

Correspondence

“Dua’s Layer” Is Just Previously Described Pre-Descemet Stroma

Dear Editor:

We read the recent claim of the discovery of a new corneal layer by Dua et al with incredulity.¹ The existence of pre-Descemet stromal tissue remaining after pneumodissection is well known. Their further investigation of this pre-Descemet stroma confirms that it is stroma, and not a new corneal layer.

After the big-bubble technique of pneumodissection was published, it was widely assumed that the dissection plane formed between stroma and the Descemet membrane (DM). An in vivo study by Jafarinasab et al² later showed an intrastromal dissection plane. These findings were confirmed in an ex vivo study.³ Anwar also described another bubble type that formed with a clear margin (as opposed to the white margin normally seen), was usually eccentric, and could coexist with the first type of bubble.⁴ Further ex vivo investigations suggested that this clear margin bubble formed between stroma and the DM,⁵ rather than within the DM as previously assumed. Dua et al have repeated the ex vivo experiments, again showing the formation of 2 different bubble types that can coexist.

Their attempt to measure the burst pressure of the 2 different bubble types is fundamentally flawed. The needle was not advanced into the bubble, so they have measured both the pressure required to force air through the stroma plus the pressure required to burst the bubble. This explains why they found a burst pressure of 0.6 bar (approximately 450 mmHg) for a bubble that had a posterior lamella consisting of only DM.

In their histologic studies of the pre-Descemet stroma, they describe “thin lamellae of tightly packed collagen bundles running in longitudinal, transverse, and oblique directions.” This is normal stromal anatomy. They mention the acellular nature of the pre-Descemet stroma being a unique feature. However, keratocytes are not randomly interspersed between collagen fibrils, but lie in sheets between lamellae. If the dissection plane is posterior to the last row of keratocytes, then this is also consistent with normal anatomy.

Despite all their investigating, the few differences they could find between the pre-Descemet stroma and the stroma anterior to it included a slight increase in fibril diameter (but within the range considered normal for corneal stroma) and 5–8 lamellae over a width they claim would be occupied by 3–5 lamellae in more anterior stroma. Their slides show increased staining intensity of type VI collagen of the posterior lamellae after the injection of air. The act of injecting air itself decreases the tissue density of the anterior stroma, which could easily be responsible for the decreased staining intensity. All their slides show samples after air injection. Surely if the pre-Descemet stroma is so “distinct” and “well-defined” that it constitutes an entirely new corneal layer, then differences could be clearly seen without pneumodissection.

It is reasonable to expect that the most posterior lamellae may have slightly different features to the lamellae anterior to them. However, to suggest that any minor differences constitute an

entirely new layer of the cornea, and not just regional stromal variation, is illogical. It is known that the stromal lamellae become more regular and easily separated posteriorly in the cornea. One could expect that the lamellae lying on the smooth DM would be the most regular; hence, the dissection plane that forms above them. The findings of pneumodissection are consistent with known corneal stromal anatomy and do not require the existence of a new corneal layer to explain them.

Regardless of what Dua hypothesized at meetings in 2007 and took 6 years to publish, it was Jafarinasab et al² who first published good evidence that stroma can remain after pneumodissection. Dua has investigated this pre-Descemet stroma and shown no evidence of a new corneal layer distinct from stroma.

Medical eponyms have traditionally been created by one’s peers to commemorate the importance of a person’s contribution and findings. Dua has taken an interesting step of creating his own eponym, even before his claims have stood the test of further investigation and scrutiny, and despite current trends to avoid medical eponyms (and when they are used, to use the non-possessive form). If one prefers a medical eponym to describe the pre-Descemet stroma that remains after pneumodissection, then “the Feizi stroma” would be more appropriate.

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