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Biomimetic Glycosaminoglycan-based Scaffolds Improve Skeletal Muscle Regeneration in a Murine Volumetric Muscle Loss Model

Biodegradable hydrogel implants that trigger natural muscle regrowth with no scar tissue.

Researchers at Purdue University have developed a new biomimetic scaffolding material to regenerate skeletal muscle in the event of muscle damage due to injury. Current muscle regeneration techniques are often limited due to scarce tissue availability. Purdue researchers have created a new scaffold implant that promotes myoblast proliferation and myogenic differentiation to signal muscle growth. The scaffolding is comprised of hydrogels, including hyaluronic acid and chondroitin salt, that mimic the extracellular matrix of skeletal muscles and exhibit excellent cell-interactive properties as well as biodegradability and biocompatibility. The scaffolding material works to induce a natural regeneration process including inflammatory response, nerve innervation, and blood vessel formation directly at the site of an injury. In testing with mice, no signs of scar tissue, infection, edema, seroma, or toxicity were observed over the course of four weeks. Improved muscular regeneration response was observed in mice within just one week, which improved with exercise.

Advantages:

-Biocompatible

-High Injury Recovery Rate

-Improved Muscle Regeneration

Potential Applications:

-Muscle Regeneration

-Regenerative Medicine

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Category
Biotechnology & Life Sciences/Cell & Gene Therapy Platforms
Materials Science & Nanotechnology/Biomedical & Bioinspired Materials

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Technology Validation:

This technology has been tested in vivo with mice to observe injury recovery and biocompatibility.

Recent Publication:

Biomimetic Glycosaminoglycan-Based Scaffolds Improve Skeletal Muscle Regeneration in a Murine Volumetric Muscle Loss Model

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