

Nanochemistry and Nanobiotechnology

Experimental study of iron nanoparticles' antianemic activity in model iron deficiency anemia

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Iron deficiency anemia (IDA) is one of the most wide-spread pathological states as well as social problem according to the WHO data [1,2]. Searching and development of new class pharmacological substances with antianemic properties for IDA treatment is very urgent. In this study iron nanoparticles (FeNPs) with average size of 40 nm have been synthesized according to the original colloidal-chemical method. Obtained FeNPs have been characterized as biosafe using *in vitro* and *in vivo* tests of cytotoxicity, genotoxicity, mutagenicity, main biochemical markers, and LD₅₀. Antianemic activity of FeNPs has been studied on the model of IDA using females of Wistar rats. IDA was modelled using iron deficiency diet. Control animals received a diet with normal iron content. It has been shown reliable increase of main blood parameters up to normal level of healthy animals comparatively with anemic control within duration of experimental treatment course under the conditions of peroral as well as intravenous route of FeNPs' administration in therapeutic and 1/10 of therapeutic doses. The effectiveness of comparison drugs (ferri (III) hydroxydi polymaltosum complexus) was reliably lower. The absence of dysbacteriosis according to the microbiological tests has been observed under the experimental treatment course with FeNPs. Thus, synthesized FeNPs are possessed of significant potential as pharmacological substance with antianemic properties for new class antianemic preparations' development.

1. Iron deficiency anemia: assessment, prevention, and control. UNICEF/UNU/WHO, Geneva, Switzerland, 2001.
2. Zimmermann M. B., Hurrell R. F. Nutritional iron deficiency // Lancet.-2007.-**370**, N 9586.-P. 511-520.

