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Studying how body chemistry affects stroke recovery: using blood, clots, and scans to predict treatment results

Submission date 06/11/2025	**Recruitment status** Recruiting	[_] Prospectively registered [_] Protocol [_] Statistical analysis plan [_] Results [_] Individual participant data [X] Record updated in last year
Registration date 27/01/2026	**Overall study status** Ongoing	
Last Edited 04/02/2026	**Condition category** Circulatory System	

Plain English summary of protocol

Background and study aims
This study looks at blood clots and how they relate to strokes. Researchers want to understand how clots form and grow, and whether certain genes increase the risk of stroke. They study clots removed during a stroke treatment called mechanical thrombectomy, along with small blood samples. They also use advanced MRI scans to see how the brain changes after a stroke. These scans help researchers learn more about brain chemistry and function.

Who can participate?
The study invites two groups of people. One group includes people who have had a stroke and are receiving clot removal treatment. The other group includes healthy volunteers who have not had a stroke.

What does the study involve?
Participants are asked to give written consent after discussing the study with the team. Those in the blood and clot part of the study may have a small blood sample taken and allow researchers to study the clot removed during their treatment. The team also collects basic health information and reviews relevant hospital records.
Participants in the imaging part of the study may be asked to fast before the scan, although this is optional. They attend an MRI appointment where different types of scans are used to study brain activity and chemistry. Some scans involve drinking a special sugar solution or receiving an injection. The scan may take up to 60 minutes, and breaks are available.

What are the possible benefits and risks of participating?
There is no direct benefit to participants, but the study may help improve stroke treatment in the future.
Risks include mild discomfort from blood sampling or injections. MRI scans are safe but may feel claustrophobic or noisy. Special equipment used in the scans is tested for safety but not approved for routine clinical use. Fasting may cause hunger or dizziness. If any unexpected health issues are found in samples or scans, the team will inform the participant with their consent.

Where is the study run from?
Cambridge University Hospitals NHS Foundation Trust (UK)

When is the study starting and how long is it expected to run for?
November 2025 to August 2028.

Who is funding the study?
The study is funded by the National Institute for Health Research Cambridge Biomedical Research Centre, The Evelyn Trust, and The Royal College of Radiologists (UK)

Who is the main contact?
The main contact for the study is Marta Wylot at marta.wylot@nhs.net

Contact information

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Additional identifiers

Integrated Research Application System (IRAS)
359277

Central Portfolio Management System (CPMS)
70797

Study information

Scientific Title
Evaluation of MEtabolic predictors for Treatment Response and Outcomes in Stroke: a study using blood, thrombus, and imaging biomarkers

Acronym
METRO-STROKE

Study objectives
Primary:
1. Evaluate blood and clot biomarkers in patients undergoing mechanical thrombectomy for ischaemic stroke.
2. Evaluate imaging biomarkers in patients undergoing mechanical thrombectomy for ischaemic stroke.

Secondary:
1. Evaluate association between blood and imaging biomarker.

Ethics approval required
Ethics approval required

Ethics approval(s)

approved 11/11/2025, East of England - Cambridge Central Research Ethics Committee (2 Redman Place, Stratford, London, E20 1JQ, United Kingdom; +44 2071048285; cambridgecentral.rec@hra.nhs.uk), ref: 25/EE/0218

Study design
Observational clinical laboratory study

Primary study design
Observational

Study type(s)
Screening

Health condition(s) or problem(s) studied
Stroke

Interventions
This will be a prospective biorepository study to evaluate the blood and thrombus collected mechanical thrombectomy procedure. The imaging sub-study will include MRI measures. The imaging substudy is a physiological study of the metabolism of pyruvate, glucose and their metabolites, and sodium levels in 12 patients undergoing standard of care mechanical thrombectomy (MT) and healthy volunteers. It is a single site study to be carried out at the Addenbrooke's Hospital site.

Blood and clot substudy includes blood and clot collection during the standard-of-care hospital treatment.

