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School of Pharmacy and Pharmaceutical Sciences
Isfahan University of Medical Sciences

A novel design of a biodegradable intravitreal implant for the sustained release of clindamycin

L. Tamaddon[1,*], S.A. Mostafavi[1], F. A.Dorkoosh[2], R. Karkhaneh[3], M. Riazi-Esfahani[3], M. Rafiee-Tehrani[2]

[1]Department of Pharmaceutics, School of Pharmacy and Pharmaceutical Sciences, Isfahan University of Medical Sciences, Isfahan, Iran
[2]Department of Pharmaceutics, School of Pharmacy and Pharmaceutical Sciences, Tehran University of Medical Sciences, Tehran, Iran
[3]Eye Research Center, Farabi Eye Hospital, Tehran University of Medical Sciences, Tehran, Iran.

Background and Aims: Polylactides (PLAs) and their copolymers with glycolides (PGAs) are the biodegradable and biocompatible polymers that extremely used for the development of controlled release drug delivery systems. The objective of this study is to evaluate the feasibility and characteristics of biodegradable devices in the prolonged and controlled intravitreous release of clindamycin in toxoplasmosis.
Methods: rod-shaped Intravitreal implants (with 0.45mm diameter), made of a homogeneous mixture of drug and polymer (polymers with lactide: glycolide (PLA:PGA) molar ratios of 50:50, 75:25 and 100:0 with different molecular weights) in various drug:polymer ratios and various doses of the drug, were prepared. In vitro clindamycin release was evaluated by high performance liquid chromatography for several weeks. Differential scanning calorimetry (DSC) was used to evaluate stability and interaction of the polymer and drug.
Results: PLGA implants with different monomer ratios and different molecular were unsuccessful in sustaining drug releases in the therapeutic durations. Implant Degradation profiles, confirm their unsuitability for clindamycin prolonged releases. In contrast, PLA implants allows for a controlled and prolonged delivery of clindamycin; since in the formulations with PLA average molecular weight 18000 (inherent viscosity: 0.2 dl/g) and 20% drug loading, drug level were maintained within the therapeutically range for about 5 weeks. On the other hand, thermoanalysis with DSC, showed the good system stability.
Conclusions: The results suggest that the PLA implants offers a promising controlled release system, when long-term sustained intraocular delivery of clindamycin is required.

Keywords: Clindamycin; Intravitreal implant; PLA; PLGA