Preparation of a sustained delivery system of pilocarpine hydrochloride from poly(lactic-co-glycolic acid)/poly(lactic acid) for subconjunctival administration

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Abstract

Glaucoma is a progressive optic neuropathy characterized most commonly by elevated intraocular pressure (IOP). It is es mated that 67 million people have glaucoma wordwide, and the disease is considered to be the second cause of blindness. Being a progressive disease makes it very important for the patient to always have the IOP under control by maintaining the effective concentration of glaucoma drugs at the site of action (aqueous humor). The presence of many protective barriers around the eye makes it difficult for drug to reach to the aqueous humor in sufficient amount, especially for hydrophilic molecules which is the case of most anti-glaucoma drugs. The bad bioavaialblity of anti-glaucoma medicines means that drugs should be taken several times a day to ensure having the sufficient effective concentration at the site of action. Poor patient compliance arises due to inability of many patients to stick to the daily dosage regimen, thus progression of disease occurs. In this study a sustained release preparation for the delivery of pilocarpine hydrochloride for a relatively long period of time (more than three months, thus decreasing to a large extent the dosing frequency) was successfully fabricated using PLGA/PLA polymers a lone or blended together, and different types of the polymer were used with different drug to polymer ratio to look for a preparation that gives best drug loading and release profile. A blend of PLGA (of 75:25 lac de to glycolide ra o) and PLA showed the most favourable drug loading and sustained release features, it was able to deliver 623 µg for about 3.5 months. By applica on of this prepara on to the subconjunc val space, a potential may be obtained for overcoming the problems of poor bioavailability and patient compliance. Pilocarpine hydrochloride is used as a model drug for glaucoma medications, the drug is hydrophilic thus it gives a good idea about how glaucoma drugs can be made as polymeric sustained release preparations.