

Dose-response of paraxanthine on brain function

Submission date 23/09/2021	Recruitment status No longer recruiting	<input type="checkbox"/> Prospectively registered <input type="checkbox"/> Protocol
Registration date 24/09/2021	Overall study status Completed	<input type="checkbox"/> Statistical analysis plan <input checked="" type="checkbox"/> Results
Last Edited 05/01/2022	Condition category Other	<input type="checkbox"/> Individual participant data

Plain English summary of protocol

Background and study arms

Paraxanthine (PX) is a natural dietary component that can be found in different parts of *Theobroma cacao* (cocoa tree) fruits, in *Coffea arabica* (coffee plant), in *Sinomenium actum* (a traditional Chinese herbal medicine), and in citrus flowers. PX is the major metabolite (breakdown product) of caffeine in humans and is less toxic than caffeine. One-time ingestion of 200 mg PX has been shown to improve cognition, short-term memory and helps to sustain attention. However, the minimal effective and optimal dose of acute paraxanthine ingestion, and if continued daily ingestion of PX increases or decreases effectiveness, is currently unknown. The aim of this study is to measure the dose-response of paraxanthine on brain function.

Who can participate?

Healthy males and females between the ages of 18 to 59 years

What does the study involve?

Participants will be randomly allocated to receive PX or placebo (dummy) capsules, and then perform four cognitive function tests that assess a range of cognitive and executive function aspects.

What are the possible benefits and risks of participating?

The potential benefit of participating is an increase in executive functioning. The ingestion of a maximum of 200 mg of paraxanthine would be less than that obtained from consuming a premium cup of coffee or energy drink.

Where is the study run from?

Texas A&M University (USA)

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

April 2019 to October 2021

Who is funding the study?

Ingenious Ingredients L.P. (USA)

Who is the main contact?

Richard B. Kreider
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Contact information

Type(s)

Scientific

Contact name

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Additional identifiers

Clinical Trials Information System (CTIS)

Nil known

ClinicalTrials.gov (NCT)

Nil known

Protocol serial number

0454D

Study information

Scientific Title

A dose-ranging study of paraxanthine ingestion on cognition, executive function, and psychomotor vigilance

Acronym

PXDR

Study objectives

One-time ingestion of 200 mg paraxanthine has been shown to improve cognition, short-term memory and helps to sustain attention. However, the minimal effective and optimal dose of acute paraxanthine ingestion, and if continued daily ingestion of paraxanthine will result in increased or diminished efficacy is currently unknown.

Ethics approval required

Old ethics approval format

Ethics approval(s)

Approved 28/10/2019, Texas A&M University Institutional Review Board (517 Blocker Building, 155 Ireland Street, Texas A&M University, College Station, TX 778431, USA; +1 (0)979 458 4067; irb@tamu.edu), ref: IRB2019-0807F

Study design

Interventional double-blinded randomized crossover controlled trial

Primary study design

Interventional

Study type(s)

Other

Health condition(s) or problem(s) studied

Executive functioning in healthy individuals

Interventions

Subjects consume capsules containing 50, 100 or 200 mg of paraxanthine (ENFINITY™, Ingenious Ingredients L.P., Lewisville, TX, USA) or capsules containing wheat flour placebo (placebo) once they have completed baseline testing. One capsule of the PLA or PX is taken with 8 ounces of water daily for 7 days. A computer-generated randomization to treatment is used. Once subjects are randomized to start, they follow the counterbalance progression.

Intervention Type

Supplement

Primary outcome(s)

The Psychology Experiment Building Language (PEBL) software program (Version 2.1, <http://pebl.sourceforge.net>) was used to administer four cognitive function tests that assessed a range of cognitive and executive function aspects:

1. Berg-Wisconsin Card Sorting Task test (BCST) at baseline, 1, 2, 3, 4, 5 and 6 hours after initial ingestion and 1 hour after daily ingestion for 7 days
2. The Go/No-Go test (GNG) at baseline, 1, 2, 3, 4, 5 and 6 hours after initial ingestion and 1 hour after daily ingestion for 7 days
3. Sternberg Task Test (STT) at baseline, 1, 2, 3, 4, 5 and 6 hours after initial ingestion and 1 hour after daily ingestion for 7 days
4. Psychomotor Vigilance Task Test (PVTT) at baseline, 1, 2, 3, 4, 5 and 6 hours after initial ingestion and 1 hour after daily ingestion for 7 days

Key secondary outcome(s)

Safety measured using:

1. Side Effect Questionnaire: participants will rank the frequency of dizziness, headache, tachycardia, heart skipping/palpitations, shortness of breath, nervousness, blurred vision, and any other adverse effects) using a scale where 0 = none; 1 = 1-2/week, 2 = 3-4/week, 3 = 5-6/week, 4 = 7-8/week, and 5 = ≥ 9 /week. They will also rate the severity of these side effects where 0 = none, 1 = minimal, 2 = slight, 3 = moderate, 4 = severe, and 5 = very severe at baseline, 6 hours after the first ingestion, and 1 hour after daily ingestion on day 7
2. Changes in blood clinical chemistries at baseline, 6 hours after the first ingestion, and 1 hour after daily ingestion on day 7

Completion date

06/10/2021

Eligibility

Key inclusion criteria

All subjects were healthy and free from known:

1. Cognitive deficit conditions
2. Wheat flour allergies
3. Sleep disorders
4. Cardiovascular, metabolic, or pulmonary diseases
5. History of hypertension, migraine headaches, cardiac arrhythmias, or anxiety
6. Gastrointestinal reflux disease or ulcers

Participant type(s)

Healthy volunteer

Healthy volunteers allowed

No

Age group

Adult

Sex

All

Total final enrolment

15

Key exclusion criteria

Subjects who were taking prescription medications in the month prior to the initiation of the study and/or were told by a physician to abstain or restrict caffeine and/or stimulant intake

Date of first enrolment

01/11/2019

Date of final enrolment

21/07/2020

Locations

Countries of recruitment

United States of America

Study participating centre

Texas A&M University

675 Kimbrough Blvd. Building #1542

College Station

United States of America

77843-4253

Sponsor information

Organisation

Ingenious Ingredients L.P.

Funder(s)

Funder type

Industry

Funder Name

Ingenious Ingredients, L.P.

Results and Publications

Individual participant data (IPD) sharing plan

All data generated or analysed during this study will be included in the subsequent results publication. Please contact Prof. Dr Richard Kreider (rbkreider@tamu.edu) with any requests.

IPD sharing plan summary

Other

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article		15/12/2021	05/01/2022	Yes	No