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"Dextran-polyacrylamide copolymers as potential carriers for cisplatin delivery into lymphomas"

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Drug nanocarriers can deliver medicines to site-specific targets and improve such pharmacologic properties of free drugs as biocompatibility and *in vivo* stability. In this study we investigated the cytotoxic effects of dextran-polyacrylamide copolymers (D-PAA) as well as the ones conjugated to nanogold in histiocytic lymphoma cell line U-937. Gold nanoparticles (AuNPs) with average size 2-8 nm have been prepared in aqueous solution of graft copolymer D-PAA. Both nanosystems were assumed to be potent cisplatin nanocarriers for a delivery to lymphomas. Also, the cytotoxic effect of these nanosystems conjugated to cisplatin was evaluated.

The nanosystems were examined for cytotoxicity by using both MTT assay (NPs concentrations – from 0.1 to 10 μg/ml) and trypan blue staining (5 μg/ml of the NPs). It was shown that copolymers, both alone or linked to Au NPs, are not toxic at any concentration. At the same time aqueous D-PAA loaded with cisplatin caused prominent cytotoxic effect on lymphoma cell line at 10 μg/ml (40-44%). However, when copolymers were conjugated to both Au NPs and cisplatin, such a nanosystem displayed less cytotoxic effect compared to conjugates of cisplatin and D-PAA. Thereby, our findings suggest that the AuNPs weaken cytotoxic effect of the therapeutic drug cisplatin and, thus, cannot be used as a carrier for targeted delivery of cisplatin to lymphoma cells. Although cisplatin conjugated to copolymers causes less toxic effect in U-937 than the free one does. This nanosystem significantly decreases the viability of lymphoma cells. Along with that copolymers provide cisplatin with improved biocompatibility and an ability to be specifically delivered into a tumor site. In this way, D-PAA copolymers are promising carriers for carrying therapeutical drugs in medical treatment of lymphomas.