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Taurine attenuates hepatic injury after orthotopic liver transplantation in rat

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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 liver transplantation.

Female Sprague-Dawley rats (210-240 g) were infused with taurine dissolved in normal saline, before organ harvest. Controls were infused with the same volume of normal saline without taurine. Following 1 hour of cold ischemia, liver transplantation was performed. Graft and animal survival, serum transaminases, liver histology, perfusion data of intravital microscopy, blood distribution at reperfusion, and both phagocytosis of

Kupffer cells and expression of tumor necrosis factor alpha (TNF-alpha) to index cellular activation were investigated. For comparison, both, analysis of variance (ANOVA) and Fisher's exact test were used as appropriate. Results are presented as mean ± SEM.

Controls survived in 60% of cases. Taurine improved survival in a dose-dependent manner to 100% ($P < 0.05$). In controls, mean aspartate aminotransferase (AST), alanine aminotransferase (ALT), and lactic dehydrogenase (LDH) serum levels increased to 3260 ± 814; 1703 ± 432; and 14071 ± 3177 U/L, respectively, after transplantation. In contrast, these values were between 20 and 45% of control values after taurine ($P < 0.05$). Histology taken after transplantation confirmed the significant protective effects of taurine, including the reduction of TNF-alpha expression. Time until homogeneous reperfusion of the graft improved to 50% of control values ($P < 0.05$). Further, taurine significantly decreased both phagocytosis of latex beads by Kupffer cells and leukocyte-endothelial cell interaction. In parallel, flow velocity of red blood cells as well as acinar and sinusoidal perfusion improved ($P < 0.05$). In conclusion, these data show for the first time in vivo that taurine minimizes reperfusion injury after liver transplantation. Reduced activation of Kupffer cells, decreased leukocyte-endothelial interaction and improved microcirculation are the proposed mechanisms.