



Eye Research *News*

Gene Therapy Restores Sight

A third RPB-supported research team reported dramatic results using gene therapy to restore the functioning of photoreceptor cells. Patients in all three studies regained useful vision. One patient's light sensitivity was so restored that the dim red light from an alarm clock bothered him and he had to turn away from it in order to sleep. The latest research offered proof that gene therapy could restore daytime vision to near-normal levels in the treated cells. The ability to adapt to low lighting conditions, while improved, was not as well corrected. According to scientists, the findings further pave the way for the potential use of gene therapy to treat **macular degeneration** and other degenerative retinal diseases within a few years. 

Door Opens to Treat Dry AMD

Until recent years, patients with the wet form of age-related **macular degeneration** (AMD) were destined to lose central vision, making it impossible to drive, watch TV, or see the faces of loved ones. Today, there are treatments to prevent the growth of leaky retinal blood vessels that cause vision loss (Lucentis and the off-label drug Avastin). RPB funded aspects of the early development of this "anti-VEGF" therapy and RPB scientists continue to develop new ways to halt AMD blood vessel damage.

Now, an RPB-supported, multi-institutional study has uncovered the first genetic link to **dry AMD**, the more common, but less harmful, form of AMD. Based on the research, a compound that inhibits the mechanism that causes dry AMD will enter clinical trials next year.

The same study unearthed a second, potentially sight-saving finding. Current, experimental therapies for

New View Inside the Eye Helps Prevent Glaucoma

A unique, new, non-invasive imaging device allows eye doctors to see areas inside the eye that previously were impossible to view, and to detect **narrow angle glaucoma** before it can cause sudden, painful loss of sight. The condition occurs in about 10 percent of all cases of glaucoma and is three times as likely to lead to blindness as the other forms. Studies have established that early detection is the key to prescribing proper treatments to slow glaucoma's progress. **Go to www.rpbusa.org for more detailed information on glaucoma.** 



Photo: Jim Wallace

A smaller version of the device, shown here in use by an RPB-supported researcher, is in development. The new system could also be used to detect a variety of eye conditions, including macular degeneration, and to guide eye surgeries.

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Door Opens to Treat Dry AMD

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wet AMD, involving the use of short interfering RNA, may actually cause the dry form of the disease in the same people who have an otherwise protective genetic mutation. One thing becomes clear, according to the researchers—as experimental gene therapies are developed, patients considering them should first be genetically profiled to assure safety. 

FY Eye: An estimated eight million Americans have the currently untreatable dry form of AMD, which causes permanent vision loss and can progress to the more damaging wet form.

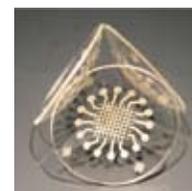
Wider Use for Vitamin Therapy

Nutritional supplements containing antioxidant sources as well as zinc and copper (known as the AREDS formula), which slow the progress of **AMD** in some patients, have now been shown to have the potential to protect diabetics from developing **diabetic retinopathy**. While earlier RPB-supported research has established that good blood sugar control can prevent or slow diabetic retinopathy (a complication that affects more than 80% of diabetic patients), the AREDS-based

micro-nutrients may be beneficial despite elevated blood sugar levels. The findings are a first step toward testing the formula in clinical trials. A separate study supports the possibility that lutein and zeaxanthin (found primarily in plants) protect against **macular degeneration** and **cataract**. Their levels in the eye can be increased either through food intake (dark leafy greens, colorful vegetables) or supplements. 

“Smart” Contacts Will Test for and Treat Glaucoma

Scientists have designed and tested a pressure-sensing contact lens that will allow **glaucoma** patients to monitor their eye pressure at home, providing more detailed and continuous information in order to improve management of the disease. The sensors in the “smart” lenses work similarly to those in bank ATM screens or iPhones, converting pressure into an electronic signal that can be wirelessly transmitted to a computer. Plans are for the lenses to eventually dispense medication in response to a detected need. The “smart” contacts will not, however, replace visits to an eye doctor’s office where those at risk for glaucoma or undergoing treatment must still have the optic nerve examined for signs of disease progression. 



