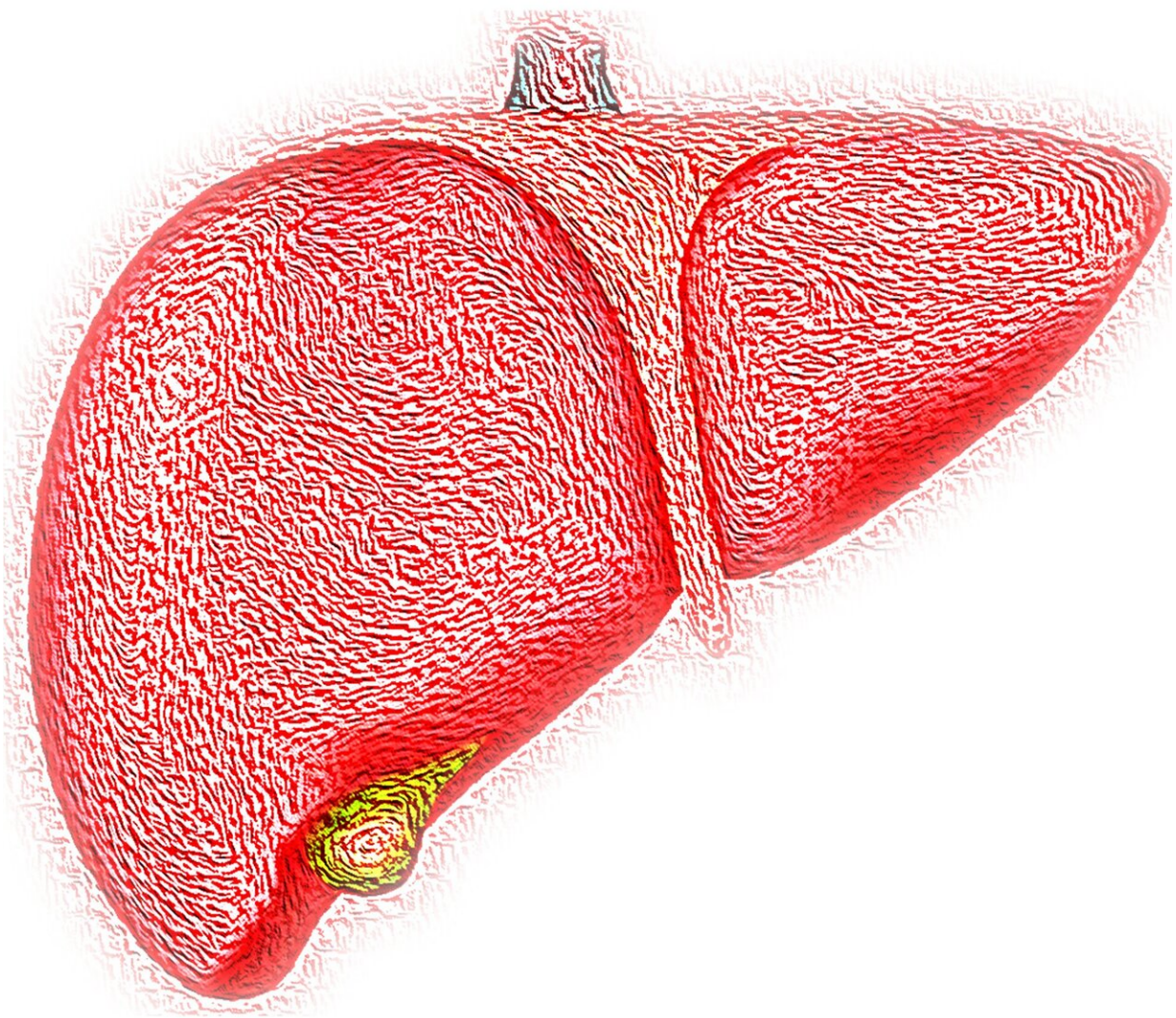


# Experimental treatment confers benefits for the alleviation of nonalcoholic hepatic steatosis

August 13 2020, by Liu Jia

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Prof. Liu Hongwei's group and Prof. Liu Shuangjiang's group from the Institute of Microbiology of the Chinese Academy of Sciences has reported the anti-NAFLD effects of a Ganoderma meroterpene derivative that increased the abundance of *Bacteroides* spp. to activate Bacteroides-folate-liver pathway and further alleviate nonalcoholic fatty liver disease (NAFLD). The study was published in *Cell Reports*.

NAFLD, one of the most common chronic liver diseases, has become a worldwide health concern. However, no effective drugs have been approved so far. The outstanding chemical diversity and bioactivity of natural products and their derivatives have put them under the spotlight as potential sources of drugs. Ganoderma mushroom, for example, have been used as a traditional Chinese herbal medicine for thousands of years.

Recently, a study demonstrated the effect of a Ganoderma meroterpene derivative (GMD) in ameliorating nonalcoholic hepatic steatosis in fa/fa rats. According to the study, the administration of GMD increased lipid oxidation, suppressed de novo lipogenesis, and lipid export from the liver, and inhibited endotoxemia. Yet, as an active agent less likely to be absorbed through oral administration, the mechanism of GMD's effect is elusive.

In this study, after in vitro and in vivo assays, the researchers confirmed that an altered gut microbiota with an increase of butyrate and folate-producing [gut bacteria](#) were the key factors that contributed to the therapeutic effects of GMD on NAFLD. Four folate-producing bacteria,

*Bacteroides xylanisolvens*, *B. thetaiotaomicron*, *B. dorei*, and *B. uniformis*, enriched by GMD were identified. This is the first report about the ability for these four intestinal bacteria to produce folate.

Furthermore, oral administration of live *B. xylanisolvens*, which is the bacterium most boosted by GMD, alleviated hepatic steatosis in mice with the activation of folate-mediated signaling pathways. To validate the role of gut-produced folate in NAFLD, the researchers generated a folate-deficient strain of *B. xylanisolvens* (BX $\Delta$ folP) by knocking out the folp gene in the folate biosynthetic pathway. Gavages with BX $\Delta$ folP failed to alleviate NAFLD in mice.

This study demonstrates the anti-NAFLD effect of a Ganoderma-derived compound, identifies a specific and useful gut *Bacteroides*-Folate-Liver Axis for the treatment of NAFLD, and discovers a group of potential probiotics beneficial for the prevention of NAFLD. The finding opens up a new perspective for future NAFLD drug discovery and broadens the scope of NAFLD treatments.

**More information:** Shanshan Qiao et al. Activation of a Specific Gut *Bacteroides*-Folate-Liver Axis Benefits for the Alleviation of Nonalcoholic Hepatic Steatosis, *Cell Reports* (2020). DOI: [10.1016/j.celrep.2020.108005](https://doi.org/10.1016/j.celrep.2020.108005)

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