Suprachoroidal outflow as a surgical target for the treatment of glaucoma

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Disclosures

- Aeon
- Alcon
- Allergan
- AqueSys
- Bausch & Lomb
- Calhoun Vision
- Carl Zeiss Meditec
- ForSight Labs
- Glaukos
- InnFocus
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- iScience Interventional
- Ivantis
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- Ocunetics
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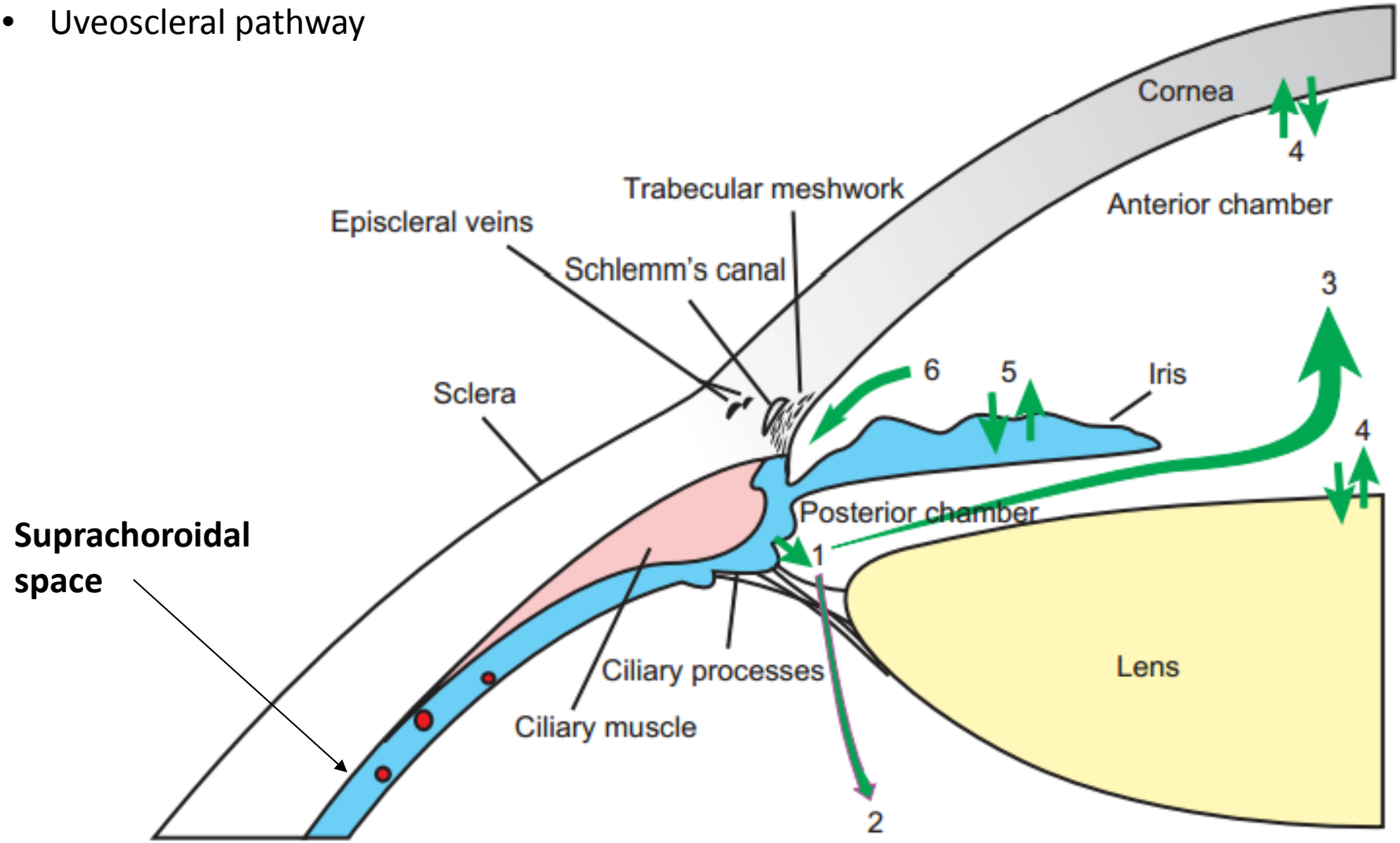
Aqueous outflow

