

Pre-meal Very-low Dose Whey Protein Microgels: Insulin, Glucose and Gastric Emptying Effects in T2D

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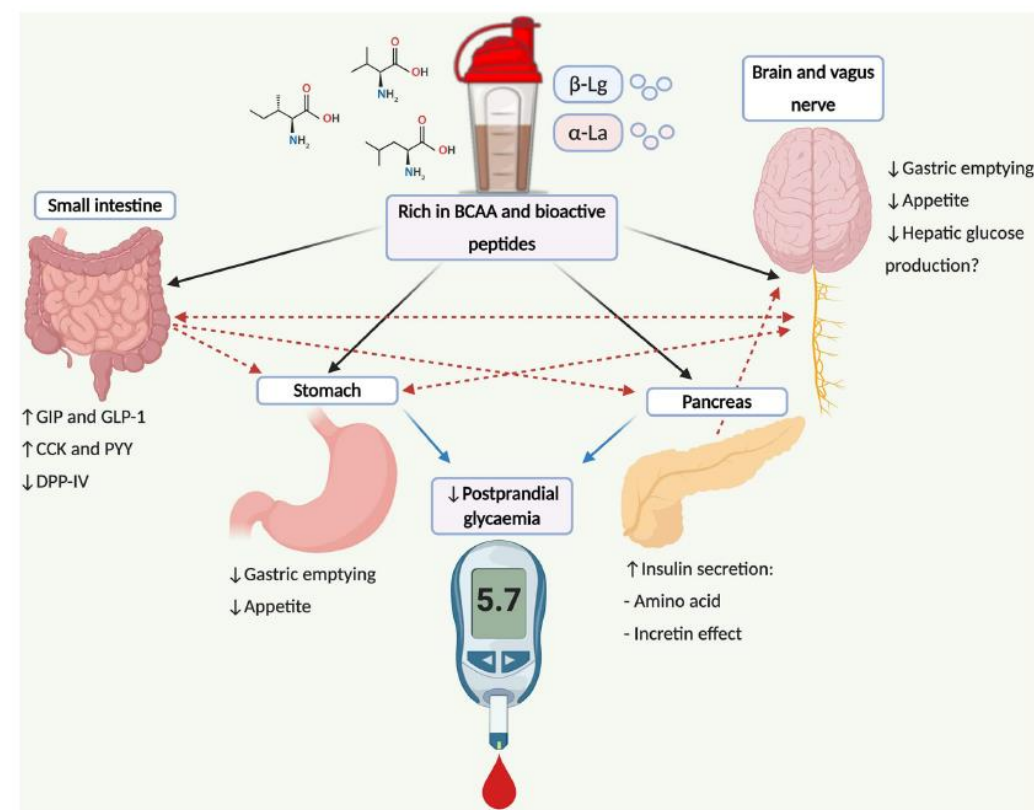
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Poster #: 249

BACKGROUND

- People with type 2 diabetes (T2D) and overweight or obesity often have impaired postprandial (PP) insulin reponse.
- Whey proteins (WP), found in dairy products, are rich in amino acids and peptides that can stimulate insulin secretion, but their routine use has been limited by requiring a high dose, and consumption well in advance of a meal.
- New micelle-technology [WPM] allowing for a more rapid absorption, could enable a greater potency of WP.

WP augment several interconnected mechanisms for postprandial glucose (PPG) regulation



Smith K, Bowden Davies KA, Stevenson EJ and West DJ. The Clinical Application of Mealtime Whey Protein for the Treatment of Postprandial Hyperglycaemia for People With Type 2 Diabetes: A Long Whey to Go. *Front. Nutr.* 2020; 7:587843.

