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Mucoadhesive PEG/PLGA nanoparticles for topical delivery of Dexamethasone to the eye

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Topical drug delivery to the eye is limited by low drug bioavailability due to rapid clearance of the formulation from the preocular surface by tear fluid or blinking. Hence, conventional eye drops require frequent topical administrations of the drugs, which cause inconvenience. To resolve this, nanoparticles made of biodegradable polymers have drawn a great deal of interest as ocular drug delivery carriers. To improve the preocular drug residence time, Poly Ethylene Glycol (PEG) has been used to allow for a mucoadhesive effect to such ocular drug delivery systems. In this work, therefore, we sought to develop drug-loaded nanoparticles composed of poly (lactic-co-glycolic acid) (PLGA) as core material and PEG (MW=6000) as mucoadhesion promoter. We employed Dexamethasone (DEX) as an anti-inflammation model drug already used in ophthalmic eye drops. The nanoparticles were prepared via o/w single emulsion. To find the optimal conditions for nanoparticle preparation with the proper actual loading-amounts of drug and PEG and sustained drug release property, we varied the initial feeding amounts of drug and PEG. In this work, the optimized nanoparticles contained 123.6 and 10.5 μg/mg of drug and PEG, respectively. They also demonstrated sustained drug release of 86.3% for 24 hours. The work is in progress to evaluate the *in vivo* preocular drug residence time of the nanoparticles and drug efficacy of the topically administered nanoparticles, using rabbit models.

Biography

Ji Min Kwak has graduated with a Bachelor's degree of Chemical and Biological Engineering from University of British Columbia and is presently a Masters candidate at interdisciplinary program of Bioengineering in Seoul National University. Her research interests include nanoparticles and ocular drug delivery and has her expertise is in fabricating PLGA nanoparticles by optimizing process and formulation variables.

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