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# Effects of Silver Nanoparticles on renal function in fat-fed and streptozotocin-treated rats

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**Objectives:** The present study investigated the effects of silver nanoparticles on serum parameters of renal function, on oxidative stress markers (malondialdehyde [MDA] and 8-isoprostane), and on expression level of insulin receptor, glucose transporter 2 (GLUT2), glucokinase genes and heat-shock proteins (HSPs) in rats

**Methods:** Male Wistar rats (n=64, 10 weeks old) were divided into four groups. Group 1 received a standard diet (12% of calories as fat). Group 2 received a standard diet, plus silver nanoparticles (SNPs); received a single daily oral dose of SNP of 100 mg/kg in suspension. Group 3 received a high-fat diet (40% of calories as fat) for 2 weeks, and was then injected with streptozotocin (STZ) on day 14 (STZ, 40 mg/kg intraperitoneally). Group 4 was treated in the same way as group 3 (HFD/STZ), but was supplemented with SNP 100mg /kg/body weight/day. Oxidative stress in the kidneys of diabetic rats was evidenced by an elevation in levels of MDA and 8-isoprostane. Protein concentrations of insulin receptor, GLUT2, glucokinase genes and heat-shock (HSP60 and HSP70) in renal tissue were determined by Western blot analyses.

**Results:** SNP supplementation lowered kidney concentrations of MDA, 8-isoprostane levels, serum urea-N, and creatinine, and reduced the severity of renal damage in the STZ-treated group (i.e., the diabetes-induced group). The expression of insulin receptor, GLUT-2 , glucokinase genes and HSPs was lower in the STZ group that received SNP than in the group that did not. No significant effect of SNP supplementation was detected in regard to the overall measured parameters in the control group.

**Conclusions:** This study supported the efficacy of SNP in reducing renal risk factors and impairment because of diabetes and act as potent antidiabetic agent.