

In vivo synthesis of connective tissues including ligaments and cranial suture

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Technology description

Summary

Fibrous tissue injuries, such as tears in the anterior cruciate ligament (ACL) or Achilles tendon, are typically treated by surgical grafts from donor animals or cadavers. Unfortunately, these procedures have risks including tissue rejection and low donor tissue availability. This technology aims to address these issues by describing a method of generating connective tissues using a layered biocompatible scaffold seeded with progenitor cells and growth factors. Successful application of this technology may lead to improved recovery outcomes and increased quality of life for postoperative patients with applications in orthopedics and dental surgery.

Using engineered fibrous tissues to address current problems in donor tissue technologies

This technology describes a method that utilizes the versatile characteristics of autologous fibroblasts or stem cells seeded scaffolds for generation for complex fibrous tissue. The addition of growth factors further support construction of tissue with the collagen-composed scaffold, ensuring a more natural and appropriate environments for cell growth.

This technology has been tested in vivo.

Web Links

[VIDEO PROFILE: JEREMY MAO](#)

Publications

Moioli EK, Clark PA, Sumner DR, Mao JJ. "Autologous stem cell regeneration in craniosynostosis." Methods. Bone. 2008 Feb;42(2):332-40.

Hong L and Mao JJ. "Tissue-engineered rabbit cranial suture from autologous fibroblasts and BMP2." Journal of Dental Research. 2004 .

Application area

Ligament generation

Cranial suture formation

Generation of other fibrous tissues such as fascia, or periosteum

Advantages

Cells can be taken directly from the patient, eliminating tissue rejection concerns

In vivo regeneration prevents the need to wait for donor tissue to become available

Technique can be implemented for nearly all fibrous tissue types

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