ISRCTN16299902 https://doi.org/10.1186/ISRCTN16299902

Increasing Inulin Propionate Ester in the gut, for prevention of weight gain in adults aged 20-40 years at higher risk of weight gain.

Submission date
04/02/2019

Recruitment status
No longer recruiting

Registration date
06/02/2019

Overall study status
Completed

Last Edited
08/10/2024

Condition category
Nutritional, Metabolic, Endocrine

[X] Prospectively registered
[X] Protocol
[X] Statistical analysis plan
[X] Results
[_] Individual participant data

Plain English summary of protocol

Background and study aims
Overweight and obesity affect over 60% of the UK population. In adults, most weight gain occurs when people are in their 20s and 30s and causes many adults to become obese by the time they are middle-aged, leading to an increased risk of developing diabetes, heart disease and cancer. There is increasing evidence that diet plays an important role in preventing obesity. The amount of fibre (found in edible plant foods such as cereals, fruits, vegetables, dried peas, nuts, lentils and grains) eaten in the diet has been linked to body weight. People who eat low amounts of dietary fibre are more likely to gain weight. Dietary fibre is the major food for the bacteria that live in our gut. It is known that dietary fibre keeps the bacteria in the gut healthy. These bacteria break down dietary fibre into short-chain fatty acids (smaller pieces of fibre) which can reduce appetite and body fat. One short-chain fatty acid called propionate appears to be the most powerful at reducing appetite. Propionate by itself would be broken down rapidly in the body so a new food supplement has been created called Inulin Propionate Ester (IPE) which is Propionate chemically bound to a fibre called Inulin. Inulin is a type of fibre normally found in garlic, Jerusalem artichoke, chicory and onion. The IPE simply delivers the Propionate to the right region of the gut where it is thought to be most effective. The aim of this study is to investigate the effects of IPE as a dietary supplement, on the prevention of weight gain in young adults aged 20-40 years at high risk of gaining weight, across a period of 12 months.

Who can participate?
Adults aged between 20 to 40 years who have a Body Mass Index (BMI) of either 25-30 kg/m2 if non-South Asian, or 24-27 kg/m2 if of South Asian origin. BMI is a value calculated from height and weight, which estimates body fat. One or more of the following must also apply: having gained 2 kg or more over the past year, low level of physical activity, eating less than two portions a day of fruit and vegetables, or drinking more than one sugary drink per day. If taking any medication, this should be stable.

What does the study involve?
Participants complete a questionnaire and attend a screening visit where they are seen by a doctor and asked questions about their medical history, current health and any medications.

Measurements of height, weight, waist and hip circumference, and body composition are taken and BMI is calculated. They have a full blood test and all females of childbearing potential complete a pregnancy test. A physical activity questionnaire is completed and lifestyle questions are asked by the researcher. Participants are then asked to return for a second visit and complete a 7-day written food diary. At the second visit, participants have all procedures carried out during the screening visit repeated except for the full blood count and height. Blood pressure will also be measured. Participants have a fasting blood test to measure glucose and their lipid profile and a blood test to measure Insulin. The questionnaire regarding physical activity is repeated and lifestyle questions are asked. Participants are randomly allocated to either IPE or Inulin for 12 months. 2 months' worth of sachets are dispensed, enough until the participant returns for their next study visit. They are asked to take one sachet daily before/after /with food or drink. Participants are asked to return for a 2-month study visit. Once again they are asked to complete a 7-day written food diary and bring back all their used/unused sachets. At the 2-month visit, participants are asked for updates in regard to medical history, health, any medications and if they have had any adverse events. Measurements of weight, waist and hip circumference, and body composition are taken, BMI is calculated, and they have their blood pressure measured. All females complete a pregnancy test. The questionnaire regarding physical activity is completed and updates on lifestyle are asked. They do not need to provide a blood sample at this visit. The 7-day food diary is collected. Sachet returns are collected from the participant and counted for accountability and compliance. They are provided with 4 more months' worth of sachets, to last until the 6-month study visit. Participants are asked to return for a 6-month study visit. Again they are asked to complete a 7-day written food diary. At the 6-month visit, all procedures and measurements taken at the 2-month visit are repeated and this time a fasting blood test (10 ml) is done to measure glucose and lipid profile and a blood test (4 ml) is done to measure Insulin. A 6 month supply of supplement sachets is dispensed, to last until the 12-month study visit. Participants are asked to complete a 7-day written food diary one final time. At the 12-month (final) study visit, all procedures and measurements taken at the 6-month visit are repeated a final time, but no further supplement sachets are dispensed and the food diary is collected from the participant. Participants are not paid for the eligibility/screening visit but are paid £50 for attending each study visit thereafter and reasonable travel expenses are reimbursed.

