

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

Cell-based therapies for the corneal endothelium

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Restoration of vision due to corneal blindness from corneal endothelial dysfunction can be achieved via a corneal transplantation. However, global shortage of donor tissues has driven the development cell-based therapeutics. Having developed the capacity to propagate regulatory compliant human corneal endothelial cells (CEnCs) at the Singapore Eye Research Institute, we evaluated the functionality of propagated CEnCs delivered via two modalities, tissue-engineered endothelial keratoplasty (TE-EK) and corneal endothelial cell injection (CE-CI) within a rabbit model of bullous keratopathy. Furthermore, we developed a two-step incubation and dissociation non-culture harvesting approach to isolate single CEnCs from donor corneas for CE-CI therapy. This direct simple non-cultured endothelial cells ('SNEC') harvesting technique from donor corneas allows the utilization of donor corneas unsuitable for conventional endothelial transplantations.