

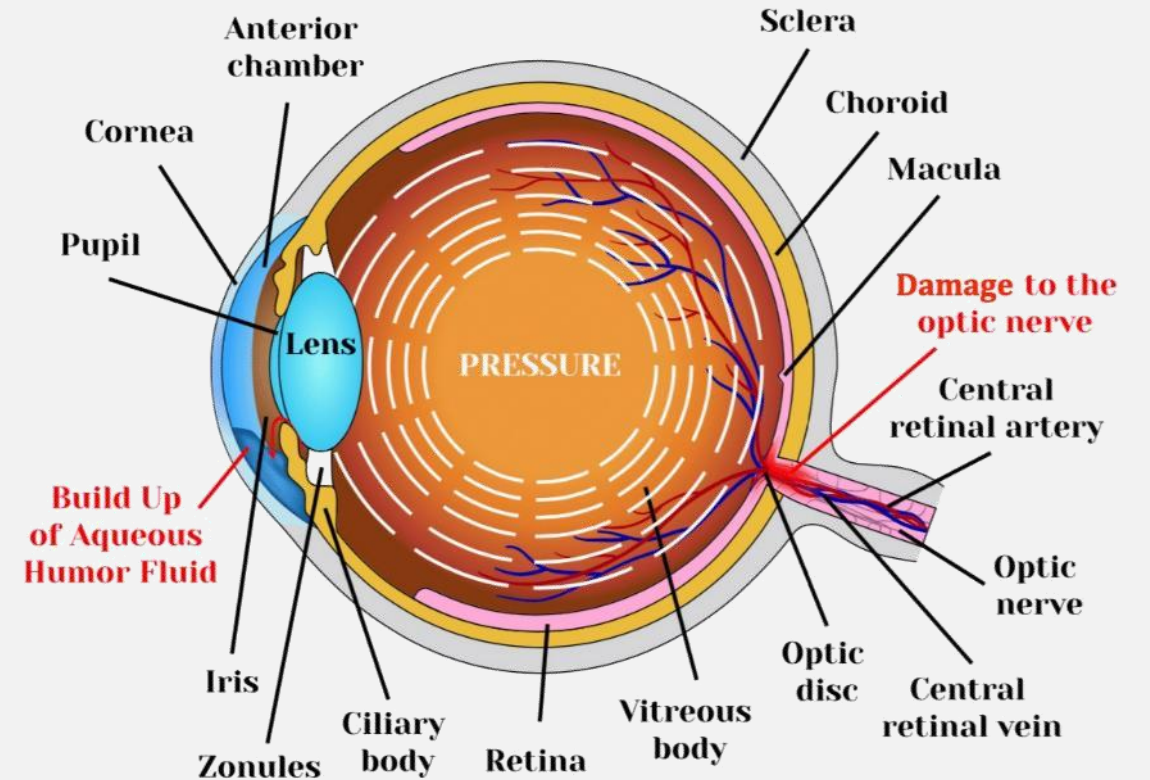


Precision That Protects Your Vision

Glaucoma

The Quiet Eye Killer

Glaucoma is an eye disease associated with the damage of the optic nerve leading to a progressive and irreversible loss of vision.



Statistics of Glaucoma

Global Market Size

76 Mn	People globally suffering from Glaucoma in 2020 and projected to reach, worldwide
112 Mn	By 2040
50-90%	Of glaucoma patients across the globe are unaware or undiagnosed
2nd	Leading cause of irreversible and complete blindness impacting
4.5 Mn	people
\$2.9 Bn	Annual direct medical costs of Glaucoma globally. There are also indirect costs associated with the disease, such as lost productivity due to vision impairment and blindness. These costs can be substantial and are often not captured in estimates of the direct medical costs of glaucoma
\$3.2 Bn	By 2040

