Etoricoxib-loaded bio-adhesive hybridized polylactic acid-based nanoparticles as an intra-articular injection for the treatment of osteoarthritis

Abdelfattah Ahmed Abdelkhalek Ahmed Soliman ,Alaa H.Salama, Nermeen A.Elkasabgy

Abstract

Osteoarthritis is a major problem in elder people. Etoricoxib-loaded bio-adhesive hybridized nanoparticles were prepared using polylactic acid (PLA) and chitosan hydrochloride (CS-HCl) in presence of CaptexÈ200 as a liquid oil, polyvinyl alcohol (PVA) and TweenÈ80 as surfactants. The study aimed to present a new intra-articular treatment of osteoarthritis with anti-inflammatory as well as bone rebuilding effects. Hybridized nanoparticles were fabricated applying the emulsion solvent evaporation technique then assessed for particle size, zeta potential, entrapment efficiency and in-vitro drug release. Furthermore, FT-IR and DSC in addition to morphological examination were done. Results revealed that the formulation composed of PLA:CaptexÈ200 in ratio 1:2 (w/w), 1%w/v TweenÈ80, 0.3% w/v CS-HCl and 3%w/v PVA possessed the smallest particle size and the most sustained drug release, thus was sorted for further analyses. The selected formulation ability to interact with the negatively charged sodium fluroscein was evaluated to predict its binding with the naturally occurring hyaluronic acid in the knee joint where promising results were obtained. Results showed the cytocompatibility of the formulation when tested using MC3T3-E1 normal bone cell line, enhanced ALP activity and increased calcium ion deposition and binding. Results suggested that the presented formulation can be considered as an innovative approach for osteoarthritis.

International Journal of Pharmaceutics 2020, March