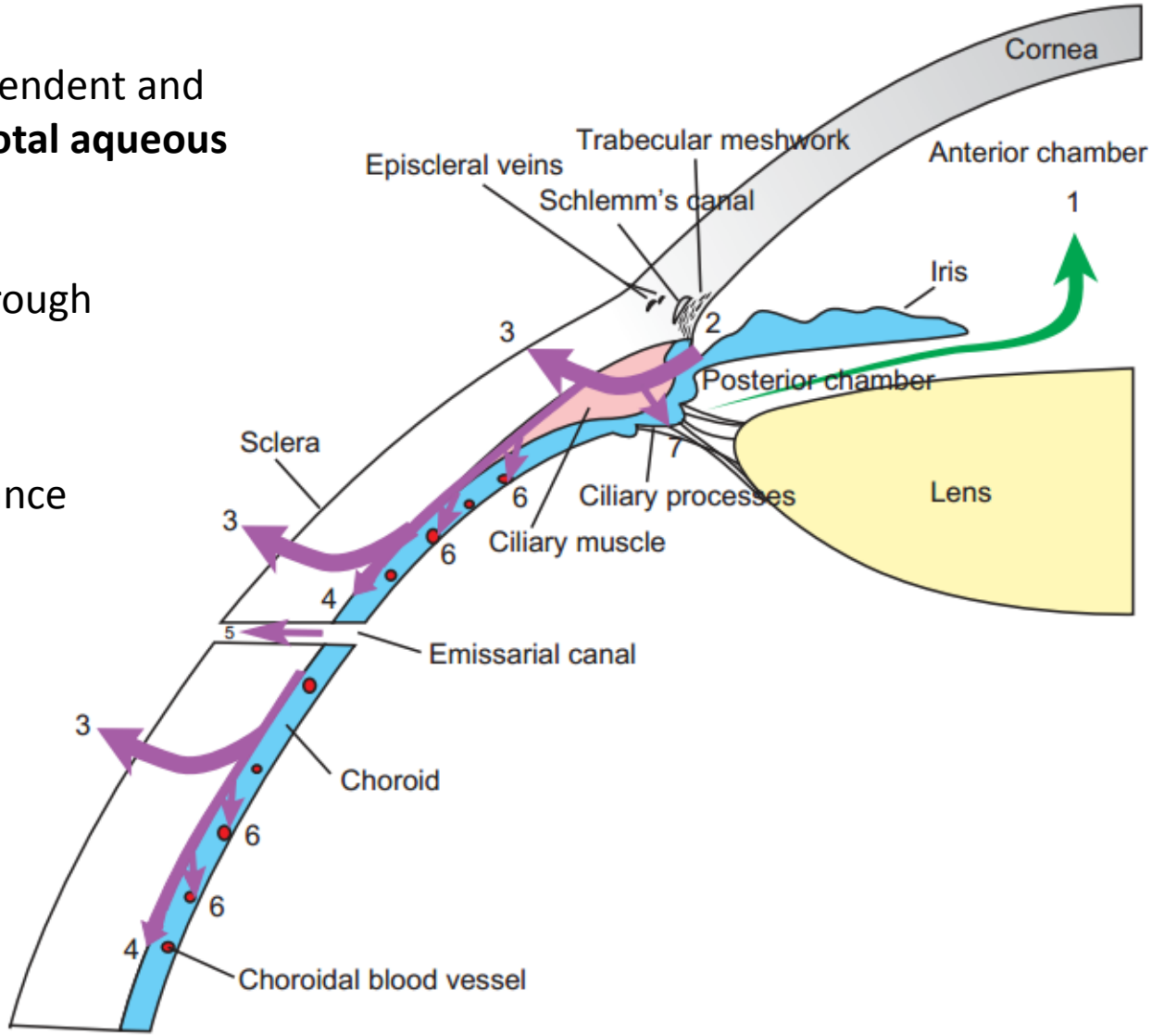
Two main physiologic outflow paths for aqueous humor:

