

# Delayed Ischemic Preconditioning Protects Against Liver Ischemia-Reperfusion Injury In Vivo

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**Objectives:** Ischemic preconditioning (IP) affords resistance to liver ischemia-reperfusion (IR) injury, providing an early phase of protection. Development of delayed IP against IR injury was assessed using partial IR in rat liver. **Methods:** The IP maneuver (10 minutes of ischemia and up to 72 hours of reperfusion) was induced before 1 hour of ischemia and 20 hours of reperfusion. At the end of the reperfusion period, blood and liver samples were analyzed for serum alanine aminotransferase (ALT), aspartate aminotransferase (AST), lactate dehydrogenase (LDH), haptoglobin and tumor necrosis factor- $\alpha$  (TNF- $\alpha$ ) levels, hepatic histology, protein carbonyl and glutathione (GSH) contents as well as nuclear factor- $\kappa$ B (NF- $\kappa$ B), and activating protein-1 (AP-1) DNA binding. **Results:** The IP maneuver significantly increased protein carbonyl/GSH ratios (275%), serum ALT (42%), and AST (58%); these changes normalized after 12 hours. Serum AST, ALT, and LDH levels were significantly increased by IR (4-, 5.6