

## **Nanochemistry and biotechnology**

### **Silver nanoparticles affect testicular function of the rats of different age**

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Due to specific physical, chemical and biological properties, nanomaterials are widely used in different branches of modern science, medicine and industry. Among different substances, silver is one of the most popular sources of nanoparticles. Silver-containing nanomaterials can be found in the food products, household chemicals, cosmetics and medicine. At the same time, the biological toxicity of the nanosilver, especially reproductive toxicity, is still not well understood.

Our experiment was carried out on the three age groups of albino rats, aged 1, 6 and 24 months respectively. The experimental animals received intraperitoneal injections of silver nanoparticles for 10 days. Nanosilver was synthesized through the reduction of silver nitrate by ascorbic acid in the presence of sodium polyphosphate in alkaline medium. The average size of nanoparticles was estimated at 8-12 nm. As morphological markers of testicular activity, we measured the diameter of seminiferous tubules and cross-sectional area of Sertoli and Leydig cells.

We found no significant pathohistological changes in any of the groups – there were present only the earliest signs of spermatocytes' degeneration. At the same time, decrease in every morphometric parameter was observed. Reduction of the Leydig cells' nuclear cross-sectional area is the sign of downregulation of testicular steroidogenesis. The other two parameters describe the spermatogenic potential of the testis. To sum up, injections of silver nanoparticles had an adverse effect on the both sperm production and production of sex steroids. Although the exact mechanism of such effects is the subject of further investigations, our data clearly showed that Ag particles should be used in everyday materials more carefully, taking into account possible negative effects.