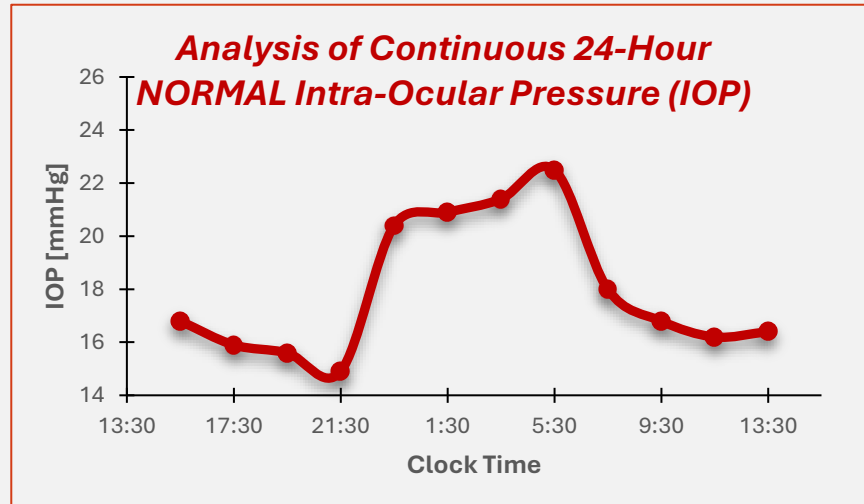
Risk of Glaucoma

5%
of adults over 65
Elevated IOP

2%
of adults over 65
Glaucoma

Glaucoma Major Issues

The Need



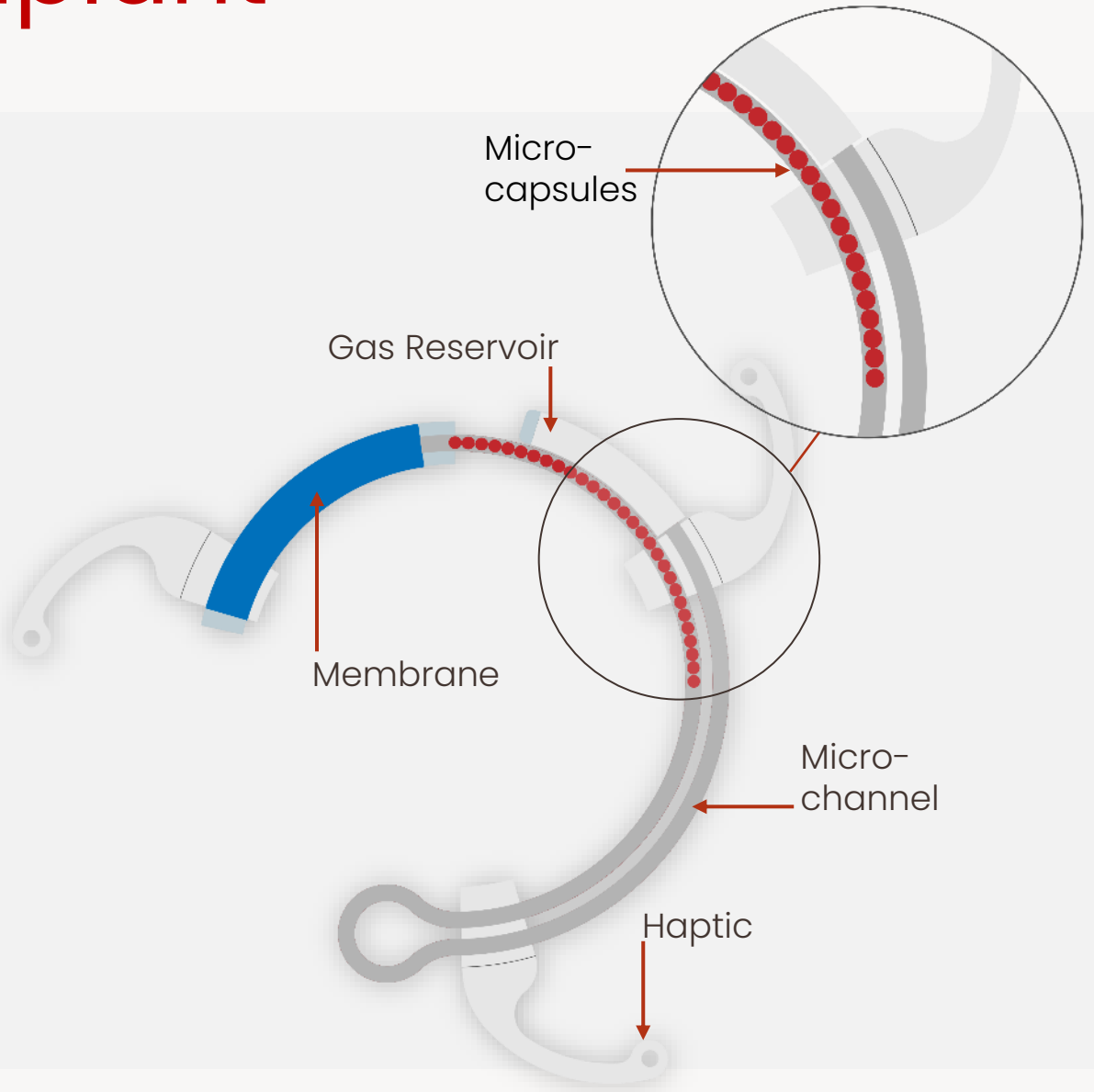
- IOP fluctuates significantly during daytime, seasons and location
- Traditional GAT may miss IOP peaks in up to 60% patients
- Today physicians measure the IOP in 1 single point in a day, basically one per 3 months
- Ineffective clinical decisioning based on single longitudinal measurement



