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LiFT

Metabolic effects of high-fibre and low GI-diets among individuals with elevated cardiometabolic risk

Aim

The overall aim of the PhD project is to investigate metabolic effects of high vs low Glycemic Index diets and effectiveness of a high fibre diet among individuals with elevated cardiometabolic risk. The ultimate goal is to reduce the risk of developing type 2 diabetes.

Conclusion

Our findings suggest that low-GI foods may be an important part of a Mediterranean diet for postprandial and daily glucose control in people at risk for type 2 diabetes.

Objectives

1. Evaluate a Mediterranean dietary pattern with low GI vs high GI on long-term effects on glucose homeostasis (published)

2. Investigate associations between short chain fatty acids in plasma and postprandial glucose response (ongoing)

3. Identify differential postprandial glucose response after a meal glucose tolerance test and investigate the role of differential responders on metabolic effects (ongoing)

4. Evaluate the effectiveness of beta-glucan enriched bread on long-term glucose control among subjects with pre-diabetes (ongoing)
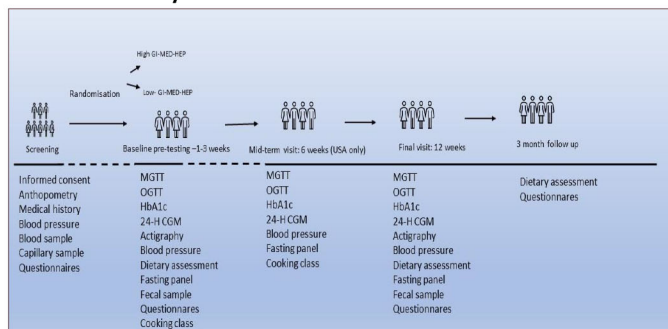
Introduction:

The Mediterranean diet, high in of fruit, vegetables, olive oil and moderate in animal-based products, has been associated with lower risk of developing type 2 diabetes (T2D) and cardiovascular disease (CVD). Foods with low glycemic index reduce postprandial glycemia in acute setting but it is yet unclear if the effect sustains after long term consumption and if they lower long-term risk factors of T2D among non-diabetics. Oat-derived β-glucan fiber reduce LDL- cholesterol and improve glycemia but it is yet unknown if long-term consumption of bread enriched with β-glucan can reduce risk factors of T2D (HbA1c and LDL-cholesterol)
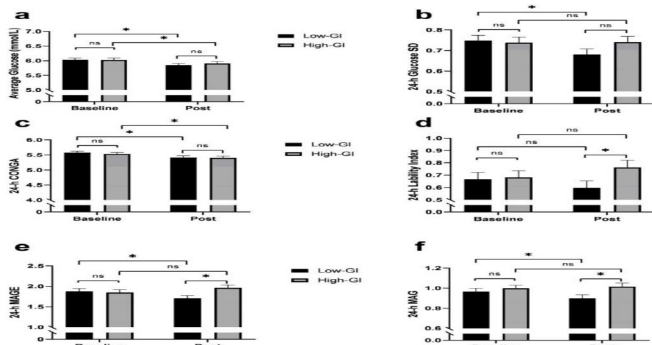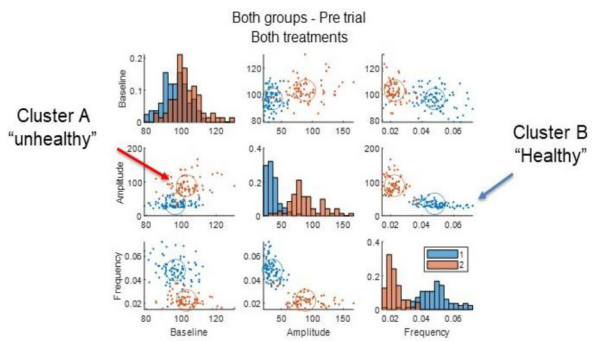

Result (objective 1): Postprandial glucose concentrations were lower after the low-GI test meal compared to the high-GI test meal, post intervention (p < 0.001). Indices of 24-h glycemic variability after the intervention were reduced in the low-GI group compared to the high-GI group.

Result (objective 3): Two different clusters were identified after a meal glucose tolerance test. The clusters associated differently with known T2D risk factors such as blood glucose (HbA1c), waist circumference, insulin resistance, glucose control and insulin sensitivity.

Method and materials
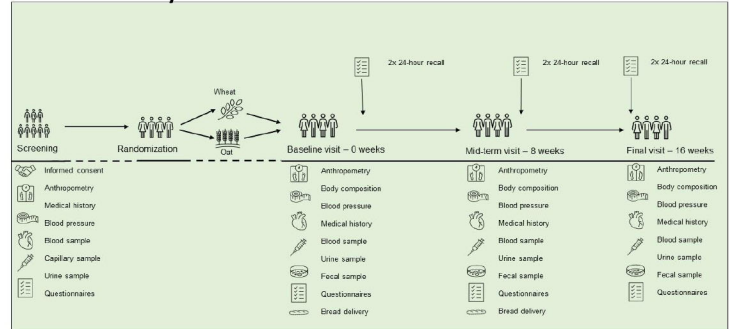
MEDGI-Carb study

Design: A 12-week international multicenter (Sweden, Italy and USA), randomized, dietary intervention trial, comparing high GI vs low GI in context of a healthy Mediterranean diet in adults at risk for type 2 diabetes.

CarbHealth study

Design: A 16-week international (Sweden, Norway, and Germany), multicenter, randomized, controlled dietary intervention trial, comparing a bread enriched with the oat derived fiber beta-glucan with a whole grain wheat bread in adults at risk of developing type 2 diabetes.