



The impact of whey protein and leucine on postprandial adhesion molecules ICAM-1 VCAM-1, E-Selectin and P-Selectin: Findings from the Whey2Glo Study

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Dairy proteins including whey protein, and the amino acid L-Leucine found in relatively high concentrations in whey have been shown to modulate postprandial lipaemia and blood glucose excursions⁽¹⁾. A previous long-term study has demonstrated the ability of dairy proteins to lower the serum concentrations of ICAM-1 and VCAM-1⁽²⁾, cell adhesion molecules associated with a greater cardiovascular disease risk. However, direct evidence of the impact of whey protein and L-leucine on postprandial concentrations of adhesion molecules is scarce⁽³⁾. A secondary aim of the Whey2Glo study was to compare the acute effects of whey protein with wheat protein and to also determine whether the L-leucine content of the protein supplement effects serum adhesion molecule concentrations in those with normal to moderately raised fasted glucose concentrations.

The Whey2Glo study was a double-blind, placebo controlled, postprandial, crossover study using a sequential test meal format. Nine participants (5M, 4F, mean age: 61 ± 6 y, BMI: 24.4 ± 2.0 kg/m²) with normal to raised fasting glucose concentrations (5.2 to 6.9mmol/L) were randomised to consume 25 g of either whey protein isolate, an L-leucine-matched partially hydrolysed wheat protein with added L-leucine (2.57 g per 100g) or partially hydrolysed wheat protein at breakfast (0 min) and lunch (330 min), on separate occasions with a washout period of >3 weeks. Blood samples were collected at fasting (baseline) and then at 180, 300 and 420 minutes following the breakfast meal. Serum concentrations of adhesion molecules were measured using Luminex. A 2-factor repeat measures ANOVA was used to analyse the postprandial time course profiles and the summary measures area under the curve (AUC) and incremental area under the curve (IAUC) were calculated and analysed using 1-factor repeated measures ANOVA.

There were significant reductions after Bonferroni correction ($p < 0.016$) in the IAUC for the serum concentrations of VCAM-1 and P-selectin after meals containing whey protein isolate compared to those containing L-leucine-matched wheat protein ($p = 0.011$ and $p = 0.009$, respectively). There were no effects of the protein treatments on time course response curves or for AUC for all adhesion molecules, no effect on IAUC found for either ICAM-1 or E-selectin and no within subjects differences at baseline for the three study visits.

In conclusion these data suggest that whey protein, but not L-leucine may be mediating beneficial effects on the postprandial VCAM-1 and P-Selectin responses in those with normo- or moderately elevated glycaemia, although further research is required to confirm these results.

References

1. Stevenson EJ & Allerton DM (2018) *Proc Nutr Soc* 77, 42–51.
2. Fekete AA, Giromini C, Chatzidiakou Y *et al.* (2016) *Am J Clin Nutr* 104, 1534–44.
3. Hajizadeh-Sharafabad F, Zahabi ES & Tarighat-Esfanjani A (2022) *Br J Nutr* 128, 659–72.