DISCOVERY EYE FOUNDATION
~ FOUNDED IN 1970 ~
SUPPORTING WORLDWIDE EDUCATIONAL PROGRAMS AND EYE RESEARCH
SPRING/SUMMER 2008

Discovery Eye Foundation exists to facilitate the development of cures and improve patient care through corneal and retinal research and educational programs for eye disease.

All in Together

International meeting proves collaboration is key

They called it Pink Tank III. The "pink" came from *pig* and *think*. Who says scientists don't have a sense of humor?

Pink Tank III at University of California, Irvine (UCI), in November 2007 was the latest meeting of an international group working to prevent or reverse vision loss from retinitis pigmentosa (RP), macular degeneration (AMD) and glaucoma. The project discussed at this meeting was "Functional Reconstruction of the Outer Retina," which is funded by The Lincy Foundation and other donors through the Discovery Eye Foundation and UCI. The project studies stem-cell regeneration of the retina in an effort to cure AMD.

According to DEF's medical director, Anthony Nesburn, MD, FACS, the approach of this project is unusual in its collaborative nature. There are 11 universities worldwide participating in the project (see sidebar, next page), with experts from multiple disciplines.

"The typical [research] approach is a traditional, academic approach, where a professor with a lab applies for NIH funding, gets it, and supports work in that lab," says Henry Klassen, MD, PhD, the director of the Stem Cell and Retinal Regeneration Program in the Department of Ophthalmology at the UCI School of Medicine. "It's a PI–centered approach. It slows things down, because the PI (principal investigator) has to develop the capacity to carry out the entire project, so it keeps the scope of the project smaller and relatively unambitious from a therapeutic translational perspective.

"The flexibility of the DEF funding has been crucial to allow the distribution of funding across this international network."

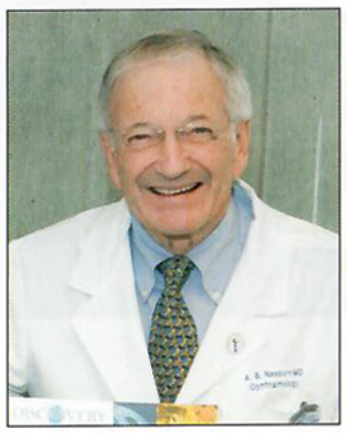
"We're trying to speed things up by working on pigs. I don't want to have to develop the farm, raise the pigs, and learn how to care for pigs. Who's an expert at growing pig retinal progenitor cells in the lab, who is also a polymer chemist *and* can do retinal surgery on pigs? I'd guess there's nobody who'd fit that description on the planet at the moment.

"The only way to move ahead is to bring people together who are already experts. It's a much more collaborative approach. But the system isn't really set up to deal with that. That's why the flexibility of the DEF funding has been crucial to allow the distribution of funding across this international network to allow us the flexibility to bring expert retinal surgeons with experience in pig, together with Mike [Young, PhD, of Harvard University's Schepens Eye Research Institute] and me — the only people who have grown retinal progenitor cells in the pig — and polymer chemists from MIT, Yale and UCSF all together in one project," Klassen says.

The Pig in the Poke

The pig is the centerpiece of the project, as work with rodents doesn't necessarily translate to humans. "Animals do differ from each other," Klassen says, "and, for better or worse, we're a lot closer to pigs than we are to mice."

Work with pigs, however, can be difficult, time-consuming and expensive. This is where the collaboration is key. In Denmark, Nesburn points out, pigs outnumber people. The Danish government helps ▶



"Our groundbreaking collaborative research is showing real potential for new treatments that will enhance the quality of life for patients with diseases of the cornea and retina."

From the Medical Director

It is a beautiful time of year — a time of growth — when all the flowers are blooming, and the leaves are filling in on the trees. Here at Discovery Eye Foundation, we are also growing, and we are excited to tell you about the wonderful things "blooming" here at the foundation.

