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Polysaccharide Carriers for Drug Delivery

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4.1 Introduction

Ocular drug delivery is one of the most interesting and challenging endeavors for formulation development fraternity. The vast anatomical, physiological, and biochemical features of the eye limit or restrict the easy entry of drug molecules at the site of action. Therefore, it is always advisable to fulfill basic and mandatory features in an ocular formulation to efficiently counterbalance such associated limitations. Drug delivery for the treatment of ocular problems or diseases can be achieved by any one of the popular routes of administration such as topical, local ocular, oral, or systemic. Currently available means of oral and systemic delivery for ocular therapy require high doses of drugs/active ingredients to maintain therapeutic effective concentration but not advisable or are less popular due to severe adverse effect to the other organs/tissues as a result of biodistribution followed by administration through these routes [1]. On other hand, local as well systemic delivery through ocular route provides better platform to ocular therapeutics along with patient compliance and psychological satisfaction. The majority of difficulties arise in ocular therapeutics especially in order to achieve the therapeutic level of drug concentration at the site of action for an appropriate duration of time to attain the desired pharmacological action. The need of ophthalmic medication is increasing day by day due to the population of industrialization environment and popularization due to patient compliances [2].

4.2 Anatomical and physiological barriers for ocular drug delivery

The human eye can be broadly structured into two large segments: anterior and posterior, the latter representing about two-thirds of the total area. The anterior segment includes the cornea, the conjunctiva, the iris, the lens, the ciliary body, and the aqueous humor. Sclera, choroid, retina, vitreous humor, and optic nerve are parts of the posterior segment [3]. For anterior-segment, common routes of drug-delivery administration are topical instillation and subconjunctival injection, whereas for posterior segment common routes include systemic dosing, periocular and intravitreal injections, and topical dosing [4]. The topical administration of drug in ophthalmic route is well accepted

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