- Adherence with glaucoma medications is a fundamental problem in the care of glaucoma patients
- Up to 50% of patients may not adhere to their prescribed treatment plan, including taking their medications as directed
- Non-adherence can have serious consequences, including disease progression and vision loss

The Implant

IOP medical develops a minimal invasive, long-term implant for measurement of absolute intraocular pressure based on microfluidic barometer sensor, reading out by optical means



IOP Reader Device

Continuous And Accurate IOP Self-monitoring

Pressure readout is performed through a smartphone camera and an eye-glasses device equipped with an optical adaptor and image analysis software for detection of the aqueous-air interface and/or the micro-capsules position.



A Continuous And Accurate IOP Self-monitoring Device



Disease Management

Pressure Display, trends and alerts



Personalized Treatment

Medication treatment according to pressure regime fluctuation



Quality of life & Longevity

Improved treatment reduces pain and deterioration



Adherence Tracking

Enhances Patient's usage & reinforcement



Remote Monitoring

Tracking patient records, engaging caregivers & healthcare providers



Big Data

Valuable for pharmaceutical companies

Initial Market

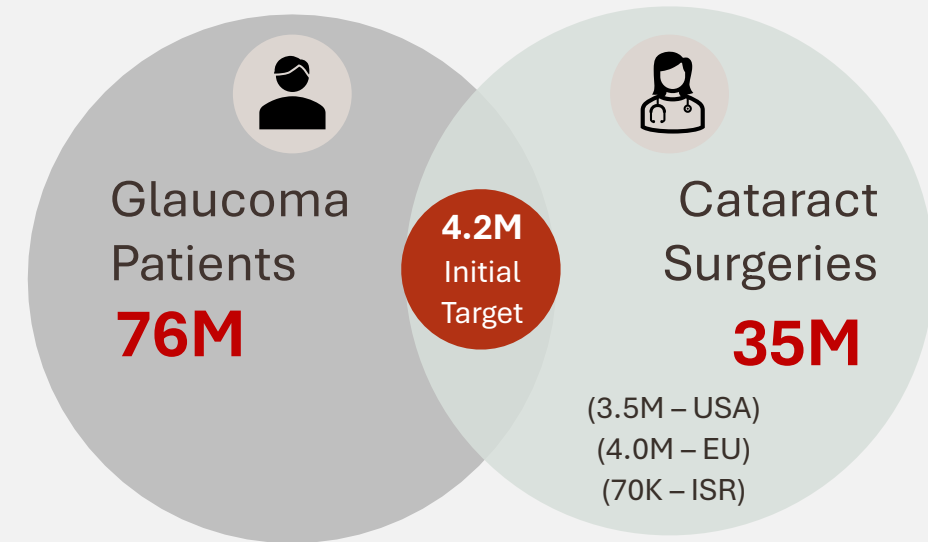
17%	of adults over 65 undergoing cataract surgeries
2%	of adults over 65 suffer from glaucoma
7-15%	of patients undergoing cataract surgeries also have a glaucoma disease

45% in Israel
(based on data from public hospitals)