Our groundbreaking collaborative research is showing real potential for new treatments that will enhance the quality of life for patients with diseases of the cornea and retina. But it is harder to get NIH funding — even for outstanding research — than it has ever been in my memory. I am proud of our researchers who are getting government and private funding when grants are so hard to get. It shows what good work our DEF–supported researchers are doing.

As always, we are grateful for our donors and partners who support our work. In this edition of our newsletter, you will meet some of the people who, through their generosity, enable us to continue to provide resources to the thousands around the world who are trying to understand more about keratoconus and macular degeneration and how to improve their lives or the lives of their loved ones.

Through you, and with you, Discovery Eye Foundation, the Macular Degeneration Partnership and the National Keratoconus Foundation are springing forward, and our future looks sunnier than ever. Thank you for your involvement with our organization and the support you give us so we can help so many people around the world affected by many sight-robbing eye diseases.

Anthony B. Nesburn, MD, FACS
Medical Director

Pink Tank III *(continued from front page)*

support research work with pigs. "Fundamentally, you do the same kind of surgery on a pig that you would do on a human," Klassen says. "The pigs offer a better proof of principal."

While the FDA will not let researchers take experiments from rodents to humans, it *will* let them take them from pigs to humans. The hope, Nesburn and Klassen agree, is to move to clinical trials in humans in two to three years.

"Just putting stem cells alone into the eye probably won't work to restore useful vision in situations where photoreceptors have already been lost to disease, such as with advanced AMD. For these situations, our goal is to identify the optimized stem cell and the optimized polymer, and put these both in the eye, together with photoreceptor sheets, as a composite implant," Klassen says.

While the human implant is in its beginning stages, Klassen points out that parts of the work are ready for clinical trials now: "We're finding things along the way — simpler approaches that could yield benefits without having to go all the way to the final product. For people with less severe retinal damage, a simpler approach might be sufficient to preserve vision," he says.

Eye to Eye

While the researchers do securely share information online, they find that in-person meetings are very important.

"There are so many components: People doing surgery on pigs, people growing and analyzing cells, people making polymers, people analyzing the cells growing on the polymers, checking different cells and different polymer combinations and so on," Klassen says. "There was quite a bit of data after one year that we wanted to go over with each other. Then we could focus on the optimal results going forward.

"We identified a short list of good polymers that seemed to have the most favorable outcome. ... Now we're trying to further zoom in on what made the good polymers so good. Meanwhile, we saw we had managed to grow the green-pig retinal progenitor cells very well and characterized them extensively."

The project's findings thus far — which were shared with the DEF board of directors and donors in a special lay-summary presentation at Pink Tank III — were "startling," Harvard's Dr. Young says. "It opens up new ideas about what's possible in terms of reconstructing the outer retina, which is exactly what we were hoping for. It was interesting to see people who had a lot of experience and years of frustration in this area see this data and just smile in amazement. That really shows you it's all coming together."

The Pink Tank III lay presentation is available on videotape. Contact Sheryl Alexander at (310) 623-4466 or sjalexander@discoveryeye.org.

Retinal Repair Consortium: Participating Organizations

- University of California, Irvine
- Schepens Eye Research Institute, Harvard University
- University of Louisville
- University of Lunds
- Eye Pathology Institute, University of Copenhagen
- University of Missouri, Columbia
- Massachusetts Institute of Technology
- University of California, San Francisco
- Boston University
- Yale University
- Case Western Reserve University

Prevention is Always Better

DEF–supported scientists get prestigious research grants

In an increasingly difficult funding environment, four DEF–supported researchers have been awarded National Institutes of Health (NIH) or charitable-foundation grants for their research on eye diseases causing vision loss.

Steven Wechsler, PhD, a world expert on herpes infection of the eye, was awarded an NIH grant to study "immunopathologic mechanisms of ocular herpes scarring." How people lose vision to herpes infection of the eye is still a mystery. Wechsler developed a powerful laboratory model that may help answer those scarring questions and find a cure for this cause of vision loss. More than half a million people in the United States get ocular herpes each year.

