

عنوان مقاله:

The assessment of berberine nano-liposome slow release for delivery to bone cancer cells

محل انتشار:

هفتمین کنفرانس بین المللی یافته های نوین علوم و تکنولوژی با محوریت علم در خدمت توسعه (سال: 1399)

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نویسندگان:

Zeinab amirpour

,Babi fatemeh haggirossadat

Behrad Nafisi

خلاصه مقاله:

Background: Osteosarcoma as a cancerous tumor in bone is more common in children and adolescents. Recently, various treatment approaches have been provided for treating of bone cancer. At present, more attention was focused on non-viral polymeric carriers, such as liposomes. Furthermore, berberine hydrochloride belonged to alkaloid groups has been proved for different pharmacological functions. But this component is associated with low solubility and bioavailability in aqueous phase. It seems that it can be loaded into liposome for enhancing permeability, decreasing adverse reactions and improving efficacy. Given that there are few studies, regarding berberine containing liposome with slow release formulation in treatment of cancer, the aim of current study was to assess slow release nanoliposome containing berberine for delivery to bone cancer cells. Materials and Methods: In this experimental study, Saos2 cell line was incubated with DMEM containing FBS at 37°C and 5% CO₂. Nanoliposomal formulation was synthesized and parameters such as size and zeta potential were assessed by atomic force microscopy and zetasizer, respectively. Drug loading in liposome was also determined. Cytotoxicity of nanoliposome and release of drug from nanoliposome were assessed by MTT assay and dialysis method, respectively. Results: The size of berberine free nanoliposome and berberine containing nanoliposome was 112.1 and 114.9 nm, respectively. The zeta potential of these two was -16.1 and -1.9 mv, respectively. The cytotoxicity of cells in various concentration of nanoliposome containing berberines in Saos2 cell line was significantly lower than free berberines ($p < 0.05$). The release of nanoliposome containing berberine at pH 7.4 and temperature of 37 °C demonstrated that in the first 12 hours of study, about 47% of the drug was released. IC₅₀ of berberine containing nanoliposome and free berberine was 52.2 and 137.3 $\mu\text{g} / \text{ml}$, respectively. Conclusion: In current study, IC₅₀ value of berberine containing nanoliposome was 2.67 times lower than berberine containing nanoliposome. Furthermore, the drug release was slow which leads that tumor is exposed for longer time with lower dose of drug, enhancing the effect of the drug on cancer cells.

کلمات کلیدی:

Berberine, Bone cancer cells, Nanoliposome, Slow release

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