ISRCTN20867728 https://doi.org/10.1186/ISRCTN20867728

12 weeks of strength training and high protein consumption in perimenopausal females

Submission date
05/01/2026

Recruitment status
Recruiting

Registration date
08/01/2026

Overall study status
Ongoing

Last Edited
07/01/2026

Condition category
Other

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

Plain English summary of protocol

Background and study aims
Perimenopause is a transitional period in the female life cycle involving significant changes to the hormonal, energy processing, and musculoskeletal systems of the body. Diet and exercise are key strategies for managing the development of some of these changes including increased body fat and the associated negative health effects. Dairy products are accessible whole foods that are rich sources of important nutrients, and previous research has shown that when combined with exercise, dairy products can improve fat loss and increase muscle mass gain in adults and adolescent females, however it is unknown if these findings also apply to females during perimenopause.

Who can participate?
Healthy, sedentary, perimenopausal females aged 40-60 years

What does the study involve?
After screening and informed consent is obtained, participants will attend the lab and have the following baseline measures assessed: body composition (fat, bone, and lean mass) measured using DEXA, muscle mass measured by D3-creatine dilution, blood, fecal sample, muscle biopsy sample, strength testing and menopausal and other health/symptom questionnaires.
Participants will then be randomly allocated into a nutrition condition that is consumed daily and consists of either:
1. Two 175 g of a high-protein Greek-style yogurt + 90 ml of a probiotic yogurt drink, or
2. An energy and protein matched, collagen + carbohydrate pudding supplement
They will also be randomly allocated into one of two progressive exercise training programs, both involving twice weekly supervised gym-based full-body resistance exercises for 12 weeks, and either:
1. Higher load (3 sets, 8-12 reps to failure), or
2. Lower load (3 sets, 20-25 reps to failure)
After 12 weeks, participants will return to the lab to repeat the rested, fasted baseline measurements.

What are the possible benefits and risks of participating?
Risks: the risks of this study include discomfort, fatigue, and delayed onset of muscle soreness

from the resistance exercise training, low-dose radiation from the dual x-ray absorptiometry scan, bruising, infection, and discomfort from the muscle biopsies/blood sampling, and possible cyber-related privacy breach.
Benefits: each participant will receive an honorarium of $200 upon the completion of the study to compensate them for their time. Resistance exercise training may improve their muscle mass and strength which has been shown numerous times to have health long term benefits.

Where is the study run from?
McMaster University (Canada)

When is the study starting and how long is it expected to last?
January 2026, expected to run for ~1-2 years

Who is funding the study?
1. Dairy Farmers of Canada
2. MITACS
3. Natural Sciences and Engineering Research Council of Canada (NSERC)

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

Contact information

Type(s)
Principal investigator

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Public, Scientific

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Additional identifiers

Protocol serial number
HiREB #18538

Study information

Scientific Title
The combined effect of yogurt consumption with resistance exercise on body composition and inflammation in perimenopausal females

Acronym
SPRY

Study objectives
The objective of our proposed study is to determine whether 12 weeks of resistance exercise combined with three daily servings of yogurt (2 x high-protein Greek-style yogurt and 1 x probiotic yogurt drink) enhances body composition adaptations (i.e., reduced body fat and increased lean mass) and other related health markers (i.e., gut microbiome, menopausal symptom questionnaires, bone turnover, and inflammatory biomarkers) compared with an isonitrogenous, isoenergetic (carbohydrate + collagen) supplement in perimenopausal females. Females, particularly those transitioning through menopause, can undergo deleterious and accelerated physiological changes and have been vastly underrepresented in published trials; thus, strategies to enhance their health and wellbeing must be developed and optimized.

Ethics approval required
Ethics approval required

Ethics approval(s)
approved 07/06/2025, Hamilton Integrated Research Ethics Board (237 Barton Street East, Hamilton, L8L 2X2, Canada; +1 (0)905 521 2100 ext 42013; belle@hhsc.ca), ref: 18538

Study design
Parallel interventional double-blind randomized control trial

Primary study design
Interventional

Study type(s)
Treatment

Health condition(s) or problem(s) studied
Perimenopausal females

Interventions
This study has two nutrition supplement groups, which are consumed twice daily for 12 weeks. They consist of:
1. Intervention: 350 g high protein 0% Greek Yogurt
2. Energy and protein matched control group: 40 g collagen, 15 g thicken-up, 39 g vanilla instant pudding.

