

CAST-Eye Bank Special Session II: Advances in Corneal Transplantation in the Past Decade

Donor corneal endothelial cell maturity influences graft survival

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With the recent advancements in corneal endothelial transplantation, the visual prognosis following corneal transplantation has dramatically improved. However, the corneal endothelial cell density (ECD) progressively and substantially decreases over time, even in the absence of obvious complications such as graft rejection. Various risk factors have been proposed, including donor age, gender, storage duration, donor size, inflammatory cytokines in the anterior chamber, and iris impairment. Nevertheless, a clear explanation for the cause has yet to be established. Previously, we reported that approximately 10% of cases after corneal transplantation maintained a high ECD without any association with donor factors or host diseases (Kayukawa K, *Cornea*, 2020). Furthermore, there is evidence suggesting the presence of dead corneal endothelial cells (CECs) in donor corneas, regardless of storage duration or donor age (Kitazawa K, *Br J Ophthalmol*, 2017). These findings imply that the survival of CECs may vary among individual donor corneas. Therefore, we assumed that there are pre-existing biological factors related to cellular longevity in the donor corneas before transplantation.

In this study, we evaluated one specific biological cell characteristic obtained from basic experiments on human corneal endothelial cells (HCECs) cultured for HCEC injection therapy (Kinoshita S, *N Engl J Med*, 2018). We investigated the relationship between postoperative ECD after successful corneal transplantation and the biological characteristics of HCECs to explore the influence of donor HCECs maturity.