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BOOK OF ABSTRACTS

NANOPARTICLES BASED ON ALIPHATIC POLYESTERS FOR THE DELIVERY OF ANTICANCER DRUGS

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Currently, the chemotherapy with cytostatic drugs is carried out by intravenous drug administration. The main drawback of such treatment is the toxic systemic drug action and low bioavailability. The interest to nanoparticles for the preparation of cancer therapeutics can be related to their ability to increase the local drug concentration in cancer cells. Furthermore, the nanocontainers can improve drug efficacy, increase the solubility and bioavailability of a medicine, reduce side effects, prolong the circulation half-life, as well as allow for controlled release of a drug.

The aim of present study was to develop the delivery systems for antitumor drug dioxadet specific to the treatment of ovarian cancer. The chemotherapeutic agent was encapsulated into nanoparticles based on aliphatic polyester. The proposed polymer nanoparticles should provide a dosed, controlled and prolonged release of the cytostatic drug.

The nanoparticles based on amphiphilic block-copolymers of poly(lactic acid) (PLA-b-PEG) and poly-ε-caprolactone (PCL-b-PEG) with poly(ethylene glycol) were prepared by the nanoprecipitation technique. The ratio of the organic and water phase was 1:5. For the preparation of nanoparticles, it was tested as solvents: acetonitrile, tetrahydrofuran, the mixture of ACN:THF with ratio 50:50 (v/v), and a mixture of acetone with ACN and THF with ratio of 20:80 (v/v). The influence of concentrations of PLA-b-PEG and PCL-b-PEG, dissolved in organic phase, on the size and the stability of forming nanoparticles was investigated. The size of nanoparticles was determined by dynamic light scattering (DLS) and nanoparticle tracking analysis (NTA) methods.

The encapsulation efficiency and maximal drug loading of chemotherapeutic agent (dioxadet) into nanoparticles were determined under the variation of drug amount. The relationships between the copolymer hydrophobicity and the ability to encapsulate the optimal amount of dioxadet were established.

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