James Jester, PhD, a world expert on the mechanism of corneal scarring, was funded for five years by the NIH to study the mechanisms and prevention of corneal scarring. Many different stressors, including trauma, surgery and infections such as herpes, can cause the cornea to become opaque from scarring. Currently, only corneal transplantation can be used to return vision to a patient with a scarred cornea. This research could help define the final common pathway that produces all corneal scarring and help scientists prevent it. Of the more than 50,000 corneal transplants done in the United States each year, more than half could be avoided if we can prevent scarring. Corneal scarring is a major cause of blindness in countries where corneal transplants cannot be done.

> **Research could help define the final common pathway that produces all corneal scarring and help scientists prevent it.**

We have known for more than a century that high eye pressure in glaucoma patients causes them to lose vision by damaging the optic nerve. The exact mechanism of this vision loss is unknown. Donald Brown, PhD, has been funded by the NIH to study how high eye pressure in glaucoma produces "pressure induced dynamic 3-D changes in optic nerve." Brown is using a million-dollar state-of-the-art laser microscope, a new technique that allows scientists to examine the human optic nerve and other tissues in 3-D without fixation with formaldehyde or chemicals. Brown has shown that high pressure inside the eye causes the connective tissue in the optic nerve to literally strangle the nerve fibers, shutting off their circulation of vital substances needed for vision function. His findings could lead to new ways to prevent glaucoma-induced vision loss.

A grant from The Lincy Foundation to Cristina Kenney, MD, PhD, supports important new research on the role of a person's genetic makeup in the loss of vision caused by both wet and dry AMD. It turns out that the energy plants, called mitochondria, in all our cells may play a crucial and unexpected role in loss of vision from AMD. Her research, carried out with retina experts Drs. David Boyer and Barry Kuppermann, holds the promise of helping to decide which of many new treatments for AMD would be most beneficial for patients.

Eye-Healthy Eating

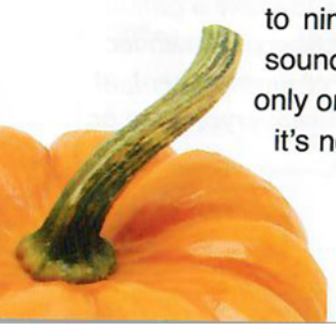
Good nutrition is, of course, vital for good health. Eating well is especially important for good eye health, and choosing the "right" foods can be of great benefit to your sight.

Look for foods high in antioxidants and omega-3 fatty acids. Studies on macular degeneration show a link between heart health and macular health, and antioxidants fight against free radical activity in the eye that is triggered by ultraviolet radiation and blue light from the sun, smoking and other traumas. Nutritional studies in large populations point out the reduced risk of age-related macular degeneration (AMD) in people who eat adequate amounts of foods with omega-3 fatty acids, antioxidants and zinc. Look especially for foods with lutein and zeaxanthin.

The most eye-healthy foods include brightly colored vegetables and fruits, especially dark green leafy vegetables, such as spinach and kale. Fish, such as salmon and sardines, contribute omega-3s. Fish oil is a healthy fat, along with oils such as avocado and olive. Tree nuts, such as walnuts, almonds and pistachios, also provide benefits. You can even wash it all down with red wine (in moderation), which has been shown to have positive benefits for eyes and AMD (not to mention Alzheimer's).

The top of the list for fruits are blueberries, raspberries, pomegranates, oranges, pumpkin and kiwi. Vegetable picks are spinach, kale, collard greens, peppers of all colors, broccoli, garlic and onions.

According to Judi Delgado, director of the Macular Degeneration Partnership, it is important to eat a variety of foods each day. Each plant and every color contribute specific vitamins; five to nine servings per day are ideal. That might sound like a lot, but remember that a serving is only one-half a cup (one cup for leafy greens), so it's not hard to get the amount you need.



Enlarging the Tent at AARP

MDP will play a major role at the AARP Life@50+ National Event & Expo in Washington, DC, Sept. 4–6, 2008.

When MDP first participated in AARP's annual event six years ago, it had a single booth representing the vision community. This year, MDP is organizing an entire Vision Pavilion.

