

REGENERATE

REGENERATE - REGENERATING the cornea



Project coordinator: Marie-Jose Tassignon, Laboratory of Ophthalmology, Centre for Cell Therapy and Regenerative Medicine, University of Antwerp, Belgium,

Marie-jose.tassignon@uza.be

Partner countries:



The human cornea is transparent and relies on this property to enable vision. Damage to the stem cells that maintains the cornea surface results in Limbal Epithelial Stem Cells Deficiency (LSCD), causing conjunctival encroachment over the cornea with scarring, corneal neovascularisation and opacification, pain reduced visual acuity and photophobia. The surgical transplantation of large segments of donor-excised limbal tissue is effective, but carries a high risk of complications. Recent research has demonstrated the benefit and feasibility of small limbal grafts cultured on biological scaffolds. These, however, are optically deficient, difficult to standardise and engender health risks. Employing a multidisciplinary approach, the objective of REGENERATE is to develop a synthetic alternative with superior cell-interactive properties, which circumvent the problems encountered with current limbal stem cell delivery scaffolds. Our research strategy is to exploit the recent introduction of human recombinant collagen to develop transparent, mechanically stable and peptide-enhanced nano-implants, which mimic the corneal collagen alignment observed in normal, healthy corneas. We will bring the nano-corneal scaffold to the stage of proof-of-principle in animal models of limbal stem cell deficiency. The data acquired from this research will help us better understand the role that collagen nano-fibre alignment and surface nano-patterning plays in improving implant integration and survival.

“Our anticipated results include the development of new scaffolds for stem cell delivery, which could have a significant impact on healthcare, in particular ophthalmology”