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Cytotoxicity & kinetic studies of cancer cell lines through Methotrexate nanoparticles: Comparative analysis with direct drug

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The aim of this study is to compare the cytotoxic effect of nanoparticle-based anticancer drug with that in direct active form on cancer cell lines HepG2, Huh7 and HeLa. We investigated the effect of methotrexate and folic acid using different cancer cell lines. The proliferation of the cell line was found to be inhibited in a dose dependent manner which was detected using MTT assay. Delivery and targeting of the methotrexate with nanoparticles on the cell lines was also performed using the same method. It was observed that the cytotoxic effect of the methotrexate was more and in controlled manner in nanoparticulate form than in the case of direct dosage. Kinetic studies revealed the sustained and controlled release patterns of the anticancer drug. Based on the results obtained, it can be envisaged that the *in vivo* use of nanoparticle based drug delivery and targeting is a promising approach in chemotherapy, overcoming the toxic effects of the known aqueous drugs.

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