The Wild Blueberry Association of North America, a Maine trade association of growers and processors of wild blueberries, is partnering with MDP and will provide blueberries. For the first time, a stage in the pavilion will welcome speakers from all over the country, including prominent researchers and Joy Bauer of *The Today Show*, who will speak about nutrition, healthy diet and eye health.

Also for the first time, a committee with representatives from other organizations — including the National Eye Institute, the American Optometric Association, Prevention of Blindness Society of Metropolitan Washington and the Lions Low Vision Center at the Wilmer Eye Institute at Johns Hopkins — is collaborating on the pavilion.

Genentech has generously provided a grant of $50,000 to support MDP's attendance and activities at the three-day event. For information about attending Life@50+, visit www.aarp.org.

A GUIDED TOUR of the Morris S. Pynoos Eye Research Laboratories at UC Irvine

UCI Medical Center
101 City Drive
Building 55, Second Floor
Orange, CA 92868

Leading scientists will discuss cutting-edge eye research in the areas of stem cells for retinal and optic nerve regeneration, macular degeneration, diabetic retinopathy, glaucoma, keratoconus, corneal scarring and ocular herpes

May 9 and Oct. 31
12:30–1:30 pm • FREE
Parking will be validated and lunch will be served

RSVP by May 2 or Oct. 24
(310) 623-4466

Making Lemonade

An artist and poet finds inspiration everywhere she looks — and even where she doesn't

Painter and poet Rosemary Balister takes the phrase "accentuate the positive" to a whole new level.

Being evacuated from her London home during World War II meant she was schooled by her mother and via correspondence courses. Balister didn't have an eye test until she was 11, when her mother was horrified to find out her daughter could barely read the top E on the eye chart. But it hadn't stopped her from learning. In fact, thanks to her one-on-one lessons, she could read at an early age, and she continued to excel at her studies. "It didn't matter that I couldn't see," she says, "because there was no blackboard."

In the middle of the war, while London was being bombed, a teacher asked her hunkered-down students to write a psalm of thanksgiving. Balister started writing her own poetry.

She believes her keratoconus may have caused her to withdraw a bit, increasing her ability to fantasize. In high school, she wrote a poem about a stream — something she had rarely seen. It became her first published poem, in 1945.

Balister continued to defy her disease, studying art, earning a degree in German and French from Bristol University, and teaching. She emigrated from England to Canada, where she furthered her art studies, then to West Virginia in 1967, where she raised her family. Soon after her arrival in West Virginia, an optometrist told her he had never seen corneas as large as hers. "He had hit on what was wrong," Balister recalls, "but he didn't know what it was." She got special contact lenses, with dramatic results. "A whole new world opened up for me," she says. "I realized why people thought the carpets I had cleaned were filthy."

Her keratoconus was not officially diagnosed until 1984, when she was sent to the University of Virginia in Charlottesville. "I was examined by a corneal specialist who took one look at me and screamed, 'Keratoconus!' and rushed in about 20 students to look at me."

Balister started writing poetry about her disease in the mid-1980s. "I was sick of people saying, 'Why don't you wear glasses and stop complaining?' I wanted to throttle them. You can't see with glasses," she says. Finding a way to express her frustration was important: "You can either go around shooting everybody in sight or write a poem."

She finally had a corneal transplant in 2001. "I have never been more frightened," she says. "I wrote a poem called "Leavetaking"; I wrote my last will and testament. Three other people with keratoconus helped me have the courage to go through with it." The surgery was a success. "I have pretty good vision," she says. "On a good day, it's 20/20."

Rosemary Balister with her painting, *West Virginia Fall*, which was chosen by the US ambassador to Kuala Lumpur to hang in the US embassy there. He found it through the Art in Embassies and Very Special Arts (VSA) programs.

"Leavetaking," below, appeared in *Root Me On, Poems and Thoughts About Life* by writers with disabilities and their caregivers. *Root Me On* was published in 2003 through a poetry project in Virginia sponsored by the city of Charlottesville and Albemarle County therapeutic recreation departments, Independence Resource Center and Charlottesville/Albermarle VSA Arts.

