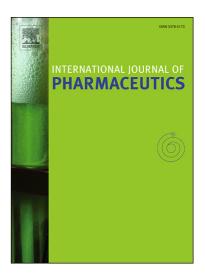
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ACCEPTED MANUSCRIPT

Dual-responsive drug delivery systems prepared by blend

electrospinning

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Abstract:

To prepare temperature and pH dual-responsive drug delivery systems, the thermosensitive polymer poly(N-isopropylacrylamide) (PNIPAAm) was first synthesized by free-radical polymerization. It was then co-dissolved with the pH-sensitive polymer Eudragit[®] L 100-55 (EL100-55) and processed into fibers using electrospinning. Ketoprofen (KET), a model drug, was also incorporated into the composite fibers, and fibers based on a single polymer additionally prepared. The fibers had smooth cylindrical morphologies, and no obvious phase separation could be seen. Using X-ray diffraction, KET was determined to be present in the amorphous state in the fiber matrix. FTIR spectroscopy also indicated the successful incorporation of amorphous KET in the fibers. In vitro drug release studies in media at different pH (4.5 or 7.4) or temperature (25 and 37 °C) showed that the release of KET from the blend PNIPAAm/EL100-55 fibers was dependent both on environmental temperature and pH, reflecting the dual-responsive properties of the fibers. The MTT assay was used to explore the biocompatibility of the PNIPAAm/EL100-55 composite fibers towards L929 fibroblasts. Viability was always found to be > 80 %, even at polymer concentrations of 100 mg/mL. Therefore, the fibers prepared here could lead to the development of multi-responsive fibers for drug

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