Cyclic compressive loading (aka massage) as an intervention for skeletal muscle atrophy and impaired regrowth in the aged

Esther Dupont-Versteegden, PhD
Timothy Butterfield, PhD

Muscle size does not recover after atrophy in aged

M2 macrophages respond to changes in loading in aged muscle

Positive effects of massage on damaged muscle

Data collected by Stephanie Moore

TA Butterfield et al. Medicine & Science in Sports & Exercise 2008
Massage Intervention

Genes involved in immune response are altered with massage

Data collected by Christine Waters-Banker

IGF-1 receptor mediated protein synthesis pathways

Glass, 2013, Nature Cell Biology
Specific Aim 1

• Determine the effect of massage in the form of CCL on anabolic and catabolic pathways to attenuate muscle loss during disuse.
  – CCL will be applied 3 times a week for 2 weeks (during atrophy) and changes in muscle size, muscle protein synthesis and markers of synthesis and degradation, as well as force generating capacity will be measured.

Grant submission

• Hypothesis:
  – Cyclic compressive loading (massage) is beneficial for the maintenance of muscle size during disuse-induced atrophy and will improve the impaired regrowth response in aged rats.

Troy Hornberger, PhD
University of Wisconsin

Measuring protein synthesis with SUnSET: A valid alternative to traditional techniques?
Goodman, Craig
Troy Hornberger, Ph.D.
Exercise & Sport Sciences Faculty
University of Wisconsin

Data collected by Emily Brownell
Specific Aim 2

• Determine the ability of massage to improve the regrowth of skeletal muscle after atrophy through immunomodulatory actions, particularly in the aged.
  – CCL will be applied to muscle starting immediately after reambulation to assess the effect on recovery of muscle size after atrophy. Muscles will be assessed for muscle size, immune cell infiltration, muscle protein synthesis, and markers for protein synthesis and degradation, as well as force generating capacity.

Research Team

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  – Troy Hornberger, PhD

Tips/Advice

• Identify strengths of each team member
  – Team members should complement each other in skills and knowledge
• Communication is of critical importance
• Outside team members: make sure you know them well enough to ensure that they will actually be helpful
• Conferences are perfect to meet people and get to know them.