Title (tentative): Engineering a human conjunctiva mimic for the development of targeted and sustained anti-scarring/anti-fibrosis drug delivery in the eye

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Motivation and application domain
Tissue contraction and scarring processes play a part in the pathogenesis or the failure of treatment of virtually every major blinding disease, particularly in glaucoma and trachomatous trichiasis. The success of the surgical treatment is directly dependent on the avoidance of post-surgical scarring. The current anti-scarring treatments are toxic anti-mitotic drugs, which can have blinding side effects.

General objectives and main activities
Our work aims at developing such a treatment using biodegradable particles loaded with anti-scarring agent in our in vitro models of conjunctival tissue contraction. The project will involve refining our recently developed engineered conjunctiva biomimetic that recapitulate the Tenon’s capsule/bulbar conjunctiva layers and using it to test the efficiency and biodegradability of various compositions of drug-loaded bioparticles.

Training Objectives (technical/analytical tools, experimental methodologies)
The student will learn: 3D cell culture with special reference to fibroblasts and conjunctiva, engineered collagen constructs, immunostaining and microscopy, microcapsules

Place(s) where the thesis work will be carried out: London UCL

Maximum number of students: 1

Financial support/scholarship: Erasmus+