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STUDY OF THE INFLUENCE OF SILVER NANOPARTICLES ON THE MORPHOLOGY OF BACTERIAL CELLS OF *ESCHERICHIA COLI* BY ATOMICALLY POWER MICROSCOPY

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Over the past decades, methods of scanning probe microscopy, including atomic force microscopy (AFM), have become rapidly developed, which have become an effective tool for solving a variety of research problems. The use of AFM in microbiological studies made it possible to obtain important and even unique information about the properties of the studied objects, to measure the morphological characteristics of biological objects, to determine the features of small-sized systems, to visualize the surface profile of the sample with nanometer resolution and obtain high-quality images of bacterial cells [2–4].

Using atomic force microscopy, it is possible to study the components, cellular organizations and bacterial biofilms of microorganisms, to determine and evaluate the degree of exposure to microorganisms of various factors of biotic and abiotic nature [1, 2, 5]. Thus, according to a number of authors who used atomic force microscopy in their studies, data were obtained on the effect of antibacterial drugs on the bacterial cell wall [1, 3].

The aim of our work was to study the effect of silver nanoparticles on the morphology of bacterial cells of *Escherichia coli* by atomic force microscopy using an atomic force microscope NT-206.

The procedure for preparing samples for atomic force microscopy was to immobilize them on a flat substrate. The material was atomically smooth mica substrates. The test samples were placed on the surface of the substrate:

1 sample – pure bacterial culture of *Escherichia coli* (control).

2 sample – bacterial culture of *Escherichia coli* + silver nanoparticles in a ratio of 1: 5.

3 sample – bacterial culture of *Escherichia coli* + silver nanoparticles in a ratio of 1:10.

For the fixation, the sample was incubated for 24 hours.

The visualization of the surface of bacterial cells of *Escherichia coli* was carried out in various modes of atomic force microscopy. During the study, images of *Escherichia coli* bacterial cells were obtained before and after incubation with silver nanoparticles.

The obtained AFM images showed the change in the morphology of the bacterial cell *Escherichia coli* under the action of silver nanoparticles in various dilutions. In this case, not only the transformation of the form of the microorganism is traced, but also the change in the number of microbial cells in the experimental and control samples. So, in the control, after 24 hours of incubation, microorganisms form numerous colonies, while in the test media after treatment with the drug single cells are found, the form of *Escherichia coli* changed from rod-shaped to more rounded. Moreover, these processes are most pronounced during incubation with compounds at a dilution of 1:10, in which complete destruction of bacterial cells was noted.

Conclusions: According to the results of the study, it was found that silver nanoparticles exhibit a pronounced antibacterial effect on *Escherichia coli* bacterial cells, which is confirmed by atomic force microscopy. Silver nanoparticles can be recommended as the basis for the creation of veterinary drugs, as an active antibacterial environmentally friendly substance.

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MORPHOLOGY OF THE OVARIES IN RACCOON DOGS

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Raccoon dogs (Nyctereutes procyonoides) are omnivores that feed on insects, rodents, amphibians, birds, fish, reptiles, molluscs, carrion, and insectivores, as well as fruits, nuts, and berries.

The ovary is divided anatomically into the cortex and medulla. The cortical aspect of the ovary is covered by cuboidal epithelium during