

Protocol: Support Healthy Blood Sugar

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Disclaimer: The Pendulum team has created this protocol in collaboration with practitioners to assist healthcare partners during the creation of individualized patient treatment plans. When using this protocol, you should understand and accept that the recommendations in the protocol are for educational guidance and need to be adapted to meet individual patient needs. This may not be appropriate for every patient.

Description

A growing body of evidence suggests that specific, naturally occurring gut bacteria, particularly *Akkermansia muciniphila* and butyrate-producing microbes, are under-represented in the intestinal tracts of individuals with type 2 diabetes. The functions of these microbes, specifically maintenance of gut barrier integrity and butyrate production, are important to glucose and insulin homeostasis¹. The short-chain fatty acid, butyrate, is shown to be essential in glucose management by binding to receptors in the gut mucosa and stimulating the release of glucagon-like peptide-1 (GLP-1). GLP-1 is reduced in individuals with impaired glucose tolerance, which contributes to hyperglycemia. The benefits of GLP-1 impact health beyond diabetes management. In addition to supporting improved glucose control, GLP-1 promotes satiety, boosts general metabolic health, and supports improved cardiovascular health. In a placebo-controlled clinical trial, subjects administered a proprietary blend of *Clostridium butyricum*, *Anaerobutyricum hallii*, *Clostridium beijerinckii*, *Akkermansia muciniphila*, and *Bifidobacterium infantis* had significant improvements in glucose total area under the curve (AUC) and reductions glycosylated hemoglobin (A1C)¹. This five-strain formulation is available as Glucose Control.

To promote the benefits of healthy blood sugar, soluble fiber is imperative as a major energy source for gut microbes and substrate for butyrate production. To optimize the presence of *Akkermansia muciniphila*, polyphenol-rich prebiotic foods are not only beneficial antioxidants, but have also been shown to increase *Akkermansia* population in the gut².

Support your supplement plan with fiber-rich foods

Top Fiber-Containing Foods

Grains	Fruits	Vegetables	Nuts + seeds	Legumes
Oatmeal	Apples	Artichokes	Almonds	Beans
Quinoa	Avocados	Asparagus	Chia seeds	Edamame
Whole-wheat flour	Blackberries	Broccoli	Flaxseeds, ground	Lentils
Wheat bran	Pears	Cauliflower	Peanuts	Peas, split
	Raspberries	Potatoes	Pistachios	

Supplement Plan

Glucose Control: 1 capsule, twice daily with food

Polyphenol Booster: *optional add on to boost *Akkermansia* which may further enhance the benefits

References

1. Perraudeau F, McMurdie P, Bullard J, et al. Improvements to postprandial glucose control in subjects with type 2 diabetes: a multicenter, double blind, randomized placebo-controlled trial of a novel probiotic formulation. *BMJ Open Diabetes Research and Care* 2020;8:e001319. doi: 10.1136/bmjdr-2020-001319
2. Pérez-Jiménez, J., Neveu, V., Vos, F. et al. Identification of the 100 richest dietary sources of polyphenols: an application of the Phenol-Explorer database. *Eur J Clin Nutr* 64, S112–S120 (2010). <https://doi.org/10.1038/ejcn.2010.221>