

Innovative approach to hull-less spring cereals and triticale use from human health perspective (NFI/R/2014/011)

RSU

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Līga Balode

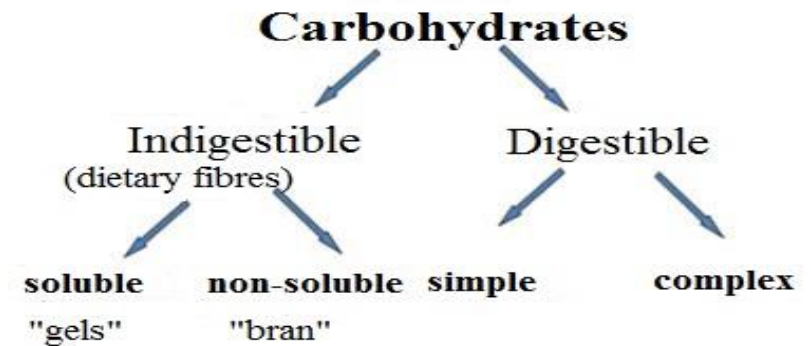
Guna Havensone

Inese Slūka

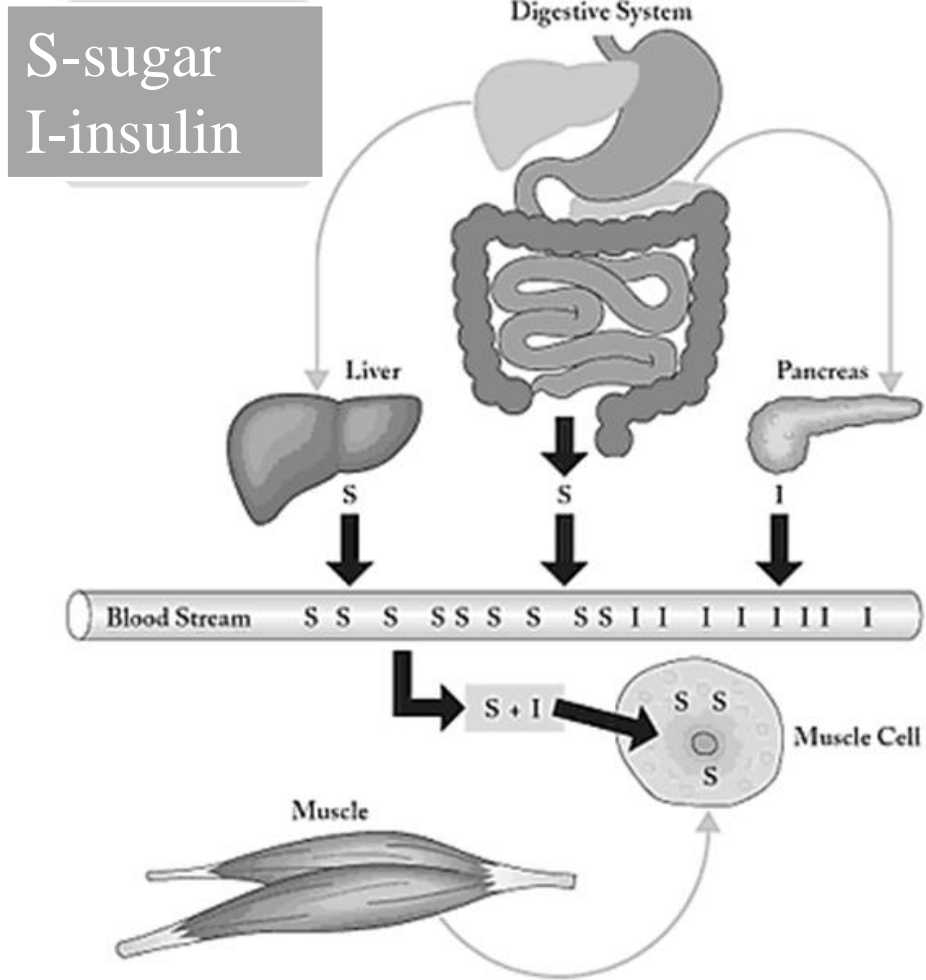
Priekuļi 23.09.2015



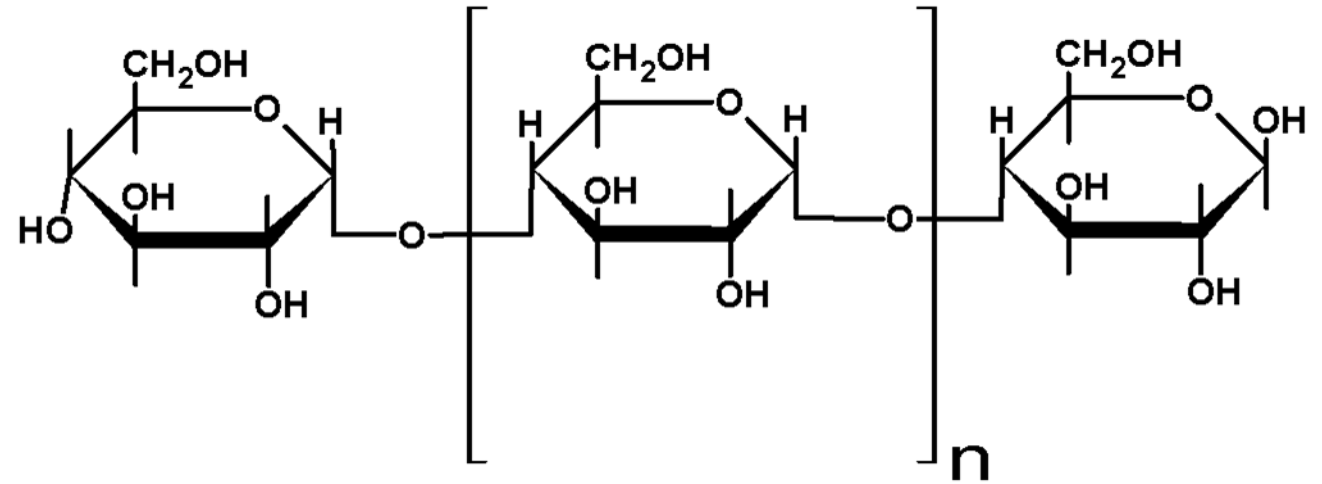
HEALTHY DIET - CEREALS- CARBOHYDRATES



METABOLISM OF CARBOHYDRATES



S-sugar
I-insulin

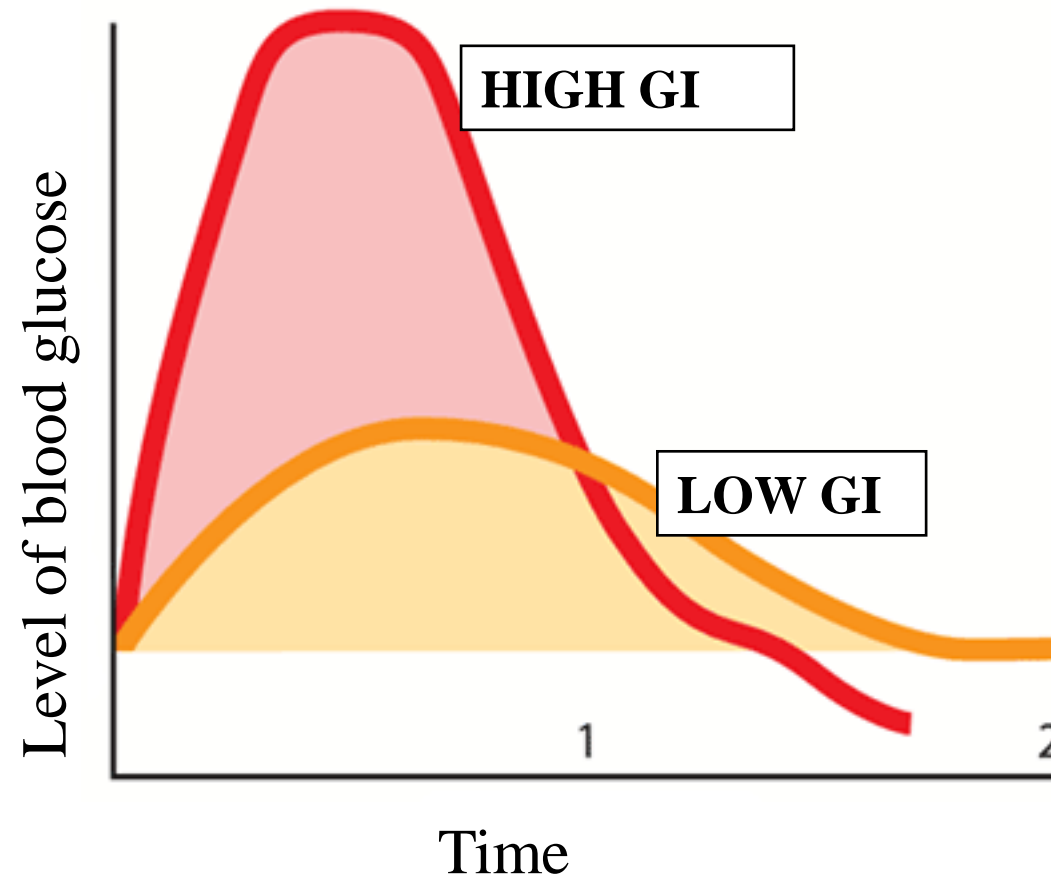


