Research to Prevent Blindness

Glaucoma

Advances in Eye Research

Glaucoma refers to a group of diseases—open-angle glaucoma, angle-closure glaucoma, low-tension or normal-tension glaucoma, congenital glaucoma, and secondary glaucoma—where cells and fibers of the optic nerve are damaged, affecting the transmission of signals from the eye to the brain. It is usually progressive. At first there are no detectable symptoms but, eventually, vision narrows. Glaucoma can lead to blindness, but seldom does when diagnosed and treated early.

Until recently, physicians and scientists believed that damage from glaucoma was solely due to increased intraocular pressure (IOP). Medications and conventional or laser surgeries are typically prescribed to reduce the fluid build-up. Now, though, we know that high IOP does not always cause glaucoma and that glaucoma can even occur when IOP is normal. Research supported by Research to Prevent Blindness (RPB) shows that thickness of a patient's cornea may also be related to glaucoma onset.

Glaucoma poses an enormous public health problem. The government estimates that 2.2 million Americans have been diagnosed with glaucoma. Experts believe that nearly 2 million more may have the disease and not know it.

Fortunately, sustainable progress is being made to detect glaucoma earlier and understand its biological roots.

Important Vision Saving News

RPB researchers have uncovered potential glaucoma treatments, links between glaucoma and other conditions, and risk factors that serve as a reminder that regular health care is always important:

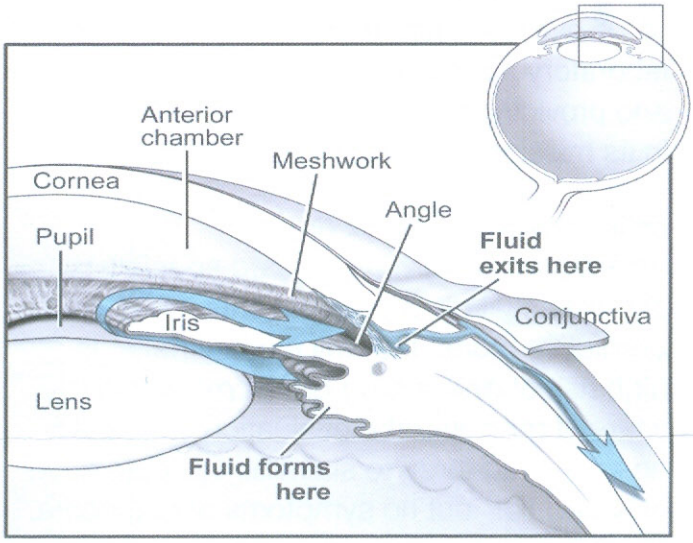


Illustration from National Eye Institute, National Institutes of Health

The eye is filled with nutrient-rich fluid, called aqueous humor. Normal intraocular pressure (IOP) is maintained through a balance between the fluid produced inside the eye and the amount drained. In glaucoma, excess fluid typically builds up because of a blockage of the drainage channels or filtering tissue called the trabecular meshwork. Researchers are developing treatments to help maintain the capacity of these drainage tissues.

- One in five cases of glaucoma occurs in a person with normal intraocular pressure.
- Hypothyroidism (underactive thyroid) poses a risk for developing open-angle glaucoma.
- Lowering fluid pressure in the eye may, at least partially, restore health to damaged regions.

Recent Strides by Researchers

- New tools designed for earlier detection of changes in the retina and optic nerve
- Glaucoma-causing gene mutations found and gene therapies researched
- Innovative pharmacological and surgical treatments advanced
- Possibility of regrowing the optic nerve increased

Hope Through Research

Research to Prevent Blindness (RPB) mobilizes financial resources in support of eye research, making available essential laboratory space, sustaining scientific personnel and providing advanced technological equipment in its mission to preserve vision and restore sight.

Better predictions…better results

Scientists have given eye care specialists and potential glaucoma patients a precise, predictive model that will identify patients at high risk of developing glaucoma within five years of receiving the evaluation. In the U.S., an estimated three to six million people have elevated IOP but no symptoms of glaucoma. The new predictive model will allow patients with elevated IOP to consult with their doctors to determine the most effective course of action.

The glaucoma / blood pressure connection

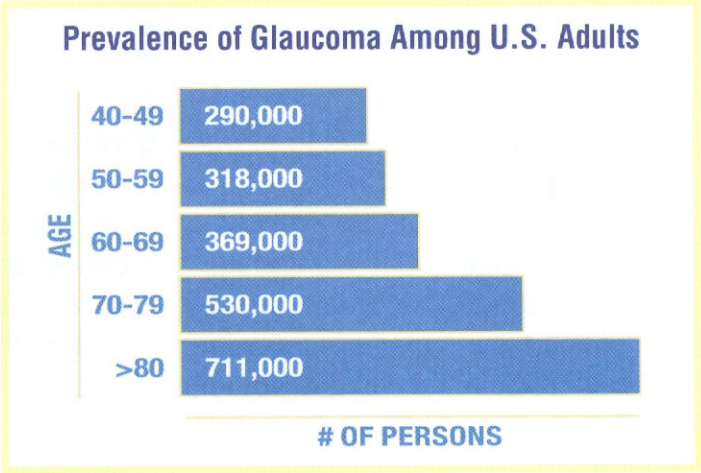
An RPB-sponsored, population based study has produced the first strong epidemiological evidence indicating low blood pressure and blood flow might directly contribute to glaucomatous damage to the optic nerve. The investigators caution persons being treated for high blood pressure—who may, as a result, have low diastolic blood pressure—to have regular glaucoma testing.

Gene Therapy for Glaucoma May Treat Two Risk Factors

Scientists are investigating the use of a process called RNA interference as a way of reducing elevated pressure in the eye that can cause glaucoma. By injecting molecules called short interfering RNAs directly into tissue that controls aqueous humor outflow (known as the trabecular meshwork), researchers have been able to silence the action of disease-relevant genes.

RNA interference also seems to be effective in regulating genes associated with another important risk factor for glaucoma: treatment with steroids. The use of corticosteroids is known to cause an increased resistance to aqueous humor outflow and elevated IOP.

These findings show, for the first time, that RNA interference could potentially serve as an important therapeutic alternative in the management of glaucoma risk factors.



Keep in Mind

Certain factors influence a person's risk for glaucoma, including the following:

- family history of glaucoma
- diabetes
- nearsightedness
- African-American or Hispanic heritage
- age 35 or older

Glaucoma testing every five years is recommended starting at age 35 for people at low risk, and every one or two years for people at high risk or over the age of 60.

Invest in Your Vision

You can join RPB in supporting critical research in the fight against vision loss by sending your tax-deductible donation to the address shown below or online at www.rpbusa.org. You may also call RPB at (800) 621-0026. All donations, up to a million dollars, are doubled through the Jules and Doris Stein Matching Fund. *RPB is a public 501(c)(3) foundation.*

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Research to Prevent Blindness www.rpbusa.org 1-800-621-0026
645 Madison Avenue • New York, NY 10022-1010 • e-mail: inforequest@rpbusa.org