What are the possible benefits and risks of participating?
Participants may not benefit directly from this study but the results may help doctors in the future treat people who are overweight and at risk of gaining weight, in preventing weight gain. Participants may find that the IPE supplement helps prevent gain weight, however, these effects may only be short-lived and at the present time the IPE supplement is not commercially available. Most of the procedures in this study, such as the recording of your weight, height, hip, waist, body composition and blood pressure present no risk. Other procedures, such as taking blood samples, can cause mild discomfort. The risks of taking a blood sample include slight discomfort when the needle is inserted and possible bruising or localised infection. These procedures will only be carried out by an experienced health professional under sterile conditions to minimise all these risks. There are no major side effects associated with taking the IPE supplement. Some participants may find the taste unpleasant (slightly metallic) or may experience mild nausea, abdominal bloating or other gut symptoms initially, however, these should settle down after a few days.

Where is the study run from?
Imperial College London (UK)

When is the study starting and how long is it expected to run for?
March 2018 to November 2022

Who is funding the study?
National Institute for Health Research - Efficacy and Mechanism Evaluation Programme (NIHR-EME) (UK)

Who is the main contact?
Christina Prechtl, iPREVENT@imperial.ac.uk

Contact information

Type(s)
Scientific

Contact name
Miss Christina Prechtl

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W12 7RH
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Additional identifiers

Integrated Research Application System (IRAS)
229300

Central Portfolio Management System (CPMS)
38959

Study information

Scientific Title
Increase in colonic PRopionate as a method of prEVENTing weight gain in adults aged 20-40 years (iPREVENT)

Acronym
iPREVENT

Study objectives
Current hypothesis as of 22/04/2021:
Inulin Propionate Ester (IPE) supplementation will prevent weight gain compared with inulin control in adults age 20-40 years at higher risk of weight gain.

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Previous hypothesis:
Inulin Propionate Ester (IPE) supplementation will prevent weight gain compared with inulin control in young adults at higher risk of weight gain

Ethics approval required
Old ethics approval format

Ethics approval(s)
London Hampstead REC, HRA Office: Barlow House, 3rd Floor, 4 Minshull Street, Manchester M1 3DZ, Tel: +44 (0)207 104 8127, +44 (0)207 104 8345, Email: NRESCommittee.London-Hampstead@nhs.net, 24/01/2019, ref: 19/LO/0095

Primary study design
Interventional

Study design
Randomized; Interventional; Design type: Prevention, Dietary

Study type(s)
Prevention

Health condition(s) or problem(s) studied
Obesity and other hyperalimentation

Interventions
Current intervention as of 20/01/2022:
Method of randomisation: minimisation

Either IPE or a control dietary fibre will be given to 270 volunteers in 10 g sachets and they will be asked to take one sachet per day with their normal diet for 12 months. The volunteers will attend study visits at 2, 6 and 12 months.

For sub study participants, the baseline and 12 month visits will be more extensive, with blood samples, breath samples, calorimetry measurements, urine sample, stool sample, appetite score taken and a test meal consumed.

Previous intervention:
Method of randomisation: minimisation

Either IPE or a control dietary fibre will be given to 270 volunteers in 10g sachets and they will be asked to take one sachet per day with their normal diet for 12 months. The volunteers will attend study visits at 2, 6 and 12 months.