- Gastro-intestinal tract:
starch-maltose-glucose.
- Blood: glucose+insulin
the main substrate of
energy in the cells.



GLYCEMIC INDEX (GI)

shows how a carbohydrate-containing food raises blood glucose.



INSULIN INDEX (II)

shows how a carbohydrate-containing food raises blood insulin level

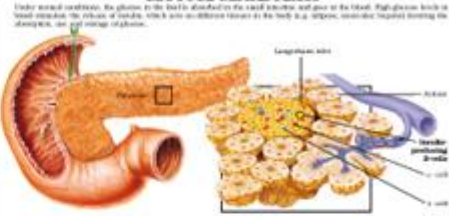
METABOLIC SYNDROME

The syndrome consists of a cluster of medical conditions including high blood insulin, impaired glucose control, and a high blood cholesterol level. Metabolic syndrome is diagnosed by results exceeding three out of five values and a high level of fasting blood glucose, glucose intolerance, and/or elevated cholesterol. A person who has three or more of these risk factors has the syndrome, which has been called X syndrome. It includes a cluster of metabolic and vascular disorders that often leads to heart disease.

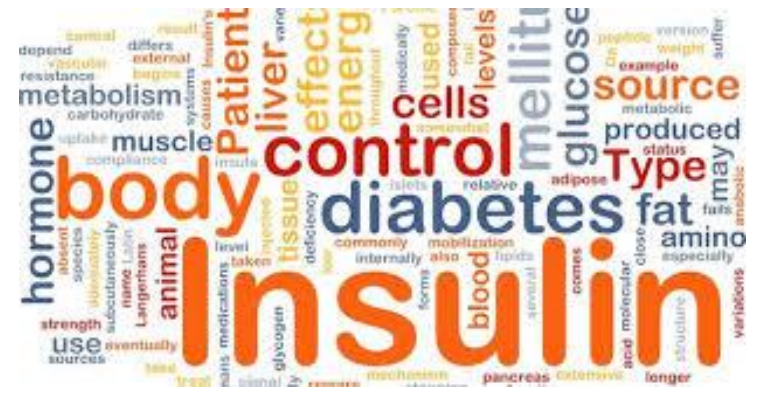
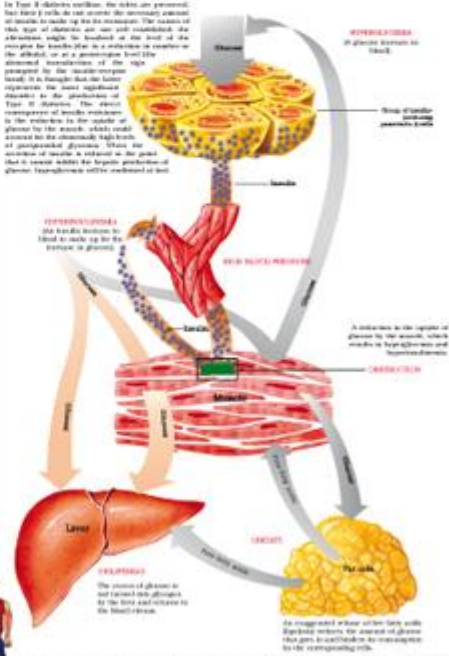
CHARACTERISTICS OF METABOLIC SYNDROME

