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Matcha green tea targets the gut-liver axis to alleviate obesity and metabolic disorders induced by a high-fat diet

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Abstract

Obesity induced by a high-fat diet (HFD) is an increasing global health problem, leading to many metabolic syndromes. As the emerging food additive rich in tea polyphenols, theanine, caffeine, and so on, matcha green tea has gained more and more popularity for its outstanding potential in ameliorating metabolic disorders. This study investigated the composition and antioxidant activity of matcha green tea and further explored its effects on gut-liver axis homeostasis in an HFD-induced obese mouse model. Male (7-8 weeks old) C57BL/6J mice were divided into four groups with the following dietary supplementation for 8 weeks: a normal chow diet (NCD), a normal chow diet+1.0% matcha (NCM), a high-fat diet (HFD), and a high-fat diet+1.0% matcha (HFM). The results demonstrated that matcha green tea ameliorated the development of obesity, lipid accumulation, and hepatic steatosis induced by HFD. Subsequently, dietary matcha supplementation restored the alterations in fecal bile acid profile and gut microbial composition. Meanwhile, the levels of mRNA expression in hepatocytes demonstrated that matcha intervention made significant regulatory on the multiple metabolic pathways of hosts involved in glucose, lipid, and bile acid metabolism. These findings present new evidence for matcha green tea as an effective nutritional strategy to mitigate obesity and relevant metabolic disorders through the gut-liver axis.

Keywords: bile acid; gut microbiota; metabolic regulation; obesity; tea polyphenols.

Figures

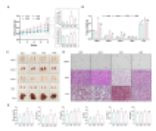

Figure 1 Effect of matcha supplementation on...

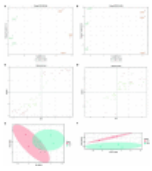

Figure 2 Effects of matcha supplementation on...

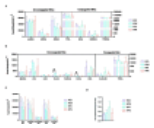

Figure 3 Effects of matcha supplementation on...

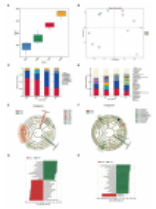

Figure 4 Effects of matcha supplementation on...

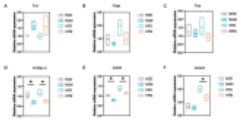

Figure 5 Effects of matcha supplementation on...

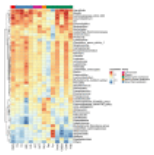

Figure 6 Spearman's correlation analysis of the...

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