



Sansom Institute
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The Effect of Dairy on Insulin Sensitivity

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Abstract

Introduction: Insulin resistance is a condition of impaired sensitivity of tissues for insulin. Insulin sensitivity may be modified by modifying diet, which could include increasing dairy consumption. The literature is divided on dairy's effectiveness at reducing the risk of type 2 diabetes. Dairy may also be linked to cardiovascular health, and two common measures of vascular health are pulse wave velocity and augmentation index which examine the stiffness of arteries.

Objective: To recruit participants at risk of developing type II diabetes as well as healthy participants for a 10-week randomised crossover trial to determine if increased dairy intake improves insulin sensitivity and cardiovascular health.

Methods: 28 Participants underwent a ten-week crossover study and were required to eat a high (4-6 serves/day) and low dairy diet (0-0.5 serves/day) for four weeks each, with a two-week break in-between. A Low Dose Insulin and Glucose Infusion test (LDIGIT), a hyperglycaemic clamp, pulse wave velocity and augmentation index test were performed at the end of each four-week period.

Results: 28 people completed the study. No significant differences in insulin sensitivity were detected ($10.2 \text{ ml kg}^{-1} \text{ min}^{-1} / \text{pmol/L} \times 10^{-3}$ in the high dairy diet, and 9.4×10^{-3} in the low dairy diet for the LDIGIT ($P=0.7$)). The hyperglycaemic clamp test had an insulin sensitivity index of 40.4×10^{-3} and $34.2 \times 10^{-3} \text{ ml kg}^{-1} \text{ min}^{-1} / \text{pmol/L}$ for the high and low dairy diets respectively ($P=0.6$).

Augmentation index was $6.7 \pm 2.6\%$ for the high dairy diet, and $6.4 \pm 2.5\%$ for the low dairy diet. No significant differences were found between diets ($P=0.9$). Pulse wave velocity had a median 6.1 and 6.5 m/s in high and low dairy diets respectively ($P=0.9$).

Average glucose concentrations in the LDIGIT were 5.7 and 5.6 mmol/L in the high and low dairy diets respectively ($P = 0.9$). The LDIGIT steady state glucose (120-150 minutes) had concentrations of 5.4 and 5.3 mmol/L ($P=0.7$).

Fasting insulin LDIGIT values were 10.6 and 11.5 pmol/L in the high and low dairy values ($P=0.52$). Steady state insulin values for the LDIGIT were 44.3 and 44.8 pmol/L in respectively ($P=0.63$). Fasting clamp insulin values were 9.7 and 9.7 pmol/L ($P= 0.6$) respectively. Steady state values were 107.3 and 116.2 pmol/L ($P=0.5$)

Conclusion: No significant differences were detected for insulin sensitivity or cardiovascular health markers. For the hyperglycaemic clamp, in order for the 10% difference observed here to be statistically significant a sample size of 113 would be needed.