- ALTERED GLUCOSE TOLERANCE:** Insulin resistance is diagnosed when glucose uptake is higher than 100 mg/dl. Insulin during test is higher than or equal to 100 mg/dl.
- FABERSHAMER:** Risk value higher than 170 mg/dl. Insulin during test is higher than or equal to 100 mg/dl.
- LDL CHOLESTEROL:** The cholesterol in the blood is not broken down by the liver into a significant risk factor. It depends on the amount of LDL cholesterol in the blood. LDL cholesterol is high (170 mg/dl). High LDL cholesterol is high (170 mg/dl). High LDL cholesterol is high (170 mg/dl).
- BIG CHOLESTEROL:** This is a cluster of three conditions. If the blood cholesterol is high, it is a cluster of three conditions. If the blood cholesterol is high, it is a cluster of three conditions. If the blood cholesterol is high, it is a cluster of three conditions.
- ABILITY TO ADJUST PERFORMANCE:** A person who has the syndrome is not able to adjust their performance. A person who has the syndrome is not able to adjust their performance. A person who has the syndrome is not able to adjust their performance.
- BLOOD PRESSURE:** A person who has the syndrome has a blood pressure that is higher than 130/80 mmHg. A person who has the syndrome has a blood pressure that is higher than 130/80 mmHg. A person who has the syndrome has a blood pressure that is higher than 130/80 mmHg.
- MUSCULOSKELETAL:** A person who has the syndrome has a muscle mass that is lower than 100 mg/dl. A person who has the syndrome has a muscle mass that is lower than 100 mg/dl. A person who has the syndrome has a muscle mass that is lower than 100 mg/dl.
- BLOOD HYPERCOAGULABILITY:** A person who has the syndrome has a blood clotting time that is longer than 100 mg/dl. A person who has the syndrome has a blood clotting time that is longer than 100 mg/dl. A person who has the syndrome has a blood clotting time that is longer than 100 mg/dl.