- Trabecular pathway
- Uveoscleral pathway



Uveoscleral outflow path

- Considered pressure independent and contributes **up to 57% of total aqueous outflow**[1]
- Aqueous exits primarily through the sclera and choroidal blood vessels
- The highest point of resistance is the **ciliary body**



Suprachoroidal outflow as therapeutic target

Robust pressure gradient

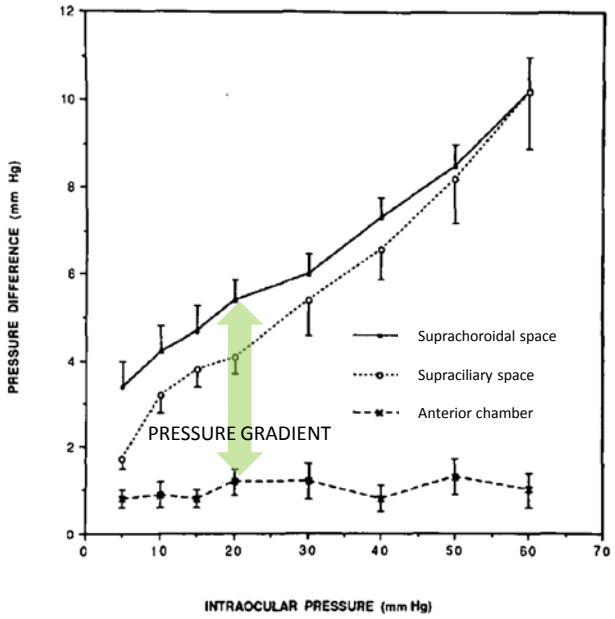
Pressure differential between anterior chamber and suprachoroidal space is 4 mmHg (at physiological range)[1]

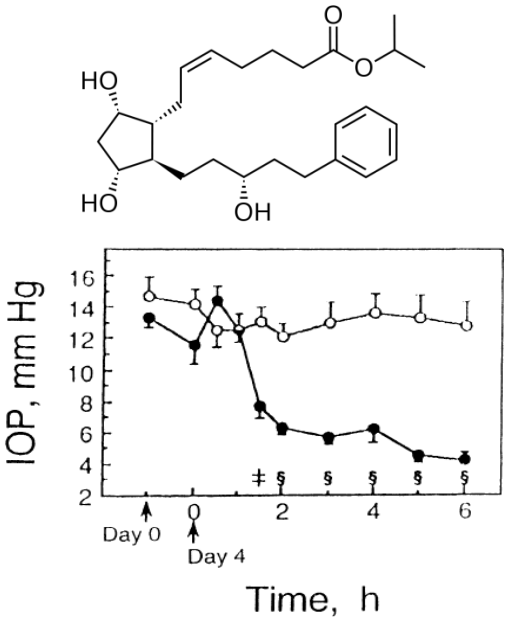
Continuous, absorptive reservoir

Single point access to the suprachoroidal continuum with up to 160x more surface area vs the trabecular meshwork[2,3]

