

# Are gut hormone changes the reason why the long-limb gastric bypass is more effective than the standard limb gastric bypass in improving type 2 diabetes mellitus?

<b>Submission date</b> 29/07/2015	<b>Recruitment status</b> No longer recruiting	<input checked="" type="checkbox"/> Prospectively registered <input type="checkbox"/> Protocol
<b>Registration date</b> 30/07/2015	<b>Overall study status</b> Completed	<input type="checkbox"/> Statistical analysis plan <input checked="" type="checkbox"/> Results
<b>Last Edited</b> 18/08/2023	<b>Condition category</b> Nutritional, Metabolic, Endocrine	<input type="checkbox"/> Individual participant data

## Plain English summary of protocol

### Background and study aims

Obesity is the main cause of the world wide epidemic of diabetes. Weight loss, or bariatric, surgery produces major and sustained weight loss and is being increasingly used to treat obese diabetic patients. There was initial optimism that these procedures might cure all diabetes. However, the gold-standard operation, standard gastric bypass, effectively cures diabetes in only 4 out of 10 patients. To design a safer and more successful procedure we need to understand how bariatric surgery works to improve diabetes. Hormones from the gut are released when we eat food. They control how the body uses the food it absorbs. For example they release the sugar lowering hormone insulin, and also greatly reduce appetite, which is why one feels less hungry after eating a meal. We have discovered that the good effects of bariatric surgery, and in particular the gastric bypass, are mainly due to increased release of gut hormones, reducing patients appetite and improving the release of insulin. In this project we will be testing a new procedure called the long-limb gastric bypass. It is designed particularly to be better at helping the diabetes in overweight patients, while being as safe as the currently available standard gastric bypass. We now want to show that this new procedure works better than the standard gastric bypass by causing an even bigger increase in the release of gut hormones and therefore insulin.

### Who can participate?

Obese adults (aged 18-70 years) with type 2 diabetes.

### What does the study involve?

Participants are randomly assigned into one of two groups. Those in group 1 have a standard-limb gastric bypass. Those in group 2 have a long-limb gastric bypass. Using a newly developed technique (mass spectroscopy) we then measure the differences in gut hormone secretion between the new long-limb and the standard gastric bypass. We also use a well-tested insulin sensitivity procedure (glucose clamp), both to confirm and to investigate how and why each participants diabetes has improved after the surgery.

What are the possible benefits and risks of participating?

The measurements we will be making are non-invasive and safe. The only discomfort comes from inserting a cannula to take blood samples.

Where is the study run from?

Imperial College London, Hammersmith Hospital (lead centre) and King's College London (UK)

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

August 2015 to February 2018

Who is funding the study?

National Institute for Health Research (UK)

Who is the main contact?

Dr Alex Miras

## Contact information

### Type(s)

Public

### Contact name

Dr Alex Miras

### ORCID ID

<http://orcid.org/0000-0003-3830-3173>

### Contact details

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### Type(s)

Scientific

### Contact name

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### Contact details

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# Additional identifiers

## EudraCT/CTIS number

Nil known

## IRAS number

## ClinicalTrials.gov number

Nil known

## Secondary identifying numbers

19153

# Study information

## Scientific Title

Are gut hormone changes the reason why the long-limb gastric bypass is more effective than the standard limb gastric bypass in improving type 2 diabetes mellitus? A randomised controlled trial

## Acronym

LONG LIMB

## Study objectives

The aim of this study is to show that a new bariatric surgery, the long-limb gastric bypass, is more effective at treating diabetes in people with obesity than the standard-limb gastric bypass.

## Ethics approval required

Old ethics approval format

## Ethics approval(s)

West London & GTAC, 29/06/2015, ref: 15/LO/0813

## Study design

Randomized; Double blind; Interventional; Design type: Treatment

## Primary study design

Interventional

## Secondary study design

Randomised controlled trial

## Study setting(s)

Other

## Study type(s)

Treatment

## Participant information sheet

Not available in web format, please use contact details to request a participant information sheet

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

Topic: Diabetes; Subtopic: Type 2; Disease: Diabetic Control, Obesity

## **Interventions**

Bariatric surgery, either the standard--limb or long--limb gastric bypass

Study Entry : Registration and one or more randomisations

## **Intervention Type**

Procedure/Surgery

## **Primary outcome measure**

Current primary outcomes as of 29/04/2019:

Peak plasma GLP-1 concentration as measured by laboratory assays at baseline and at 2 weeks after intervention.

Previous primary outcomes as of 10/01/2017:

Mechanistic primary outcome: Peak plasma GLP-1 level as measured by laboratory assays at baseline and at the point of 20% weight loss.

Clinical primary outcome: Glycated haemoglobin (HbA1c) as measured by laboratory assays at baseline and 1 year.

Previous primary outcome:

Change in peak GLP--1 level; Timepoint(s): After the mixed meal tolerance test.