GLUCOSE METABOLISM



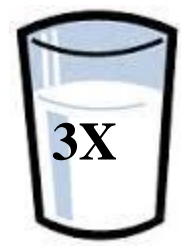
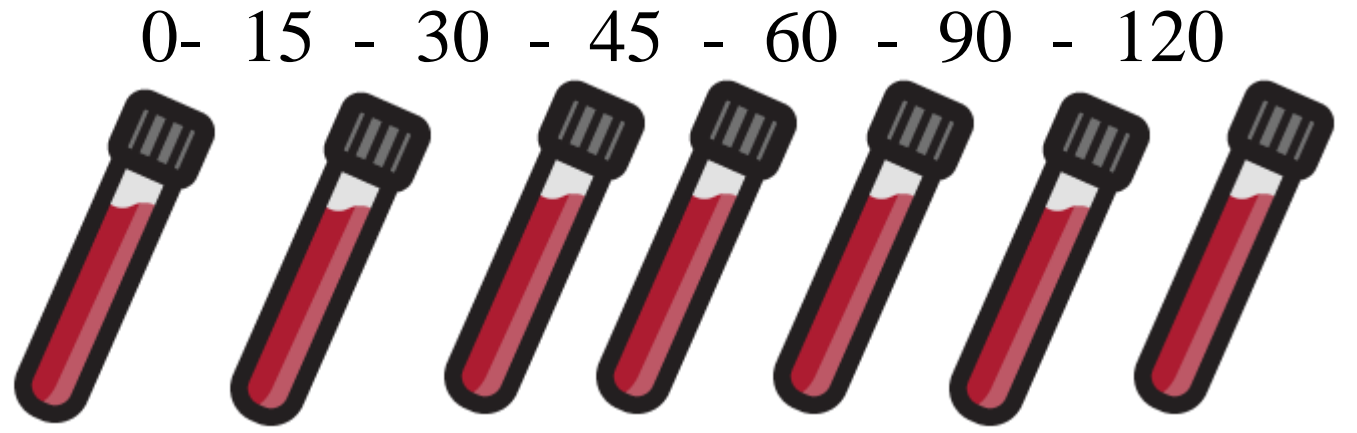
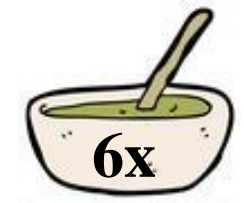
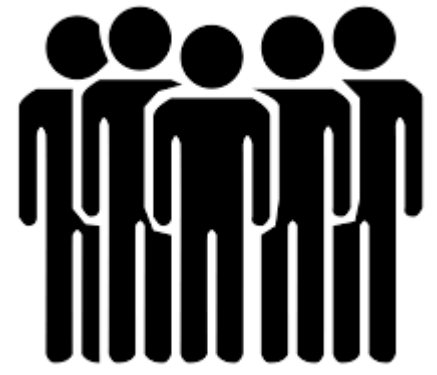
HYPERGLYCEMIA AND HYPERINSULINEMIA



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GI, II ASSESSMENT: express % compared with a specific standart (50g glucose)

Serial experiment:
2 groups; each of 15 persons



STANDART-GLUCOSE SOLUTION



SAMPLES OF FLAKES

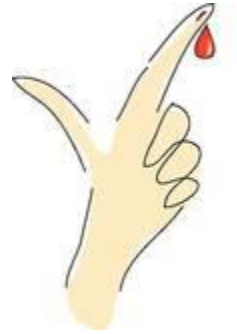
BLOOD SAMPLES

- 1st week - drink glucose 3x /week
- 2nd week - 2x / week
- 3rd week - 2x / week
- 4th week - 2x / week