OBJECTIVE

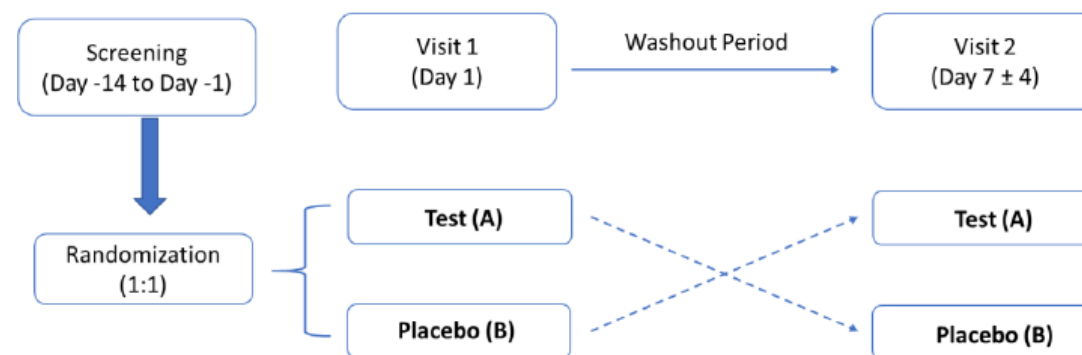
- To assess the effects of WPM on PP insulin secretion, glucose trajectory and gastric emptying.

METHODS

- This crossover study in drug-naïve or metformin-treated T2D with overweight or obesity, studied the effects of 10g WP (40kcal) prepared as WPM, or placebo (PBO, 0kcal), provided as a 125mL shot 15min ahead of a 250g pizza meal (622kcal [29.0g protein, 22.6g fat, 72.6g carbohydrates]).
- PP insulin, glucose trajectory and effects on gastric emptying (acetaminophen absorption) were evaluated in frequently drawn blood-samples over a 4h periode.
- The difference between WPM and PBO were assessed by comparing change in incremental (i), or total (t) areas under the curve (iAUC/tAUC) between the two interventions.
- ClinicalTrials.gov: NCT04639726

