



Office of Technology Management

In Vivo Synthesis of Connective Tissue

Technology Reference

CX003

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Inventor

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Field

Tissue Engineering

Key Words

Craniosynostosis

Fibrous tissue

Collagenous tissue

Suture-like

Connective tissue

License Status

Seeking licensing partner

Patent Status

US Patent Application and International Patent Application pending

Overview

Fibrous Tissue consists of fibroblastic cells embedded in a hydrated extracellular matrix. Fibroblasts are crucial to fibrous tissue histogenesis and maintenance. Mature fibrous tissue only has a limited number of resident fibroblasts. The mature fibrous tissues contain primarily mature fibroblasts rather than fibroblast-progenitor cells or Mesenchymal stem cells (MSCs). Thus, few fibroblasts are available for regeneration upon injuries at the injured site. This process can also address defects in the cranium as in cranial synostosis.

Technical Summary

UIC Inventors propose an approach to develop the formation of fibrous soft tissue, connective tissue in vivo utilizing mesenchymal stem cells.

This technique will be helpful in the treatment of craniosynostosis, a birth defect of the brain characterized by the premature closure of one or more of the fibrous joints between the bones of the skull (called the *cranial sutures*) before brain growth is complete. The abnormal head shape resulting from cranial malformations in infants continues to be a diagnostic and therapeutic challenge, which can be addressed by this technology.

Benefits

- Connective tissue generated in vivo can overcome deficiencies associated with current craniofacial surgery for cranial synostosis
- No immunorejection issues (tissue-forming cells are from the patient's own bone marrow or fat tissue)
- Biological integration with the patient's tissue
- Possible to utilize the current surgical approaches without separate approval process

Areas of Application

- Calvarial defects
- Soft tissue replacement
- Repair of tendons and ligaments
- Production of fibrous tissue and periodontal ligaments
- Correct congenital craniofacial anomalies (can produce cranial sutures)
- Trauma
- Repair of soft tissue
- Correct congenital soft tissue anomalies

Stage of Development

- In vivo data in rabbits