

Effect of Gold and Silver Nanoparticles Functionalized by Cyanobacteria *Spirulina platensis* on Rats

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Abstract. The functionalization of gold and silver nanoparticles with living cells of *Spirulina platensis* (spirulina) was achieved through adding them to the cyanobacteria nutrient medium and performing a complete cycle of biomass growth. Biomass containing gold or silver nanoparticles in the amount of 1 µg/day versus unmodified nanoparticles stabilized in PEG, was administered to rats for 28 days, followed by a clearance period of the same duration. The accumulation of nanoparticles in different organs, the change in hematological, biochemical and morphometric parameters in the experimental animals were assessed at the end of the nanoparticle administration and the clearance periods. It was established that the level of functionalized and unmodified nanoparticles accumulation in the organs of rats was different. The highest content of gold and silver after the 28-day administration period was determined in kidneys, while of silver in brain and testicles. After the clearance period, the highest content of gold was detected in the liver and of silver in brain. Both types of nanoparticles induced changes in the leucogram of experimental animals. More pronounced changes being characteristic for unmodified gold nanoparticles. The gold nanoparticles tested in the present study are characterized by pronounced tropism towards ovaries. They can cause long-term or delayed effects, which include the increase in glucose and urea levels as well as the increase in ALT activity after the clearance period. The hematological indices of the rats did not change significantly under the action of the silver nanoparticles except for the content of reticulocytes and eosinophils, which increased significantly. Changes in the biochemical parameters did not exceed the limits of normal values.

Keywords: *Spirulina platensis*; silver nanoparticles; hematological indices