Intervention Type
Supplement

Primary outcome(s)
Weight gain (clinic measured weight) from baseline to 12 months

Key secondary outcome(s)

Current secondary outcome measures as of 20/01/2022:
1. Occurrence of Adverse Events and Serious Adverse Events (self reported and asked during study visits) over the duration of the study
2. Changes in fasting biochemistry (blood results of samples taken during study visits) from baseline to 6 and 12 months:
2.1. Glucose
2.2. Insulin
2.3. Triglycerides
2.4. Total cholesterol
2.5. Low Density Lipoprotein (LDL) cholesterol
2.6. High Density Lipoprotein (HDL) cholesterol
3. Changes in blood pressure (clinic measured BP) from baseline to 2, 6 and 12 months
4. Changes in body weight (clinic measured weight) from baseline to 2 and 6 months
5. Changes in waist/hip/BMI/body composition measurements - Fat Mass (FM), Fat Mass Index (FMI), percent body fat (Fat%), fat free body mass, (FFM) and FM/FFM ratio (clinic measurements and clinic measured bioelectrical impedance) from baseline to 2, 6 and 12 months
6. Changes in appetite (7-day food diary completion) from baseline, to 2, 6 and 12 months
7. Changes in compliance (returned used/unused sachets count) from baseline to 2, 6 and 12 months
8. Changes in diet (7-day food diary completion) during the 12 month intervention
9. Changes in physical activity during the 12 month intervention
10. Changes in other lifestyle factors during the 12 month intervention; smoking, drinking and recreational drugs

Sub-study (exploratory/mechanistic):
1. To explore the effects of IPE on colonic metabolism using metataxonomic analysis of the 16S ribosomal ribonucleic acid (rRNA) gene in stool samples, to identify the relative abundance of the bacterial component of the microbiome.
2. To explore the effects of IPE on the metabolite profile using nuclear magnetic resonance spectroscopic analyses. These data will be used to determine how these specific changes in the colonic environment influence L-cell differentiation using a human organoid model.
3. To explore the effects of IPE on anorectic gut hormones (GLP-1, PYY, gastrin and CCK) and subjective feelings of appetite via visual analogue scales (VAS), as measures of appetite regulation.
4. To explore the effects of IPE on energy expenditure and hepatic lipid metabolism as potential mechanisms involved in body weight maintenance.

Previous secondary outcome measures:
1. Occurrence of Adverse Events and Serious Adverse Events (self reported and asked during study visits) over the duration of the study
2. Changes in fasting biochemistry (blood results of samples taken during study visits) from baseline to 6 and 12 months:
2.1. Glucose
2.2. Insulin
2.3. Triglycerides
2.4. Total cholesterol
2.5. Low Density Lipoprotein (LDL) cholesterol
2.6. High Density Lipoprotein (HDL) cholesterol
3. Changes in blood pressure (clinic measured BP) from baseline to 2, 6 and 12 months
4. Changes in body weight (clinic measured weight) from baseline to 2 and 6 months
5. Changes in waist/hip/BMI/body composition measurements - Fat Mass (FM), Fat Mass Index (FMI), percent body fat (Fat%), fat free body mass, (FFM) and FM/FFM ratio (clinic measurements

and clinic measured bioelectrical impedance) from baseline to 2, 6 and 12 months
6. Changes in appetite (7-day food diary completion) from baseline, to 2, 6 and 12 months
7. Changes in compliance (returned used/unused sachets count) from baseline to 2, 6 and 12 months
8. Changes in diet (7-day food diary completion) from baseline, to 2, 6 and 12 months

Completion date
30/11/2022

Eligibility

Key inclusion criteria
Current inclusion criteria as of 22/04/2021:
1. Males and females aged 20-40 years
2. BMI of 24-27 kg/m2 if of South Asian ethnicity or 25-30 kg/m2 if non-South Asian, and at least one of the following:
2.1. A self-reported weight gain of 2 kg or more over the last 12 months
2.2. Low self-reported physical activity ('inactive' or 'minimally active' as per IPAQ)
2.3. Low self-reported fruit and vegetable intake (<2 servings of fruit and vegetables per day)
2.4. Self-reported high intake of sugar-sweetened beverages (>1 serving per day)
3. On stable medication (if taking any) at point of screening
4. Written informed consent

