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Enhanced Corneal Permeation of Pilocarpine Using Liposome Technology

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Abstract:
A novel liposomal pilocarpine formulation as an ophthalmic drug delivery system has been designed to treat patients with glaucoma. The purpose of the present study was to formulate and evaluate liposomes loaded with pilocarpine and to evaluate permeation through rabbit cornea. Liposomes containing pilocarpine were prepared using thin film method. The quantities of soya lecithin and cholesterol were changed to enhance the encapsulation of the drug. The physicochemical properties of the prepared liposomes were evaluated according to their viscosity, pH, particle size, in vitro drug release, and transcorneal rabbit permeation. Dialysis membrane method was utilized to assess drug release profile. The results indicated that the mean particle sizes of liposomes were 120.5-212 nm and the pH and viscosity of formulations were in the range of 6.30-6.63 and 43.85-80.1 cps, respectively. According to the release study results, maximumally 60% of the drug released from liposomal formulations after 24 hours of the experiment. Also, the cumulative percentage of the drug permeated through rabbit cornea was differing from 3.86 to 14.9%. Irrespective from the composition and characteristics of the different liposomal formulations, they significantly increased the drug partitioning, permeability coefficient and flux of pilocarpine in rabbit cornea ex vivo model in comparison to control drug solution. The present study proved that any alteration in composition and nature of pilocarpine liposomal formulations may affect the drug permeability parameters through corneal membrane and also physico-chemical properties. It is probably due to the change in corneal structure in the presence of different liposomes composition.

Keywords: Corneal Permeability, Pearmeability, Liposome, Rabbit

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