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Emerging benefits of soy protein on liver and metabolic health

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Greater than two-thirds of U.S. adults are classified as overweight or obese. In the liver, obesity manifests as nonalcoholic fatty liver disease (NAFLD), a spectrum of pathologies ranging from simple steatosis (excess fat accumulation) to nonalcoholic steatohepatitis (NASH; inflammation and fibrosis) and cirrhosis. Disturbingly, NAFLD affects greater than 30% of the US adult population and is considered the hepatic manifestation of the metabolic syndrome. Currently, there are no proven pharmacological therapies for the treatment of NAFLD. Diets high in soy protein have been linked to a number of beneficial metabolic/health outcomes, including improved insulin sensitivity, reduced inflammation and metabolic syndrome, and improved endothelial function/vasodilatory responses. In addition, emerging evidence from our lab and others suggests that diets high in soy protein and/or supplementation of soy bioactive components have beneficial effects on hepatic lipid metabolism and can lower NAFLD. Work from our lab demonstrates that dietary soy protein feeding improves cholesterol homeostasis and reduces indices of systemic oxidative stress in an obese, hyperphagic rodent model. Soy protein also suppresses hepatic de novo lipogenesis, increases machinery for VLDL-triacylglycerol export, and ultimately reduces histological features of NAFLD. In addition, soy protein feeding promotes healthy lipid remodeling in the liver by increasing n-3 and n-6 polyunsaturated fatty acids and lowering total and saturated fatty acids in diacylglycerols. Moreover, soy protein-containing diets increase gut microbial diversity and alter microbial composition consistent with upregulation in bile acid signaling pathways promoting improved cholesterol homeostasis and a healthy liver metabolic profile. Overall, the existing scientific literature supports the benefits of soy protein consumption on promoting systemic and hepatic metabolic health.