

عنوان مقاله:

FeMn₂O₄ nanoparticles coated dual responsive temperature and pH-responsive polymer as a magnetic nano-carrier for controlled delivery of letrozole anti-cancer

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خلاصه مقاله:

Objective(s): For cancer cells, an efficient and selective drug delivery vehicle can remarkably improve therapeutic approaches. This paper focuses on the synthesis and characterization of magnetic MnFe₂O₄ NPs and their incorporation in a dual temperature and pH-responsive polymer, which can serve as an efficient drug carrier. Materials and Methods: MnFe₂O₄ NPs were synthesized by chemical co-precipitation technique and coated with tetraethyl orthosilicate (TEOS) and modified with 3-mercaptopropionic acid (MPA). Then, it was used in the reaction medium during the synthesis of a temperature and pH-responsive poly (N-isopropylacrylamide-co-vinyl acetate-co-methacrylic acid). The prepared vehicle was characterized by FESEM, XRD, VSM, and FT-IR. Letrozole was used as a model drug and its loading and release and LCST of the vehicles were evaluated. Results: The results for LCST measurements reveal that the phase transition of polymer occurs at temperatures in the range of 37-40 °C which is in the range of body conditions. Results for loading efficiency shows that maximum loading occur in about 10 h. The loading % for nano-carrier was lower than plain polymer which was due to lower polymer content in the nano-carrier with the same weight compare to the plain polymer. The results for drug release showed that the release of letrozole in pH 1.2, 5.5 and 7.2 was about 80, 45 and 35% for plain polymer and 81, 56 and 50% for the nano-carrier respectively. Conclusion: The results indicate that the prepared magnetic nano-carrier can be a suitable candidate for site-specific and controlled anti-cancer delivery through oral administration.

کلمات کلیدی:

Letrozole, Drug Delivery, MnFe₂O₄ nanoparticles, Dual responsive polymers

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