

Compositions and Methods to Increase Muscular Strength Without Exercise

Technology #19768

Applications

This technology has applications in the medical field for muscle regeneration and rehabilitation to increase strength and mobility in bed-ridden patients such as those with cancer cachexia as well as for performance improvement in athletes.

Problem Addressed

Millions of bed-ridden patients experience loss of muscle strength. Decreased use of muscles leads to an increase in internal resistance in skeletal muscle cells, thereby limiting the force that muscles can exert. This results in the development of muscle wasting disorders, such as cachexia and sarcopenia, which ultimately impair mobility and decrease patients' quality of life. Furthermore, muscle weakness can also be caused by strenuous exercise or long breaks from exercise. Currently, methods to increase muscle strength involve tedious resistance exercises which require much time and effort before improvements in strength are observed. This technology improves muscle strength through therapeutic targeting of the cytoskeletal network within muscle cells.

Technology

This invention is a therapeutic strategy which amplifies muscle force. The transient disruption of the cytoskeletal network within muscle cells decreases stiffness and internal resistance in muscles. This breakdown can be achieved by a variety of therapeutic agents, including small molecules or polypeptides which induce breakdown of filamentous actin (F-actin) in the cytoskeleton via the depolymerization of F-actin or the disruption of microtubules or intermediate filaments in skeletal or smooth muscle. Subsequently, when the cytoskeletal network is rebuilt, muscle cells demonstrate at least a two-fold increase in force exertion abilities within hours post-treatment. This technology facilitates increases in muscle strength without exercise.

Advantages

- Easier to implement than exercise to increase muscle strength
- Faster results - improved muscle strength can be observed in just hours after treatment
- Methodology can be applied to a wide variety of medical indications associated with muscle wasting
- Can also be applied to healthy muscle tissues for athletes seeking quicker recovery in muscle strength

Intellectual Property

IP Type: Published PCT Application

IP Title: Compositions and methods to increase muscular strength without exercise

IP Number: WO 2019-090171

IP Type: Pending US Patent Application

IP Title: Compositions and methods to increase muscular strength

IP Number: US 2020-0352940

Categories For This Invention:

Life Sciences

Clinical Applications

Cardiovascular

Physical Medicine & Rehabilitation

Tissue Engineering

Therapeutics

Peptide

Small Molecule

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External Links:

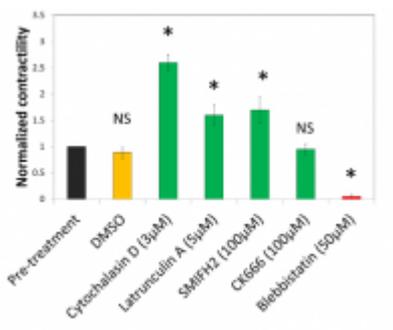
Inventor's Thesis

<http://hdl.handle.net/1721.1/115667>

Mechanobiology Lab Website

<http://web.mit.edu/meche/mb/index.html>

Image Gallery:



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