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Astragalus polysaccharide promotes the curative effect of metformin

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Metformin is recommended as the first line treatment of diabetes. However, the clinical efficacy of metformin decreases with the prolongation of medication. To explore the effective adjuvant therapy drugs with metformin is beneficial. An insulin resistance mouse model induced by high-fat diet (HFD) was used to study the therapeutic effect and mechanism of metformin combined with Astragalus polysaccharide (APS), a natural plant polysaccharide, which was extracted from the stem or dry root of Huangqi (*Astragalus membranaceus* (Fisch.) Bge). Besides evaluating the immunity and inflammation, gut microbiota of mice was analyzed by the 16S rRNA sequence analysis to explore the potential mechanism. Further, the effects of HFD and metformin combined with APS on serum metabolites were studied by metabolomics. Metformin combined with APS treatment improved body weight gain, blood glucose, insulin tolerance and insulin resistance in mice fed with HFD. Moreover, APS could promote metformin to improve blood lipid disorder, pancreatic tissue, and liver tissue damage. Results showed that APS could promote metformin to improve immunity by increasing immunoglobulin and immune cells, and to improve inflammatory by reducing pro-inflammatory cytokines and increasing anti-inflammatory cytokine. The 16S rRNA sequence analysis demonstrated that APS could promote metformin to alter HFD induced gut microbiota dysbiosis, in which it decreased the phylum Firmicutes/Bacteroidetes ratio of HFD-fed mice. Particularly, it reduced the relative abundances of genus *Intestinimonas* and *Romboutsia ilealis* (considered as a potential worsener of glucose metabolism). Else, metabolomics analysis revealed that APS could promote metformin to reduce lysophosphalipid metabolites, which were positively correlated with genus *Intestinimonas*. APS could promote the curative effect of metformin by regulating gut microbiota to enhance immunity, suggesting APS might be a potential adjuvant therapy drug with metformin in clinic.

Biography

Jianglan Long, an ethnic minority from China, has completed her MS (master's degree) from Chengdu University of Traditional Chinese Medicine and studying for a PhD (doctor's degree) in Beijing Friendship Hospital, Capital Medical University. She is mainly engaged in research on the diagnosis of diabetes and treatment of integrative Chinese and Western medicine. After doctor's admission in 2020, she has published paper about the diagnosis of diabetes in Clinical and Translational Medicine, and has obtained two Chinese authorized patents. At present, she has submitted two applications for Chinese invention patents.

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