Imaging substudy may include the following imaging techniques:
• hyperpolarised 13C-MRSI
• DMI
• dynamic 2H-MRS and MRSI
• Sodium MR
• resting state fMRI
Imaging brain in study participants after MT treatment (within 14 days)

Intervention Type
Other

Primary outcome(s)
1. Identification of blood proteomic, metabolomic, and clot inflammatory biomarkers will be carried out using immunofluorescence, immunohistochemistry, the Olink proteomics platform, liquid chromatography–tandem mass spectrometry, and spatial transcriptomics on samples collected from the clot and blood during MT.
2. Identification of imaging biomarkers measured using hyperpolarised C-13 MRI, sodium MRI, DMI, fMRI and MRS within 14 days of MT
3. Clinical outcome will be measured using the TICI (Thrombolysis in Cerebral Infarction) grade, the mRS (modified Rankin Scale) score and the rate of SICH (Symptomatic Intracranial Haemorrhage) up to one year after MT.

Key secondary outcome(s))
There are no secondary outcome measures

Completion date
31/08/2028

Eligibility

Key inclusion criteria
Healthy volunteers:
1. Over 18 years old
2. Able to and provide written informed consent to participate
3. If female, postmenopausal or if women of childbearing potential (WOCBP) using a suitable form of contraception
4. If male, use of a suitable contraceptive method
5. Capable of undergoing a minimum of one study visit

Patients:
1. Over 18 years old
2. Attending Addenbrooke's Hospital, Cambridge University Hospitals NHS Trust (including patients transferred from other hospital sites)
3. Patients planning to undergo, or recently having undergone a mechanical thrombectomy procedure for AIS with LVO in Addenbrooke's Hospital
4. If female, postmenopausal or if of childbearing potential (WOCBP) using a suitable form of contraception
5. If male, use of a suitable contraceptive method

Participant type(s)
Healthy volunteer, Patient

Healthy volunteers allowed
No

Age group
Mixed

Lower age limit
18 years

Upper age limit
99 years

Sex
All

Total final enrolment
0

Key exclusion criteria
Healthy volunteers and patients.
1. Age less than 18 years.
2. Patients who lack capacity to consent to entry to the study, where the personal consultee or clinical team feel entry into the study is not appropriate.

3. Patients who lack capacity to consent to entry to the study who object to entry into the study, or to study procedures, contrary to section 33 of the Mental Capacity Act 2005.
4. Contraindication or inability to tolerate MRI
5. Pregnant or actively breast-feeding woman
6. If using an intrauterine contraceptive device (IUCD) as a method of contraception the device should be MRI safe at 3 T (researcher to confirm)
7. Clinically significant cardiac, pulmonary or neurological diseases as determined by the investigators
8. Laboratory abnormalities that may impact on the study results although no screening will be required for entry into the study.
9. Any other significant medical or psychiatric history rendering the subject ineligible as deemed by the investigators

Date of first enrolment
01/12/2025

Date of final enrolment
31/08/2027

Locations

Countries of recruitment
United Kingdom

England

Study participating centre
Cambridge University Hospitals NHS Foundation Trust
Cambridge Biomedical Campus
Hills Road
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Sponsor information

Organisation
Cambridge University Hospitals NHS Foundation Trust

ROR
https://ror.org/04v54gj93

Funder(s)

Funder type
Government

Funder Name
NIHR Cambridge Biomedical Research Centre

Funder Name
THE EVELYN TRUST

Funder Name
Royal College of Radiologists

Results and Publications

Individual participant data (IPD) sharing plan
Data requests can be submitted starting 9 months after article publication and the data will be made accessible for up to 24 months. Extensions will be considered on a case-by-case basis. Access to trial IPD can be requested by qualified researchers engaging in independent scientific research and will be provided following review and approval of a research proposal and Statistical Analysis Plan (SAP) and execution of a Data Sharing Agreement (DSA). Only anonymised data will be shared. For more information or to submit a request, please contact cuh.radiologyresearch@nhs.net.

IPD sharing plan summary
Available on request