

Current Advances/Research and Treatment **Glaucoma**

Glaucoma refers to a group of diseases—open-angle, angle-closure, low-tension or normal-tension, congenital 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. The brain can compensate for some visual field loss, so you may not be aware of blind areas. Eventually, vision narrows. Glaucoma can lead to blindness, but seldom does when diagnosed and treated early.

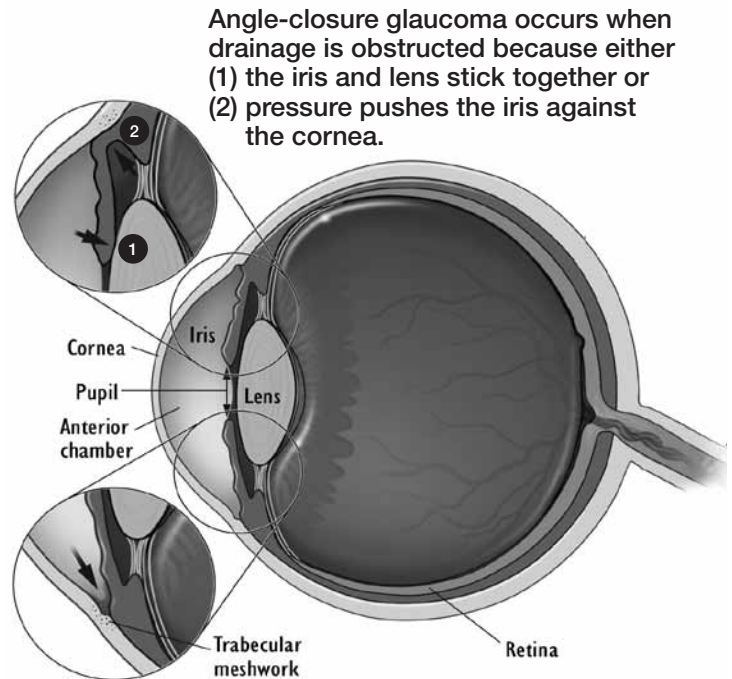
You should schedule regular, annual examinations with your eye care specialist, and do so without delay if you are experiencing loss of peripheral vision.

Until recently, 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, we know that high IOP does not always cause glaucoma and it can even occur when IOP is normal.

The information in this fact sheet is based on studies supported by Research to Prevent Blindness (RPB).

Important Vision Saving News

- One in five cases of glaucoma occurs in a person with normal intraocular pressure.
- Hypothyroidism (under active thyroid) poses a risk for developing open-angle glaucoma.
- Lowering fluid pressure in the eye may, at least partially, restore health to damaged regions.
- Thickness of a patient’s cornea may be related to glaucoma onset.



Angle-closure glaucoma occurs when drainage is obstructed because either (1) the iris and lens stick together or (2) pressure pushes the iris against the cornea.

In open-angle glaucoma, excess fluid typically builds up because of a blockage of drainage filtering tissue called the trabecular meshwork.

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. Researchers are developing treatments to help maintain the drainage capacity of filtering tissues.

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.

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
- Genetically engineered antioxidant protein shown to slow glaucoma

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.

In the future, measuring IOP at home

Scientists have designed and tested a pressure-sensing contact lens that will, in the future, allow glaucoma patients to monitor eye pressure at home, providing more detailed and continuous information in order to improve management of the disease. The “smart” contacts, which still require many refinements before they can be made available, will also eventually dispense medication in response to a detected need.

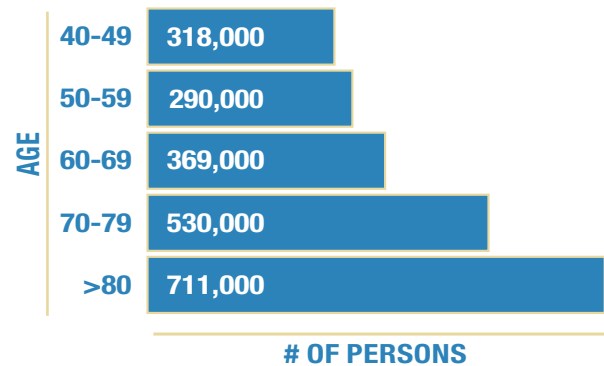
The glaucoma / blood pressure connection

RPB research 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

Prevalence of Glaucoma Among U.S. Adults



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.

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. A matching fund, created by RPB's founder, doubles contributions totaling up to one million dollars in any calendar year. *RPB is a public 501(c)(3) foundation.*

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.