

New eye layer has possible link to glaucoma

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A new layer in the human cornea—discovered by researchers at The University of Nottingham last year—plays a vital role in the structure of the tissue that controls the flow of fluid from the eye, research has shown.

The findings, published in a paper in the *British Journal of Ophthalmology*, could shed new light on [glaucoma](#), a devastating disease caused by defective drainage of fluid from the [eye](#) and the world's second leading cause of blindness.

The latest research shows that the new layer, dubbed Dua's Layer after the academic Professor Harinder Dua who discovered it, makes an important contribution to the sieve-like meshwork, the trabecular meshwork (TM), in the periphery of the cornea.

The TM is a wedge-shaped band of tissue that extends along the circumference of the angle of the anterior chamber of the eye. It is made of beams of collagen wrapped in a basement membrane to which trabecular cells and [endothelial cells](#) attach. The beams branch out randomly to form a 'meshwork'.

Pressure within the eye is maintained by the balance of aqueous fluid production by [eye tissue](#) called the ciliary body and drainage principally through the TM to the canal of Schlemm, a circular channel in the angle of the eye.

Defective drainage through the TM is an important cause of glaucoma, a

condition that leads to raised pressure in the eye that can permanently affect sight. Around 1 to 2% of the world's population yearly have chronic glaucoma and globally around 45 million people have [open angle glaucoma](#) which can permanently damage the optic nerve—10% of whom are blind.

The latest research by Professor Dua and colleagues in Academic Ophthalmology at The University of Nottingham sheds new light on the basic anatomy of Dua's Layer, which is just 15 microns thick but incredibly tough. Comprised of thin plates of collagen, it sits at the back of the cornea between the corneal stroma and Descemet's membrane.

By examining human donor eyes using electron microscopy, the researchers were able to look at Dua's Layer beyond the central part of the cornea to shed more light on its features at the extreme periphery of the cornea. They discovered that the collagen fibres of Dua's Layer also branch out to form a meshwork and that the core of TM is in fact an extension of Dua's Layer.

It is hoped the discovery will offer new clues on why the drainage system malfunctions in the eyes of some people, leading to high pressure.

Professor Dua said: "Many surgeons who perform lamellar corneal transplant recognise this layer as an important part of the surgical anatomy of the cornea. This new finding resulting from a study of the microanatomy of the periphery of the layer could have significance beyond corneal surgery."

More information: Paper: The Collagen Matrix of the Human Trabecular Meshwork is an Extension of the Novel Pre-Descemet's layer (Dua's layer) [dx.doi.org/10.1136/bjophthalmol-2013-304593](https://doi.org/10.1136/bjophthalmol-2013-304593)

Provided by University of Nottingham

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