

# **Distribution and amount of cathepsin B in gentamicin-induced acute kidney injury in rats**

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## **Abstract**

The aim of our study was to investigate how the distribution and amount of cathepsin B change during acute kidney injury. The research was done on a rat model of acute kidney injury that was induced by nephrotoxic antibiotic gentamicin. Gentamicin was injected at a dose of 40 mg/kg body weight (the first treated group) and 80 mg/kg body weight (the second treated group) for 14 days. Control groups received injections of physiological saline only. One day after the last injection, animals were euthanized, dissected and kidney samples were taken and fixed in 10% buffered formalin. Tissue sections were stained with haematoxylin and eosin, periodic Acid Schiff (PAS) and Oil-red-O. Immunohistochemistry was used for the demonstration of cathepsin B. Vacuolar degeneration of the proximal convoluted tubules was the most prominent pathologic lesion found in the first treated group, while necrosis prevailed in the second treated group in the same localisation. In both treated groups significantly weaker immunohistochemical reaction for cathepsin B was noticed in the proximal convoluted tubules in comparison to the control groups ( $P < 0.05$ ). The decrease of positive reaction was the largest in the proximal convoluted tubules of the outer renal cortex. Stronger positive reaction for cathepsin B, although not statistically significant, was found in the proximal straight tubules ( $P > 0.05$ ), as well. However, more numerous cathepsin B-positive large granules appeared in the proximal straight tubules of the second treated group than in the second control group ( $P < 0.05$ ). We can conclude that the amount of cathepsin B in the affected proximal convoluted tubules significantly decreases along the increased severity of the histopathological lesions of the proximal convoluted tubules, the amount of enzyme in the well preserved proximal straight tubules increases and more cathepsin B-positive large granules appear in the cytoplasm.

**Key words:** Kidney, cathepsin B, gentamicin, rats