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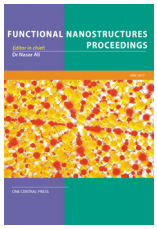

The Field Interaction Explains Features of Antiviral Action of Nanoparticles

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ABSTRACT

Antimicrobial and antiviral properties of pure (non-functionalized) nanoparticles have been studied for a long time. It was revealed that antimicrobial and antiviral action is due to the general mechanism, as it is observed for different viruses, bacteria and fungi and for nanoparticles of different materials - medal, oxides.
Based on the revealed features it was supposed that the main mechanism of inhibition of infective ability of bioobjects has physical nature. Namely, the nanoparticle forms the stable structure with the virus/microbe due to electromagnetic interaction and influences the local field distribution on its surface. The enhanced local field can deform or damage specific molecules which are responsible for virus penetration into the cell. Results of calculations of the energy of interaction and local field distribution show that: 1. smaller nanoparticles intensify the local field more than bigger ones; 2. local field enhancement is higher on the surface of influenza virus than the one of herpes simplex virus; 3. there is a possibility of weakening the local field at high concentrations of nanoparticles. These results are in a good agreement with results of the experiments [1-3]. It is well known that microorganisms and viruses have high ability to adapt to drugs action, which is a relevant problem in modern science and medicine. The physical mechanism of antiviral and antimicrobial action can allow producing medicines, which it will not be possible to adapt to.

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