The study of ion-associates of quaternary ammonium salts interaction, in particular miramistin, with preservatives and antibiotics

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Introduction. The infections, resistant to antibiotics and difficult to cure, are becoming more common and cause a global crisis in the field of healthcare. The amount of bacteria, resistant to antibiotics, increased over the last decade. Antibiotic-resistant bacterium strains can spread rapidly, threatening the community with new, much larger outbreaks of an infectious disease that is more difficult to cure [1].
The aim. Miramistin aqueous solution with preservatives and antibiotics became the subject matter of the study. Miramistin (Benzyldimethyl [3- (myristoylamino) propyl] ammonium chloride monohydrate) is well - known as a medication from cationic surface active compounds (SAC) group. The biological action of miramistin is based on its direct effect on the cell membranes of microorganisms.
The predominant mechanism of its action lies in the hydrophobic interaction of the molecule with lipid membranes, which leads to fragmentation and destruction of microbial shell. Miramistin belongs to the synthetic substances with low toxicity, does not cause local irritation, is not an allergen, does not show mutagenic, carcinogenic and embryotoxic effects. Being a cationic SAC, miramistin enters the reaction of ion- associates formation with some other organic substances [2].
Antibiotics is a large group of medicinal products showing both bactericidal and bacteriostatic action. For example, antibiotics from antifungal medicinal products group can block phospholipid or protein components and cause cellular permeability disfunction, changes in membrane potential [3].
Ion - associates is a group of compounds in which the electrostatic interaction between cation and anion is supplemented by the formation of hydrogen bonds, van der Waals and hydrophobic interaction, which leads to redistribution of electron density in newly formed molecules. Ion- associates formation leads to changes in physicochemical properties of final compounds, in particular increasing lipophilicity, which may contribute to transport through the microorganism membrane [4].
Materials and methods. In connection with the above said it is possible to make an assumption that it is possible to try studying the reactions of formation of miramistin ion- associates in order to enhance its biological action.
Conclusions. Obtaining new ion - associates of miramistin with anions of some antiseptics and antibiotics may make it possible to get substances with increased antimicrobial activity.

References

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