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Novel targeted fluocinolone acetonide loaded aqueous micelles for the treatment of Posterior uveitis

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Fluocinolone acetonide (FA) is a potent glucocorticoid used for treatment of posterior uveitis. Current therapy involves surgical placement of intra-vitreous implant of FA. This method has several disadvantages like retinal detachment, redness and pain. Therefore, the optimum strategy is to develop eye drops of FA. Since FA is very poorly soluble in water, it is difficult to prepare clear aqueous eye drops of FA. Therefore, our aim in this study is to develop folic acid conjugated aqueous nanomicellar formulations containing FA. Vitamin E TPGS (1K), a surfactant polymer has been utilized to prepare nanomicelles. We also synthesized polymer with higher molecular weight of PEG (2000) (2K). Modified TPGS was synthesized by conjugating D- α -tocopheryl succinate and mPEG having molecular weight of 2000 and then conjugated to folic acid. CMC values were calculated using standard pyrene method. Micelles were prepared by thin film hydration technique. Box-Behnken design was used to optimize the formulation to achieve maximum entrapment and solubility of drug. Cytotoxicity studies were conducted on corneal and retinal cells. The CMC value obtained was 9.44 μ g/ml. Results showed that solubility of FA maybe increased up to 26 times with newly synthesized 2K polymer. Entrapment efficiency greater than 90% was achieved with 2K polymers. Nanomicelles exhibited very small size (<20nm) and narrow size distribution with both polymers. Cell viability on both corneal (HCEC) and retinal (D407) cells lines was comparable to control. Confocal microscopy studies showed increased internalization of drug with targeted micelles. Future studies involve release and uptake from nanomicelles.

Biography

Sujay Shah has completed his Bachelor's of Pharmacy from University of Pune, India and is currently a doctoral candidate at the University of Missouri-Kansas City. He has co-authored five articles till date and contributed in several book chapters. He has presented more than ten posters at national and international conferences. He was elected chair for AAPS-UMKC student organization for 2012-2013 and is a member of AAPS and ARVO organizations.

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