

Nanochemistry and biotechnology

Nanosystem for targeted delivery of medicaments into tumor cells

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Macromolecules of water-soluble polymers, due to their biocompatibility with living cells and tissues and their possible load dosage forms, are used as nanocontainers (nanocarrier) or nanotechnology-based drug delivery systems. This study was focusing on using of branched biocompatible polymer Dextran-graft-Polyacrylamide as templates for preparation nanocarrier containing simultaneously both Ag nanoparticles and *anticancer drugs*.

The Ag nanoparticles of certain size and morphology were synthesized in situ in polymer matrices and characterized by UV-vis spectroscopy and Transmission electron microscopy and Zeta-sizer. It was shown that nanoparticles were spherical in shape, 10-20 nm in size and sols were stable in time. Polymer/nanoparticles systems were loaded by cisplatin and tested for cytotoxicity in both U-937 histiocytic lymphoma cells and K-562 myeloid leukemia cells. U-937 lymphoma cell line possesses a phagocytic activity, as well as K-562 cells have only slight phagocytic activity. It was shown a dose-dependent decrease in viability for both cell types exposed to the Ag nanoparticles and the ones conjugated to cisplatin. The data from our cytotoxic studies indicate that nanosilver induces toxicity in cells. The polymers conjugated to both nanosilver and cisplatin displayed less cytotoxic effect compared to conjugates of cisplatin and the polymers, and that was especially obvious in U-937 cells (57-60% for polymer/Ag/cisplatin and 40-44% for polymer/cisplatin at 10 µg/ml).