Nanophotonics-Based Implantable Iop-Sensor With Remote Optical Readout

Tech ID: 24177 / UC Case 2012-104-0

INVENTION NOVELTY

This invention enables the remote automated monitoring of intraocular pressure in patients or animal models to inform glaucoma treatment and the development of new therapeutics for glaucoma.

VALUE PROPOSITION

Glaucoma is a leading cause of blindness and vision loss. While there is no cure, monitoring intraocular pressure (IOP) and utilizing new and existing treatments can halt further vision loss. IOP monitoring is the single most important clinical management tool. Current standard devices for measuring IOP utilize applanation tonometry where a fixed force is applied to the eye and the area of deformation is measured. This system involves local anesthesia and is usually performed by an optometrist requiring a visit to their office. It is also influenced by the corneal curvature and thickness which can vary due to ocular pathologies and procedures such as laser photorefractive keratectomy, leading to inaccuracies. Since IOP measurements can fluctuate throughout the day, it would be preferable to develop an IOP profile utilizing frequent measurements which could more accurately advise physicians on treatment regimens and patient compliance to those regimens. A nanophotonics-based implantable IOP sensor offers a novel method for pressure measurements. Instead of applying pressure to the eye, the system utilizes a light beam from a hand held detector so no anesthesia is required and patients can perform measurements at home. In addition, the system can be adaptable to large animal colonies for glaucoma drug development research which currently requires the use of general anesthetics for traditional applanation tonometry.

This novel invention provides the following advantages:

- **Convenient** self-administered testing of intraocular pressure.
- **Compatible** with telemedicine hook-up to doctor's office.
- **Small and unobtrusive** to ensure patient compliance.
- **Automated reporting** of intraocular pressure measurements.

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OTHER INFORMATION

KEYWORDS

Nanophotonics, Glaucoma, Intraocular pressure sensor, Handheld detecotr

CATEGORIZED AS

- **Optics and Photonics**
  - All Optics and Photonics
- **Medical**
  - Devices
  - Disease: Ophthalmology and Optometry

RELATED CASES

2012-104-0

- **Adaptable** for use in animal research facilities to support glaucoma drug development.
- **Simple and accurate** IOP monitoring for glaucoma patients and animal research.

TECHNOLOGY DESCRIPTION

From the minds of co-inventors at UCSF and Cal-Tech comes a revolutionary concept for the measurement of intraocular pressure. This system utilizes two membranes separated by a gap and nanophotonic components embedded within the two membranes. The membranes move in response to changes in intraocular pressure, resulting in changes in the gap. Changes in reflectance off the nanophotonic components in response to a beam of light correlate with changes in the gap and serve as a measure of intraocular pressure. While the current standard for tonometry requires visits to the optometrist, this system utilizes a hand held detector, does not require anesthesia and can remotely report readings via telemedicine, making home-based monitoring accurate and reliable.

APPLICATION

- Patient home based monitoring of intraocular pressure to inform glaucoma treatment.
- Large scale animal research monitoring of intraocular pressure for the development of new therapeutics for treating and controlling glaucoma.

LOOKING FOR PARTNERS

To develop and commercialize this technology as an effective monitor of glaucoma.

STAGE OF DEVELOPMENT

Preclinical

DATA AVAILABILITY

Under NDA/CDA

PATENT STATUS

Country	Type	Number	Dated	Case
Germany	Issued Patent	2790568	10/26/2022	2012-104
France	Issued Patent	2790568	10/26/2022	2012-104
United Kingdom	Issued Patent	2790568	10/26/2022	2012-104
United States Of America	Issued Patent	10,426,341	10/01/2019	2012-104
United States Of America	Issued Patent	9,173,564	11/03/2015	2012-104

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