Effect of taurine supplementation on cytochrome P450 2E1 and oxidative stress in the liver and kidneys of rats with streptozotocin-induced diabetes

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To investigate whether diabetes-induced alterations of CYP2E1 and oxidative stress can be modulated by dietary taurine supplementation, male Wistar rats were divided into non-diabetic, diabetic, and diabetic taurine-supplemented groups (administered at 2% in the drinking water). Increased levels of CYP2E1-catalyzed p-nitrophenol hydroxylation were found in liver and kidney microsomes of rats with STZ-induced diabetes compared to those of non-diabetic control rats. Immunoblot and RT-PCR analyses of CYP2E1 protein and mRNA levels in the liver and kidneys showed the same trend as with enzyme activities. Taurine supplementation significantly decreased the enzyme activity and expression (protein and mRNA) of CYP2E1 in diabetic rat kidneys. Plasma beta-hydroxybutyrate concentration was significantly reduced in taurine-treated diabetic rats.

The induction of heme oxygenase-1 mRNA was suppressed by taurine treatment in diabetic rat kidneys. An increase in reduced glutathione (GSH) and a higher ratio of reduced to oxidized glutathione (GSH/GSSG) together with lower values of thiobarbituric acid-reactive substances (TBARS) were observed in the kidneys of taurine-treated diabetic rats. However, taurine supplementation caused only a slight or insignificant effect on these alternations in the liver of diabetic rats. Our results show dietary taurine may reduce CYP2E1 expression and activity, and oxidative stress in kidneys of diabetic rats.

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