Research Article

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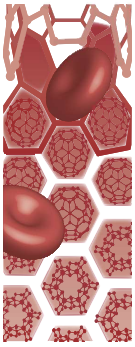

Polymeric micelles loaded *in situ* gel with prednisolone acetate for ocular inflammation: development and evaluation

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Aim: Our study developed a prednisolone acetate polymeric micelles (PM) system for ocular inflammation related to allergic uveitis. **Methods:** For PM development, a thin-film hydration procedure was used. Irritation, *in vitro*, *ex vivo* transcorneal permeation, micelle size, entrapment efficiency and histology within the eye were all calculated for PM. **Results:** The optimized *in situ* gel (A4) showed superior *ex vivo* transcorneal permeation with zero-order kinetics. **Conclusion:** The developed formulation could be a promising candidate for treating anterior uveitis via topical application to the anterior segment of the eye.

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Allergic uveitis (AU) is characterized by eye irritation caused by a variety of natural elements, resulting in inflammation inside the eye that can impair vision. Over 35% of the world's population is affected by AU, which is the fifth leading cause of vision loss in developed countries, with up to 20% of cases resulting in legal blindness [1]. Depending on the underlying cause, AU is classified as infectious or noninfectious. While intravenous corticosteroids (IC) are commonly used for noninfectious AU, owing to the adverse effects and ineffectiveness of IC recent studies have investigated the use of immune suppressants and local therapy with steroid implants. Pictorial examinations to assess ocular inflammation use technological advances such as enhanced depth imaging, optical coherence tomography and ultra-widefield fluorescein angiography [2,3].

Polymeric micelles (PMs) are liquid-solution amphipathic copolymers that act like ordinary amphiphiles and have a covalent bond between each surfactant molecule inside the hydrophobic center [4,5]. This bond, unlike normal surfactant monomer micelles, prevents monomeric unit exchange between the free and micellar pseudophases, making PM more stable and inflexible [6,7]. The number of PMs, which can range from 10 to 100 nm in size, is influenced by the manufacturing process, the proportion of amphiphiles in the copolymer, the proportion of hydrophobic and hydrophilic chains, and the total number of amphiphiles [8–10]. The goal of this research is to create a prednisolone acetate PM system to combat ocular inflammation. Medication is the first-line treatment. However,