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Polysaccharides from *Lycium barbarum* attenuates hepatic steatosis, fibrosis and inflammation in a non-alcoholic fatty liver diseases (NAFLD) rat model

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BACKGROUND/AIMS: *Lycium barbarum* polysaccharides (LBP) are derivative from Wolfberry with antioxidant and neuroprotective properties. Although it shows beneficial effects against aging and oxidative stress in neuron, but whether LBP possesses protective effects in chronic liver injury, such as in non-alcoholic fatty liver disease, (NAFLD), is still unknown. We aimed to investigate the protective effects of LBP in a NAFLD rat model. **METHODS:** Female rats were fed a high-fat diet to induce NAFLD with or without an oral 1 mg/kg LBP feeding every day. Control rats were given regular chow or with LBP. After 8 weeks, rats were euthanized. Blood and liver samples from each rat were subjected to histological, biochemical, and molecular analyses. **RESULTS:** Compared with control rats (regular chow), NAFLD rats showed obvious fat accumulation and inflammatory foci in the liver, which was accompanied by dysregulated lipid metabolism gene expressions. NAFLD induction also increased the formation of fibrosis with induced fibrogenic gene expressions. Pro-inflammatory cytokines, such as TNF- α and IL-1 β , were induced in the NAFLD rats. In contrast, LBP co-treatment in NAFLD rats showed attenuation of fat accumulation in the liver, partly through down-regulation of the expressions of lipogenic genes (SREBP-1c and PPAR γ -2) and up-regulation of the expressions of lipolysis genes (ATGL and adiponectin), leading to re-balance the status of lipid metabolism. Furthermore, co-treatment with LBP drastically reduced the formation of hepatic collagen, partly through down-regulation of the expressions of fibrogenic genes, including TGF- β 1, α -SMA, and pro-collagen 1. Elevated expressions of pro-inflammatory cytokines were reversed by LBP as well. Vehicle-LBP group showed no evidence of hepatic injury and toxicity. **CONCLUSION:** LBP is a novel hepato-protective agent against NAFLD caused by abnormal liver functions, such as hepatic steatosis, fibrosis and inflammation. LBP (Wolfberry) could be considered as a potent food supplement in the prevention of early-stage of chronic liver disease.