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Reperfusion injury after warm hepatic ischemia is decreased by taurine

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Relevant mechanisms of reperfusion injury after liver transplantation are most likely mediated by activated Kupffer cells. Recently, it has been demonstrated that taurine prevents Kupffer cell-activation in vitro. Thus, this study was designed to assess the effects of taurine after warm hepatic ischemia.

Female Sprague Dawley rats (170-210g) were divided into three groups. In sham controls only laparotomy was performed. Some animals were given taurine (10 mg/kg i.v.; 1.2 ml) 10 minutes prior to ischemia. Ringer's solution (1.2 ml) was given to controls. In both study groups the left liver lobe underwent 60 minutes of warm ischemia. Subsequently, both transaminases and histology were assessed to indicate liver injury. In vivo microscopy, CD11b/c and CD18 expression were evaluated to assess interaction between leukocytes and endothelial lining cells. To determine whether taurine prevents activation of Kupffer cells, latex beads, taken up by Kupffer cells were counted and the serum level of TNF-alpha was compared to controls. Further, ICAM-1 expression was shown with immunohistochemistry. For comparison between

study groups ANOVA test was used as appropriate. Results are presented as mean ± SEM.

Taurine given before warm ischemia significantly decreased both ALT and AST from 278±74 U/l and 392±22 U/l in controls to 129±19 U/l and 268±26 U/l, respectively eight hours after reperfusion. Histological changes, i.e. neutrophil infiltration, necrotic cell death and ICAM-1 expression were markedly reduced by 14% to 34% after taurine ($p<0.05$) at eight hours after reperfusion. However, taurine did not have influence on CD11b/c and CD18 expression on white blood cells. Further, taurine dramatically improved microcirculation. The number of stickers was reduced to 76% of controls in sinusoids and to 53% of controls in venules ($p<0.05$) while rolling was decreased to 37% in venules ($p<0.05$). Taurine significantly decreased both phagocytic activity of Kupffer cells and TNF-alpha release ($p<0.05$).

In conclusion, this study demonstrates that taurine decreases liver injury after warm ischemia most likely via Kupffer cell-dependent mechanisms including leukocyte-endothelial cell interaction upon reperfusion.