Innovations
UNIVERSITY OF COLORADO
ANSCHUTZ MEDICAL CAMPUS

Implanted glaucoma drainage device regulator

Product

An ocular implant to regulate glaucoma drainage devices

Indication

Glaucoma, lowering intraocular pressure

Value Propositions

- Adjustable device
- Non-invasive regulation of aqueous flow post-surgery
- Made of biocompatible materials

Market

- $818 million—Global glaucoma surgery devices market (24.6% CAGR 2021-2030)

Intellectual Property

- US patent issued*
- Available for licensing

Key Documents

A nanopore membrane regulator device for laser modulated flow after glaucoma surgery. Olson JL, Bhandari R, Groman-Lupa S, Velez-Montoya R. Biomed Microdevices. 2015.

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Background on CU3038H

About 3 million people in the United States are affected by glaucoma which may lead to blindness. That number is expected to increase to more than 4 million by 2030. To decrease the intraocular high pressure characterizing glaucoma, current treatments include topical medications, laser treatments or surgery. For the most advanced cases, implanted glaucoma drainage devices are used and include a tube through which the aqueous fluid passes. However, the current drainage devices do not allow the precise regulation of the aqueous flow after surgery and the tube may get clogged. As a consequence, complications may occur and include hypotony, hemorrhages, choroidal effusion, choroidal detachment or infection after surgery. Improvement of the drainage device is needed to fix the post-operative problems and decrease the high rate of surgical failure (about 50%) in the long-term.

Technical Innovation

A research group led by Dr. Jeffrey Olson at the University of Colorado developed a new technology that allows the adjustment of the aqueous flow rate after surgery and non-invasively permits a customized treatment for each patient. A lumen is coupled to a shunt silicone tube and/or a reservoir. The regulator is connected to the lumen and consists of a nanopore membrane which can be perforated with a laser or a needle to regulate the flow post-implantation and hence the intraocular pressure. The number and size of the perforations regulate the flow i.e. a higher number of perforation increases the flow. Lumens can be adjusted to fit different devices or configured to fit several shunt tubes and/or reservoirs. In addition, a flange can be coupled with a lumen to secure the implant with suture or other materials. The device is placed beneath the scleral flap. The invention was tested on a model eye and in an enucleated porcine eye with success demonstrating the prevention of immediate post-operative hypotony, increased aqueous flow rate and extension of the device functional duration. Overall, this new technology will improve the success rate of surgeries and patient outcomes.

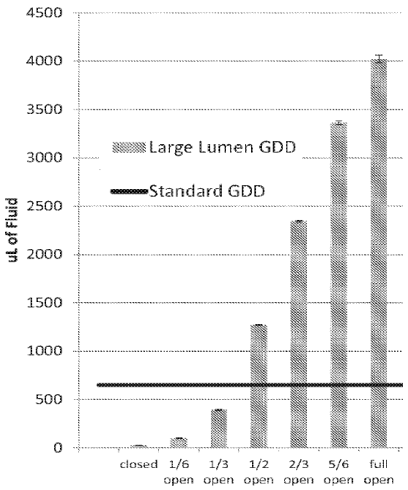

Figure: Flow through large lumen glaucoma drainage device. The flow increases as the membrane cap is opened with a laser.

*US2013/064473—"Ocular Filtration Devices, Systems, and Methods"