 **State of Israel
Ministry of Health**
משרד הבריאות

 **Kineret**
Israel health data lake

Addressable Populations



Competitive Analysis

Non-Continuous Monitoring

- **Clinical**

Table devices:
Contact
Non-contact



- **Handheld devices**

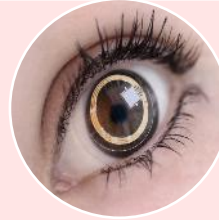


- **Home**

Handheld devices:
Contact



Continuous Monitoring (major competitors)



Triggerfish

- Short-term (~24Hr.) lens
- Unsuccessful trials so far



Smartlens

- Same principle as Triggerfish
- Short-term (~24Hr.) lens
- Measuring by smart-phone camera



Implant data

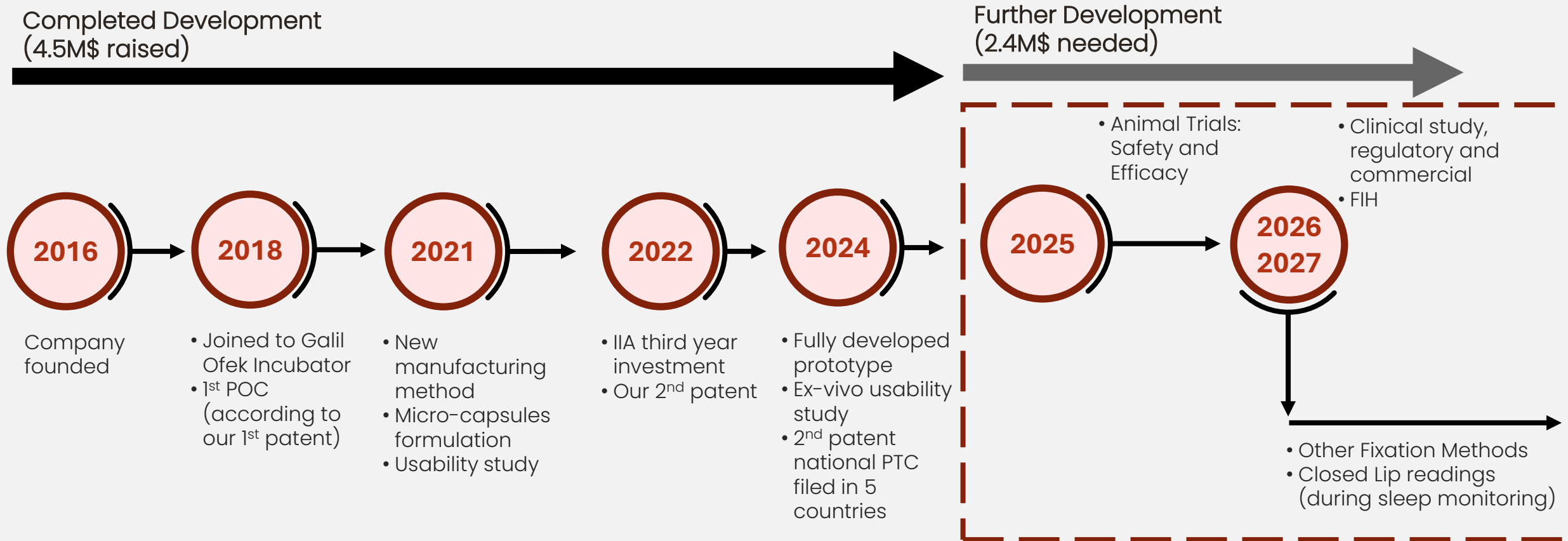
- Requires energy source
- Bulky
- Large incision, complicated implantation procedure



IOP Medical

- Without energy source
- Less Bulky
- Minimal incision
- Simple implantation procedure

