Title

Elastin content and distribution in endothelial keratoplasty tissue determines direction of scrolling. (letter to the editor)

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Dear Editor,

We welcome the recent publication by Mohammed et al.[1] that demonstrates the surgical implications of the corneal elastic system in scrolling in endothelial keratoplasty. We have pioneered the characterisation of the corneal elastic system in normal human[2], keratoconic[3] corneas and in knock-out mouse models of Marfan's Syndrome. [4] The current article adds to our knowledge by showing the presence and depth distribution of elastin in the posterior cornea, which provides further confirmation that the corneal elastic system (predominantly elastin and fibrillin) is an integral part of the cornea.

We have previously shown the nanoscopic 3D distribution and arrangement of elastic fibres in the human cornea using an electron microscopy elastic stain for amorphous elastin and fibrillin[2] and the high resolution technique of serial block face scanning electron microscopy. We also showed that the concentration of elastic fibres, as a function of depth was highest in the 8µm region of the stroma immediately above Descemet's membrane and fell significantly distal to this region. TEM morphological observations in the same study also revealed that true elastic fibres containing fibrillin sheaths and amorphous elastin cores were restricted to the corneal peripheral region, limbus and trabecular meshwork (TM) while thinner, predominantly fibrillin-1 fibres, previously described by Hanlon et al [5], were only present in low densities in the central posterior cornea. Since our previous studies, we have now characterised the human elastic fibre system using a range of antibodies including elastin and fibrillin-1 [6] and we have clarified the association and distribution of elastin- and fibrillin 1-containing fibres within the corneal elastic fibre system.

We note that in this study by Mohammed et al.[1] a band of homogenous elastin immuno-fluorescence was identified above Descemet's membrane. We would be interested to know if the authors examined the elastin concentration between the posterior peripheral and central regions and, if so, were any differences detected?

We initially proposed the potential implications of the elastic fibre system in glaucoma [2] and we have now revealed that the posterior elastic fibres in the corneal stroma are indeed linked with the TM. [6] The results in the current article fit nicely with our results as the authors show that these fibres contain a high concentration of elastin that is continuous with the TM. Interestingly, it is known that full thickness keratoplasty has been shown to cause high incidence of glaucoma when compared to partial thickness deep anterior keratoplasty. A surgery that preserves the peripheral posterior component of the corneal elastic system would seem to be crucial.

Once again we welcome this article for highlighting the elastic properties of the cornea that has clear surgical implications including the formation of big bubble in keratoplasty and scrolling.

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