The Glaucoma Foundation

2018 Annual Report

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Message from the President

Dear Friends:

2018 was a challenging year for everyone, and The Glaucoma Foundation was certainly not immune to the meaningful economic uncertainties we were all presented. However, as the year ended, we were able to cite meaningful and measurable accomplishments in all key areas.

Our mission continues to embrace the funding of cutting-edge research that is being performed around the world by the best and the most talented investigators. They each offer a vision coupled with an idea, that if validated and achieved, may stand to make a meaningful difference in the diseases that we call glaucoma.

The second component of our core purpose is to provide educational outreach to all, relative to proper eye care and awareness about glaucoma. As we all understand, proper and timely diagnosis is essential to arresting the progress of this disease. We are continually reminded that our efforts have made a huge impact on behalf of the populations of the world.

During the year 2018, we hosted an award-worthy 25th Annual International Think Tank in New York City. Forty eight participants from around the world gathered to address: “EXFOLIATION SYNDROME: GENETIC AND BIOLOGICAL ASPECTS.”

Enormous positive progress was demonstrated throughout the session, with the hope being that the same exciting report will be forthcoming from the 26th Annual Think Tank that will be held in June, 2019 once more in New York City.

We are very proud of our Foundation and its accomplishments. We are also extremely excited about the future service that will be provided to all of our constituencies. We thank you for your support of and interest in The Glaucoma Foundation. You and we, as partners, can make a significant difference to the world in which we operate.

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2018 RESEARCH GRANTS

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University of Iowa, Iowa City, IA

Robust Mouse Models of Exfoliation Glaucoma

While some mouse models of exfoliation glaucoma exist, they lack some key features of the human disease. This project proposes generating new mouse models of exfoliation syndrome (XFS) by screening animals with targeted manipulations to genes that are known genetic risk factors for human disease. These mice could be used by the research community in a wide range of studies that will expedite development of new treatments and bring us closer to finding a cure.

Rajendra Apte, MD, PhD
Washington University, St. Louis, MO

Growth Differentiation Factor - 15 Levels in Pseudoexfoliation Glaucoma

Loss of vision can make it more difficult for people to work, get around, and enjoy daily life. The number one cause of irreversible vision loss in the world is glaucoma. There are several kinds of glaucoma, all of which can lead to the death of cells in the eye that send visual information to the brain. Preventing these cells from dying is an important part of the treatment for glaucoma. However, it can be difficult for physicians to identify which patients are at highest risk of developing glaucoma, or having their glaucoma get worse over time. Finding a marker, such as a protein in the eye, whose presence might predict whether glaucoma will get worse would make it possible for physicians to better determine whether a patient should have surgery or another treatment.
This project will study a protein called growth differentiation factor 15 (GDF-15), which is associated with retinal stress in rodents and humans. By measuring the levels of this protein in human patients with glaucoma before and after surgery, we hope to understand whether there is a relationship between GDF-15 levels in the eye, the severity of glaucoma, and success of glaucoma surgery. If high GDF-15 levels are linked with more severe glaucoma, it could be used as a marker to help determine treatment for patients at the highest risk of developing severe glaucoma.

Rashima Asokan, PhD
Medical & Vision Research Foundation, Sankara Nethralaya, India

Evaluating the Effect of Ocular UV Exposure as a Major Causative Factor in a Risk Model for Pseudoexfoliation Syndrome in Indian Population

Pseudoexfoliation syndrome (XFS) is a disease that manifests in ocular tissues, is the major cause of secondary glaucoma and associated vision loss. Certain changes in the genetic makeup of an individual make them more susceptible in developing XFS. Similarly, environmental factors such as lifetime ocular UV exposure through solar radiation, inflammation and hypoxic condition (low oxygen supply to eye tissues) also are known to play a role in XFS disease progression. However the extent of influence that the factors have individually or in combination remains uncertain and

needs to be investigated. This study, using a single group of patients aims to address this issue and hopes to generate a profile accounting for the effect of both genetic and non-genetic factors in XFS disease pathology.

Sanjoy K. Bhattacharya, M. Tech, PhD
Bascom Palmer Eye Institute, University of Miami Miller School of Medicine, Miami, FL

Metabolomic Analyses of Aqueous Humor of Pseudoexfoliation Glaucoma

We will identify the small molecules in the clear fluid of the front part of the eye termed aqueous humor. These small molecules are involved in all day-to-day functions of biological tissues in the eye. This analysis will show a difference in small molecules between pseudoexfoliation glaucoma and normal eyes. Their addition (for example the molecules that provide energy) or removal (for example known toxic molecules) may be early intervention strategies for treating pseudoexfoliation glaucoma.

Rachel Kuchtey, MD, PhD
Vanderbilt Eye Institute, Nashville, TN

Elastic Fibers and Exfoliation Glaucoma

In order to effectively treat exfoliation glaucoma (XFG), precise understanding of its molecular mechanisms is needed. The breakthrough genetic discoveries within the last decade have paved the pathways leading toward this goal. Lysyl oxidase-like 1 () is the most significant gene associated with XFG and the interaction between LOXL1 and fibrillin-1 has been increasingly recognized as they are two essential elements for proper elastic fiber formation and function. This study will use mouse models to study these two key molecules, affording the unique opportunity to test the hypothesis that mice with dual defects of those two proteins have more severe XFG. If successful, new treatments could be quickly tested.

