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Evaluation of magnetic nanoparticles coated by 5-fluorouracil imprinted polymer for controlled drug delivery in mouse breast cancer model

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Nanoparticles (NPs) have been extensively investigated to improve delivery efficiency of therapeutic and diagnostic agents. In this study, magnetic molecularly imprinted polymer (MIP) was synthesized by using polydopamine. Synthesized MIP was used for controlled 5-fluorouracil (5-FU) delivery in a spontaneous model of breast adenocarcinoma in Balb/c mice in the presence of an external magnetic field. Antitumor effectiveness of 5-FU imprinted polymer (5-FU-IP) was evaluated in terms of tumor-growth delay, tumor-doubling time, inhibition ratio,

and histopathology. Results showed higher efficacy of 5-FU-IP in the presence of magnetic field upon suppressing tumor growth than free 5-FU and 5-FU-IP without magnetic field. The 5-FU and Fe distribution among tissues were evaluated by high-performance liquid chromatography and flame atomic absorption spectrometry, respectively. The obtained results, showed significantly deposition of 5-FU in the 5-FU-IP treated group with magnetic field. Thus, magnetic 5-FU-IP is promising for breast cancer therapy with high efficacy.

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