## **Secondary outcome measures**

Current secondary outcome measures as of 29/04/2019:

1. Plasma levels of glucose, insulin, c-peptide, gut hormones, bile acids, FGF-19 and 21 after the mixed meal tolerance test are measured using laboratory assays at baseline, within 2 weeks and at the point of 20% weight loss
2. Rate of glucose appearance (Ra) and disposal (Rd) in the euglycaemic hyperinsulinaemic clamp is measured using mass spectroscopy/metry at baseline, within 2 weeks and at the point of 20% weight loss.
3. Faecal caloric content is measured using calorimetry at baseline, 20% weight loss and at 1 year
4. 4. Blood, urine and faecal microbial diversity and metabolomics are measured using mass spectroscopy/metry at baseline, within 2 weeks and at the point of 20% weight loss.
5. Total caloric intake and macronutrient composition is measured using dietary records at baseline and at 1 year
6. HbA1c is measured using by laboratory assays at baseline and 1 year
7. Total number of medications are measured using health records at baseline and 1 year
8. Rate of patients achieving diabetes remission is measured using HbA1c and number of medications at 1 year
9. Body weight is measured using scales at baseline and 1 year
10. Systolic, diastolic blood pressure and pulse are measured using a sphygmomanometer at baseline and 1 year
11. Serum fasting lipids are measured using laboratory assays at baseline and 1 year
12. Medical, surgical, nutritional and psychological complications are measured using health records at 1 year

13. Adverse events are measured using health records at 1 year
14. Glycated haemoglobin (HbA1c) as measured by laboratory assays at baseline and 1 year.

Previous secondary outcome measures:

1. Plasma levels of glucose, insulin, c-peptide, gut hormones, bile acids, FGF-19 and 21 after the mixed meal tolerance test are measured using laboratory assays at baseline, within 2 weeks and at the point of 20% weight loss
2. Rate of glucose appearance (Ra) and disposal (Rd) in the euglycaemic hyperinsulinaemic clamp is measured using mass spectroscopy/metry at baseline, within 2 weeks and at the point of 20% weight loss.
3. Faecal caloric content is measured using calorimetry at baseline, 20% weight loss and at 1 year
4. 4. Blood, urine and faecal microbial diversity and metabolomics are measured using mass spectroscopy/metry at baseline, within 2 weeks and at the point of 20% weight loss.
5. Total caloric intake and macronutrient composition is measured using dietary records at baseline and at 1 year
6. HbA1c is measured using by laboratory assays at baseline and 1 year
7. Total number of medications are measured using health records at baseline and 1 year
8. Rate of patients achieving diabetes remission is measured using HbA1c and number of medications at 1 year
9. Body weight is measured using scales at baseline and 1 year
10. Systolic, diastolic blood pressure and pulse are measured using a sphygmomanometer at baseline and 1 year
11. Serum fasting lipids are measured using laboratory assays at baseline and 1 year
12. Medical, surgical, nutritional and psychological complications are measured using health records at 1 year
13. Adverse events are measured using health records at 1 year

**Overall study start date**

01/02/2015

**Completion date**

14/08/2018

## **Eligibility**

**Key inclusion criteria**

1. Both genders
2. Age 18-70 years
3. Type 2 diabetes mellitus
4. Obesity
5. HbA1c > 7.0%
6. On glucose-lowering medication

**Participant type(s)**

Patient

**Age group**

Adult

**Lower age limit**

18 Years

**Upper age limit**

70 Years

**Sex**

Both

**Target number of participants**

Planned Sample Size: 50; UK Sample Size: 50

**Total final enrolment**

53

**Key exclusion criteria**

1. Contraindications to bariatric surgery
2. Type 1 diabetes
3. Pregnancy or breastfeeding
4. Recent blood donation

**Date of first enrolment**

31/07/2015

**Date of final enrolment**

01/02/2017

**Locations****Countries of recruitment**

England

United Kingdom

**Study participating centre**

**Imperial College London, Hammersmith Hospital (lead centre)**

Du Cane Road

London

United Kingdom

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**Study participating centre**

**King's College London**

Denmark Hill

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# Sponsor information

## Organisation

Imperial College London

## Sponsor details

Joint Research Compliance Office  
Charing Cross Hospital  
Fulham Palace Road  
London  
England  
United Kingdom  
W6 8RF

## Sponsor type

Hospital/treatment centre

## ROR

<https://ror.org/041kmwe10>

# Funder(s)

## Funder type

Government

## Funder Name

National Institute for Health 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

## Publication and dissemination plan

The results of this project will be published in high quality peer-reviewed journals with a wide medical and scientific readership which will allow the detail of the trial to be scrutinized by the medical and scientific community at large. The results of the study will be presented at national and international scientific meetings. All of the applicants are experts in their field and regularly lecture to professional and lay audiences on these topics. We will also disseminate our findings via the press offices of Imperial College London and King's College London and associated NHS Trusts. Crucially, the clinical results of the trial will be disseminated through our research teams and institutions to NHS England service providers and policymakers.

## Intention to publish date

01/02/2019

## Individual participant data (IPD) sharing plan

## IPD sharing plan summary

Available on request

## Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
<a href="#">Results article</a>		06/11/2020	23/09/2021	Yes	No
<a href="#">HRA research summary</a>			28/06/2023	No	No
<a href="#">Results article</a>		01/02/2021	18/08/2023	Yes	No