The potential of dairy and non-dairy proteins for blood glucose management

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Type II Diabetes Mellitus (T2DM), is an increasingly concerning global epidemic, worsened by a lack of physical activity and the current obesogenic environment¹,². Despite the existing efforts to manage this disease, there is a definite need for enhanced lifestyle interventions and novel dietary strategies to prevent and treat T2DM. Evidence suggests that proteins may play a role in the management of blood glucose levels, by numerous mechanisms, including their insulin stimulating effects³,⁴. The aim of this research is to elucidate the potential glycaemic management properties of a range of plant derived proteins alone or in combination with dairy proteins.

In vitro experiments were conducted in the BRIN-BD11 cell line. Acute insulin secretion experiments (n = 4) were performed. Cells were incubated for 20 mins in the presence of a range of intact proteins [1 mg/ml]: two dairy fraction proteins (DFP) (DFP-1 and DFP-2), and two plant derived proteins (PDP) (PDP-3 and PDP-4); and hydrolysed proteins [1 mg/ml] including two hydrolysed plant derived proteins (HPDP) (HPDP-5 and HPDP-6) and one hydrolysed dairy fraction protein (HDFP) (HDFP-7); all in 16·7 mM glucose. Insulin release was measured by ELISA assay (Mercodia Ultrasensitive Rat Insulin, Sweden). Statistical analysis was performed using SPSS V20 software.

HPDP-5 and -6 both stimulated insulin secretion above baseline, while the intact proteins and HDFP-7 did not. Exposure to HPDP-5 and -6 induced an insulin release significantly higher than the baseline, 16·7 mM glucose; and significantly higher than their respective intact proteins (PDP-3 and -4) (table 1). Exposure to a combination of DFP-1 + HPDP-5 demonstrated an enhanced insulin release, which was significantly higher than baseline, positive control, DFP-1, the combination of DFP-1 + HPDP-5 and the HPDP-5 alone, p < 0·05 (table 1).

The cellular mechanisms of the glucose stimulated insulin secretion (GSIS) observed by the HPDP-5 and its enhanced effect when combined with an intact dairy fraction protein, DFP-1, are currently being examined, and should also be studied in vivo. This research will lay the foundations for the development of innovative foods ingredients for potential use in functional foods, targeted at pre-diabetics and people with T2DM.