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Investigating the effects of oral scopolamine on cognition and emotion processing

Submission date
11/11/2025

Recruitment status
Recruiting

Registration date
20/11/2025

Overall study status
Ongoing

Last Edited
18/11/2025

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
There is growing interest in drugs that act on the brain's cholinergic system as possible new treatments for depression. Research suggests that drugs which block the muscarinic receptor may produce rapid antidepressant effects, but higher doses can also cause problems with learning and memory. This study will test whether a low dose of the muscarinic receptor blocker scopolamine affects emotional processing and cognition in healthy volunteers. The findings will help researchers understand how this medicine influences brain processes linked to mood and may guide future clinical trials for depression.

Who can take part?
The study will include 60 healthy volunteers aged 18–45 years.

What does the study involve?
Participants will be screened via a video call lasting about one hour to check eligibility and ensure they have no history of psychiatric disorder. Eligible participants will attend a single study visit (up to 5 hours) at the Department of Psychiatry, Warneford Hospital, University of Oxford. After final checks, they will be randomly assigned to receive either scopolamine (0.6 mg) or a placebo, in a double-blind design (neither the participant nor researchers will know which is given). About one hour later, they will complete a set of computerised tasks assessing emotional and non-emotional thinking. Heart rate and mood questionnaires will be taken throughout to track physiological and subjective effects. Participants can win up to £10 during one task and will be reimbursed for time (£90) and travel.

What are the possible benefits and risks of participating?
Scopolamine is a licensed medicine used to prevent motion sickness. There are no direct benefits to participants, but the results may support the development of faster-acting antidepressant treatments. Some people experience temporary side effects such as dry mouth, blurred vision, or drowsiness, which usually resolve within a few hours.

Where is the study run from?
The Neurosciences Building, Department of Psychiatry, University of Oxford, UK.

When is the study starting and how long is it expected to run for?
November 2025 to November 2027.

Who is funding the study?
National Institute for Health and Care Research, UK.

Who is the main contact?
Professor Susannah Murphy, Department of Psychiatry, University of Oxford, susannah.murphy@psych.ox.ac.uk

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Additional identifiers

Study information

Scientific Title
Investigating the effects of oral scopolamine on cognition and emotion processing

Acronym
SCOPE

Study objectives
The objective of this study is to investigate whether a low dose of the muscarinic receptor antagonist scopolamine affects emotional processing, learning, and memory in healthy volunteers. The study will use scopolamine as a pharmacological probe to examine the effects of muscarinic receptor blockade on neurocognitive mechanisms relevant to depression. This will help determine whether oral scopolamine produces a cognitive and emotional profile consistent with rapid antidepressant potential. The findings will advance understanding of the cholinergic system's role in mood regulation and inform the development of muscarinic antagonists as novel treatments for depression.

Ethics approval required
Ethics approval required

Ethics approval(s)
approved 11/11/2025, University of Oxford Medical Sciences Interdivisional Research Ethics Committee (University Offices, Wellington Square, Oxford, OX1 2JD, United Kingdom; +44 01865 (2)70000; curec@admin.ox.ac.uk), ref: MS IDREC 1661602

Primary study design
Interventional

Allocation
Randomized controlled trial

Masking
Blinded (masking used)

Control
Placebo

Assignment
Single

Purpose
Treatment

Study type(s)
Other

Health condition(s) or problem(s) studied
Healthy volunteers

Interventions

This is a single-center interventional double-blind randomized placebo-controlled experimental medicine study.

To explore the cognitive effects of oral scopolamine, 60 healthy volunteers (aged 18–45) will be screened via video call before attending a single 5-hour laboratory session at the Department of Psychiatry, Warneford Hospital. After final eligibility checks, participants will be randomly assigned via sealed envelopes to receive either scopolamine (0.6 mg) or a placebo in a double-blind design.
Approximately one hour post-dose, participants will complete a battery of emotional and non-emotional cognitive tasks, while mood, side effects, and heart rate are monitored to assess physiological and subjective effects. Randomisation will be stratified by gender.

Intervention Type
Drug

Phase
Not Applicable

Drug/device/biological/vaccine name(s)
Scopolamine (hyoscine hydrobromide)

Primary outcome(s)
1. Affective memory performance (capturing accuracy, reaction times, and emotional bias in recall and recognition of affectively valenced words) measured using the Emotional Recall (EREC) and Emotional Recognition Memory (EMEM) tasks from the Emotional Testing Battery (ETB) at approximately 60 minutes after oral administration

Affective memory performance, assessed using the Emotional Recall (EREC) and Emotional Recognition Memory (EMEM) tasks from the Emotional Testing Battery (ETB).
Performance will be measured approximately 60 minutes after oral administration of scopolamine (0.6 mg) or placebo, capturing accuracy, reaction times, and emotional bias in recall and recognition of affectively valenced words.

