This study investigated the hepatoprotective effects of curcumin against liver damage induced by a high-fat diet. Curcumin is a diarylheptanoid and it is the principal curcuminoid of the popular South Asian spice turmeric. In vitro, curcumin modulates the inflammatory response by down-regulating the activity of cyclooxygenase-2, lipoxygenase, and inducible nitric oxide synthase enzymes and inhibits several other enzymes involved in inflammation mechanisms. Thus, this study aimed to elucidate the impact of curcumin on modulation of these molecular mediators on liver damage, steatohepatosis and inflammation in high fat diet-induced rat. We also examined several potential underlying mechanisms of curcumin including antioxidant activity and lipid metabolism. In our study, Sprague-Dawley male rats were divided into four groups (n=8/group). One group of rats were fed diet containing 10% fat by weight and designated as the control group. Other group (HF) was fed high fat diet containing 60% fat and third group (HF+Cur) was fed high fat diet supplemented with curcumin (1000 mg/kg diet) for 16 wks. Last group of rats were fed with normal diet supplemented curcumin (1000 mg/kg diet). Total free fatty acids, triglycerides were measured in plasma, Dien Conjugate (DC) content and antioxidants levels were measured. Hem Oxygenase (HO-1) expression was demonstrated by western blotting (data not shown). In addition, the presence of fat droplets, peri-portal fibrosis and glycogen was examined histologically (Figure.1-2). In recent studies curcumin through a series of complex mechanisms, alleviated the adverse effects of high fat diet on weight gain, fatty liver development, dyslipidemia, expression of inflammatory cytokine in rats. According to our results, lipid droplets within hepatocytes, infiltration of inflammatory cells, and necrotic foci in the liver were morphologically alleviated by curcumin (HF+Cur) in a compared with the HF group. These findings indicate that curcumin suppressed development of steatohepatosis, reduced fibrotic tissue, and preserved glycogen levels in liver and it may protect against liver damage caused by a high-fat diet partly by modulating the antioxidant activity and the lipid metabolism. Therefore, curcumin may provide a promising natural nutri-therapeutic strategy against liver disease.

Fig. 1: Hematoxylin and eosin stained liver tissues all groups. A- Control group, normal liver tissue structure. In control group, normal liver tissue structure. B/D- HF group, inflammation area in the liver tissue. C- Focal degeneration area and cytoplasmic vacuolization in hepatocytes. E/F- HFCur group, liver tissue is similar to control group.

Fig. 2: Reticulin stained liver tissues of all groups. A-B-C Control group, normal liver tissue architecture. D-E, HF group, dark black staining of the reticulin fibers with reticulin stain. The other white circular structures near the reticulin fibers are fat globules. F- HF-Cur group, liver tissue is similar to control group.