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The effects of protein supplementation with or without Urolithin A during single-leg immobilization

Submission date
08/02/2023

Recruitment status
No longer recruiting

Registration date
09/02/2023

Overall study status
Completed

Last Edited
28/02/2025

Condition category
Musculoskeletal Diseases

[X] Prospectively registered
[ ] Protocol
[ ] Statistical analysis plan
[ ] Results
[ ] Individual participant data
[ ] Record updated in last year

Plain English summary of protocol

Background and study aims
There are times in life when we cannot use our muscles, such as during illness or injury. Muscle and mitochondria (the 'energy factory' in our cells) health decline very quickly when we cannot use our muscles, but certain foods can help reduce these declines. Recent research suggests that Urolithin A, which is a natural compound that can be produced after eating pomegranates, nuts, and berries, improves muscle health. In this study, we aim to investigate if a protein beverage (standard care during disuse) with or without Urolithin A can reduce or prevent the loss of muscle health while wearing a knee brace (muscle disuse).

Who can participate?
We are recruiting healthy male volunteers aged 18-30 years.

What does the study involve?
This study involves consuming a randomly assigned supplement for 4 weeks, including 2 weeks of wearing a knee brace.

What are the possible benefits and risks of participating?
There are no proposed benefits to you as the subject of this study. However, the findings of this study may contribute to the development of nutritional interventions that prevent or attenuate the loss of skeletal muscle mass in various clinical scenarios including aging, bed rest, surgery, cachexia, and renal failure.
As with any research, there are risks of participating such as during blood sampling or muscle biopsies. The researcher team has done everything possible to mitigate any risks and will gladly provide further information if requested.

Where is the study run from?
McMaster University in Hamilton, Ontario, Canada

When is the study starting and how long is it expected to run for?
April 2021 to December 2023

Who is funding the study?
This study is funded by Nestle SA (Switzerland)

Who is the main contact?
Stuart Phillips, phillis@mcmaster.ca

Contact information

Type(s)
Scientific, Principal investigator

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Additional identifiers

ClinicalTrials.gov (NCT)
NCT05814705

Protocol serial number
13783

Study information

Scientific Title
Comparison of high-protein formulation with/without urolithin a during a unilateral knee immobilization: a pilot proof-of-concept trial

Study objectives
1. PRO+UA will mitigate reductions in maximal mitochondrial respiration compared to PRO during immobilization.
2. PRO+UA will alter gene expression compared to PRO during immobilization.

Ethics approval required
Old ethics approval format

Ethics approval(s)
Approved 30/11/2022, Hamilton Integrated Research Ethics Board (293 Wellington St. N., Suite 120 Hamilton, ON, Canada L8L 8E7; +1 905-521-2100 Ext. 42013; eREBhelpdesk@hhsc.ca), ref: #13783

Primary study design
Interventional

Study design
Single-centre interventional double-blinded randomized trial

Study type(s)
Treatment

Health condition(s) or problem(s) studied
Disuse-induced muscle atrophy in healthy young adults

Interventions
Participants will be randomized (computer-generated) to either active comparator (protein) or treatment (protein plus Urolithin A) group.
Participants will sequentially complete the three phases of this study:
1. RUN-IN phase – participants continue habitual lifestyle (1 week)
2. IMMOBILIZATION phase – participants undergo 2 weeks of unilateral knee immobilization
3. RECOVERY phase – participants return to habitual lifestyle (1 week)

Measurements will be taken at baseline and the end of each phase.

Participants will consume their randomly assigned beverage (ready-to-drink supplement; 20 grams of protein with or without 1000 mg Urolithin A) during all three phases.

Intervention Type
Supplement

Primary outcome(s)
1. Maximal mitochondrial respiration and mitochondrial ADP sensitivity (Oroboros O2k; measured at baseline and the end of each phase)
2. Gene expression (measured at baseline and the end of each phase)

Key secondary outcome(s)
1. Skeletal muscle fractional synthetic rate (deuterated water; measured at baseline and the end of each phase)
2. Leg muscle strength (biodex dynamometer; measured at baseline and the end of each phase)
3. Quadriceps volume and cross-sectional area (magnetic resonance imaging; measured at baseline and the end of each phase)
4. Physical activity level (accelerometry; measured at baseline and the end of each phase)
5. Metabolomics (plasma; measured at baseline and the end of each phase)

Completion date
01/12/2023

Eligibility

Key inclusion criteria
1. Men aged 18-30 years
2. Healthy, non-smoking
3. BMI between 20 and 30 kg/m²
4. No orthopedic issues that would preclude participation in the knee bracing protocol
5. Not taking any medication or with any medical condition that, in the opinion of the investigators, would compromise the study outcome or the safety of the research participant
6. Provide informed consent
7. Understand COVID-19 risks and procedures for in person research and sign Information Letter: COVID-19 Risks and Procedures for In-Person Research at McMaster University

Participant type(s)
Healthy volunteer

Healthy volunteers allowed
No

Age group
Adult

Lower age limit
18 Years

Upper age limit
30 Years

Sex
Male

Total final enrolment
24

Key exclusion criteria
1. Subject has any concurrent medical, orthopedic, or psychiatric requirements that, in the opinion of the investigators, would compromise their ability to comply with the study requirements
2. Clinically significant abnormal laboratory results at screening
3. Participation in a clinical research trial within 30 days before randomization
4. Allergy or sensitivity to study ingredients
5. Individuals who are cognitively impaired and/or who are unable to give informed consent
6. Any other condition that, in the opinion of the investigators, may adversely affect the subject' s ability to complete the study or its measures or may pose a significant risk to the subject
7. Any cachexia-related condition or any genetic muscle diseases or disorders
8. Current gastrointestinal condition that could interfere with the study (e.g., IBS/IBD, diarrhea, acid reflux disease, dysphagia, etc.)
9. Excessive alcohol consumption (>21 units/week) and/or a smoker (cigarettes or vaping)
10. Concomitant use of corticosteroids, antibiotics, any anabolic steroid, creatine, whey protein supplements, casein, branched-chain amino acids (BCAAs) or any other NHP, medication or

supplement used for muscle strengthening/building within 45 days prior to screening
11. Contraindications to an MRI scan (metal implants, metal-based ink tattoo)

Date of first enrolment
24/02/2023

Date of final enrolment
01/04/2024

Locations

Countries of recruitment
Canada

Study participating centre
McMaster University
1280 Main Street West
Hamilton
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Sponsor information

Organisation
McMaster University

ROR
https://ror.org/02fa3aq29

Funder(s)

Funder type
Industry

Funder Name
Nestlé SA

Results and Publications

Individual participant data (IPD) sharing plan

The data-sharing plans for the current study are unknown and will be made available at a later date.

IPD sharing plan summary

Data sharing statement to be made available at a later date