SL 07

NOVEL FUNCTIONAL OLIGOPEROXIDE-BASED CARRIERS OF BLOCK AND BRANCHED STRUCTURES AND WATER DRUG-DELIVERY SYSTEMS FOR TUMOR TARGETING AND TREATMENT

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The development of novel block and branched oligoperoxide surfactants and their application for obtaining micelle-like or/and nanocomposite water preparations of water insoluble anticancer drugs capable of specific tumor targeting and prolongation of their action are presented.

The consecutive multi-stage polymerization of mixtures of hydrophilic and hydrophobic monomers initiated by linear, telechelic or comb-like oligoperoxide surfactants provides synthesis of water soluble functional oligomeric carriers of comb-like, block or branched structures, respectively. They are water soluble at pH 7.2-7.4 surface-active substances that form micelle-like intermolecular structures sized 20-70 nm at the attainment of definite concentration in solution.

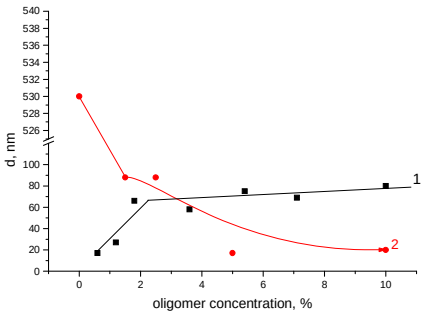

Figure. Concentration-dependence of nanoparticle size in water preparations without drug (1) and with drug solubilized in the carrier core (2).

Method combining solubilization of water insoluble anticancer drugs and formation of stable water drug delivery systems comprising of functional nanoparticles, was developed by using block, comb-like and branched oligomeric surfactants. Both a decrease of the nanoparticle size to 20 nm (Figure) and enhancement of the system surface activity witness strong hydrophobic interaction between the drug and surfactant hydrophobic core. Since functional oligomeric surfactants are oligoelectrolytes of tailored type, we also used an approach consisting of previous synthesis of complexes of anticancer drugs containing COOH or NH_2 groups with surface-active carriers, and following their dispersion in water solutions. Availability of hydrophilic oligomeric shell on the particle surface provides high stability of water drug delivery systems and a possibility of their targeting towards tumor cells. Preparations developed were studied using UV and NMR-techniques, and their anticancer activity and toxicity were tested *in vitro* (cell culture) and *in vivo* (rats).