

# Turkish Journal of Medical Sciences

Turkish Journal  
of  
Medical Sciences

Effect of Low Dietary Zinc Intake and Experimental Diabetes on the Zinc and Carbohydrate Metabolism in Rats

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
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**Abstract:** To investigate the effect of low dietary zinc intake and experimental diabetes (IDDM) on the zinc and carbohydrate metabolism, 8-week-old male weaning normal albino (Wistar) rats were fed diets containing either adequate (54mg/kg) or low zinc (1mg/kg) quantities for one week. Ten rats from each group (n=20) were then intraperitoneally injected with alloxan to induce diabetes. The rats were sacrificed after a further three weeks. Body weight gain and food intake were recorded regularly. On day 28, after an overnight fast, the animals were sacrificed and blood glucose, serum insulin, serum cholesterol concentrations, liver glycogen contents, and femur and pancreatic zinc concentrations were determined. Diabetic rats fed a low zinc or control diet had a low body weight gain, high total food intake (hyperphagia), low serum insulin, low liver glycogen contents and high serum cholesterol concentrations compared to normal rats. The consumption of the low zinc diet had only a minimal effect on the zinc status of rats as indicated by the growth rate, food intake and femur and pancreatic zinc concentrations. However, both diabetic and non-diabetic rats fed a low zinc diet had higher blood glucose than their control counterparts. Liver glycogen was also found to be higher in the low zinc non-diabetic rats than in their controls. Serum insulin and serum cholesterol concentrations were unaffected by dietary regimen. To conclude, the present study demonstrates that a reduced zinc intake had an effect on glucose utilization in both diabetic and non-diabetic rats and on glycogen deposition in non-diabetic rats. However, there were negligible changes in zinc status. Therefore, it appears that abnormalities in the carbohydrate metabolism may occur before tissue zinc depletion becomes apparent.

**Key Words:** Diabetic rats, non-diabetic rats, Alloxan, Low zinc levels

Turk J Med Sci 2002; **32**(2): 101-105.

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