**Creating of effective prodrugs: gold nanoparticles - doxorubicin - bovine serum albumin complex**

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The effectiveness of chemotherapy for cancer treatment when using traditional antitumor drug doxorubicin (Dox) is insufficient, as it is accompanied by a number of adverse side effects. In order to overcome the mechanisms of development of Dox resistance, to increase the selectivity of its action, and to ensure the detoxification associated with radical forms of oxygen, a variety of methods for the creation of modified drugs (prodrugs) through the attachment of chemical fragments to antitumor agents, synthesis of conjugates with metallic, semiconductor, carbon nanoparticles and metal ions are used [1-2].

In present work, the interaction between Dox and bovine serum albumin (BSA) complex with gold nanoparticles (AuNPs) was investigated by optical spectroscopy. The optical absorption of Dox and BSA solutions was studied. The formation of Dox-BSA complexes with a binding constant K=7.56·106 M-2 and the number of binding sites n=2 was found out. With pH=6.9 the concentration of complexes is an order of magnitude lower than the concentration of unbound antibiotic molecules. Optical absorption in solutions of Dox-BSA conjugates with AuNPs undergoes a significant rearrangement due to the binding of BSA molecules to AuNPs, which leads to changes in the conformational states of molecules, the magnitude of the hydrophobic interaction with Dox and, as a consequence, to plasmon-induced change in the mechanism of complex formation. The aggregation of the Dox-AuNPs conjugate depends on the presence and concentration of BSA and in the case of formation of the Dox-BSA complex is minimal.

The results of the study indicate the possibility of creating effective prodrugs comprising Dox-BSA-AuNPs with regulated properties of antibiotic and protein complexation due to the presence of AuNPs.

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2. Chegel V. I., Lopatynskyi A. M., Rachkov O. E. et al. Smart nanocarriers for drug delivery: controllable LSPR tuning // Semiconductor Physics, Quantum Electronics and Optoelectronics.-2016.-19, N 4.-P. 358-365.