

Summary

INTRODUCTION: Milk and milk proteins have higher insulinogenic index than glycemic index. This feature is mainly attributed to whey proteins. The main goal of this thesis was to evaluate a C-peptide response after administration of whey proteins in healthy individuals (study 1) and in patients with type 2 diabetes mellitus (study 2) in comparison to other experimental stimulation tests.

METHODS: Eight young, healthy (7 males, 1 female; aged 20-26 years), non-obese (BMI: 17 - 25.9 kg/m²) participants with normal glucose tolerance were enrolled for study 1. Each individual underwent six C-peptide secretion tests in total. Three secretion tests measured C-peptide response to orally administered substances: whey proteins only (OWT), whey proteins with glucose (OWGT) and glucose only (OGTT, reference); while the other three secretion tests measured C-peptide response to intravenously administered substances: arginine (AST), glucagon (GST) and glucose (IVGTT, reference). Sixteen overweight (BMI 26,4 - 29,8 kg/m²) patients with type 2 diabetes mellitus, good glycemic control and with preserved fasting serum C-peptide levels ($0,94 \pm 0,07$ nmol/l) were enrolled for study 2. Two oral stimulation tests - one with 75 g of glucose (OGTT) and the other with 75 g of whey proteins (OWIST) - were used for assessing serum C-peptide and plasma glucose levels in each participant.

RESULTS: Study 1 showed that the C-peptide secretion (iAUC/min) stimulated by OWT was greater by 93 % ($p < 0,05$) than the C-peptide response after AST and 64 % smaller ($p < 0,05$) than response after OGTT. OWT also showed lower variability ($p < 0,05$) in C-peptide responses compared to OWGT and OGTT. The highest total C-peptide response was induced by OWGT (36 % higher than after OGTT). OWT consistently increased C-peptide concentrations, while not increasing glucose levels. In study 2, both oral tests induced similar pattern of C-peptide secretion, with a peak at 90 min. The serum C-peptide peak concentration after OWIST was 22 % lower than in OGTT. Similarly, the C-peptide iAUC₀₋₁₈₀ were 32 % lower in the OWIST than in the OGTT ($p < 0,01$). Contrary to OGTT the OWIST did not cause a significant increase of glycaemia ($p < 0,01$).

CONCLUSION: Findings from both studies indicate that administration of whey proteins leads to significant increase of C-peptide/insulin secretion in both healthy individuals and in patients with type 2 diabetes mellitus, while not increasing glycemic levels. As whey protein tests were also well-tolerated by both groups of individuals, whey protein tests might be a useful tool in estimation of stimulated serum C-peptide levels in patients with type 2 diabetes mellitus.