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T2DM & the Microbiome

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COMPARATIVE ANALYSIS OF THE EFFICACIES OF PROBIOTIC SUPPLEMENTATION AND GLUCOSE-LOWERING DRUGS FOR THE TREATMENT OF TYPE 2 DIABETES: A SYSTEMATIC REVIEW AND META-ANALYSIS.

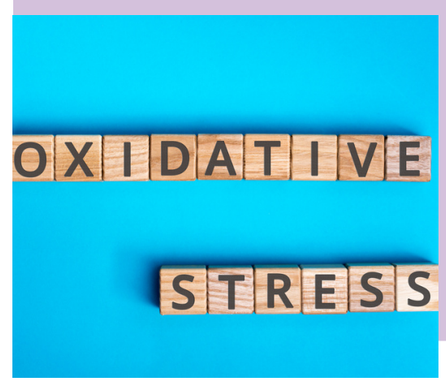
Liang, T ; Xie, X ; Wu, L ; Li, L ; Yang, L ; Gao, H ; Deng, Z ; Zhang, X ; Chen, X ; Zhang, J ; et al.
Frontiers in nutrition. 2022;9:825897
With Expert Review from Kirsty Baxter

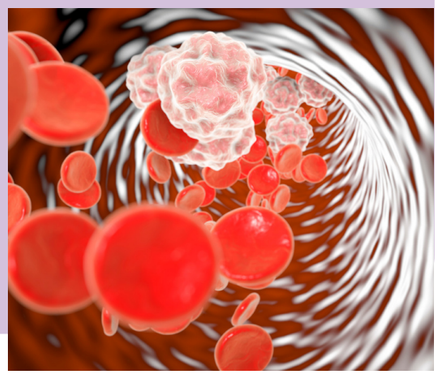
The aim of this systematic review and meta-analysis was to evaluate the effects of probiotics and glucose-lowering drugs (thiazolidinedione [TZD], glucagon-like pep-tide-1 receptor agonists [GLP-1 RA], dipeptidyl peptidase IV inhibitors, and sodium glucose co-transporter 2 inhibitors [SGLT-2i]) in patients with type 2 diabetes from randomized con-trolled trials (RCTs).
Probiotics were found to be less effective than specific antidiabetic drugs in reducing fasting blood sugar levels (FBS), HbA1c levels, and triglycerides. Different probiotic formulations were effective in reducing the HOMA-IR index, total cholesterol (TC), triglycerides (TG), and systolic and diastolic pressure (SBP and DBP). A subgroup analysis showed a greater reduction in FBS, HbA1c, TC, TG, and SBP in obese and elderly participants, those who participated for a longer duration, and those from Eastern origins. Considering the high heterogeneity in baseline study characteristics among the studies included in this systematic review and meta-analysis, further studies are required to evaluate the effects of probiotics and antidiabetic drugs. However, healthcare professionals can use the study to understand the effect of probiotics and antidiabetic drugs in reducing glycaemic, lipid and hypertension profiles.

THE EFFECTS OF PROBIOTIC AND SYNBIOTIC SUPPLEMENTATION ON INFLAMMATION, OXIDATIVE STRESS, AND CIRCULATING ADIPONECTIN AND LEPTIN CONCENTRATION IN SUBJECTS WITH PREDIABETES AND TYPE 2 DIABETES MELLITUS: A GRADE-ASSESSED SYSTEMATIC REVIEW, META-ANALYSIS, AND META-REGRESSION OF RANDOMIZED CLINICAL TRIALS

Naseri, K ; Saadati, S ; Ghaemi, F ; et al.
European journal of nutrition. 2023;62(2):543-561

Chronic inflammation can contribute to and exacerbate diseases such as type 2 diabetes (T2D). The gut microbiota and the use of probiotics has been shown to modulate processes within the body and decrease chronic inflammation, however findings are not consistent. This systematic review and meta-analysis aimed to determine the effect of probiotics and synbiotics on inflammation in individuals with prediabetes and T2D. A total of 32 randomised control trials were included in the meta-analysis and showed that certain, but not all, inflammatory markers were reduced. Antioxidants were increased. The effect was especially pronounced in individuals with T2D as opposed to prediabetes. It was concluded that probiotics or synbiotics could be useful for individuals with T2D to reduce inflammation and reduce the risk for other associated diseases such as heart disease.





HIGH-FIBER DIET AMELIORATES GUT MICROBIOTA, SERUM METABOLISM AND EMOTIONAL MOOD IN TYPE 2 DIABETES PATIENTS

Chen, L ; Liu, B ; Ren, L ; Du, H ; Fei, C ; et al.
Frontiers in cellular and infection microbiology. 2023;13:1069954

Accumulating studies have demonstrated that there are strong correlations between type 2 diabetes mellitus (T2DM) and gut microbiota. A nutritious diet composed of an adequate level of dietary fibres could provide enough carbohydrates for the gut microbiota to ferment, and the microbial metabolites could provide energy supply and regulate the immune function of the host. The aim of this study was to analyse the changes in gut microbiota, serum metabolism and emotional mood of patients with T2DM after consumption of a high-fibre diet. This study was a randomised, open-label, parallel-group clinical trial in T2DM patients with a 4-week treatment period. Seventeen patients clinically diagnosed with T2DM enrolled in the clinical trial and were randomly assigned into two groups: the control group (n = 8) or the intervention group (n = 9).
Results showed that the high-fibre diet, when compared to the control group: 1) improved glucose homeostasis and lipid metabolism of participants with T2DM; 2) decreased serum levels of inflammatory chemokines in participants with T2DM; 3) alleviated depression and anxiety symptoms, particularly by the uptake of more diverse carbohydrates in the diet in participants with T2DM; and 4) enhanced the diversity of gut microbiota in the treatment group.
Authors conclude that dietary fibre demonstrated protective impacts and the gut microbiota composition improved the glucose homeostasis in patients with T2DM.

IMPACT OF DIETARY INTERVENTIONS ON PRE-DIABETIC ORAL AND GUT MICROBIOME, METABOLITES AND CYTOKINES

Shoer, S ; Shilo, S ; Godneva, A ; Ben-Yacov, O ; Rein, M ; Wolf, BC ; et al.
Nature communications. 2023;14(1):5384

Pre-diabetes, a condition characterized by elevated blood glucose levels but below diabetes thresholds, is a significant risk factor for the development of type 2 diabetes, as well as other comorbidities including cardiovascular and kidney diseases. Diet plays a critical role in the development of hyperglycaemia and the onset of pre-diabetes. The aim of this study was to assess the impact of a personalized postprandial glucose-targeting diet (PPT), as well as the standard of care Mediterranean diet (MED), on the oral and gut microbiome, metabolites and cytokines in 200 pre-diabetic individuals. This study was a biphasic, randomised, controlled, single-blind dietary intervention. Phase one included a six-month intervention that compared two diets targeting glycaemic control, while phase two included a six-month follow-up period. Results showed that participants assigned to the PPT diet had significant changes in 19 gut microbial species, 14 gut and one oral microbial pathway, 86 serum metabolites and four cytokines. Participants assigned to the MED diet showed significant changes in five gut and one oral microbial species, 18 gut microbial pathways, 27 serum metabolites and four cytokines. Authors conclude that dietary interventions can affect the microbiome, cardiometabolic profile and immune response of the host. Thus, diets such as the PPT used in this study, which takes into account microbiome features, could be designed to affect the microbiome and inflict desired metabolic outcomes.

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