

# Effects of breakfast and supper on energy expenditure

<b>Submission date</b>	<b>Recruitment status</b>	<input type="checkbox"/> Prospectively registered
10/08/2016	No longer recruiting	<input type="checkbox"/> Protocol
<b>Registration date</b>	<b>Overall study status</b>	<input type="checkbox"/> Statistical analysis plan
10/08/2016	Completed	<input type="checkbox"/> Results
<b>Last Edited</b>	<b>Condition category</b>	<input type="checkbox"/> Individual participant data
29/11/2019	Nutritional, Metabolic, Endocrine	<input type="checkbox"/> Record updated in last year

## Plain English summary of protocol

### Background and study aims

It is often said that breakfast is the most important meal of the day. However, the benefits of breakfast consumption have not been thoroughly investigated in well-designed studies. A recent study carried out in The University of Sheffield clearly showed that consuming a fortified cereal (cereal enriched with vitamins and minerals) with milk every day for 12 weeks led to an increase in the intake of vitamins and minerals and improved measures of nutritional status. The study was carried out in adolescent girls who rarely ate breakfast. Interestingly, if the cereal and milk was consumed for supper there was a small weight gain. This could not be explained by an increase in the amount of energy consumed. It is thought possible that taking cereal and milk as a breakfast might lead to an increase in the amount of energy used in physical activity (physical activity energy expenditure) later in the day, and that this is not seen when cereal with milk is taken as a supper. The aim of this study is to find out whether eating cereal with milk as breakfast will lead to an increase in physical activity energy expenditure compared with eating cereal with milk for supper.

### Who can participate?

Healthy women aged 18-24 of normal weight who regularly skip breakfast

### What does the study involve?

Participants are randomly allocated into two groups, who either eat cereal with milk for four days for breakfast or for supper. After a one week break, the two groups swap so that those who were eating the cereal for breakfast now eat it for dinner and vice versa. Participants are asked to wear an accelerometer (device to measure physical activity) on their wrist for all of their waking hours during the two four day study periods. Participants also complete a food diary for four days before and during the four day study periods. At the end of the study, energy expenditure is calculated from the accelerometer readings and dietary intakes are compared.

### What are the possible benefits and risks of participating?

There are no direct benefits or risks involved with participating in this study.

### Where is the study run from?

The University of Sheffield (UK)

When is the study starting and how long is it expected to run for?  
April 2007 to December 2015

Who is funding the study?  
Kelloggs Company of Great Britain (UK)

Who is the main contact?  
Professor Hilary Powers

## Contact information

### Type(s)

Scientific

### Contact name

Prof Hilary Powers

### ORCID ID

<https://orcid.org/0000-0002-0496-5446>

### Contact details

Department of Oncology and Metabolism  
The Medical School  
The University of Sheffield  
Sheffield  
United Kingdom  
S102RX

## Additional identifiers

### Protocol serial number

007629

## Study information

### Scientific Title

A comparison of the effect of consuming cereal with milk as a breakfast or as a supper, on physical activity energy expenditure

### Acronym

BEES

### Study objectives

The consumption of cereal with milk as breakfast will elicit an increase in physical activity energy expenditure compared with consumption of cereal with milk as supper.

### Ethics approval required

Old ethics approval format

**Ethics approval(s)**

University of Sheffield Research Ethics Committee, 12/02/2016, ref: 007629

**Study design**

Single-centre randomised crossover trial

**Primary study design**

Interventional

**Study type(s)**

Other

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

Energy expenditure

**Interventions**

Participants are randomly allocated to eat 50g fortified breakfast cereal with 150ml semi-skimmed milk for breakfast or dinner for four days in a random order. There is a wash out period of one week between the two interventions.

Participants are asked to wear the Actigraph monitor for all their waking hours for each of the 4 day intervention periods. They are asked to take the monitor off when bathing or showering or swimming. They are asked not to wear the monitor when they go to bed.

Participants complete a food and beverage diary on three occasions - for 4 days prior to intervention and for 4 days for each of the interventions (i.e. cereal and milk at supper and at breakfast time). Participants are shown how much detail to put in the diaries and at the end of each 4-day period they meet with the researcher to discuss the details of their diary entries. They are asked to eat and drink what they liked, as long as they took their intervention cereal and milk. There is no follow-up. Data collection finishes when the last food diary has been completed and discussed.

**Intervention Type**

Other

**Primary outcome(s)**

Physical activity energy expenditure is measured using an accelerometer (Actigraph), worn on the wrist during waking hours of each 4 day intervention period.

**Key secondary outcome(s)**

Dietary intake is assessed using 4-day food and beverage diaries, facilitated by using food portion booklets.

**Completion date**

31/08/2016

**Eligibility****Key inclusion criteria**

1. Female
2. Age 18-24 years
3. BMI between 18.5 and 25kg/m<sup>2</sup>
4. Report regularly skipping breakfast

**Participant type(s)**

Healthy volunteer

**Healthy volunteers allowed**

No

**Age group**

Adult

**Lower age limit**

18 years

**Upper age limit**

24 years

**Sex**

Female

**Key exclusion criteria**

1. BMI outside 18.5-25 kg/m<sup>2</sup> range
2. Report in training for sporting event
3. Known allergy to wheat, barley or milk

**Date of first enrolment**

09/05/2016

**Date of final enrolment**

31/08/2016

## Locations

**Countries of recruitment**

United Kingdom

England

**Study participating centre**

**The University of Sheffield**

Sheffield Medical School

Beech Hill Road

Sheffield

United Kingdom

S10 2RX

# Sponsor information

## Organisation

The University of Sheffield

## ROR

<https://ror.org/05krs5044>

# Funder(s)

## Funder type

Industry

## Funder Name

Kelloggs Company of Great Britain

# Results and Publications

## Individual participant data (IPD) sharing plan

### IPD sharing plan summary

Not expected to be made available

## Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
<a href="#">Participant information sheet</a>		10/08/2016	11/08/2016	No	Yes
<a href="#">Participant information sheet</a>	Participant information sheet	11/11/2025	11/11/2025	No	Yes