In situ thermosensitive Tamoxifen citrate loaded hydrogels: an effective tool in breast cancer loco-regional therapy.

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Abstract

One of the main challenges for using Tamoxifen citrate (TMC) in breast cancer therapy is achieving
proper target and efficient delivery of adequate concentration to the adenocarcinoma without harming
healthy glandular and soft fatty tissue. Herein, TMC niosomal thermosensitive hydrogels were proposed
as a tool to resolve this challenge. Niosomes were prepared by film hydration technique and incorporated
into Pluronics thermosensitive gels prepared using cold method. The prepared hydrogels were evaluated
for gelation temperature, rheological behavior and in vitro drug release. Moreover, in vivo anti-tumor
activity was examined in Ehrlich carcinoma mice model through reporting solid tumor volume regression
and tissue distribution of TMC. Type and ratio of used poloxamers were manipulated to provide the
optimal gelation temperature (34e37 C). Rheological analysis showed low viscosity and elasticity values
at low and room temperature while these values significantly increased at the physiological temperature.
A prolonged diffusion-driven release of TMC was detected. In vivo data showed, evidently, that anticancer
activity was improved with significant retention of the drug at the tumor site. These encouraging results
confined that this in situ hydrogel depot offers an attractive approach for controlled delivery of TMC and
clinically expected to be useful delivery system in loco-regional therapy for breast cancer.

J Drug Delivery Sci Tech., - 2016, July