Pharmacologic precedent

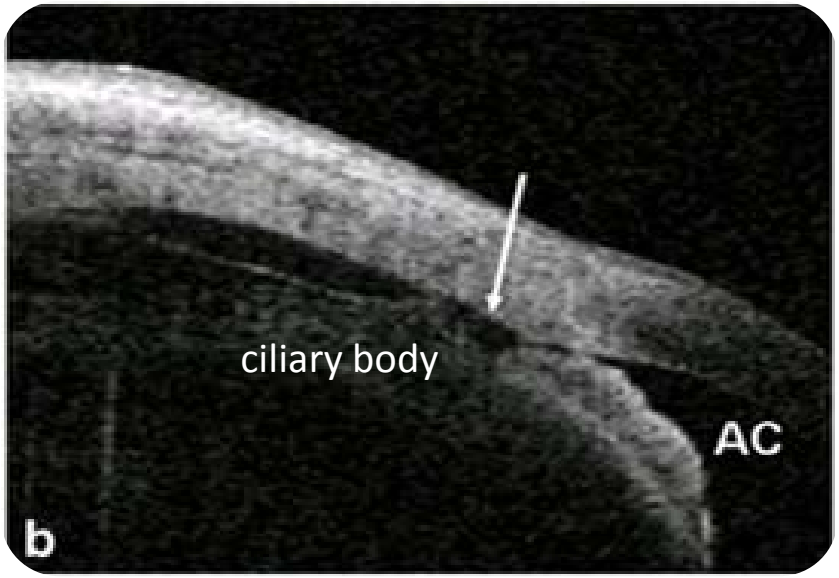
Prostaglandins – first-line therapy and most effective medical treatment –acts on uveoscleral pathway[4]





1. Emi K, Pederson JE, Toris CB. Hydrostatic pressure of the suprachoroidal space. IOVS. 30(2):233-238
2. Patel SR, Lin ASP, Edelhauser HF, Prausnitz MR. Suprachoroidal Drug Delivery to the Back of the Eye Using Hollow Microneedles. Pharm Res . 2011 January ; 28(1): 166–176
3. Internal analysis – Grierson (1979). BJO. 63:9-16; Olsen (1998). Am J Ophth. 125:237-241.
4. Weinreb RN, Toris CB, Gabelt BT, Lindsey JD, Kaufman PL. Effects of prostaglandins on the aqueous humor outflow pathways. Surv Ophthalmol 2002;47(Suppl 1):S53-S64

Supraciliary stenting creates a conduit to the suprachoroidal space



Cyclodialysis cleft

Historically used procedure which was effective but limited in duration, as the ciliary body cleft would eventually close

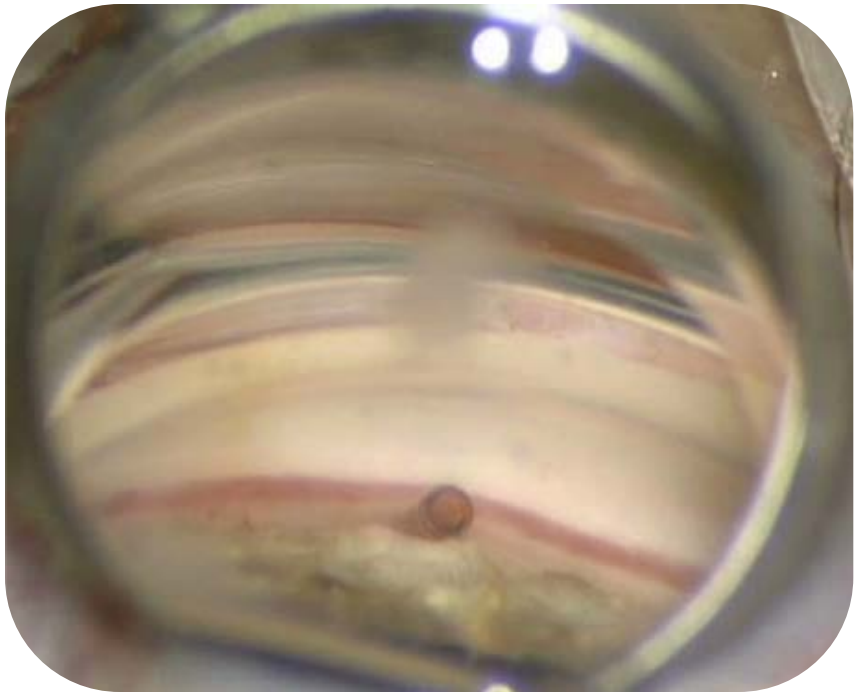
Supraciliary Stent *in situ*

Supraciliary stenting allows for a “controlled cyclodialysis” that is repeatable and permanent to overcome ciliary body flow resistance

