

# Microstructure of starch-based meals and change in blood sugar

<b>Submission date</b> 05/04/2019	<b>Recruitment status</b> No longer recruiting	<input type="checkbox"/> Prospectively registered <input type="checkbox"/> Protocol
<b>Registration date</b> 23/04/2019	<b>Overall study status</b> Completed	<input type="checkbox"/> Statistical analysis plan <input checked="" type="checkbox"/> Results
<b>Last Edited</b> 02/12/2019	<b>Condition category</b> Other	<input type="checkbox"/> Individual participant data

## Plain English summary of protocol

### Background and study aims

The postprandial glycemic response (response after consuming food) consists of the elevation of blood sugar (glucose) levels that occur after the ingestion of carbohydrate-rich foods. It has been shown that there is great variability in the postprandial response in response to the intake of different foods. Starch is the most abundant source of carbohydrates of vegetable origin. The main objective of the study was to evaluate if the physical properties of solid foods based on starch, gluten and lipids are associated with different postprandial glycemia/insulin responses in response to the intake of starchy foods (starch test and glucose test oral).

### Who can participate?

Healthy female volunteers of normal weight, the participants were selected from previous studies.

### What does the study involve?

Visit the centre on four occasions one week apart after 8-12 hours of fasting (only water allowed). During the first visit, basic measurements are performed including a blood test. During the second visit, participants have multiple blood tests after eating a small amount. During the third and fourth visit, further meal tests were performed

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

**Benefits:** Participants will not benefit from participating in this biomedical research. However, they may know what their current nutritional status is and their blood sugar and lipid tests. They were given a written document containing general nutritional recommendations and prevention of diabetes mellitus, made by a nutrition professional. If the results of the oral glucose tolerance test were altered, they were given medical advice in this regard

**Risks:** The extraction of blood can cause pain, bruising, bruising and rarely infection at the puncture site. In the procedures involving several blood samples, only one puncture was performed, obtaining the samples from the same route. To avoid this type of discomfort to the maximum the person who extracted the blood sample had great experience in the procedure

### Where is the study run from?

UC Centre of Clinical Research, Santiago, Chile

When is the study starting and how long is it expected to run for?  
March 2015 to December 2016

Who is funding the study?  
Fondo Nacional de Desarrollo Científico y Tecnológico, Chile.  
Supported by a FONDECYT grant (1170594) for J. Parada, and a FONDECYT grant (1150416) for J.L. Santos.

Who is the main contact?  
Dr. José Luis Santos, jsantosm@uc.cl

## Contact information

**Type(s)**  
Scientific

**Contact name**  
Dr José Luis Santos

**ORCID ID**  
<https://orcid.org/0000-0003-2895-0369>

**Contact details**  
Avenida Libertador Bernardo O´Higgins 340  
Santiago  
Chile  
8320000  
+56 23543862  
jsantosm@uc.cl

## Additional identifiers

## Study information

**Scientific Title**  
Microstructure of starch-based meals with either palm or soybean oils alter in vitro starch digestibility with no major effects on glyceemic responses

**Study objectives**  
Study the effects of the oil type in a solid ternary matrix (starch-oil-protein) on starch digestibility. Additionally, we studied the postprandial glyceemic responses to starch-based meals enriched with either palm or soybean oil in volunteers in a pilot study.

**Ethics approval required**  
Old ethics approval format

**Ethics approval(s)**

Approved 16/10/2014, Ethics Committee of the School of Medicine of the Pontificia Universidad Católica de Chile (Marcoleta 391, Piso 1, 8330024, Santiago, Chile; 02-2354.8173; etica.investigacion@med.puc.cl), ref: 14-479