Credit: Tingrui Pan/UC Davis Photo

Eye Research *Briefs*

New Prescription for Amblyopia Amblyopia (known as “lazy eye”) develops due to poor visual input early in life, often from misaligned eyes, cataracts or extreme astigmatism. New research indicates that, for children with astigmatic amblyopia, including those previously thought to be beyond the effective treatment period (older than seven), sustained treatment with eyeglasses significantly improves visual acuity. 

Potential Vaccine to Fight Ocular Herpes Scientists have created a new, cost-effective method to synthesize the first vaccine that could safely combat **ocular herpes** infection and disease in humans. Herpes simplex virus type-1 is one of the most prevalent viral infections of the eye, causing damage ranging from blepharitis and conjunctivitis to blinding herpes stromal keratitis in more than 450,000 people. 

Sutureless Patch for Corneal Burns The first study of a sutureless patch for treatment of severe chemical burns of the eye’s surface suggests it is effective in rapidly relieving symptoms, reducing inflammation, and promoting healing. The patch, made of specially treated amniotic membrane tissue obtained during Caesarian section, can be applied in a doctor’s office, reducing costs and delays. 

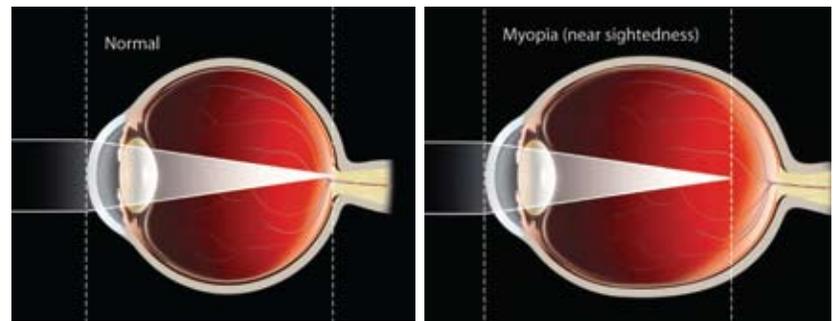
Can Myopia Be Prevented In Children?

Myopia affects 25 percent of the U.S. adult population and a much higher percentage of Asians. A soon-to-be-published study suggests that myopia (nearsightedness) can be prevented in children by modifying their visual experiences. The findings hold far reaching implications for the eye health of a growing number of people worldwide. They may also signal a need for fundamental changes in the way children are exposed to visual stimuli while they play and learn, including reducing exposure to children's video games.

The new research identifies long-sought myopia genes and confirms that myopia is primarily a genetic disorder. It also contains a surprise: exposure to red light activates myopia's genetic mechanism and drives eye elongation, creating a condition called **"high" myopia**. High myopia cannot be treated with glasses or LASIK surgery. The current study supplies an explanation for the upward trend in myopia that began in the late 1980s. According to the researchers: "The intensely colored images on video screens, particularly the liberal use of large areas of red in animated video games [...]."

This also explains why using a night light may contribute to myopia, as indicated in other studies. The night light is filtered through the eyelids, which bathe the retina in red light. The same mechanism explains the effect of birth date on myopia. Babies born in June, July and August have a higher prevalence of myopia. This is because they are more likely to be asleep when the sun is still up.

In a separate study, daily treatment with pirenzepine has been found to slow the rate of progressive myopia in children. Delaying progressive myopia can reduce the risk of serious complications and enhance quality of life for children who might have to wear corrective glasses. More research will be needed before the drug can be widely recommended. 



Myopia develops when the shape of the eye becomes overly elongated and unable to focus on distant objects. When the eye is extremely elongated, parts of the back wall can be affected, leading to significant vision loss due to myopic retinopathy, macular degeneration, retinal detachment, glaucoma or strabismus.

Illustrations: Elisabeth Kelly, courtesy of Jay Neitz

Eye Research *Briefs*

Warning on AMD Therapy for Some New research has identified a complication of anti-VEGF therapy that patients with the occult form of **wet age-related macular degeneration** (AMD) should discuss with their doctor. Anti-VEGF therapy, involving injections into the eye, is the most current treatment to curtail vision loss due to wet AMD. The recent investigation demonstrated that, in 17% of anti-VEGF-treated eyes with the occult form of wet AMD, breaks can occur in the thin layer of cells that nourish retinal visual cells. 