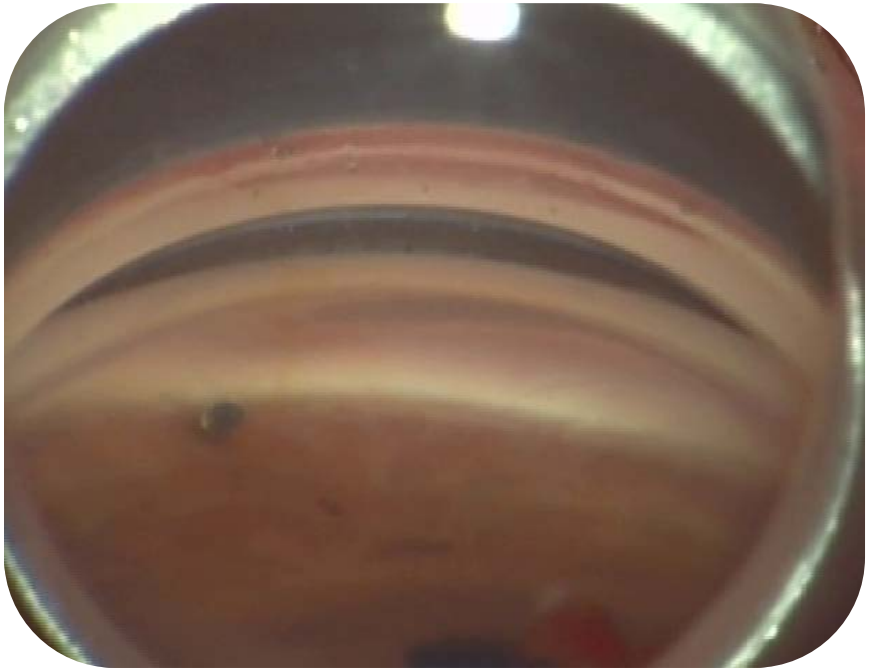
Prata. Imaging of a traumatic cyclodialysis cleft in a child using slit-lamp-adapted OCT. Eye 2009;23:1618-1619.

Shoham-Hazon. Stability and predictive value of OCT findings after CyPass Suprachoroidal Micro-Stent implantation. AGS Poster 2012

Current ab interno supraciliary devices in US clinical studies



CyPass Micro-Stent



iStent Supra

Caution: Investigational devices. Federal (US) Law limits these devices to investigational use.