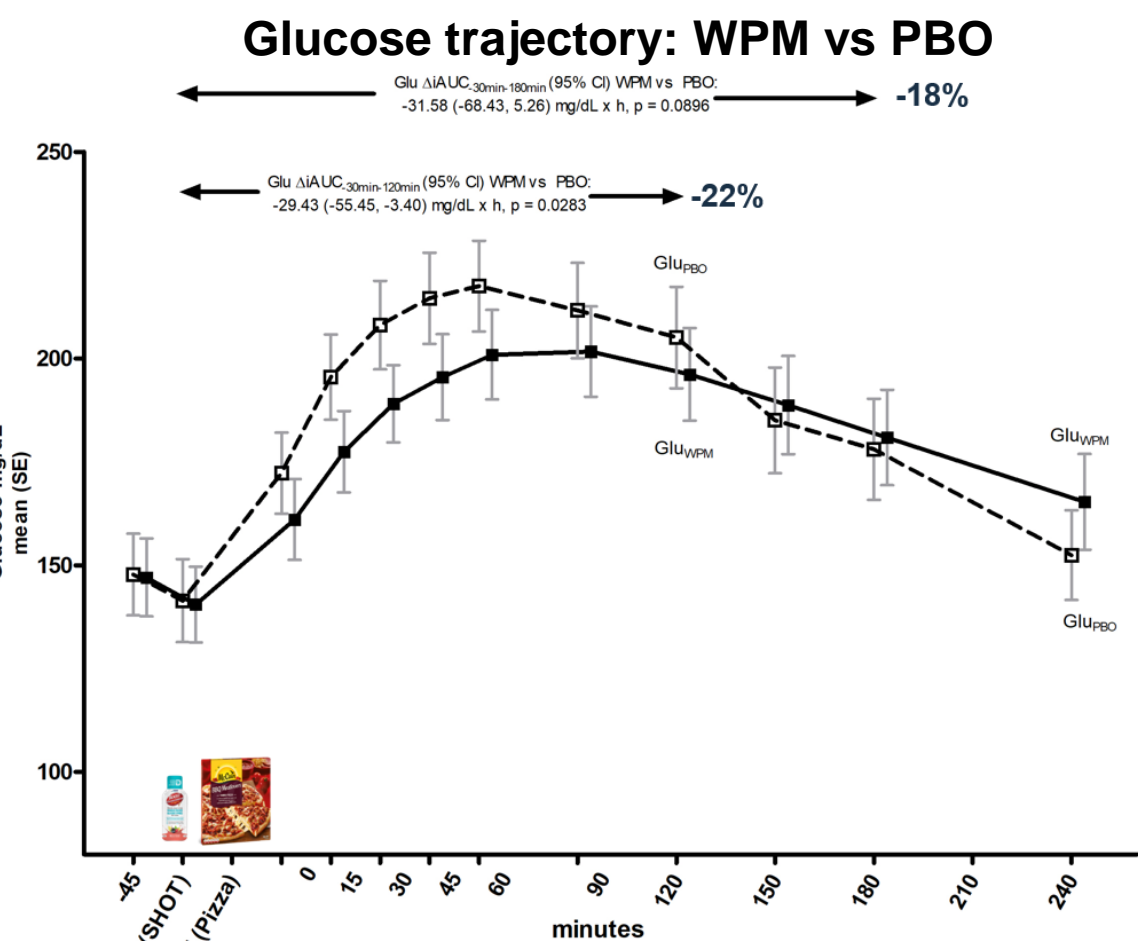
RESULTS

- In total 26 individuals (12 males, mean [SD] age 62.0 [8.3] years, baseline HbA1c 58 [12] mmol/mol /7.5 [1.1] %, eGFR 96.6 [25.7] ml/min/1.73m², BMI 29.2 [4.8] kg/m²) completed both sequences.



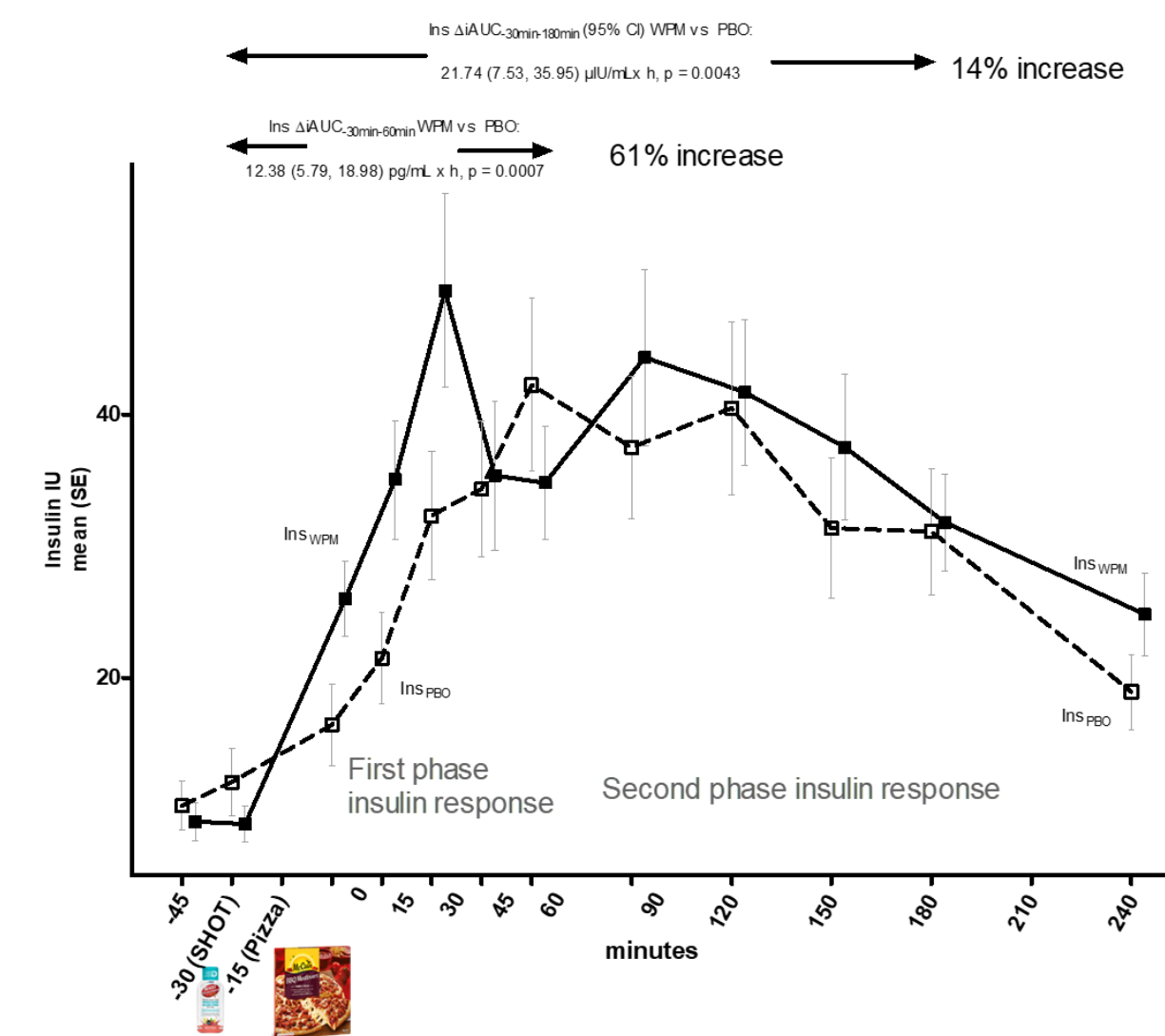
	Mean (SD), or n (%)
Age, years	62.0 (8.3)
Weight, kg	82.9 (15.0)
Body Mass Index, kg/m ²	29.2 (4.8)
Waist circumference, cm	101.3 (12.7)
HbA1c, %	7.5* (1.1)
Fasting plasma glucose, mg/dL	139.9** (42.9)
Total cholesterol, mg/dL	180.4*** (50.0)
Triglycerides, mg/dL	159**** (62)
Systolic/diastolic blood pressure, mmHg	129 (12)/77 (9)
eGFR (MDRD-formula), mL/min/1.73m ²	99.1 (24.7)
Medications	
Metformin	19 (73%)
Glimepiride	1 (4%)
Statins	8 (31%)

