

Protocol: Support GLP-1 Production

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Description

Understanding the physiological mechanisms of metabolic health and obesity is essential for developing new and targeted approaches for clinical management. This area of study concerns the connection between metabolic function and gut health—especially the gut microbiota, the collection of bacteria and other microorganisms inhabiting the digestive tract, with the greatest concentration in the colon. Cross-sectional population studies profiling the gut microbiome have repeatedly demonstrated decreased diversity in individuals exhibiting obesity and/or type 2 diabetes.¹ With growing evidence suggesting that gut microbiota contribute to many aspects of metabolism, the field is moving closer to specific gut-focused solutions for managing metabolic health and body weight.²

When fermentable carbohydrates are digested by certain bacteria in the gut, the bacteria release metabolites (e.g. short-chain fatty acids, or SCFAs) that trigger the secretion of GLP-1 and PYY, helping regulate energy balance and glucose homeostasis.³ Butyrate is a key SCFA that is mechanistically linked with metabolic benefits in numerous preclinical studies; bacterial strains such as *Clostridium butyricum* and *Faecalibacterium prausnitzii*, which possess genes to specifically increase butyrate production, can be of use to trigger host secretion of GLP-1 and PYY. Additionally, *Akkermansia muciniphila*, a keystone bacterial strain, secretes a P9 protein which stimulates GLP-1 production.⁴

Evidence indicates that lifestyle interventions (i.e. diet and exercise) for weight loss and metabolic health may depend on the baseline gut microbiota. A real-world challenge is that the gut microbiomes of individuals in developed countries tend to be depleted through many factors such as frequent antibiotic use, a Western diet, physical inactivity, and chronic stress. A promising clinical approach is thus to normalize an individual's gut microbiota so it is more like that found in healthy subjects. Precise approaches can be envisioned: namely, using precise probiotic strains with relevant mechanisms of action to target metabolic health improvements. Replenishment of specific microbes repeatedly shown to be diminished in patients with metabolic disorders, e.g., *Akkermansia muciniphila* and butyrate producers have the potential to support and amplify the beneficial effects of lifestyle interventions. Demonstratively, in a preclinical study, administration of a three-strain probiotic formulation containing *A.muciniphila*, *C. butyricum*, and *B. infantis*, 91% of participants demonstrated reduced overall food cravings.⁵

Supplement and Dietary Plan

- Supplement with **Pendulum GLP-1 Probiotic Pro**: 1 capsule, once daily with food
- Encourage intake of polyphenols such as pomegranate, green tea, and grape seed⁶
 - Supplement as necessary with **Pendulum Polyphenol Booster** to boost *Akkermansia* which may further enhance the benefits
- Encourage intake of prebiotic dietary fibers such as onion, chicory, garlic, asparagus, banana, and artichokes⁷
- Emphasize a dietary pattern with sufficient protein and fat to trigger satiety
- Consider supplementation with DHA/EPA to promote *Akkermansia* abundance⁸
- Consider a classic 5R protocol

References

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