Supraciliary micro-stent implantation

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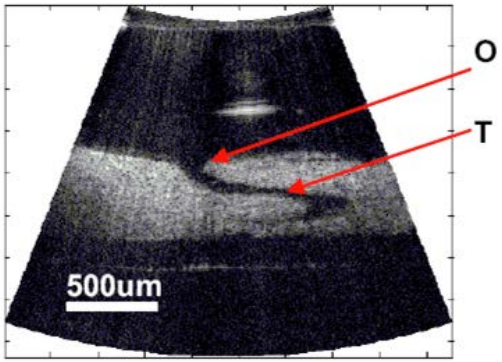
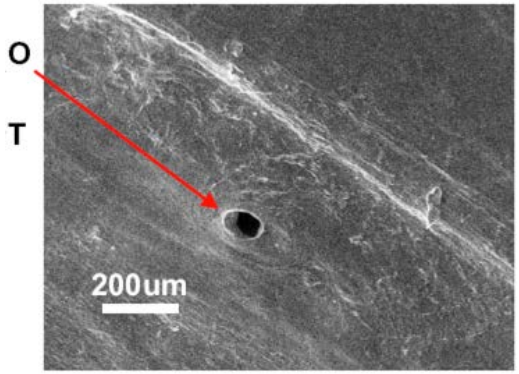
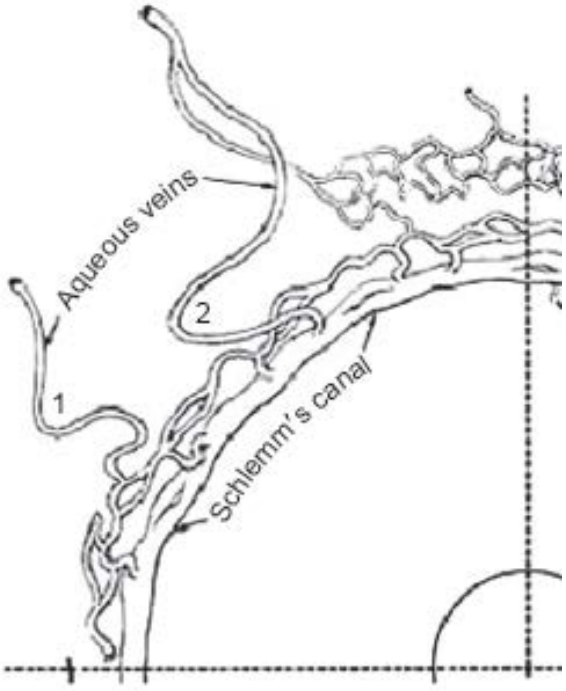
Challenges with trabecular outflow path

Downstream resistance
Discrete canalicular system and episcleral venous back pressure limits outflow potential

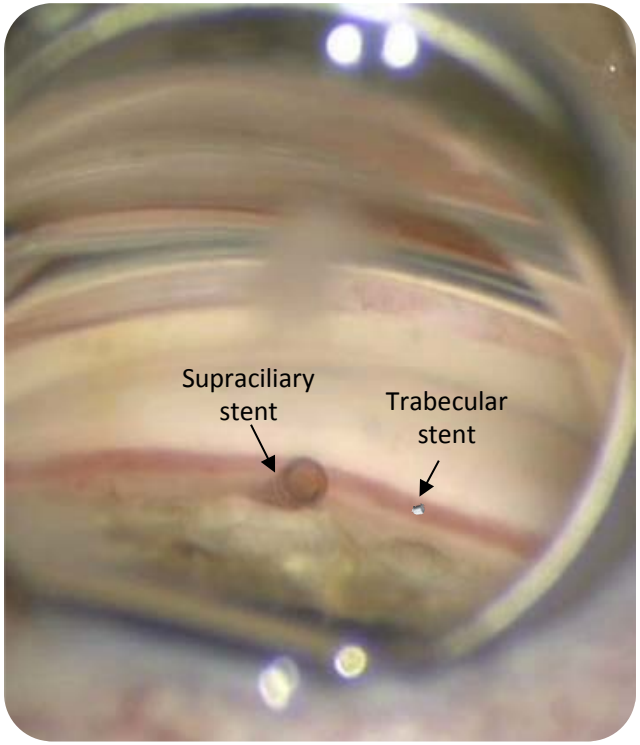




Variability in collector channel location
Placement of two stents may be required for optimal placement with respect to collector channelzs



Smaller anatomical target
Trabecular meshwork and Schlemm's canal provide significantly smaller surgical target vs. the ciliary body band



Suprachoroidal outflow – promising MIGS target

- Potential for best-IOP-lowering efficacy based on physiological mechanism
- Preliminary safety results from international experience in line with other MIGS devices
- Anatomical approach makes for more elegant procedure
- Overall – suprachoroidal outflow represents a very promising MIGS approach