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Sutureless attachment system of the collagen film using riboflavin/UV-A cross-linking method

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Statement of the Problem: The corneal collagen film can provide corneal protection and promote corneal healing when it is applied to corneal epithelial or stromal defect due to trauma or disorders. To apply this thin film, several fixation methods have been studied. First, suturing is the most common method, but it takes a long time to fix. Fibrin glue can be used to fix, but the fixed strength is weak to maintain. Thus, we used the photochemical crosslinking method to fix this collagen film.

Materials and methods: Type I atelocollagen was extracted from pig skin using acetic acid in the presence of pepsin, and then purified by dialysis against distilled water and lyophilized. Extracted collagen was crosslinked using 1-ethyl-3-(3-dimethyl aminopropyl) carbodiimide (EDC) with N-hydroxysuccinimide (NHS). Thin transparent collagen film was produced by air-drying of crosslinked collagen solution. Superficial keratectomy model was induced in porcine eyes and, the collagen film was attached to a cornea using Riboflavin/UV-A crosslinking method under accelerated method protocol (10 mins irradiation at 9 mW/cm2).

Results: The collagen films were fixed well immediately after UV irradiation, and it maintained 3 days after fixation in porcine eye ex *vivo* culture.

Conclusion & Significance: In this study, attachment of thin collagen film using Riboflavin/UV-A crosslinking method was successful. And, it would be helpful to promote the corneal healing by the collagen film and to reduce the time for fixing the film on the corneal surface by Riboflavin/UV-A crosslinking.

Biography

Se Eun Kim is a postdoctoral researcher in Biomaterial R&BD Center in Chonnam National University, Republic of Korea. She has lots of interests in biomaterials in human and animals. She and her colleagues have been developed porcine-derived bone grafts, and also they are developing biomaterials using porcine-derived collagen. In veterinary clinics, there are many patients with corneal diseases like corneal erosion or ulcer, however, there are limitations to treat with medicine. Thus, she is searching other alternatives to promote those diseases, less invasive. And she is focusing on the collagen materials.

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