## **Primary study design**

Interventional

## **Study design**

Non-randomised crossover trial

## **Study type(s)**

Other

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

Healthy volunteers

## **Interventions**

Participants visited the UC Centre of Clinical Research in four occasions one week apart after 8-12 hours of fasting (only water was allowed). During the first visit, basal biochemical and anthropometric measurements were performed. At this stage, subjects with diabetes, glucose intolerance, dyslipidemia or in pregnancy were excluded from the study. During the second visit, participants were submitted to a standard 75g Oral Glucose Tolerance Test (OGTT). Blood samples were drawn at -15, -5, 15, 30, 60, 90 and 120 minutes after glucose ingestion. During the third and fourth visit, meal tests were performed with model solid meals based on starch, wheat gluten and two types of triglycerides based on either palm or soybean oil, which have notable differences in the fraction of palmitic and linoleic acids. The meal consisted of 140 g of a dough containing 25 g of potato starch, 5 g of wheat gluten and 5.7 g of oils (either palm or soybean oil). Each meal was consumed together with 150 mL of tap-water over, at most, five minutes by chewing approximately 15 times before swallowing.

## **Intervention Type**

Other

## **Primary outcome(s)**

Plasma glucose, insulin levels and c-peptide, measured by blood sample analysis at -15, -5, 15, 30, 60, 90, and 120 minutes after glucose ingestion and meal test.

## **Key secondary outcome(s)**

1. Glycemic response after meal tests measured by drawing of blood samples at times -15, -5, 15, 30, 60, 90, and 120 minutes after meal test, for the determination of plasma glucose and insulin levels.
2. Anthropometric and biochemical characteristics measured after 8-12 hours of fasting:
  - 2.1 Age (years)
  - 2.2 Weight (kg)
  - 2.3 Height (m)
  - 2.4 BMI (kg/m<sup>2</sup>)
  - 2.5 Fasting Glucose (mg/dl)
  - 2.6 Fasting Insulin (μIU/ml)
  - 2.7 Total cholesterol (mg/dL)
  - 2.8 HDL cholesterol (mg/dL)

2.9 Triglycerides (mg/dL)

2.10 Systolic arterial pressure (mmHg)

2.11 Diastolic blood pressure (mmHg)

The anthropometric measurements were made by personnel trained in light clothing and without shoes, using a calibrated set of stadiometers, scales and tapes. The weight and height were used to calculate the BMI (Kg / m<sup>2</sup>). Fasting blood samples were taken in the volunteers, and blood glucose, insulinemia, total cholesterol, HDL cholesterol and triglycerides were measured by the laboratory of the Department of Nutrition, Diabetes and Metabolism of the Pontificia Universidad Catolica de Chile

**Completion date**

30/12/2016

## Eligibility

**Key inclusion criteria**

1. Female
2. Normoglycemic
3. Normal weight Body Mass Index of  $22 \pm 1.9$  kg/m<sup>2</sup> (Mean  $\pm$  SD)

**Participant type(s)**

Healthy volunteer

**Healthy volunteers allowed**

No

**Age group**

Adult

**Sex**

Female

**Total final enrolment**

8

**Key exclusion criteria**

1. Family history of diabetes
2. Diabetes
3. Glucose intolerance
4. Dyslipidemia
5. Pregnant

**Date of first enrolment**

05/03/2015

**Date of final enrolment**

30/08/2015

## Locations

## Countries of recruitment

Chile

## Study participating centre

UC Centre of Clinical Research

Portugal 61

Santiago

Chile

8320000

## Sponsor information

### Organisation

Pontificia Universidad Católica de Chile

### ROR

<https://ror.org/04teye511>

## Funder(s)

### Funder type

Government

### Funder Name

Fondo Nacional de Desarrollo Científico y Tecnológico

### Alternative Name(s)

National Fund for Scientific and Technological Development, El Fondo Nacional de Desarrollo Científico y Tecnológico, FONDECYT

### Funding Body Type

Government organisation

### Funding Body Subtype

National government

### Location

Chile

## Results and Publications

## Individual participant data (IPD) sharing plan

The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request

## 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>	results	20/11/2019	02/12/2019	Yes	No