Injectable Extracellular Matrix For Treating Skeletal Muscle Atrophy And Degeneration

Tech ID: 32051 / UC Case 2017-276-0

CONTACT

University of California, San Diego
Office of Innovation and Commercialization
innovation@ucsd.edu
tel: 858.534.5815.

OTHER INFORMATION

KEYWORDS

biomaterial scaffold, pelvic muscle, pelvic floor muscle (PFM) fibrosis, pelvic floor disorders (PFD), fecal incontinence, pelvic organ prolapse, dysfunction of pelvic striated muscles, external anal (EAS) sphincteric muscles, rectal prolapse, stress urinary incontinence, mixed urinary incontinence, decellularized skeletal muscle extracellular matrix, injured pelvic muscles

CATEGORIZED AS

- **Materials & Chemicals**
  - Biological
- **Medical**
  - Disease: Musculoskeletal Disorders
  - Disease: Women's Health

RELATED CASES

2017-276-0

BACKGROUND

The primary therapeutic goal in female pelvic medicine is to restore normal pelvic floor function. Despite this, the current standard treatments are 5 compensatory, as they do not directly target sphincteric and supportive muscle dysfunction and do not reverse the existing injury or halt functional deterioration.

Surgical treatments, such as muscle transplantation and transposition techniques, have had some success; however, there still exists a need for alternative therapies. Tissue engineering approaches offer potential new solutions; however, current options offer incomplete regeneration. Many naturally derived as well as synthetic materials have been explored as scaffolds for skeletal tissue engineering, but none offer a complex mimic of the native skeletal extracellular matrix, which possesses important cues for cell survival, differentiation, and migration. The extracellular matrix consists of a complex tissue-specific network of proteins and polysaccharides, which help regulate cell growth, survival and differentiation.

Despite the complex nature of native ECM, in vitro cell studies traditionally assess cell behavior on single ECM component coatings, thus posing limitations on translating findings from in vitro cell studies to the in vivo setting. Overcoming this limitation is important for cell-mediated therapies, which rely on cultured and expanded cells retaining native cell behavior over time.

Skeletal muscles are composed of bundles of highly oriented and dense muscle fibers, each a multinucleated cell derived from myoblasts. The muscle fibers in native skeletal muscle are closely packed together in an extracellular three dimensional matrix to form an organized tissue with high cell density and cellular orientation to generate longitudinal contraction. Skeletal muscle can become dysfunctional due to a variety of different factors including trauma, atrophy or degeneration.

The reconstruction of skeletal muscle, which is lost by injury, tumor resection, or various myopathies, is limited by the lack of functional substitutes.

TECHNOLOGY DESCRIPTION

Researchers from UC San Diego developed a technology that provides a novel injectable biomaterial scaffold, derived from decellularized skeletal muscle extracellular matrix (ECM), which capitalizes on the endogenous regenerative potential of the host tissue and bridges this therapeutic void by restoring and preserving function of injured pelvic muscles and striated focal skeletal muscles.

This technology has the potential for treating the symptoms of pelvic floor muscle (PFM) fibrosis, pelvic floor disorders (PFD), urinary (UI) and fecal incontinence (FI), pelvic organ prolapse (POP), dysfunction of pelvic striated muscles, external urethral (EUS) and external anal (EAS) sphincteric muscles, rectal prolapse (RP), stress urinary incontinence (SUI), and mixed urinary incontinence (MUI).

APPLICATIONS

This technology has the potential for treating

pelvic floor muscle (PFM) fibrosis

pelvic floor disorders (PFD)

urinary (UI) and fecal incontinence (FI)

pelvic organ prolapse (POP)

dysfunction of pelvic striated muscles

external urethral (EUS) and external anal (EAS) sphincteric muscles

rectal prolapse (RP)

stress urinary incontinence (SUI)

and mixed urinary incontinence (MUI)

STATE OF DEVELOPMENT

UC San Diego is seeking partners to commercially develop this technology. US Patent Rights are available for licensing.

INTELLECTUAL PROPERTY INFO

RELATED MATERIALS

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	0197567-A1	06/25/2020	2017-276
Patent Cooperation Treaty	Published Application	2018213375	11/22/2018	2017-276

University of California, San Diego
Office of Innovation and Commercialization
9500 Gilman Drive, MC 0910, ,
La Jolla,CA 92093-0910

Tel: 858.534.5815
innovation@ucsd.edu
https://innovation.ucsd.edu
Fax: 858.534.7345