In total: **4-6 weeks**



63X



126 ml



ANALYSIS

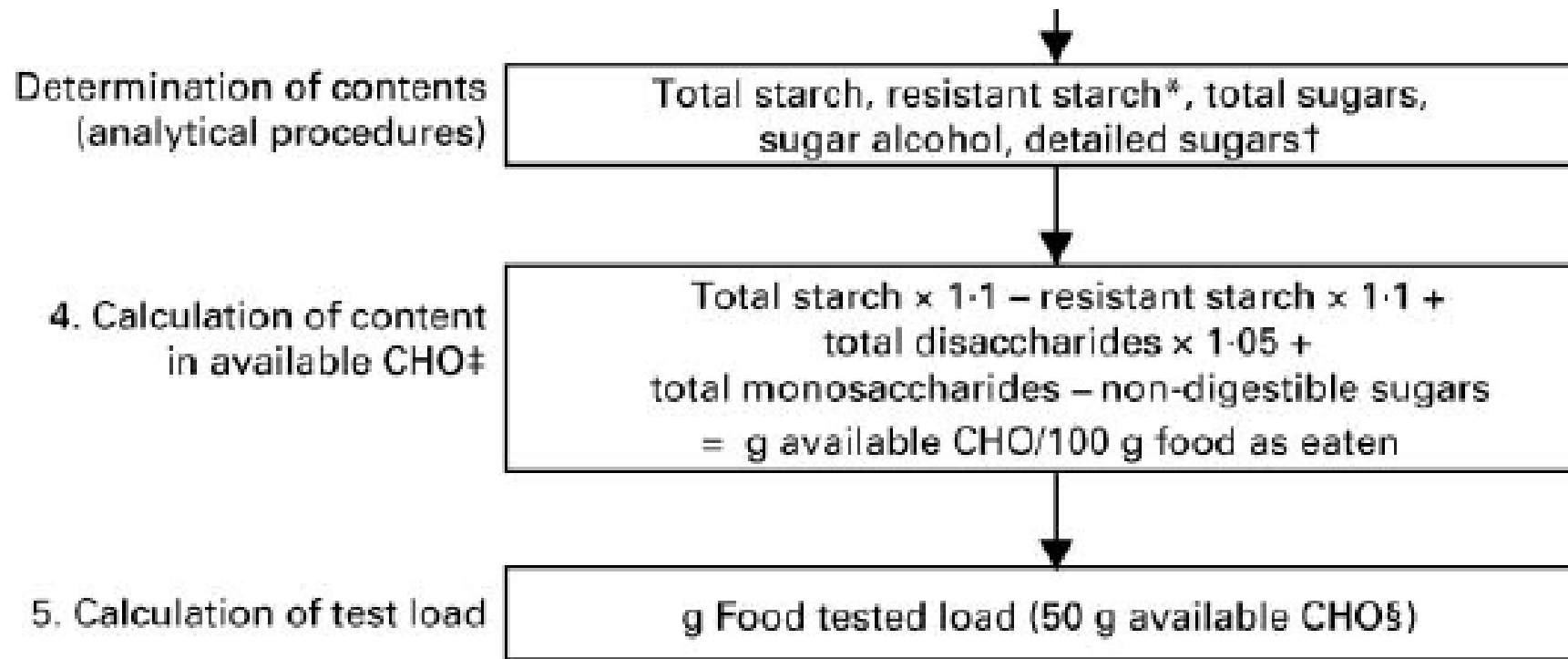
- GLUCOSE



- INSULIN
- C-peptide



SAMPLES OF FLAKES for GI determination - 50 g digestible carbs

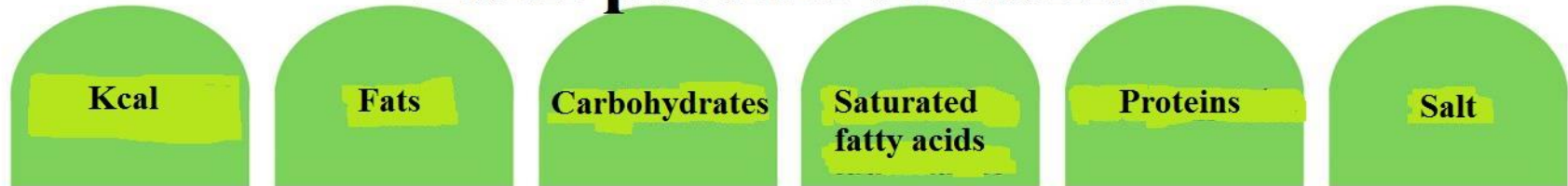


Brouns F., Bjorck I., Frayn K.N., Gibbs A.L., Lang V., Slama G., Wolever T.M. Glycaemic index methodology. // Nutr Res Rev. 2005 Jun;18(1):145-71.

SAMPLES OF FLAKES II determination- portion of 1000 kJ (239 kcal) product



Each portion contains:



TIME PERIOD FOR A STUDY.

- Maximal time period of the experiment is 6-8 weeks for each group (according to the method of experiment),
planned time in total - 4-6 weeks.
- Pauses of 2 days between tests (*washout period*).
- Apparent start non later than November (11.2015.)

ASSIGNMENTS

- **Analysis of newest information about GI determination methods, work out the study protocol (done).**
- **Coordination of study protocol with RSU Ethics Commission, creation of consent form for study volunteers (done).**
- **Create technical specification for laboratory outsourcing laboratory (done).**
- **Recruitment of volunteers:**
 - to prepare informative material about the study and aims;
 - to inform and to coordinate the schedule of study tests.
- **Inserting of information about the study in RSU homepage.**

ASSIGNMENTS in collaboration with LUA

- **Analysis of flakes (*ref. Brouns*)**

- dietary fibres
- starch
- resistant starch
- monosaccharides
- disaccharides

- **Preparation of different grain flake samples according to methods (5.11.2015)**

THANK YOU!

