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IMMOBILIZATION OF CYCLOPHOSPHAMIDE IN THE ALBUMIN STRUCTURE

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Currently, there are many anticancer drugs, but long-term use of these drugs leads to significant side effects, which significantly reduce the efficiency of treatment.In this regard, the urgent task is the creation of novel dosage forms such as nanoparticles, which prolong the effect of the drug in the treatment of malignant tumors.

At present, nanoparticles are widely studied in pharmaceutical research as drug delivery systems. As a rule, nano-carriers protect the drug from degradation, improve drug's absorption bydiffusion through the epithelium. Polymeric nanoparticles can be made of polysaccharides, proteins or synthetic polymers. Nanoparticles made of natural hydrophilic polymers, such as albumin, have proven to be effective in terms of the best ability to load the drugs and biocompatibility. In this regard, albumin was chosen as the carrier for drug delivery in our study, as it is a non-toxic, biocompatible, and biodegradable polymer[1-2].

We have carried out the studies on immobilization of the anticancer drug "Cyclophosphan" (cyclophosphamide) into the albumin nanoparticles and have selected the optimal conditions for synthesizing the nanoparticles with satisfactory characteristics. Albumin nanoparticles immobilized with cyclophosphamide using various drug concentrations (2 mg / ml; 4 mg / ml; 8 mg / ml) were obtained by the adsorption method. The physicochemical characteristics of synthesized polymeric nanoparticles were determined using photon correlation spectroscopy. Thus, for each concentration, the average sizes of nanoparticles were 200.1, 234.3, and 263.6 nm, and the values of polydispersity indices (PDI) were 0.078, 0.218, and 0.095, respectively. The degrees of binding of the anticancer drug "Cyclophosphan" with albumin nanoparticles, determined using UV spectrophotometry were 73.6, 81.0 and 81.7% (correspondingly), which indicates to the promising technique of immobilizing Cyclophosphan into albumin nanoparticles.

Thus, we have developed the method for producing albumin nanoparticles immobilized with the antitumor drug «Cyclophosphan» with satisfactory physicochemical parameters and high values of the binding degree which makes possible to use them in future for the drug delivery.

References

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