

PNIPAAm-MAA Nanoparticles as Delivery Vehicles for Curcumin Against MCF-7 Breast Cancer Cells

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Abstract : Breast cancer is the most frequently occurring cancer among women throughout the world. Natural compounds such as curcumin hold promise to treat a variety of cancers including breast cancer. However, curcumin's therapeutic application is limited, due to its rapid degradation and poor aqueous solubility. On the other hand, previous studies have stated that drug delivery using nanoparticles might improve the therapeutic response to anticancer drugs. Poly (N-isopropylacrylamide-co-methacrylic acid) (PNIPAAm-MAA) is one of the hydrogel copolymers utilized in the drug delivery system for cancer therapy. The aim of this study was to examine the cytotoxic potential of curcumin encapsulated within the NIPAAm-MAA nanoparticle, on the MCF-7 breast cancer cell line. In this work, polymeric nanoparticles were synthesized through the free radical mechanism, and curcumin was encapsulated into NIPAAm-MAA nanoparticles. Then, the cytotoxic effect of curcumin-loaded NIPAAm-MAA on the MCF-7 breast cancer cell line was measured by MTT assays. The evaluation of the results showed that curcumin-loaded NIPAAm-MAA has more cytotoxic effect on the MCF-7 cell line and efficiently inhibited the growth of the breast cancer cell population, compared with free curcumin. In conclusion, this study indicates that curcumin-loaded NIPAAm-MAA suppresses the growth of the MCF-7 cell line. Overall, it is concluded that encapsulating curcumin into the NIPAAm-MAA copolymer could open up new avenues for breast cancer treatment.

Keywords : PNIPAAm-MAA, breast cancer, curcumin, drug delivery

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