Temporo-mandibular Joint (TMJ) Meniscus Reconstruction Device

ID 1878

Background
Temporomandibular joint (TMJ) disorders cause pain and dysfunction in the jaw joint and muscles that control jaw movement. A variety of procedures including minimally invasive techniques and arthroscopy have been used to treat this condition. However, meniscectomy is indicated in the majority of cases where the TMJ meniscus is irreparably damaged or if the meniscal disc is anatomically amenable to repair but prohibits the fluid, smooth movement of the condyle.

Alloplastic materials such as Silastic, silicone and Proplast-Teflon have been previously used to replace the TMJ meniscus with limited success, with joint pathology often worsening following the placement of such devices. Autograft tissues have also been used both as disc replacement materials following meniscectomy and as interpositional materials in the treatment of joint fusion. The obvious disadvantage associated with autografts is the morbidity associated with the graft donor site.

The ideal graft material for the treatment of TMJ pathology resulting in meniscus abnormality would be a material that provides a scaffold for tissue ingrowth, prevents degenerative changes of the TMJ, and is readily implanted without the associated morbidity of autogenous tissue harvest.

Technology Description
A novel extracellular matrix (ECM) device has been developed for TMJ reconstruction. This device, consisting of a particulate or gel ECM pillow encased in sheets of ECM, mimics the shape and size of the native TMJ meniscus. These biodegradable scaffolds are capable of repairing and replacing cartilaginous menisci. This ECM device therefore represents an effective tissue scaffold for the reconstruction of the TMJ meniscus following meniscectomy.

Advantages
- Scaffolds are biodegradable, elastomeric, porous and biocompatible
- Device mimics the shape and size of the native TMJ meniscus
- Device undergoes rapid and constructive remodeling into cartilage-like tissue that highly resembles native TMJ in terms of ECM components, organization, and cellular populations
- Functionality of the device is not degraded over time; remodeling allows device to confirm to unique anatomy of each implanted individual

Stage of Development
- Device has been validated in large animal (dog) TMJ models.

US Non Provisional Patent Application filed
WO/2010/099463

Inventor
Dr. Stephen F Badyak, DVM, PhD, MD
Department of Surgery

Application
- Reconstruction of the temporo-mandibular joint
Featured Innovator | Dr. Stephen F Badylak, DVM, PhD, MD

Dr. Stephen Badylak, D.V.M., Ph.D., M.D. is a Professor in the Department of Surgery, a deputy director of the McGowan Institute for Regenerative Medicine (MIRM), and Director of the Center for Pre-Clinical Tissue Engineering within the Institute.

In 1976, Dr. Badylak received his D.V.M. from Purdue University. He then obtained an M.S. in Clinical Pathology from Purdue University in 1978, a Ph.D. in Anatomic Pathology from Purdue University in 1981 and graduated with highest honors with a M.D. from Indiana University Medical School in 1985.

Research Interests

• Tissue Engineering and Regenerative Medicine
• Biomaterials and Biomaterial/Tissue Interactions
• Vascular and Developmental Biology
• Orthopedic Biology and Prostheses
• Biomedical Engineering as it Relates to Device Development and Biomatera

Select Publications


Contact Information

Alexander P. Ducruet, PhD
Technology Licensing Manager
Life Sciences
412-648-2219
apdst11@pitt.edu

Office of Technology Management
200 Gardner Steel Conference Center
Thackeray & O’Hara Street
Pittsburgh, PA 15260
412-648-2206
www.otm.pitt.edu