

Harnessing Nerve-Muscle Interaction for Accelerating Skeletal Muscle Repair

Biopolymer matrix with nerve cells that stimulate muscle repair and angiogenesis.

Researchers at Purdue University have developed a new approach to skeletal muscle regeneration using nerve cells to promote myoblast response. There remains an unmet need in treating skeletal injuries as implants must be biocompatible to avoid causing adverse effects from presence of a foreign object such as infection and scarring. Purdue researchers introduce a new biomimetic scaffold with a biopolymer matrix containing PC 12 nerve cells that can stimulate nerve function, myoblast behavior, and angiogenesis to promote muscle regeneration. Neural cells are known to contribute to muscle contraction; however, researchers have been able to modulate them for muscle vascularization, regulating stem cell behavior, and regulating cell migration. In testing with human skull cells and nerve cells in vitro, cell aggregation was increased within seven days and high cell viability and metabolic activity were observed.

Advantages:

- Biocompatible
- Improved Myoblast Behavior
- Self-Renewal of Nerve Cells
- High Cell Viability

Potential Applications:

- Skeletal Muscle Repair & Regeneration
- Advanced Regenerative Biomaterials

Technology Validation:

Technology ID

2020-DENG-69055

Category

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

Further information

Patrick Finnerty

pwfinnerty@prf.org

View online page



A new biomimetic scaffolding has been created and has been cultured with nerve cells and skeletal muscle cells to observe cell viability and muscle regeneration behavior.

Recent Publication:

Harnessing Nerve-Muscle Cell Interactions for Biomaterials-Based Skeletal Muscle Regeneration

Journal Biomedical Material Research Part A

DOI: 10.1002/jbm.a.37022

TRL: 2

Intellectual Property:

Provisional-Gov. Funding, 2020-04-28, United States

Utility-Gov. Funding, 2021-02-24, United States

DIV-Gov. Funding, 2024-11-15, United States

Keywords: Biomaterials, Biomedical, Biomedical Engineering, Biotechnology, Medical device, Medical Implant, Scaffold, Traumatic Brain Injury