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Berberine protects acute liver failure in mice through inhibiting inflammation and apoptosis

Lulu Xu, Xia Zheng and **Yubin Zhang**
China Pharmaceutical University, China

Liver is an important metabolic organ, which is usually attacked by various toxic substances, such as bacteria, viral hepatitis, alcohol and hepatotoxic drugs. ALF, characterized by a sudden large area of inflammation and extensive hepatocyte death, is defined as a life-threatening disease with a high mortality rate. Although many drugs are commercially available to ALF, there are still no ideal therapeutic methods. Berberine (BBR), an isoquinoline alkaloid extracted from Chinese herb Rhizoma Coptidis, has several pharmacological activities. The study was aimed to investigate the effect of BBR on ALF *in vivo* and *in vitro*. Mice were administered intraperitoneally with BBR (5, 10 and 15 mg/kg/d) and orally with silymarin (200 mg/kg/d) for 3 days prior to an injection of D-Galactosamine (D-GalN)/lipopolysaccharide (LPS). The mortality and liver damage were subsequently evaluated. The results showed that BBR attenuated D-GalN/LPS induced liver damage, as evidenced by the reduction of mortality, the alleviation of liver pathological changes and the down-regulation of alanine aminotransferase (ALT)/aspartate aminotransferase (AST). Additionally, BBR exerted anti-oxidant capacity with the rise of hepatic glutathione (GSH) in ALF. The data also exhibited that BBR suppressed D-GalN/LPS induced the nuclear translocation of NF-κB p65 and the expressions of tumor necrosis factor-α (TNF-α) and interleukin-6 (IL-6) at mRNA and protein levels. *In vitro*, human L02 hepatocytes injury was stimulated by D-GalN (5 mM)/TNF-α (100 ng/ml) and the cell apoptosis was improved by pre-incubation with BBR. Western blotting showed that BBR effectively suppressed apoptosis via modulating bax/bcl-2 rate, cytochrome c release and caspase-3/-9 cleavage. In summary, we concluded that BBR may be a potential strategy for the treatment of ALF. Our findings demonstrated that the hepatoprotective property of BBR was relied on inhibiting inflammation and apoptosis in ALF.

Biography

Lulu Xu is doing her PhD in Life Sciences from the School of Life Science and Technology, China Pharmaceutical University. Her research work focuses on liver diseases. She has done her Bachelor's degree from China Pharmaceutical University, China.

994516225@qq.com

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