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Effects of exercise, diet and creatine supplementation in middle-aged and older adults

Submission date 04/11/2025	**Recruitment status** Recruiting	[_] Prospectively registered [_] Protocol [_] Statistical analysis plan [_] Results [_] Individual participant data [X] Record updated in last year
Registration date 06/11/2025	**Overall study status** Ongoing	
Last Edited 06/11/2025	**Condition category** Other	

Plain English summary of protocol

Background and study aims
Research has identified four basic ways exercise, diet, and/or ingesting nootropic nutrients may affect cognitive function. First, acute exercise and exercise training increases blood flow and oxygen delivery to the brain, improving cognitive function. Second, increasing energy availability in the brain helps maintain energy availability during stress, fatigue, and injury, improving cognitive function. Third, reducing inflammation and/or oxidative stress in the brain can help improve recovery from ischemia or concussion and may play a role in slowing cognitive impairment as we age. Finally, stimulating neural activity in the brain can improve focus, memory, and delay mental fatigue. For this reason, most nootropic foods, beverages, and dietary supplements designed to improve cognitive function contain nutrients that can improve cerebral blood flow, energy availability in the brain, reduce inflammation and oxidative stress, or contain various stimulants. While there are data supporting the safety and effectiveness of some nootropic nutrients, more research is needed to explore the potential benefits of ingesting nootropic nutrients when combined with exercise, diet, and/or other nutrients. Additionally, more research is needed to examine how the effects of nootropic nutrients may change as we age and/or in people experiencing mild cognitive impairment. Therefore, the aim of this study is to determine if creatine supplementation helps to improve health, fitness, cognitive function, and quality of life in late middle-aged and older adults.

Who can participate?
Healthy volunteers between the ages of 45 and 65 years

What does the study involve?
Each participant will be asked to visit the lab four times over approximately a 12-week period. Each study visit will last about 2 to 3 hours (minus the first study visit or Familiarization which will last approximately 1 hour). Each visit after the first Familiarization visit will include; anthropometric measures (height, weight, W/H assessment), vital signs (heart rate and blood pressure), blood draw, DXA scan, resting energy expenditure test, muscular strength assessment, muscular endurance assessment, graded exercise test, food log assessment, physical activity questionnaire, quality of life questionnaire, profile of mood states

questionnaire, memory complaint questionnaire, Wechsler Memory Scale questionnaire, Mini-Mental State Examination, COMPASS cognitive test battery, and side-effects assessment.

What are the possible benefits and risks of participating?
Possible benefits of participation include increased insight into one's health and fitness status (i.e., anthropometric measurements, vital sign measurements, lab values, DXA body composition and bone density values, etc). Possible risks of participation include complications from the blood draws (i.e., pain, dizziness, nausea, etc.), radiation exposure from the DXA scan (i.e., < 1 mRem per scan), side effects of the supplements (i.e., bloating, cramping, diarrhea, etc), and possible allergic reactions to the supplements.

Where is the study run from?
The study will be run from the Exercise & Sport Nutrition Laboratory (ESNL) at Texas A&M University (USA)

When is the study starting and how long is it expected to run for?
November 2023 to November 2026

Who is funding the study?
WoodNext Foundation (USA)

Who is the main contact?
Dr Richard Kreider, rbkreider@tamu.edu

Contact information

Type(s)
Scientific, Principal investigator

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Additional identifiers

Clinical Trials Information System (CTIS)
Nil known

ClinicalTrials.gov (NCT)
Nil known

Protocol serial number
STUDY2024-0233

Study information

Scientific Title
Effects of exercise, diet, and creatine supplementation on cognition and health in middle-aged and older adults

Study objectives
The objective of this study is to evaluate the effects of 12 weeks of creatine supplementation during an exercise and diet intervention on markers of health and cognitive function in older adults.

Ethics approval required
Ethics approval required

Ethics approval(s)
approved 10/06/2024, Texas A&M University Institutional Review Board (IRB) (301 Old Main Drive, Suite 3104, College Station, 77843, United States of America; +1 (0)9798458585; irb@tamu.edu), ref: STUDY2024-0233

Study design
Randomized double-blind placebo-controlled clinical trial

Primary study design
Interventional

Study type(s)
Treatment

Health condition(s) or problem(s) studied
Creatine supplementation on markers of health and cognitive function in older adults

Interventions
Participants will be randomized (using Stratified Randomization using sealed envelopes) into one of four treatment groups :
1. No Exercise + Placebo (2 x 5 g/d of dextrose)
2. No Exercise + Creatine (2 x 5 g/d of creatine monohydrate)
3. Exercise + Placebo (2 x 5 g/d of dextrose)
4. Exercise + Creatine (2 x 5 g/d of creatine monohydrate)

The supplements will be prepared in powder form in generic, labeled capsules from the sponsor. Participants will be asked to consume two doses of their assigned supplement per day (one with breakfast and one with dinner) for 12 weeks.