The participants will also complete two supervised, full-body resistance training sessions twice per week, with the type of training randomized into either:
1. Higher-load group (8-12 repetitions before failure)
2. Lower-load group (20-25 repetitions before failure)
Both groups will complete an additional 1x at-home workout that consists of full body aerobic /high-intensity interval exercise.

Randomisation will be completed by the registered dietitian using an online randomisation software and generated before subjects enter the protocol.

Intervention Type
Supplement

Primary outcome(s)
Body composition measured using dual x-ray absorptiometry (DXA) at baseline and after 12 weeks

Key secondary outcome(s))
1. Skeletal muscle mass measured using D3-creatine at baseline and after 12 weeks
2. Skeletal muscle characteristics measured using muscle biopsy at baseline and after 12 weeks
3. Gut microbiome diversity from fecal samples measured using 16S gene sequencing at baseline and after 12 weeks
4. Menopausal symptoms, sleep, mood and GI disturbances measured by questionnaires (Menopause Specific Quality of Life Questionnaire, Pittsburgh Sleep Quality Index, Profile of Mood State, PROMIS-GI) at baseline and after 12 weeks
5. Muscle strength assessments measured using 5-Repetition Maximum (5RM) at baseline and after 12 weeks

Completion date
01/01/2028

Eligibility

Key inclusion criteria
1. Be in the perimenopausal period (Stage -1 or -2 assessed using the STRAW+10 guidelines) .
2. Be untrained/sedentary (<2 structured exercise sessions per week).
3. Low habitual dairy consumption (≤1 serving of milk, yogurt, cheese/day).
4. Be able to maintain a habitual diet and safe to perform RET three times per week throughout the trial (assessed by the “Get Active” Questionnaire).
5. Understand the study procedures and provide informed consent to participate in the study.

Participant type(s)
Population

Healthy volunteers allowed
No

Age group
Mixed

Lower age limit
35 years

Upper age limit
65 years

Sex
Female

Total final enrolment
40

Key exclusion criteria
1. Regular use of tobacco- or cannabis-related products (smoking, chewing or vaping).
2. Have any electronic medical or metal implants.
3. Currently pregnant or planning to get pregnant.
4. Allergy to dairy foods or lactose intolerance.
5. Orthopaedic conditions (MSK injury, chronic back pain etc) that may worsen with exercise.
6. Any acute or chronic illness relating to the cardiac, pulmonary, skeletal or neuromuscular systems, Type 1 diabetes or unmanaged hypertension, lipidaemia or cardiovascular disease or any other medical concern that may interfere with their ability to safely complete the study.
7. Regular use of medications known to affect protein metabolism or inflammation (i.e. corticosteroids, non-steroidal anti-inflammatory drugs (prescription use or daily use of over-the-counter medication), or prescription strength acne medications).
8. Concurrent participation in a research study that may interfere with the results of the current study.

Date of first enrolment
06/01/2026

Date of final enrolment
01/10/2027

Locations

Countries of recruitment
Canada

Study participating centre

McMaster University
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Sponsor information

Organisation
Dairy Farmers Of Canada

ROR
https://ror.org/028f19s63

Funder(s)

Funder type
Not defined

Funder Name
Dairy Farmers of Canada

Alternative Name(s)
Canadian Federation of Milk Producers, Producteurs Laitiers du Canada, DFC, PLC

Funding Body Type
Private sector organisation

Funding Body Subtype
Other non-profit organizations

Location
Canada

Funder Name
Mitacs

Alternative Name(s)
Mathematics of Information Technology and Complex Systems, Mitacs Canada, Mitacs Inc., MitacsCanada

Funding Body Type

Private sector organisation

Funding Body Subtype
Other non-profit organizations

Location
Canada

Funder Name
Natural Sciences and Engineering Research Council of Canada

Alternative Name(s)
Conseil de Recherches en Sciences Naturelles et en Génie du Canada, The Natural Sciences and Engineering Research Council of Canada, nserc_crsng, NSERC, CRSNG

Funding Body Type
Government organisation

Funding Body Subtype
National government

Location
Canada

Results and Publications

Individual participant data (IPD) sharing plan
The data-sharing plans for the current study are that all data will be made publicly available upon reasonable request from the PI, Dr Stuart Phillips (phillis@mcmaster.ca).

IPD sharing plan summary
Available on request