Leavetaking

Today I bade farewell to my old cornea.
Diseased, cone-shaped, irregular
It was yet an old friend.

In thanksgiving for the many years
Of flawed, yet faithful service
I painted what I saw through an imperfect window,
To familiarize ophthalmologists
With
The keratoconic-eye view of the world.

I may have created a masterpiece
Called "Points of Light"
Equal in beauty and impact
To "Guernica" and "Starry Night"
And turned a lemon into lemonade.

Balister's poetry has been published in numerous books, several by Very Special Arts (VSA), a nonprofit organization founded in 1974 by Ambassador Jean Kennedy Smith. VSA aims "to create a society where all people with disabilities learn through, participate in and enjoy the arts." Balister is involved, as both a poet and an artist, with VSA in Charlottesville, where she still resides. She says she gets a great deal of inspiration from VSA's programs. No doubt she provides a great deal, as well.

Stock Up for Discovery Eye Foundation

A contribution of appreciated securities or mutual-fund shares can produce significant tax savings, while allowing you to be more philanthropic than you may have thought possible. When you make a gift of securities or mutual-fund shares, the benefits you receive are immediately doubled:

- You receive an immediate charitable deduction for the full fair market value of the donated assets.
- You are exempt from paying capital-gains tax on the appreciated value of the securities or shares you donated to a charity.

The fair market value of contributed securities can be deducted up to 30 percent of your adjusted gross income. In addition, if the amount is larger than you can use in one year, the surplus can be carried forward for up to five subsequent years.

Giving appreciated securities is better than giving cash, because you get the tax deduction on the donation at its appreciated value without paying capital-gains tax on the appreciation. You'll be providing the same level of support to Discovery Eye Foundation but at less cost to you.

For example, in 1980 Al Smith paid $1,000 for 100 shares of ABC Corp. He has decided to donate these shares to DEF. The current value of his 100 shares is $10,000.

Once the 100 shares of ABC Corp. are liquidated, DEF will get $10,000 from the sale. Mr. Smith will be able to immediately obtain a charitable deduction for his gift of stock, offset the $10,000 donation against income, and avoid the taxes on the $9,000 capital gain. Everyone benefits.

Anyone can make gifts of stock or mutual-fund shares valued at any amount, small or large. DEF will liquidate donated shares (we're not in the business of speculating on the market!), so your gift will help us progress with our important work almost immediately.

Program Reports

Macular Degeneration Partnership (MDP) and National Keratoconus Foundation (NKCF) are educational programs of the Discovery Eye Foundation

MDP Grants & Gifts

Google: What's in a Word?

With a grant from Internet giant Google, MDP is choosing its words carefully. MDP received a "Google Grant" of $40,000 to be used through the advertising program, AdWords, with its website, **www.amd.org**. Nonprofit grant recipients use their award of free AdWords advertising on www.google.com to raise awareness and increase website traffic — and, of course, donations.

"With the help of Google, we have set up 'ad campaigns' with different keywords and text," explained Judi Delgado, director of MDP. "Depending on how well we do this, our ad will be shown to people who search for our keywords (macular degeneration, age-related macular degeneration, AMD, etc.). Part of the program is to track how many 'impressions' occur (how many times our ad shows up) and how many times a viewer of the ad 'clicks through' to our website."

When people search on Google using one of the keywords, the MDP ad may appear next to the search results. There is only a fee if they "click through" to the MDP website. That fee is paid out of the Google Grant.

Planning Ahead

DEF Medical Director Anthony Nesburn accepts a donation from Bud and Jane Ison.

On April 4, Jane and Charles (Bud) Ison visited with DEF–supported AMD researchers Henry Klassen and Cristina Kenney at their laboratories at UC Irvine. Mr. Ison is co-trustee of the William and Blanche Smith Trust and was in Southern California to present DEF with the first of five yearly checks of $25,000 to support dry age-related macular degeneration research.