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Previous inclusion criteria:
1. Males and females aged 20-35 years
2. BMI of 24-27kg/m2 if of South Asian ethnicity or 25-30kg/m2 if non-South Asian, and at least one of the following:
2.1. A self-reported weight gain of 2kg or more over the last 12 months
2.2. Low self-reported physical activity ('inactive' or 'minimally active' as per IPAQ)
2.3. Low self-reported fruit and vegetable intake (< 2 servings of fruit and vegetables per day)
2.4. Self-reported high intake of sugar sweetened beverages (> 1 serving per day)
3. On stable medication (if taking any) at point of screening
4. Written informed consent

Participant type(s)
Healthy volunteer

Healthy volunteers allowed
No

Age group
Adult

Lower age limit
20 Years

Upper age limit
40 Years

Sex

All

Total final enrolment
270

Key exclusion criteria
Current exclusion criteria as of 04/01/2022:
1. Diagnosed with chronic disease: Type I and II diabetes, cancer, renal failure, heart disease, organic
acidaemia (propionic acidaemia, methyl malonic acidaemia)
2. Diagnosed gastrointestinal condition including coeliac disease, inflammatory bowel disease and irritable bowel syndrome
3. Previous bowel reconstruction surgery
4. Pregnancy or lactation
5. Use of antibiotics at any time in the past 3 months
6. Untreated Vitamin B12 deficiency (<160 ng/l)
7. Taking part in a weight loss program or consuming a weight loss product
8. Have lost 3 kg or more in the last 3 months
9. Any other gastrointestinal upset (such as diarrhoea/constipation in the last 2 weeks, abdominal cramping etc)
10. Any other reason in the opinion of the investigator

For sub-study:
1. Known anaemia or as per screening blood results (haemoglobin levels of <130 g/l for males and <110 g/l for females)
2. Allergies or intolerances to any of the ingredients in the set sub-study meals

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1. Diagnosed chronic disease; Type I and II diabetes, cancer, renal failure, heart disease, organic acidaemia (propionic acidaemia, methyl malonic acidaemia)
2. Diagnosed gastrointestinal condition including coeliac disease, inflammatory bowel disease and irritable bowel syndrome
3. Previous bowel reconstruction surgery
4. Pregnancy or lactation
5. Use of antibiotics at any time in the past 3 months
6. Anaemic AND Vitamin B12 deficient (< 160 ng/L)
7. Taking part in a weight loss program or consuming a weight loss product
8. Have lost 3kg or more in the last 3 months
9. Any other gastrointestinal upset (such as diarrhoea/constipation in the last 2 weeks, abdominal cramping etc)
10. Any other reason in the opinion of the investigator

Date of first enrolment
25/07/2019

Date of final enrolment
31/10/2021

Locations

Countries of recruitment
United Kingdom

England

Scotland

Study participating centre
Imperial Clinical Research Facility
Imperial Centre for Translational and Experimental Medicine
Imperial College Healthcare NHS Trust, Hammersmith Hospital
Du Cane Road
London
United Kingdom
W12 0HS

Study participating centre
Glasgow Clinical Research Facility
NHS Greater Glasgow & Clyde
Glasgow Royal Infirmary
New Lister Building
10 Alexandra Parade
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Sponsor information

Organisation
Imperial College of Science, Technology and Medicine

ROR
https://ror.org/041kmwe10

Funder(s)

Funder type
Government

Funder Name

NIHR Evaluation, Trials and Studies Co-ordinating Centre (NETSCC); Grant Codes: 15/185/16

Results and Publications

Individual participant data (IPD) sharing plan

The data sharing plans for the current study are unknown and will be made available at a later date.

IPD sharing plan summary

Data sharing statement to be made available at a later date

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article		25/09/2024	08/10/2024	Yes	No
HRA research summary			28/06/2023	No	No
Protocol (preprint)		10/10/2022	05/04/2023	No	No
Statistical Analysis Plan	version 2.0		18/03/2024	No	No