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TYPE 2 DIABETES
& THE GUT

WHITEPAPER



TYPE 2 DIABETES

Type 2 diabetes, or T2D, is a serious disease which is characterised by an inability to effectively regulate blood sugar content. T2D is often distinguished by high levels of blood sugar, the result of an impaired response of our body to insulin (hormone managing blood sugar content). If not managed appropriately it can lead to consequences such as damage to different parts of the body including the eyes, heart and feet.

There is currently no cure available for this condition, however it is easily manageable with medications and diet. T2D is often linked to obesity or inactive lifestyle, with other risk factors being genetic predisposition and age. The number of T2D cases is growing worldwide⁽¹⁷²⁾.

T2D is associated with a noticeable shift in microbial communities. Two independent large-scale studies have demonstrated there are reduced levels of important butyrate-producing bacteria such as *Roseburia intestinalis* and *Faecalibacterium prausnitzii* in T2D individuals^(144, 145). Certain drugs used in the treatment of T2D can unexpectedly affect the gut's microbiota.

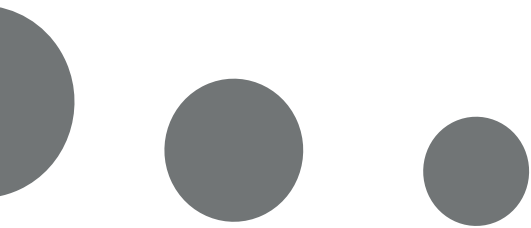
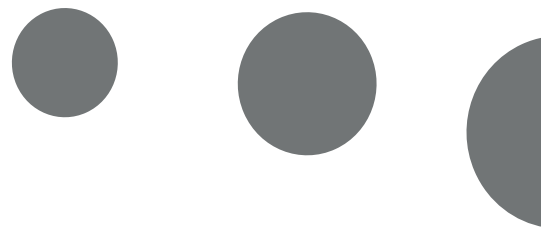
Metformin is used widely to control T2D; animal experiments have demonstrated that this drug increases the concentration of *Akkermansia muciniphila*, a bacteria usually associated with health benefits – better weight and glucose control, both in human and rodent models^(146, 147, 148).

Several independent studies emphasise that Short-Chain Fatty Acids (SCFAs) can improve the condition. Daily supplementation with fibre (30g) for 4 weeks has been shown to increase levels of acetate and propionate, which was associated with improved insulin sensitivity of the cells. A Fibre-rich diet has also been associated with increasing the ability and efficiency of gut microbes to produce more SCFAs.

In contrast to observed positive effects of SCFAs, some other microbial products have been considered as risk factors of T2D. The increased production of phenolic compounds and branched chained amino acids (BCAA) correlates with the occurrence of T2D. Typically high levels of phenolic compounds and BCAA are linked to increased protein consumption in a diet, which is a typical trend in wealthy countries today⁽¹⁴⁾.

Manipulation of the bacterial products derived from fibre or protein supplied with food is likely a valuable strategy to prevent or alleviate T2D together with other related disorders (such as obesity).





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