Joshua Morgan, PhD
University of California, Riverside, CA

Identifying Changes in Protein Synthesis and Secretion Induced by PXFG-Associated LOXL1 Mutants

Pseudoexfoliative glaucoma (PXFG) occurs due to the production of extracellular deposits within the eye. By inhibiting the flow of aqueous humor, these deposits lead to a dangerous increase in IOP, the hallmark of glaucoma. In this project, investigators use a sequencing technique, ribosome profiling, to understand how mutations in the gene LOXL1 and PXFG-associated molecules alter the production and secretion of proteins. This knowledge will provide increased understanding as to how changes in protein production within the cell can contribute to the formation of these deposits.

Ernst R. Tamm, MD
University of Regensburg, Universitatsstr, Regensburg, Germany

Towards an Understanding of the Roles of LOXL1 and BMP-1 in PEX Syndrome

Pseudoexfoliation (PEX) syndrome is characterized by the deposition of whitish, fluffy material throughout the anterior eye segment. Variants in the gene that codes for the protein LOXL1 are associated with PEX syndrome, and genetic and/or environmental factors may cause elevated levels of LOXL1 in the eye. We believe that cleavage of LOXL1 (when present in high amounts) by the protein BMP-1 causes molecular changes that induce the formation of PEX material. To test our idea, we will increase BMP-1 levels in mouse eyes via virus-delivered gene transfer and examine the eyes for signs of PEX material. To this end, we have generated genetically engineered mice that already have high levels of LOXL1 in the eye. In parallel cell culture experiments we will elucidate the molecular mechanisms of the LOXL1/BMP1 interaction.

THE GLAUCOMA FOUNDATION, INC.
STATEMENT OF FINANCIAL POSITION
AT DECEMBER 31, 2018
(With comparative totals at December 31, 2017)

	12/31/18	12/31/17
Assets		
Cash and cash equivalents	$1,201,559	$1,308,832
Pledges receivable	113,253	334,038
Prepaid expenses and other assets	3,915	5,199
Security deposit	27,796	27,796
Property and equipment, net (Note 3)	4,125	4,401
Investments held for endowments (Note 5)	5,299,615	6,121,951
Total assets	$6,650,263	$7,802,217
Liabilities and Net Assets		
Liabilities:		
Accounts payable and accrued expenses	$67,176	$50,534
Grants payable	90,000	240,000
Deferred rent	5,175	9,476
Total liabilities	162,351	300,010
Net assets:		
Without donor restrictions:		
Operations	617,666	721,440
Board designated for medical research grants	570,631	408,816
Board designated for endowment	1,511,123	1,700,719
Total net assets without donor restrictions	2,699,420	2,830,975
With donor restrictions:		
For future periods (Note 4)	0	250,000
Donor restricted endowment (Note 5)	3,788,492	4,421,232
Total net assets with donor restrictions	3,788,492	4,671,232
Total net assets	6,487,912	7,502,207
Total liabilities and net assets	$6,650,263	$7,802,217

THE GLAUCOMA FOUNDATION, INC.
STATEMENT OF ACTIVITIES
FOR THE YEAR ENDED DECEMBER 31, 2018
(With comparative totals for the year ended December 31, 2017)

		With Donor Restrictions				
	Without Donor Restrictions	Donor Restricted Support	Donor Restricted Endowment	Total	Total 12/31/18	Total 12/31/17
Support and revenue:						
Contributions	$1,026,627		$10,050	$10,050	$1,036,677	$960,402
Special event income (net expenses with a direct benefit to donor (Note 6)				0	0	57,000
Interest income	14,697			0	14,697	6,566
Net assets released from restrictions	402,500	($250,000)	(152,500)	(402,500)	0	0
Total support and revenue	1,443,824	(250,000)	(142,450)	(392,450)	1,051,374	1,023,968
Expenses:						
Program services	1,053,692			0	1,053,692	1,210,934
Supporting services:						
Management and general	177,640			0	177,640	114,505
Fundraising	154,451			0	154,451	185,772
Total supporting services	332,091	0	0	0	332,091	300,277
Total expenses	1,385,783	0	0	0	1,385,783	1,511,211
Change in net assets from operating activities	58,041	(250,000)	(142,450)	(392,450)	(334,409)	(487,243)
Non-operating activities:						
Investment income/(loss) (Note 5)	(189,596)		(490,290)	(490,290)	(679,886)	1,092,589
Total non-operating activities	(189,596)	0	(490,290)	(490,290)	(679,886)	1,092,589
Change in net assets	(131,555)	(250,000)	(632,740)	(882,740)	(1,014,295)	605,346
Net assets - beginning of year	2,830,975	250,000	4,421,232	4,671,232	7,502,207	6,896,861
Net assets - end of year	$2,699,420	$0	$3,788,492	$3,788,492	$6,487,912	$7,502,207