



Study of changes in biochemical parameters of rats after acute exposure to gold core-shell hybrid nanostructures

Olga D. Hendrickson

Federal Research Center «Fundamentals of Biotechnology» of the Russian Academy of Sciences, Russia

Abstract:

Gold nanoparticles are one of nanomaterials widely used for biomedical purposes. Due to large surface area and high sorption capacity, they can be coated by biomolecules to produce gold core-shell hybrid nanostructures (GHNs). GHNs possess a great potential as agents for diagnostics, controlled drug delivery, bioimaging, cancer treatment, photodynamic therapy, etc. Use in biomedicine arises a problem of GHNs' toxicity towards humans. In this study supported by the Ministry of Science and High Education of the Russian Federation (state contract 14.613.21.0086, unique identifier of the project RFME-FI61318X0086), measurement of biochemical parameters of rats after acute exposure to GHNs was carried out. GHNs were obtained by coating gold nanoparticles with immunoglobulins. After single intravenous administration of GHNs in a dose of 1000 mg/kg of body weight, alanine aminotransferase (ALT) and alkaline phosphatase (ALP) were measured in rats' organs and tissues. These parameters were used to evaluate the function of liver which is known to be the target organ for nanotoxins. The obtained data indicated that the maximum change in the activity of ALT was observed in blood (it increased by 25% as compared to control animals). In other organs and tissues, changes in ALT did not exceed 14%. For ALP, the maximum increase in the activity was recorded in the liver (15% higher than the control value). Therefore, an increase in the enzymatic activity of ALT and ALP after administration of GHNs indicates the development of hepatic pathologies in rats as a result of acute toxicity of GHNs.

Biography:

Dr. Olga D. Hendrickson has completed his PhD in A.N.



Bach Institute of Biochemistry, Russian Academy of Sciences, Moscow, Russia. Now she is a Senior Researcher in the Immunobiochemistry Laboratory of Federal Research Center "Fundamentals of Biotechnology" of the Russian Academy of Sciences. Her scientific interests include studies of immune complexes' formation, interaction of nanoparticles with biomolecules, structural bases of interactions with bioreceptors, biosensor systems, development of new immunochemical methods for the detection of biologically active compounds, nanobiosafety issues, methods for quality control and safety of food and feed, etc. She has published more than 30 papers in reputed journals.

Publication of speakers:

1. Hendrickson, Olga & Byzova, Nadezhda & Zvereva, Elena & Zherdev, Anatoly & Dzantiev, B.. (2020). Sensitive lateral flow immunoassay of an antibiotic neomycin in foodstuffs. *Journal of Food Science and Technology*. 10.1007/s13197-020-04541-z.
2. Bartosh, Anastasia & Sotnikov, Dmitriy & Hendrickson, Olga & Zherdev, Anatoly & Dzantiev, B.. (2020). Design of Multiplex Lateral Flow Tests: A Case Study for Simultaneous Detection of Three Antibiotics. *Biosensors*. 10. 17. 10.3390/bios10030017.
3. Hendrickson, Olga & Zvereva, Elena & Popravko, Demid & Zherdev, Anatoly & C. H., Xu & Dzantiev, B.. (2020). An immunochromatographic test system for the determination of lincomycin in foodstuffs of animal origin. *Journal of Chromatography B*. 1141. 122014. 10.1016/j.jchromb.2020.122014.

Webinar on Materials Science and Nanotechnology | August 27, 2020 | London, UK

Citation: Olga D. Hendrickson; Study of changes in biochemical parameters of rats after acute exposure to gold core-shell hybrid nanostructures; Euro Materials 2020; August 27, 2020; London, UK