

Reconstruction of Lamellar Bioartificial Cornea Using Lyophilized Amniotic Membrane and Collagen scaffold

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Abstract

Cryopreserved amniotic membrane (CAM) has been usually used for the treatment of severely damaged cornea with cultured corneal epithelial cells on amniotic membrane (AM). Lyophilized amniotic membrane (LAM) have a higher graft take and a longer shelf life than CAM, and are easier to store and safer, due to gamma irradiation.¹⁾ In this study, we evaluated the possibility that LAM could be used as a substratum for the reconstruction of bioartificial cornea. AM was prepared by CAM or LAM. We reconstructed corneal epithelium on LAM and CAM. We manufactured composite scaffold to culture corneal epithelial cells and fibroblasts to make a lamellar bioartificial cornea (LBC). To evaluate the reconstructed corneal epithelium and LBC, we stained the reconstructed tissue sections against PCNA, P63, CK3 TEM was also examined. LAM and CAM had similar properties of attachment, stratification and differentiation of corneal epithelial cells under histological and immunohistological examination. Corneal epithelium and stromal layer could be successfully reconstructed using composite scaffold. Corneal epithelium and LBC were successfully reconstructed using LAM and collagen scaffold. The reconstructed corneal epithelium and lamellar bioartificial cornea could be used for treating the patients with severely damaged cornea.

Reference

1. Nather A., The scientific basis of tissue transplantation. In: Farazdaghi M., Adler J., and Farazdaghi S. M., Electron microscopy of human amniotic membrane, *Advances in Tissue Banking* Vol. 5, World Scientific Publishing Co., 2001, pp 149-171.