Milestones And Investment Opportunity



Team

BOARD



Dr. Amir Belson



Dr. Shulamit Hadi



Dr. Mark Ishay



Prof. Yossi Mandel



Abraham (Miko) Gilat

ADVISORY BOARD



Prof. Ehud Assia



Prof. Shlomo Melamed



Prof. Zvia Burgansky



Prof. Zoltán Nagy

EXECUTIVE



Dr. Mark Ishay
CEO



Dmitry Golom
Micro-Mechanics



Dr. Ilia Plazman
Bio-Physics



Michal Abraham
PMO



Avital Nigel
Optics and V&V



Victoria Bershadsky
Bio-Engineering

Intellectual Property

Our 1st IP: Stanford University licensed patent
(pn:US206/0015265)

nature medicine

An implantable microfluidic device for self-monitoring of intraocular pressure

Tomislav E. Aravi^{1,2}, Baocong Su¹, Stephen R. Quake¹⁻³ & Yossi Mandel^{4,6}

Glaucoma is the second most common cause of blindness in the world. It is a multifactorial disease with several risk factors, of which intraocular pressure (IOP) is a primary contributing factor. IOP measurements are used for glaucoma diagnosis and patient monitoring. IOP has wide diurnal fluctuation and is dependent on body posture, so the occasional measurements done by the eye care expert in the clinic can be misleading. Here we show that microfluidic principles can be used to develop an implantable sensor that has a limit of detection of 1 mm Hg, high sensitivity and excellent reproducibility. This device has a simple optical interface that enables IOP to be read with a smartphone camera. This sensor, with its ease of fabrication and simple design, as well as its allowance for IOP trends monitoring, offers a promising approach for better care of patients with glaucoma.

Glaucoma affects more than 65 million people worldwide and is expected to affect about 80 million people in 2020 (ref. 1,2). It is second only to cataracts in frequency of causing blindness in the world^{3,4}. Glaucoma is characterized by a progressive loss of retinal ganglion cells, a characteristic optic neuropathy and progressive visual field loss in the more advanced stages. The pathogenesis of glaucoma is multifactorial with several recognized risk factors, of which IOP is a major one. Normal IOP ranges between 10 and 21 mm Hg with an average of 15.3 mm Hg (ref. 5). Lowering IOP by medications or surgery⁶ is the only therapeutic modality currently available. Therefore, IOP measurements are critical for glaucoma diagnosis, management and follow-up during medical or other surgical treatment. Notably, recent studies have demonstrated that large diurnal variation in IOP levels exists in patients with glaucoma. In one study⁷, peak IOP during 24-h monitoring was on average 4.9 mm Hg higher than the peak IOP measured in the clinic, and 24-h IOP monitoring resulted in a change of medical and surgical management in almost 90% of patients. Some studies have reported increased IOP fluctuations as an independent risk factor for glaucoma progression^{8,9}. In addition to diurnal variation, IOP was found to increase by up to more than 6 mm Hg in response to upright positions, and the difference was reported to be increased in patients with glaucoma and to be highly associated with visual field loss¹⁰.

¹Department of Bioengineering, Stanford University, Stanford, California, USA; ²Howard Hughes Medical Institute, Department of Genetic Psychiatry, Stanford University, Stanford, California, USA; ³Department of Chemistry, the Sutter Neuroscience Program Laboratory, Stanford University, Stanford, California, USA; ⁴The Moran Eye Center, Utah State Eye Center, Cornea and External Eye Disease Service, Utah State Eye Center, Utah State University, Logan, Utah, USA; ⁵Department of Ophthalmology, University of California, San Francisco, San Francisco, California, USA; ⁶Department of Ophthalmology, University of California, San Francisco, San Francisco, California, USA; ⁷Department of Ophthalmology, University of California, San Francisco, San Francisco, California, USA; ⁸Department of Ophthalmology, University of California, San Francisco, San Francisco, California, USA; ⁹Department of Ophthalmology, University of California, San Francisco, San Francisco, California, USA; ¹⁰Department of Ophthalmology, University of California, San Francisco, San Francisco, California, USA

NATURE MEDICINE | ADVANCE ONLINE PUBLICATION

Micro-fluidics:

- Physical model
- Possible approach
- Implant

Our 2nd IP: filed (IPA No. 291216)



Micro-fluidics:

New manufacturing method (robust, on-the-shelf components, easy assembling)

Micro-capsules:

Using micro-capsules for measuring the pressure, unrelated to amount of fluid and gas in the device

Optics:

Developing a new approach for "delivering" information (for implementing on an IOL)

Medicine Journal Vol. #20 | No. 9 | Sept. 2014

Thank You



Contact details:

Mark Ishay, Ph.D.

Phone: +972(0)52-893-6766

Email: mark@iop-medical.com