

# REPORT

*Better Health Through Research*

October 2008



## Possible Genetic Link to Glaucoma Discovered

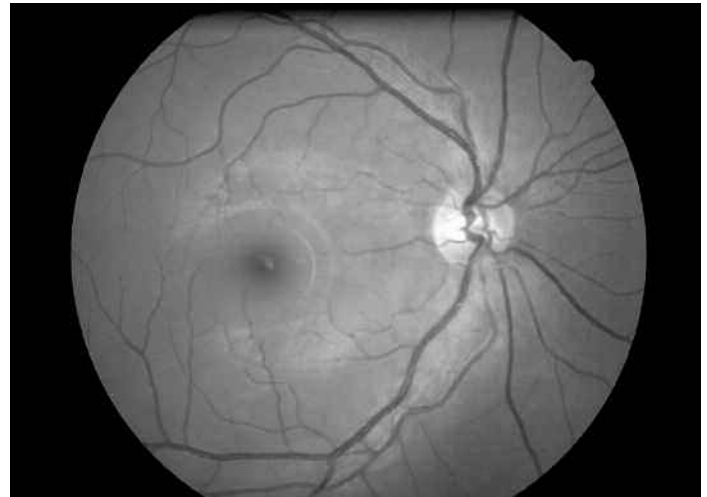
*Findings could enhance diagnosis and treatment*

The disruption of a signaling pathway by a specific gene plays a key role in the onset of glaucoma, according to a study spearheaded by Alcon Research. The findings could have major implications for diagnosing and treating glaucoma.

“The cause of glaucoma and the resulting elevation of intraocular pressure has been poorly understood,” says Abe Clark, Ph.D., Alcon’s vice president of discovery research and member of National Glaucoma Research’s Scientific Review Committee. “This new discovery may allow researchers to develop therapies to treat the underlying cause of the disease.”

The study, published in the *Journal of Clinical Investigation*, found that, when a gene called sFRP1 becomes more active, or “overexpressed,” it disrupts the WNT-signaling pathway, creating the high pressure within the eye that characterizes glaucoma. Researchers found this pressure could be significantly reduced by normalizing the signaling pathway.

The findings have not yet been confirmed in human eyes, and researchers emphasize that they are still in the early stages of understanding glaucoma’s causes.



“We are hopeful that further study of sFRP1 and the WNT-signaling pathway will help advance our understanding of why some people get glaucoma and others do not,” says study team member John Fingert, M.D., Ph.D., an assistant professor at the University of Iowa.

### INSIDE THIS ISSUE

**High Cost of Medicines Can Affect Glaucoma Treatment**

*Beta blockers least expensive class of drugs* ..... p. 2

**President’s Corner**

*Boosting America’s health literacy* ..... p. 2

**Research Roundup**..... p. 3

**Acknowledge the Special People in Your Life**

*Honor gifts to NGR give twice over*..... p. 4



## President's Corner

### *Boosting America's health literacy*

What does it mean to say someone is health literate?

According to the U.S. Department of Health and Human Services, health literacy is “the degree to which individuals have the capacity to obtain, process and understand basic health information and services needed to make appropriate health decisions.”

In the case of glaucoma, that means understanding the disease's basic mechanics, but it also means keeping doctor's appointments and following prescribed medical treatments, including regular doses of eye drops.

Unfortunately, according to an article in this issue of **National Glaucoma Research Report**, too many glaucoma sufferers still don't know enough about their condition and what they need to do to manage it. As a result, their vision is declining all the more rapidly.

If you know people with glaucoma, please remind them how important it is to get proper eye care. And if they have any questions about their condition, send them a copy of this newsletter or refer them to our website ([www.ahaf.org](http://www.ahaf.org)). Armed with knowledge, they can begin taking charge of their glaucoma—and their future.

Brian K. Regan, Ph.D., President

## High Cost of Medicines Can Affect Glaucoma Treatment

### *Beta blockers least expensive class of drugs*

Glaucoma medications cost Americans hundreds of millions a year—a price tag that could help determine how glaucoma patients are treated, according to a cost analysis published in the *American Journal of Ophthalmology*.

Researchers from the Texas A&M University

found that the direct cost of managing glaucoma in the United States is roughly \$1.9 billion a year. Medications account for between 38 percent to 52 percent of that total cost.

Of the four classes of pharmaceuticals—beta blockers, prostaglandins,  $\alpha$ -agonists and

*continued on page 3*

Learn more online at  
[www.ahaf.org](http://www.ahaf.org)

Logon to our website at [www.ahaf.org](http://www.ahaf.org) and click on the National Glaucoma Research link to learn more about what's new in the world of research, as well as important information about risk factors for glaucoma.