Intervention Type
Supplement

Primary outcome(s)
1. Body weight measured using a calibrated, digital scale at 0, 6, 12 weeks
2. Body fat mass (kg) measured using dual-energy x-ray absorptiometry (DXA) at 0, 6, 12 weeks
3. Body composition (%) measured using DXA at 0, 6, 12 weeks
4. Waist to hip circumference (W/H) measured using a tension-regulated tape measure at 0, 6, 12 weeks -
5. Subjective memory complaints measured using the Memory Complaint Questionnaire (MAC-Q) at 0, 6, 12 weeks
6. Various aspects of memory and learning measured using the Wechsler Memory Scale (WMS - VAP1 and VAP2) at 0, 6, 12 weeks
7. A range of cognitive skills including processing speed, memory, attention, executive function, and visuoperceptual skills measured using the COMPASS Cognitive Function Test Battery at 0, 6, 12 weeks
8. Various aspects of mental function measured using the Mini-Mental State Examination (MMSE) at 0, 6, 12 weeks

Key secondary outcome(s))
1. Resting Energy Expenditure (REE) measured using a calibrated ParvoMedics TrueOne 2400 metabolic cart at 0, 6, 12 weeks
2. Graded Exercise Test (GXT - VO2 max) measured using a calibrated ParvoMedics TrueOne 2400 metabolic cart at 0, 6, 12 weeks
3. Muscular strength measured using bench press One-Repetition Maximum (1 RM) at 0, 6, 12 weeks
4. Muscular strength measured using leg press One-Repetition Maximum (1 RM) at 0, 6, 12 weeks
5. Muscular endurance measured using bench press muscular endurance (total work - total repetitions at 70% 1 RM) at 0, 6, 12 weeks
6. Muscular endurance measured using leg press muscular endurance (total work - total repetitions at 70% 1 RM) at 0, 6, 12 weeks
7. Complete Blood Count (CBC) measured using automated analyzers from Clinical Pathology Laboratories (CPL) at 0, 6, 12 weeks
8. Blood Chemistry Panel (Chem Panel) measured using automated analyzers from Clinical Pathology Laboratories (CPL) at 0, 6, 12 weeks
9. Blood Lipids (Lipid Panel) measured using automated analyzers from Clinical Pathology

Laboratories (CPL) at 0, 6, 12 weeks
10. Hemoglobin A1c (HbA1c) measured using automated analyzers from Clinical Pathology Laboratories (CPL) at 0, 6, 12 weeks
11. An individual's overall well-being, encompassing their physical health, psychological state, and social relationships measured using the Quality of Life Questionnaire (SF-36) at 0, 6, 12 weeks
12. Physical activity and inactivity in adults over the past 7 days measured using the International Physical Activity Questionnaire (IPAQ) at 0, 6, 12 weeks
13. Fluctuations in six mood states (Tension-Anxiety, Depression-Dejection, Anger-Hostility, Vigor-Activity, Fatigue-Inertia, Confusion-Bewilderment) measured using the Profile of Mood States (POMS) Questionnaire at 0, 6, 12 weeks
12. Adverse effects assessed using Side-Effects Assessment at 0, 6, 12 weeks

Completion date
20/11/2026

Eligibility

Key inclusion criteria
1. Male or female between the ages of 45 and 65 years
2. Participant has the ability to comply with the study procedures
3. Participant agrees to refrain from alcohol intake and the use of non-steroidal anti-inflammatory drugs (NSAIDS), aspirin, and other over-the counter pain medications for 48-hours prior to each testing session
4. Participant has the availability to complete the study based on the duration of the individual study visits and scheduling requirements

Participant type(s)
Healthy volunteer

Healthy volunteers allowed
No

Age group
Adult

Lower age limit
45 years

Upper age limit
65 years

Sex
All

Key exclusion criteria
1. Participant is pregnant, breastfeeding, or wishes to become pregnant during the study
2. Participant has an orthopedic limitation that would prevent participation in the study
3. Participant has taken weight loss dietary supplements or medications during the last 2 weeks
4. Participant has a history within the previous 12 months of alcohol or substance abuse

5. Participant is a heavy smoker (>1 pack/day within the past 3 months)
6. Participant has a known allergy to creatine or dextrose

Date of first enrolment
10/07/2024

Date of final enrolment
10/07/2026

Locations

Countries of recruitment
United States of America

Study participating centre
Exercise & Sport Nutrition Laboratory
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Sponsor information

Organisation
WoodNext Foundation

Funder(s)

Funder type
Charity

Funder Name
WoodNext Foundation

Results and Publications

Individual participant data (IPD) sharing plan
The datasets generated during and/or analyzed during the current study will be available upon request from Dr Richard Kreider (rbkreider@tamu.edu).

IPD sharing plan summary

Available on request

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Participant information sheet	Participant information sheet	11/11/2025	11/11/2025	No	Yes