A Comparison of the protective effects of erythropoietin and melatonin on renal ischemia-reperfusion injury in rats

**Background:** Renal ischemia reperfusion (IR) contributes to the development of acute renal failure (ARF). Oxygen free radicals are considered principal components involved in the pathophysiological tissue alterations observed during renal IR.

**Objective:** In this study, we compared the effects of melatonin (MEL) and erythropoietin (EPO), which are known antioxidant and anti-inflammatory agents, in IR-induced renal injury in rats.

**Materials and Methods:** Wistar albino rats were unilaterally nephrectomized and subjected to 45 min of renal pedicle occlusion followed by 24 hr reperfusion. MEL (10mg/kg, i.p.) and EPO (5000U/kg, i.p.) were administered prior to ischemia. After 24 hr reperfusion, following decapitation, blood samples were collected for the determination of hemoglobin (Hb), hematocrit (Hct), serum urea, and creatinine (Cr) levels. In addition, renal samples were taken for histological evaluation.

**Results:** Ischemia reperfusion significantly increased urea, creatinine, and decreased Hb and Hct values. Histopathological findings of the IR group confirmed there was an increase in hyaline cast and thickening of Bowman’s capsule basement membrane. Treatment with EPO or MEL significantly decreased urea levels and increased Hb and Hct values. In the MEL + IR group, the histopathological changes were lower than for the EPO + IR group.

**Conclusion:** Treatment with EPO and MEL had a beneficial effect on renal IR injury. These results may indicate that MEL protects against morphological damage better than EPO in renal IR injury.

**Keywords:** Melatonin, erythropoietin, ischemia reperfusion injury, kidney.