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In-vitro and *in-vivo* assessment of bioactive scaffolds nanofibers for artificial cornea epithelialization

Davood Kharaghani[a], Debarun Dutta[b], Kitty Ka Kit Ho[c], Mark D P Willcox[b], Ick Soo Kim[a]**

Abstract

Propose: This study aimed to produce composite nanofibers scaffolds via electrospinning method with high potential bioactivity to encourage epithelization for artificial cornea application. The composite nanofibers formed from polyvinyl alcohol - hydroxyethyl cellulose and optimized with graphite and different amount of hydroxyapatite.

Method: The prepared scaffolds nanofibers containing graphite which cross-linked by glutaraldehyde were subjected to dipping in calcium and phosphate solutions to load different amounts of nHA on the surface of composite nanofibers. These scaffolds surrounded a transparent core composed of a PVA hydrogel that was cross-linked by freeze-thawing cycles.

Results: The results from ATR-FTIR & XRD demonstrated the initiation of nHA nucleation and FE-SEM & SEM showed that there were no significant changes in the morphology of the nanofibers. The scaffolds and core did not cause any cytotoxicity response to human corneal epithelial cells or mouse fibroblasts. *In-vivo* cell attachment results indicated that nHA had a significant effect on cell growth and adhision.

Conclusion: The results showed scaffolds with large amounts of nHA were not suitable for soft tissue regeneration despite scaffolds with the amount of 1.66% nHA was promising candidates for artificial cornea implantation.

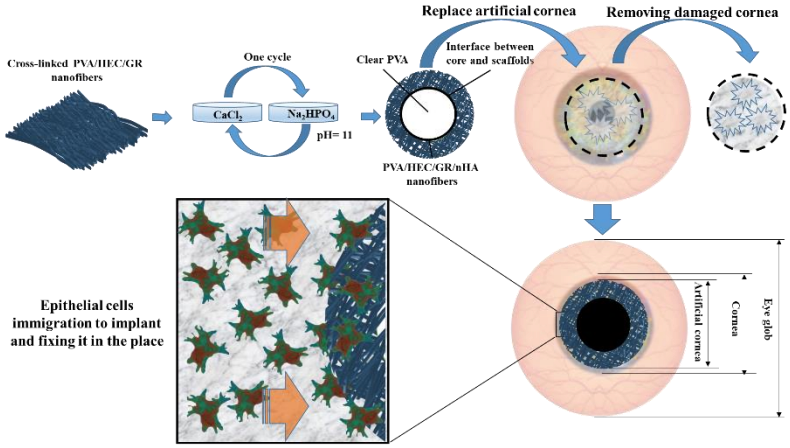

Figure 1. Schematic illustration artificial cornea epitheliazation.

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