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Preparation, characterization, and in vivo evaluation of nanoliposomes-encapsulated bevacizumab (avastin) for intravitreal administration

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Abstract

PURPOSE: Intravitreal injections can cause several ocular complications, including vitreous hemorrhage, endophthalmitis, retinal detachment, and cataract, and clearly repeated injections can multiply the risk of these complications. Bevacizumab is used for the treatment of different ocular diseases. For improvement of drug availability after intravitreal administration, in this study, liposomal bevacizumab as a novel drug delivery system was prepared and compared with conventional formulas in the market. METHODS: Bevacizumab was encapsulated into liposomes via the dehydration-rehydration method. After reducing the size of liposome to the nanoscale, the final liposomal formulation was tested in an animal model. Left eyes of rabbits received liposomal bevacizumab and the right eyes were injected by soluble bevacizumab. The free drug concentration in aqueous humor and vitreous samples at Days ٣, ٧, ١٤, ٢٨, and ٤٢ after the injection was determined by enzyme-linked immunosorbent assay. RESULTS: Mean concentration of free bevacizumab in the eyes that received liposomal bevacizumab compared with the eyes injected with soluble bevacizumab was ١ (٤٨ versus ٢٨ μg/mL) and ٥ (١٦ versus ٣,٣ μg/mL) times higher at Days ٢٨ and ٤٢, respectively. Mean concentration of free bevacizumab in the aqueous humor of both injected eyes was almost the same at the different intervals. CONCLUSION: The results of this study showed the beneficial effects of liposomes in prolonging the residency of bevacizumab in the vitreous. © The Ophthalmic Communications Society, Inc.

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