Augmentation

Technology Reference

CX051

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Field

Plastic and
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engineering
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Adipose tissue

License Status

Seeking licensing
partner

Patent Status

Provisional patent
application filed

Overview

Plastic and reconstructive surgeons are constantly burdened with the challenge of replacing lost soft tissue due to trauma, diseases, or congenital anomalies. A mastectomy procedure is an example of non-elective surgical procedure that mandates the replacement of lost soft tissue to restore physical shape. In the majority of cases, the lost soft tissue or the existing is largely composed of subcutaneous adipose tissue. Ideally, the patient's own adipose tissue is preferable for implantation to avoid potential complications associated with allografts, xenografts, and synthetic materials such as transfer of pathogens and possible immune rejection. However, the need for a second surgical procedure for autologous tissue harvest, and reduction in graft volume over time are drawbacks of current adipose tissue transfer procedures.

Technical Summary

This current invention proposes an engineering of adipose tissue implants from the patient's own adult stem cells; a technique, which should overcome most of the above mentioned deficiencies.

Adult human MSC were isolated and treated. Following the treatment, the cells were either incubated ex vivo or implanted in vivo (in immunodeficient mice). Adipose tissue formation was demonstrated by histological staining and mRNA analysis. Both constructs maintained their physical size throughout the incubation or implantation periods.

Benefits

- Tissue-engineered adipose tissue grafts in any shape and size using adult MSC
- No need for a separate approval process
- No immunorejection issues (tissue-forming cells are from the patient's own bone marrow)
- Ease of fabrication of tissue-engineered adipose tissue construct in-vitro
- Biological integration with the patient's own tissue
- Unlimited sources for therapeutic applications in soft tissue reconstruction and augmentation

Areas of Application

- Soft tissue reconstruction
- Soft tissue augmentation
- Breast reconstruction after cancer resection
- Breast augmentation for cosmetic procedures
- Facial soft tissue reconstruction after cancer resection, trauma and congenital anomalies
- Tissue-engineering of any composite connective tissues such as skin-adipose-bone grafts
- Post-cancer tissue reconstruction
- Research

Stage of Development

- In Vivo Data