*58 mmol/mol; Old HbA1c = 0.0915 New + 2.15%; **7.8 mmol/L; mg/dL to mmol/L glucose: multiply by 0.0555; ***4.7 mmol/L; multiply by 0.02586; ****1.8 mmol/L; multiply by 0.01129

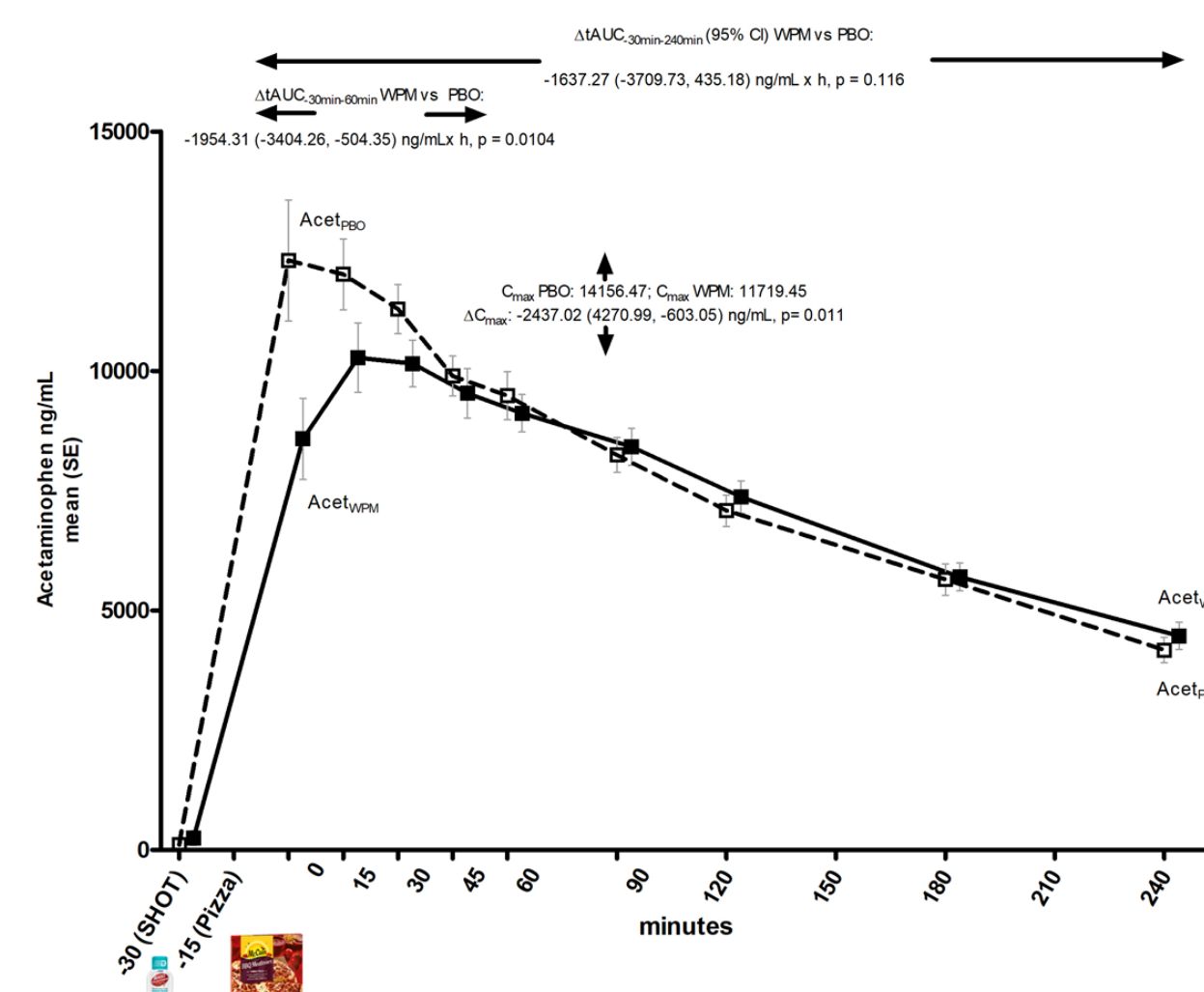


RESULTS (CONT.)

Insulin trajectory: WPM vs PBO



Gastric emptying: WPM vs PBO



LIMITATIONS

- Single center study
- Acute study
- Limited number of participants

DISCUSSIONS AND CONCLUSION

- Compared to placebo, 125 mL of 10 g WPM taken 15 minutes ahead of a meal significantly increased early insulin secretion by 61% at 1h and 30% at 3h, while altering the early postprandial glucose trajectory and reduced the 2h incremental area under the curve by 22%.
- An early differing effect on gastric emptying could be involved in the effect of WPM having a differing effect on glucose
- The reduction observed in early glycemic burden and augmented early insulin response, supports its use as a convenient pre-meal shot to improve postprandial metabolic profile in type 2 diabetes
- Longer term studies are needed to understand the full translational metabolic impact of this novel WPM formulation

Potential conflict of interests and acknowledgements

Author	Conflicts of interest
Luiz Henrique de Gregório, MD	None
Ian J Neeland, MD	Received consulting fee from NHSc and Boehringer Ingelheim
Roberto Zagury, MD	Received speakers fee from NHSc
Bo Ahrén, MD	None
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Emilie Perrin, MSc	Employment SOCAR, who has done analytical work paid by NHSc
Evan Berk, PhD	Employment NHSc
Maximilian von Eynatten, MD	Employment NHSc
Odd Erik Johansen, MD, PhD	Employment NHSc

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