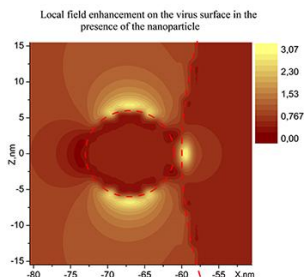


The possible mechanism of antiviral and antimicrobial action of nanoparticles

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Antimicrobial and antiviral properties of pure nanoparticles have been studied for a long time. However, there is no unified theory, which can explain the mechanism of this action. While studying the scientific data, 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 material. Also intensity of antimicrobial and antiviral action depends much on the size, shape and concentration of nanoparticles.



Based on the revealed features it was supposed that the main mechanism of suppression of infective ability of bioobjects has physical nature. Namely, the nanoparticle forms the stable structure with the virus due to electromagnetic interaction and influences the local field distribution on its surface (Fig. 1). The increased field can deform or damage specific molecules which are responsible for virus penetration into the cell. In order to approve the idea the local field distribution was calculated based on the ideas of nanooptics for different sizes of nanoparticles. It was obtained that bigger nanoparticles lead to the less intensive local field enhancement. This is 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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