Key secondary outcome(s))
1. Facial expression recognition measured using accuracy and reaction times on the Facial Expression Recognition Task (FERT) 1–2 hours post-administration of scopolamine (0.6 mg) or placebo.
2. Categorization of emotionally valenced personality descriptor words, measured using performance on the Emotional Categorization Task (ECAT) 1–2 hours post-administration.
3. Response inhibition under emotional and non-emotional distraction, measured using accuracy and reaction times on the Emotional Go/No-Go Task (EGNG) 1–2 hours post-administration.
4. Reward-based learning and reversal, measured using choice behaviour and reaction times on the Probabilistic Reversal Learning Task (PRL) 1–2 hours post-administration.
5. Verbal learning and memory measured accuracy on the Auditory Verbal Learning Task (AVLT) 1–2 hours post-administration.
6. Working memory, measured using accuracy and reaction times on the N-Back Task 1–2 hours post-administration.
7. Digit span performance measured using maximum sequence length recalled on the Digit Span Task (DST) 1–2 hours post-administration.
8. Heart rate measured using an automated blood-pressure monitor at baseline and hourly post-administration as a physiological index of drug effect.

9. Subjective state measured using self-report questionnaires at baseline, 1 hour, and 2 hours post-administration.

Completion date
10/11/2027

Eligibility

Key inclusion criteria
1. Willing and able to give informed consent for participation in the study
2. Aged 18-45 years
3. Resident in the UK for the duration of the study
4. Good vision and hearing
5. Sufficiently fluent English to understand and complete the study
6. Body mass index (BMI) within the range of 18-35 kg/m2
7. Willing to avoid drinking alcohol for 24 hours before and on the day of the study visit
8. Willing and able to travel to the Warneford Hospital (Oxford) for a single research visit

Participant type(s)
Healthy volunteer

Healthy volunteers allowed
Yes

Age group
Adult

Lower age limit
18 years

Upper age limit
45 years

Sex
All

Total final enrolment
0

Key exclusion criteria
1. Currently receiving or seeking treatment for any mental health condition
2. Any past or current history of severe and/or serious psychiatric disorder, including but not limited to schizophrenia, psychosis, bipolar affective disorder, severe major depressive disorder, obsessive compulsive disorder (covered in SCID-5/MINI assessment in screening procedures)
3. ADHD requiring treatment with stimulant or other centrally-acting drugs
4. Regular alcohol consumption of more than 21 units per week
5. A head injury causing concussion or unconsciousness in the past 6 months
6. Pregnancy / intention to become pregnant during the study or breastfeeding
7. Any use of recreational drugs in the last three months
8. Participation in any other drug study in the last three months

9. Participation in any other study with the same tasks in the last year
10. Glaucoma
11. Current use of psychoactive medication that in the opinion of the Investigator may interfere with the study measures
12. History of, or current medical condition(s) which, in the opinion of the Investigator may interfere with the safety of the participant or the scientific integrity of the study, including epilepsy/seizures, brain injury, heart, metabolic, gastrointestinal, liver or kidney conditions, Central Nervous System (CNS) tumours, severe neurological problems (e.g. Parkinson's disease; blackouts requiring hospitalisation; dementia)
13. Any physical (including visual and auditory), cognitive or language impairment that would make complying with the study protocol challenging
14. Excessive caffeine consumption, i.e., consumption higher than 8 cups of standard caffeinated drinks (tea, instant coffee) or higher than 6 cups of stronger coffee or other drinks containing methylxanthines such as Coca-Cola or Red Bull per day
15. Smoking >10 cigarettes per day; or equivalent nicotine consumption
16. Participant who is unlikely to comply with the clinical study protocol or is unsuitable for any other reason, in the opinion of the Chief Investigator.
17. Inability to ingest up to 95mg of lactose
18. Previous or current use of gender-affirming hormonal treatment
19. Allergy to scopolamine or other anticholinergic medication (e.g. atropine, hyoscyamine)
20. History of urinary retention or bladder obstruction
21. Current use of antihistamines, antipsychotics, antidepressants, linezolid, domperidone and metoclopramide or amantadine or any other medication which, in the opinion of the Investigator may interfere with the safety of the participant or the scientific integrity of the study

Date of first enrolment
18/11/2025

Date of final enrolment
01/07/2026

Locations

Countries of recruitment
United Kingdom

England

Study participating centre
Warneford Hospital
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Sponsor information

Organisation
University of Oxford

ROR
https://ror.org/052gg0110

Funder(s)

Funder type
Government

Funder Name
National Institute for Health and Care Research

Alternative Name(s)
National Institute for Health Research, NIHR Research, NIHRresearch, NIHR - National Institute for Health Research, NIHR (The National Institute for Health and Care Research), NIHR

Funding Body Type
Government organisation

Funding Body Subtype
National government

Location
United Kingdom

Results and Publications

Individual participant data (IPD) sharing plan

IPD sharing plan summary
Data sharing statement to be made available at a later date