

# Molecular mechanisms in liver ischemic-reperfusion injury and ischemic preconditioning

## Mecanismos moleculares en el daño por isquemia-reperfusión hepática y en el preacondicionamiento isquémico

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Ischemia-reperfusion (IR) liver injury is associated with temporary clamping of hepatoduodenal ligament during liver surgery, hypoperfusion shock and graft failure after liver transplantation. Mechanisms of IR liver injury include: i) loss of calcium homeostasis, ii) reactive oxygen and nitrogen species generation, iii) changes in microcirculation, iv) Kupffer cell activation, and (v) complement activation. Pre-exposure of the liver to transient ischemia increases the tolerance to IR injury, a phenomenon known as hepatic ischemic preconditioning (IP). IP involves: i) recovery of the energy supply and calcium, sodium and pH homeostasis, ii) enhancement in the antioxidant potential, and iii) expression of multiple stress-response proteins, including acute phase proteins, heat shock proteins, and heme oxygenase. These observations and preliminary studies in humans give a rationale for the assessment of IP in minimizing or preventing IR injury during surgery and non surgical conditions of