Smoking Connected to Uveitis Complication Patients with **uveitis** may be further complicating that condition if they smoke. Almost half of the uveitis patients in a study had cystoid macular edema (CME, swelling and cysts in the macula area). Those who were current smokers were four times as likely to have CME as those who had never smoked. The more cigarettes a day they smoked, the higher their risk for having CME. 

Can't Find Your Condition Here? RPB supports research into cures, treatments and preventives for all blinding diseases. Go to www.rpbusa.org for the latest information on **retinitis pigmentosa, dry eye, retinopathy of prematurity, strabismus, ocular cancer, optic neuritis, infectious eye diseases such as toxoplasmosis, low vision, complications of LASIK/PRK surgery**, and a host of other visual disorders. 

For further information on any of the reports in this newsletter, please contact RPB at inforequest@rpbusa.org or 1-800-621-0026.

WHY IS RPB DIFFERENT from other charitable non-profit foundations?

- It is the only public foundation supporting research seeking preventative and cures for all diseases of the visual system that damage and destroy sight.
- It supports scientists at every stage in their career, from medical school fellowships to senior scientific investigator awards.
- With no more than ten employees at any time during its nearly half century existence, it has the smallest professional staff among all major non-profit foundations in the country.
- Since it conducts no expensive special events or mass public mailings, its fund raising cost ratio has been held to less than 2% over more than four decades of service.
- Through a special fund created by RPB's founder, contributions totaling up to one million dollars are matched, thus doubling the value of gifts received during any calendar year.
- The names and addresses of contributors to Research to Prevent Blindness (RPB) and prospective donors are never shared with any third party.



Keep an Eye on the Future by Investing In Vision

Contributors to RPB, both large and small, are critical to the success of our efforts. You, too, can help pass the gift of sight to others. You might:

Simply mail your gift by check or contribute online at www.rpbusa.org/rpb/invest/contribute.

Donate real estate/life insurance—contribute stock.

Giving long-term appreciated stock allows you to avoid capital gains tax on the increase in value, and you also receive a tax deduction for the full fair market value of the stock on the date of the gift.

For instance, if you purchased stock several years ago for \$1,000 and it is now worth \$10,000, a gift of that stock to RPB would allow a charitable deduction of \$10,000 and you would avoid paying capital gains tax on the \$9,000 appreciation. **FIND OUT HOW:** Call RPB at 1-800-621-0026.

Establish a Charitable Remainder Trust (CRT) that enables you to provide for yourself and/or your family—and to support eye research as well. CRTs allow for tax-free diversification of assets within the fund, and can reduce or eliminate estate taxes.

Include RPB in a bequest. A bequest made through your will or trust is completely free of estate tax. You can designate a specific dollar amount, specific piece of property, a percentage of your estate or all or part of the residue of your estate. You can also name Research to Prevent Blindness (RPB) as a contingent beneficiary if someone in your will is no longer living at the time of your passing. A bequest can be made by including the following words in your will:

"I give, devise, and bequeath to Research to Prevent Blindness, 645 Madison Avenue, New York City, 10022 (here insert dollar amount, percentage of estate, or describe property) to be used for its scientific purposes or for research related to a specific eye disease, e.g., macular degeneration, glaucoma, etc."

To learn more about bequests or any of the other above options, consult with a financial advisor, and talk to your attorney regarding the final form of any lifetime or testamentary transfer.

- **ALL GIFTS AND BEQUESTS ARE TAX DEDUCTIBLE. Research to Prevent Blindness, Inc. (RPB) is recognized by the U.S. Internal Revenue Service as a publicly supported tax exempt organization under section 501(c)(3) of the Internal Revenue Code.**

A SITE FOR SORE EYES!

Visit RPB's user-friendly web site—www.rpbusa.org. Anyone seeking information on disorders that affect sight can view animations that explain eye diseases, explore comprehensive research archives, perform self-tests for vision loss (including **macular degeneration** and a test for **color blindness**) and download disease oriented informational brochures. They can also **find an eye doctor** within RPB's membership base of active research supporters. Links are provided to service oriented resources, including more than 50 medical research institutions supported by RPB's Grants Program.

DON'T HAVE A COMPUTER? Find assistance at your public library.



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