

Nanoparticles – functional and drug delivery molecules in biological investigations

Summary

The objective of the study was to investigate the use of nanoparticles of metals and nanostructures of carbon allotropes as therapeutic and health-promoting agents. It was demonstrated that nanoparticles of silver, copper and platinum, as well as graphene nanoflakes, are toxic to *Salmonella enteritidis* and *Listeria monocytogenes* bacteria, among other microorganisms. In experiments with chicken embryos treated *in ovo* with molecules of silver, gold and diamond nanoparticles with attached amino acids and glycosaminoglycans, enhanced muscle growth and improved morphological structure were observed. Further experiments carried out with glioblastoma cancer cells cultured *in ovo* demonstrated that nanodiamond had antiangiogenic and anticancer properties. Furthermore, graphene inhibited growth rate and increased apoptosis in glioblastoma cells and caused regression of glioblastoma multiforme. The study demonstrated unique pro-healthy properties of nanoparticles depending on their type and method of application.

KEY WORDS: nanoparticles, bacteria, chicken embryo, angiogenesis, cancer