

Long Lasting in-situ forming implant loaded with raloxifene HCl: An injectable delivery system for treatment of bone injuries

Seham Elkheshen, AZZA AHMED MOHAMED MAHMOUD, Nermeen A. Elkasabgy, Fatma S. Abdel-Salam, Emad B. Basalious, Mohammed S. Amer, Amany A. Mostafa

Abstract

Bone injury is very serious in elder people or osteoporotic patients. In-situ forming implants (IFI) for bone rebuilding are usually poly-lactic-co-glycolic acid (PLGA)-based, which have a burst release effect. This study aimed to prepare novel liquid lipid-based PLGA-IFI loaded with raloxifene hydrochloride for prolonged non-surgical treatment of bone injuries by applying solvent-induced phase inversion lasting lipid-based IFI (LLL-IFI). The formulations were characterized by analysing their in-vitro drug release, solidification time, injectability, rheological properties, and DSC in addition to their morphological properties. Results revealed that the LLL-IFI composed of 10% w/v PLGA with a lactide to glycolide ratio of 75:25 with lowest burst effect, as well as delayed pore formation compared to its counterpart for their capability to enhance bone regeneration in bone injuries induced in rats. Both formulations succeeded in healing the bones completely with the superiority of LLL-IFI in the formation of well-organized bone structures lacking fibrous tissues. The results suggest that LLL-IFI and PLGA-IFI are innovative approaches for treating critical and non-critical sized bone injuries.

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