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Dietary zinc modifies diabetic-induced renal pathology in rats

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This study was conducted to investigate how far dietary zinc (Zn) modifies the histomorphological alterations induced by diabetes in rat kidneys. The animals were divided into negative control group (10 rats) and diabetes was induced in 30 animals by streptozotocin. After confirming diabetes, the animals were divided into three groups (n=10). Group-2 fed on standard diet, group-3 fed on Zn deficient diet and group-4 fed on Zn supplemented diet. Stereological procedures were used to measure the quantity of the immune stain and the surface area of the Bowman's space. The renal cortices of group-2 rats revealed apparent widening of Bowman's spaces with few apoptotic figures. EM examination of the filtration barrier showed thickening of the basement membrane. The proximal convoluted tubules showed patchy loss of the apical microvilli with swollen mitochondria. The distal convoluted tubules revealed area of irregular basal enfolding. The picture was aggravated by Zn deficiency in group-3 besides areas of cortical interstitial fibrosis. The histopathological alterations were minimal in the cortices of group-4. A significant increase of the Bowman's space surface area in group-2 and 4, while decrease in group-3 compared with group-1. The expression of caspase-3 density was significantly increased in group-2 and 3 compared with group-1 while in group-4 was non-significant. In conclusion, dietary Zn modulated renal cortical changes caused by diabetes in rats.

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