عنوان مقاله:

Anticancer Activity of Doxorubicin Loaded PBMA-b-POEGMA Micelles against MCF۷ Breast Cancer Cells and HepG۲ Liver Cancer Cells

محل انتشار:

فصلنامه زیست پزشکی جرجانی, دوره 9, شماره 3 (سال: 1400)

تعداد صفحات اصل مقاله: 12

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خلاصه مقاله:

Background and Objective: Cancer is one of the most serious diseases. Doxorubicin is a type of chemotherapy drug used to treat a variety of cancers. Doxorubicin is a type of chemotherapy drug used to treat a variety of cancers. However, its side effects have limited its use. The aim of this study was to synthesize and evaluate polymer micelles containing doxorubicin and evaluate its toxicity on MCF۷ breast cancer cells and HepG۲ liver cancer cells. Material and Methods: For this purpose, PBMA-b-POEGMA diblock copolymer was first synthesized using the RAFT method and confirmed by GPC. Dynamic light scattering (DLS) and Transmission electron microscope (TEM) were used to observe the morphology, size, and polydispersity of the micelles. In addition, in vitro cytotoxicity of DOX-loaded polymeric micelles against MCF۷ cells and HepG۲ cells were assessed. Furthermore, cell uptake and apoptosis assay of DOX-loaded polymeric micelles against MCF۷ cells were evaluated. Results: The TEM image revealed that the nanoparticles were spherical and uniform. The particle size and polydispersity measured by DLS were ۳۵ nm and ۰.۱۳, respectively. The drug encapsulation efficiency and drug loading contents were ۵۰±۳.۴۶ % and ۴.۵۳±۰.۲۹ %, respectively. The drug release rate was reported ۶۹% in saline phosphate buffer (pH ۷.۴) within ۲۴ hours. The results showed that micelles containing doxorubicin had a greater effect on MCF۷ cell viability than the free drug. The MTT assay demonstrated that micelles were biocompatible to HepG۲ cells while DOX-loaded micelles showed significant cytotoxicity. The IC۵۰ of doxorubicin-loaded micelles against MCF۷ cells were obtained to be ۰.۵ µg/ml. It was further shown that micelles containing doxorubicin had higher cell uptake and apoptosis than free drugs on MCF۷ cells. Conclusion: These polymeric micelles are an ideal candidate to deliver anticancer agents into breast cancer cells.

کلمات کلیدی:

Polymeric Micelle, Cytotoxicity, Cancer Therapy, RAFT Polymerization, Nanocarriers, Breast Cancer Cells

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