Medicine food homology plant extracts alter the gut microbiota and metabolism, alleviates polymicrobial sepsis-induced liver injury via promoting release of interleukin-10 from M2 macrophage in mice

Significance of this study

What is already known on this subject?

► The gut-liver-immune axis describes important bidirectional communications between the intestinal microbiome, liver and the mucosal immune system.

► The intestinal barrier is critical for conserving normal physiology of the gut microbiome. Pathogenic bacterial adherence to mucosal surfaces and barrier damage is central in mucosal immune priming and may be important in the progression of liver disease.

► Polysaccharide, alkaloids, brass, polyphenols and saponins derived from MFH plants have been shown to have antibacterial and antiinflammatory properties.

► Modulation of gut microbiota using prebiotics and probiotics may improve host metabolism and reduce sepsis and sepsis induced liver injury.

What are the new findings?

► MFH can protect mice against sepsis and reverse sepsis-induced gut dysbiosis, leaky gut, inflammation, liver injury and ABX-induced damages in CLP mice.

► MFH modulates the composition of the gut microbiota, notably by enriching the gut bacterium *Enterococcus* and *Lactobacillus.*

► Oral treatment of CLP mice with live *L. johnsonii* bacteria prevents death, improves intestinal integrity and reduces inflammation and liver injury by promoting the release of IL-10 from M2 macrophages.

► MFH increases the production of tryptophan (Trp) and phosphatidylcholines (PCs), which are contributed to induction of M2 macrophages, by the microbiota, improving gut barrier function.

How might it impact on clinical practice in the foreseeable future?

► MFH represents a novel class of prebiotics to improve the treatment of sepsis patients.

► *E. faecalis* and *L. johnsonii* are novel probiotic bacterium that may be used to treat sepsis and associated liver injury.

► *L. johnsonii* promotes the release of IL-10 from M2 macrophages to alleviate sepsis liver injury, which shed light on a novel mechanism of sepsis injury and suggest that the therapy via targeting microbiome, IL-10 is a promising strategy to prevent sepsis injury.