

# The Enhanced Angiogenic Cell Therapy in Acute Myocardial Infarction (ENACT-AMI) trial

<b>Submission date</b> 12/02/2010	<b>Recruitment status</b> No longer recruiting	<input checked="" type="checkbox"/> Prospectively registered <input checked="" type="checkbox"/> Protocol
<b>Registration date</b> 17/02/2010	<b>Overall study status</b> Ongoing	<input type="checkbox"/> Statistical analysis plan <input type="checkbox"/> Results
<b>Last Edited</b> 07/03/2025	<b>Condition category</b> Circulatory System	<input type="checkbox"/> Individual participant data <input checked="" type="checkbox"/> Record updated in last year

**Plain English summary of protocol**  
Not provided at time of registration

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## **Additional identifiers**

### **Clinical Trials Information System (CTIS)**

Nil known

### **ClinicalTrials.gov (NCT)**

NCT00936819

### **Protocol serial number**

MCT-90169

## **Study information**

### **Scientific Title**

Enhanced Angiogenic Cell Therapy in Acute Myocardial Infarction: a multicentre, phase IIb randomised placebo-controlled trial

### **Acronym**

ENACT-AMI

### **Study objectives**

The primary objectives of this study are to determine whether endothelial-like culture modified mononuclear cell (E-CMM) therapy is effective in improving cardiac function following acute myocardial infarction, and whether eNOS transfected E-CMMs are superior to non-transfected E-CMMs.

A secondary objective is to determine whether the efficacy of E-CMM therapy depends on the timing of cell therapy (5 - 10 days versus 11 - 30 days).

### **Ethics approval required**

Old ethics approval format

### **Ethics approval(s)**

Approved 11/11/2011, Health Canada (Biologics and Genetics Therapies Directorate, Address Locator #0701B, Ottawa, Ontario, K1A 0K9, Canada; +1 (0)613 863 8405; brdd.dgo.enquiries@hc.sc.gc.ca), ref: Control # 150429 / File # 9427-O0476-39C

### **Study design**

Phase IIb double-blind parallel randomized placebo-controlled trial

### **Primary study design**

Interventional

## Study type(s)

Treatment

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

Acute myocardial infarction

## Interventions

After providing informed consent, all participants who meet the eligibility criteria will undergo apheresis. Apheresis is performed to obtain mononuclear cells from the participant's blood. These cells are sent to a site-specific cell manufacturing lab where they will be processed according to the random allocation. The random allocation will be to:

1. Endothelial-like circulating mononuclear cells (E-CMMs)
2. E-CMMs transfected with human eNOS
3. Plasma-lyte A

Approximately 5 days later, the participant will receive the study treatment via intracoronary injection through the distal stent of the IRA during coronary angiography in the catheterisation suite. Study follow-up will include clinic visits the day after cell therapy, at 6 weeks, 3 and 6 months post-injection.

## Intervention Type

Other

## Phase

Phase II/III

## Primary outcome(s)

Change in global left ventricular ejection fraction (LVEF) from baseline to 6 months after study treatment as determined by magnetic resonance imaging (MRI).

## Key secondary outcome(s)

Changes from baseline to 6 months after study treatment of:

1. Regional wall motion, wall thickening and infarct volume as determined by cardiac MRI
2. Echocardiographic assessment of LVEF and ventricular volumes
3. Time to clinical worsening (death, hospitalisation for angina, reinfarction)
4. Quality of life (36-item short form health survey [SF-36] and Duke Activity Status Index [DASI] questionnaires)

## Completion date

18/09/2029

## Eligibility

### Key inclusion criteria

1. Male or female 18 - 75 years of age
2. Clinical diagnosis of ST-elevation myocardial infarction (MI) of greater than 1 mm in two adjacent electrocardiogram (ECG) limb leads, or greater than 2 mm in two adjacent ECG precordial leads, or a new left bundle branch block and an increase in cardiospecific enzymes (creatine kinase [CK] greater than 3 x upper limit of normal [ULN]), and either positive myocardial bands (MB) fraction or increase in troponin compared to institutional laboratory

normal ranges

3. Patients who have suffered an acute Q-wave MI within the preceding 30 days prior to inclusion and have undergone percutaneous coronary intervention (PCI) with stent implantation in the infarct-related artery (IRA)
4. Culprit artery must have distal flow greater than thrombolysis in myocardial infarction (TIMI) 1
5. Left ventricular ejection fraction (LVEF) less than or equal to 45% by echocardiography (Simpson's Method) performed at least 2 days after onset of chest pain
6. In the case of previous MI, must have documentation of LVEF greater than 45% prior to index AMI
7. Females who are surgically sterile, or are post-menopausal, or have documented infertility, or are of child-bearing potential using one of the following methods of contraception:
  - 7.1. Barrier-type devices (e.g., condom, diaphragm) used in combination with a spermicide; a double barrier method is recommended
  - 7.2. Intrauterine devices (IUDs)
  - 7.3. Oral or implanted contraceptives, if used in combination with a barrier method
8. Provided written informed consent

