In vivo mechanism study of NGAL in rat renal ischemia-reperfusion injury

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ABSTRACT. This study aimed to determine the protective effect and mechanism of neutrophil gelatinase-associated lipocalin (NGAL) in rat kidney on ischemia/reperfusion injury (I/R). The rat I/R model was set up by cutting one kidney and clamping the contralateral renal pedicle for 45 min. Male SD rats were randomly divided into sham-operation, I/R and NGAL groups. Hematoxylin-eosin staining was performed to observe the renal pathological changes in the 3 groups; serum creatinine (Scr) and blood urea nitrogen (BUN) determined in blood samples taken from the inferior vena cava 24 h after the reperfusion were measured; TUNEL was used to observe the apoptosis of renal tubular epithelial cells; immunohistochemistry was performed to evaluate the expressions of Bax and activated caspase-3; Western blotting was used to determine the expression changes in apoptotic proteins Fas and Bcl-2. Compared with the I/R group, Scr and BUN of the NGAL group were 63.400 ± 11.908 µM and 14.840 ± 2.868 mM, respectively. The number of apoptotic tubular epithelial cells was reduced (7.800 ± 1.924 vs 15.400 ± 3.049); the expression of
renal tissue Fas mRNA of the NGAL group was decreased (2.34 ± 0.51 vs 6.84 ± 2.34); the expression of the Bax protein was lower (7.440 ± 1.640 vs 15.456 ± 1.955%); the expression of the CC3 protein was decreased (3.171 ± 0.321 vs 7.291 ± 1.059%), while the expression of the Bcl-2 protein increased (6.91 ± 1.64 vs 5.30 ± 1.48), P < 0.05. NGAL had a protective effect towards the renal tubular epithelial cells in I/R, and the effect might have been associated with the reduction in apoptosis and the altered expression of apoptotic proteins, which would thereby reduce tissue damage and protect the kidney.

**Key words:** NGAL; Tubular epithelial cells; Ischemia-reperfusion; Apoptosis; Apoptotic protein