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## Postprandial glycaemic responses in women co-ingesting green leafy vegetables with a carbohydrate meal: interactions with the sirtuin system

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### Abstract

The addition of vegetable to carbohydrate-based meals has been shown to improve postprandial glucose homeostasis. Inter-individual variation in responses preclude conclusive evidence, particularly in women. The sirtuins and associated genes involved in producing the chemical, nicotinamide adenine dinucleotide (NAD), are emerging as key players in blood glucose control and may contribute to variable responses. This study aimed to investigate effects of co-ingesting green leafy vegetables (GLV) on postprandial glucose regulation following a carbohydrate meal and factors affecting inter-individual variation particularly around the sirtuin system.

Twenty-five women (BMI 24.8–30.5 kg/m<sup>2</sup>) were recruited to ‘The impact of Vegetables’ (VegGI) study on acute glycaemia and Glycaemia induced CVD risk in women: metabolic effects and Inter-individual variations. Postprandial glycaemic responses (GR) following rice (75 g of available carbohydrate), rice with bok choy (150g) or spinach (150g) were measured every 5 minutes for 4 hours using a Continuous Glucose Monitoring system (Medtronic Ltd). Anthropometric, cholesterol (Cholestech LDX, Alere), HbA1c (Afinion AS100, Alere) and insulin (Mercodia AB) measures were made in a fasted state. Oestradiol, progesterone, follicular stimulating hormone and testosterone were measured (ADVIA Centaur). Total RNA was extracted from postprandial blood collected at 0 h, 30 min, 1 h and 2 h in PAXgene blood RNA tubes (PreAnalytiX GmbH) using a Blood RNA Kit (Qiagen, Crawley, UK) and quality assessed by Agilent Bioanalyser (Agilent Technologies, Bracknell, UK). Gene expression was measured using the GenomeLab System and a custom designed multiplex assay, the hSIRTINADPlex (25 targets involved in the sirtuin signalling).

Linear mixed models (ver.24.0; SPSS Inc) revealed no effect of GLV consumption on postprandial GR. Principal component analysis (SIMCA-P + 12.0 software, MKS Instruments UK Ltd.) of postprandial GR indicated inter-individual variation in the responses associated with the test meals. Partial Least Square (PLS) stratified the cohort into two subgroups based on sirtuin system gene expression profiles. Postprandial GR was a contributing factor in the stratification observed, together with BMI, plasma lipid, insulin and glucose levels, but not menopausal status.

Preliminary evidence indicates that co-ingesting GLV with a carbohydrate meal does not reduce postprandial GR in women (BMI 24.8–30.5 kg/m<sup>2</sup>) and that significant inter-individual variation in postprandial GR may be linked to the sirtuin system, BMI, plasma lipid, insulin, and glucose levels but not menopausal status. Recruitment and data analysis are ongoing to increase group size and further assess contributing factors.

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### Conflict of Interest

There is no conflict of interest