### **Participant type(s)**

Patient

### **Healthy volunteers allowed**

No

### **Age group**

Adult

### **Lower age limit**

18 years

### **Upper age limit**

75 years

### **Sex**

All

### **Total final enrolment**

47

### **Key exclusion criteria**

1. Significant unprotected left main disease (greater than 50% stenosis) on diagnostic angiography
2. Planned coronary artery bypass graft (CABG) or percutaneous coronary intervention (PCI) for a coronary stenosis greater than 70% in the non-infarct related artery (IRA)
3. History of sustained ventricular arrhythmias not related to AMI (evidenced by previous holter monitoring +/- medication history for sustained ventricular arrhythmias in the subject's medical chart)
4. History of cerebrovascular accident or transient ischaemic attack less than or equal to 6 months
5. Any exclusion to magnetic resonance imaging (MRI) (includes already implanted automatic internal defibrillator or permanent pacemaker). Recent stent implantation is NOT an exclusion to MRI.

6. Persistent haemodynamic instability (need for ongoing pharmacological or mechanical support greater than 24 hours of the onset of chest pain)
7. Mechanical ventilatory support
8. Significant cardiac valvular disease
9. Left ventricular (LV) dysfunction from any other cause (e.g., non-ischaemic cardiomyopathy, collagen diseases)
10. Clinical evidence of persistent heart failure not responding to standard oral therapy
11. Clinical evidence of persistent ischaemia at time of cell therapy
12. Current pregnancy or nursing mothers
13. Known history of human immunodeficiency virus (HIV)
14. Known history of hepatitis B or C (hepatitis B surface antigen [HBsAg], hepatitis B [HB] core, hepatitis C [HC] antibody)
15. History of untreated ethanol (ETOH) or drug abuse
16. Creatinine clearance less than 60 by Cockcroft-Gault calculator (SI units)
17. Contraindications to apheresis (inadequate venous access or haematological exclusions)
18. Evidence of active infection
19. Significant co-morbidity (e.g., immunocompromise, hepatic failure)
20. Known history of malignancy in the past 5 years (except for low-grade and fully resolved non-melanoma skin cancer)
21. Known allergy to gentamycin and amphotericin
22. Patients receiving other investigational drug or device therapy within 30 days of screening
23. Patients who have received gene therapy
24. Inability to provide informed consent and comply with the follow-up visit schedule

**Date of first enrolment**

01/05/2010

**Date of final enrolment**

15/09/2019

## Locations

**Countries of recruitment**

Canada

**Study participating centre**

**Ottawa Hospital General Campus**

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## Sponsor information

**Organisation**

Ottawa Hospital Research Institute (OHRI) (Canada)

**ROR**

<https://ror.org/03c62dg59>

**Organisation**

Canadian Stem Cell Network

## **Funder(s)**

**Funder type**

Research organisation

**Funder Name**

Canadian Institutes of Health Research (ref: MCT-90169)

**Alternative Name(s)**

Instituts de Recherche en Santé du Canada, The Canadian Institutes of Health Research (CIHR), Canadian Institutes of Health Research (CIHR), Canadian Institutes of Health Research | Ottawa ON, CIHR - Welcome to the Canadian Institutes of Health Research, CIHR, IRSC

**Funding Body Type**

Government organisation

**Funding Body Subtype**

National government

**Location**

Canada

## **Results and Publications**

**Individual participant data (IPD) sharing plan**

Current IPD sharing plan as of 07/03/2025:

The datasets generated during and/or analysed during the current study are/will be available upon request from Dr Duncan Stewart ([djstewart@toh.ca](mailto:djstewart@toh.ca)).

The de-identified raw data and clean data set files are housed in OHRI's securely encrypted password-protected Sharepoint folder system and will be maintained there for at least 15 years following trial completion.

Prior to implementing any requests for data sharing (other than from the REB pre-approved ENACT AMI Study team) that are received and approved by Dr Stewart, a Secondary Use of Information Application will be completed and submitted to the OHSN-REB for approval to share data/files. Each of the participants will be approached with a separate signed consent

obtained for permission to share their de-identified data. As required, a Data Sharing Agreement will be signed and executed between Dr Stewart and the requesting party prior to any data being shared with that party.

Previous IPD sharing plan:

The datasets generated during and/or analysed during the current study are/will be available upon request from Dr Duncan Stewart (djstewart@toh.ca).

The de-identified raw data and clean data set files are housed in OHRI's securely encrypted password-protected Sharepoint folder system and will be maintained there for 15 years following trial completion.

Prior to implementing any requests for data sharing (other than from the REB pre-approved ENACT AMI Study team) that are received and approved by Dr Stewart, a Secondary Use of Information Application will be completed and submitted to the OHSN-REB for approval to share data/files. Each of the participants will be approached with a separate signed consent obtained for permission to share their de-identified data. As required, a Data Sharing Agreement will be signed and executed between Dr Stewart and the requesting party prior to any data being shared with that party.

**IPD sharing plan summary**

Available on request

**Study outputs**

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
<a href="#">Protocol article</a>	protocol	01/03/2010	11/04/2019	Yes	No