PHOTOPHYSICAL PROPETIES OF DEXTRAN-POLY(N-ISOPROPYLACRYLAMIDE) COPOLYMER LOADED WITH CHLORIN e_6 DERIVATIVES

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In our work we synthesized a start-like copolymer with dextran core and grafted poly(N-isopropylacrylamide) PNIPAAm arms and photophysical properties of the copolymer complexes with chlorin e_6 derivatives as function of temperature have been studied. Previously it was shown that chlorin e_6 derivatives (chlorin e_6, dimethyl ester of chlorin e_6 (DME), and trimethyl ester of chlorin e_6 (TME)) are promising photosensitizers for photodynamic therapy.

Analysis of spectral and polarization characteristics of chlorins fluorescence showed that at low temperatures their molecules interacted weakly with copolymer chains. As a result, absorption and fluorescence properties of chlorine e_6 derivatives in aqueous and polymer solutions are practically identical. Heating above critical solution temperature has a significant influence on the fluorescent characteristics of non-polar chlorins indicating the binding of DME and TME molecules in the polymer globule. With the deep penetration of DME and TME into the polymer globule is associated also a significant temperature-dependent increase in the fluorescence polarization degree. The fluorescent characteristics of chlorine e_6 in the polymer solution when heated, remain unchanged, indicating the absence of opportunities for the binding of sensitizer in the bulk of polymer globules.

The results of our research with several structurally similar chlorin-type photosensitizers clearly show that the applicability of (PNIPAAm)s as smart drug-delivery system is dependent strongly on the properties of loaded drug.

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