*continued from High Cost of Medicines ...*

carbonic anhydrase inhibitors—nonselective beta-blockers are generally the cheapest. An individual patient can annually pay anywhere from \$150.81 for generic timolol maleate (a beta blocker) to \$873.98 for a three-times-a-day dose of Alphagan P (a2-agonist).

“Physicians consider many factors when treating patients with glaucoma,” says researcher Steven D. Vold. “Ultimately, the goal of eye care providers is to give the best, most cost-effective care to their patients.”

## Research Roundup

### *Lack of health literacy may aggravate glaucoma*

Glaucoma patients with poor health literacy experience a more rapid disease progression than patients who are well-informed about glaucoma, says a report in *Archives of Ophthalmology*.

The report, undertaken by the Kresge Eye Institute at Detroit’s Wayne State University, looked at 204 English-speaking glaucoma patients. Of this group, the patients with poor health literacy tended to miss more appointments and to take eye drops less frequently. They also showed greater loss of visual field.

“Closing the gap in health literacy is one essential component in reducing disparities in glaucoma care,” the report’s authors conclude. “However, the real challenge is in shaping effective public health communication that is culturally and linguistically appropriate for patients and promotes compliance with medications and follow-up treatment with their physicians.”

### *Nanoparticle goes where other drugs can’t*

Researchers with the University of Central

Florida have created a nanoparticle that could offer significant advances over traditional glaucoma treatments, according to an article in the *Journal of Physical Chemistry C*.

Researcher Sudipta Seal and his team bound the nanoparticle to a compound that blocks a key enzyme called hCAII. The enzyme causes carbon dioxide to build up inside the eye, helping to creating the abnormally high pressure that is the hallmark of glaucoma.

“The nanoparticle can safely get past the blood-brain barrier, making it an effective non-toxic tool for drug delivery,” says researcher Sudipta Seal.

While very few existing glaucoma medicines can be absorbed directly into the eye, early experiments show that the nanoparticles have a high rate of penetration. Their tiny size also makes them less abrasive than the complex polymers commonly used in eye drops.

### *Immune system could be key factor in glaucoma*

A Stanford University team led by researcher Ben Barres has found that the human

*continued on page 4*

*continued from Research Roundup ...*

immune system directly targets brain synapses. The findings have significant implications not just for glaucoma but for other neurodegenerative diseases like Alzheimer's disease and multiple sclerosis.

Normally, when the human body is invaded by a foreign antigen, the immune system dispatches a group of proteins called the classical complement cascade to help kill the invader. Barres' team has learned that these same complement proteins also bind to unwanted brain synapses—in effect, flagging

them for removal.

This elimination process is a standard part of the brain's developmental progression from childhood to adulthood. However, in diseases like glaucoma, that process is somehow reactivated, Barres says, creating the conditions for massive loss of synapses and neurons.

Because the optic nerve is a direct extension of the brain, there is an important connection between the immune system and glaucoma.

## Acknowledge the Special People in Your Life

*Honor gifts to NGR give twice over*

Looking for a special way to acknowledge the important people in your life? Consider an honor gift to National Glaucoma Research.

Honor gifts can be given on special occasions—a friend's or relative's birthday, graduation, or anniversary—or they can be given on holidays like Christmas, Hanukkah, Mother's Day, or Father's Day. Or they can be given at any time of the year to show appreciation for someone's kindness or to recognize someone's impact on your life.

National Glaucoma Research's honor gift program can help you to thank others for their unselfish acts of kindness—while advancing sight-giving and life-enhancing research and educational efforts.

For more information on this unique way of giving, please contact Katherine Jimenez of National Glaucoma Research at 1-800-437-2423.

*Thank you for thinking of National Glaucoma Research!*

The National Glaucoma Research Report is published by National Glaucoma Research, a program of the American Health Assistance Foundation ©, a nonprofit organization located at 22512 Gateway Center Drive, Clarksburg, Maryland 20871, 301-948-3244, 800-437-2423, [www.ahaf.org](http://www.ahaf.org).

The information in National Glaucoma Research Report is provided as a public service and should not in any way substitute for the advice of a qualified health care professional nor is it intended to constitute medical advice. The American Health Assistance Foundation does not endorse any medical product or therapy. Prior written permission is required for use of the material herein. Copies of the National Glaucoma Research Report are available upon request.