An optical system to improve glaucoma diagnosis and treatments by monitoring the ocular outflow pathway in vivo

Unmet Need

Glaucoma, a progressive optic neuropathy, is a leading cause of blindness in this country and the rest of the world. The root cause of primary glaucoma is poorly understood, but risk factors have been identified in those likely to develop progressive glaucomatous changes. Of these risk factors, resistance in the ocular pathway which leads to elevated intraocular pressure (IOP) is one of the most important. In fact, all current glaucoma therapeutics focus on lowering IOP to prevent further optic nerve death. Unfortunately, diagnostics for the ocular outflow pathway *in vivo* have been limited. Many of the clinically most vulnerable elements of the outflow pathway cannot be imaged using conventional medical imaging modalities, such as conventional gonioscopy, due to unique characteristics of this region. There is a need for improved optical access to structures of the eye, including the ability to directly view the ocular outflow pathway from inside the eye to better treat and diagnose glaucoma.

Technology

Duke inventors have developed an optical system that can monitor the ocular outflow pathway *in vivo*. This is intended to improve glaucoma patient outcomes by altering medical and surgical management as well as enabling researchers to monitor the effectiveness of new ocular outflow treatments. The optical system could be built as a standalone system or as an add-on accessory to existing commercially available imaging systems. Specifically, this technology allows complete, 360° *in vivo* tomographic imaging of the ocular outflow pathway using a custom, radially symmetric, gonioscopic contact lens. A gonioscopic OCT system

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Department

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External Link(s)

• From the lab of Dr. Joseph Izatt
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that images the angle circumferentially from inside the eye has been developed as a prototype. This prototype successfully collected the first 360° circumferential volumes of peripheral iris and iridocorneal angle structures obtained via an internal approach.

Advantages

- A first-in-class system that can provide valuable *in vivo* information regarding the ocular outflow pathway not available in the clinic
- Enables minimally invasive, image-guided therapeutics of the ocular outflow tract as well as improved diagnostics
- Working prototype successfully collected the first 360° circumferential volumes of peripheral iris and iridocorneal angle structures obtained via an internal approach for two normal subjects and two subjects with pathology