"Blanche Smith suffered from dry AMD and poor vision for more than a decade before her death last year at the age of 92," Mr. Ison said. The Isons were Mrs. Smith's longtime friends, and she asked Mr. Ison and Timothy Rogers of Cincinnati's KeyBank to act as co-trustees to carry out her wishes that her legacy be used to help find a cure for dry AMD. Mr. Ison found out about DEF and our research through our Macular Degeneration Partnership website (**www.amd.org**).

"We greatly appreciate the Isons' support and the forethought and generosity of Blanche Smith for including us in her estate plan," said DEF Medical Director Anthony Nesburn.

NKCF in Las Vegas

Global Keratoconus Congress

The second annual Global Keratoconus Congress (GKC) took place in January 2008 in Las Vegas, with more than 500 participants from 30 countries attending.

NKCF was one of the sponsors of the two and a one-half–day meeting, hosted by Contact Lens Spectrum and the Lippincott Williams & Wilkins (LWW) Health Care Conference Group, focused on the latest diagnostic methods and treatments for keratoconus. GKC provided international insights and access to the most advanced products used in the treatment of keratoconus. The meeting included information for vision-care professionals in all disciplines, with both surgical and non-surgical options.

The program covered every aspect of keratoconus, from fundamentals to post-surgical fitting and patient-management issues. The expert faculty, which included speakers from nine countries, provided a worldwide snapshot of current diagnosis and treatment standards.

Making Contact

NKCF's Catherine Warren, Blanchard President Jean Blanchard and RoseK International President Ian Jennings

At the GKC, Blanchard Contact Lens and RoseK International presented the NKCF with an annual sponsorship contribution of $10,000. Blanchard has partnered with the NKCF in past years with similar contributions in support of the Patient Outreach and Education Program of the Discovery Eye Foundation.

"As manufacturer of the RoseK family of lens products in North America, and in recognition and support of keratoconus contact-lens practitioners fitting RoseK lenses, we feel an obligation to provide continued support for the dedication and efforts of the National Kerato-conus Foundation," said Lee Buffalo, director of sales and marketing at Blanchard.

"Blanchard and RoseK are companies with a strong commitment to the keratoconus population," said Catherine Warren, NKCF's executive director. "Their contribution will enable the NKCF to provide information and resources to keratoconus patients worldwide."

Ways to Give to DEF

There are many ways you can make a charitable contribution. Discovery Eye Foundation is a 501(c)3 nonprofit organization. In all cases, your contribution will receive the maximum tax deduction allowed by law. You may direct your gift to DEF, MDP or NKCF, or to our research programs at The Morris S. Pynoos Eye Research Laboratories at UC Irvine.

Cash

Cash gifts, which can be made using a check or credit card, are simple and fully deductible for federal income-tax purposes.

Appreciated Securities

Gifts of appreciated securities — stocks and bonds — provide important tax advantages to donors. The full fair market value of the donated appreciated securities is fully deductible as a charitable contribution for federal income-tax purposes.

Real Estate

Gifting a residence, vacation home, commercial building, land or vacant property can provide many tax advantages. It can also provide lifetime income.

Retained Life Estates

Donors can contribute a residence, vacation home or farm, while retaining the right to live in and use the property. Donors may receive an income-tax deduction.

Bequests

Setting up an endowment in your family's name, by means of a bequest in your will or living trust, is a wonderful way to support your philanthropic priorities in perpetuity.

Retirement-Plan Assets

Using retirement-plan assets to make a charitable contribution gives donors financial and tax advantages. Naming DEF, NKCF or MDP as a beneficiary of a retirement plan — including IRAs, 401(k)s and profit-sharing plans — may eliminate estate and income taxes.

Life Insurance

By assigning ownership of life insurance to DEF, donors can receive tax deductions for the cash value of the policy and the yearly premiums.

For more information about these and other ways to make a gift, please contact Sheryl Alexander, vice president of development, at sjalexander@discoveryeye.org or (310) 623-4466.

DISCOVERY
EYE FOUNDATION

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Discovery Eye Foundation

Macular Degeneration Partnership

National Keratoconus Foundation

The Morris S. Pynoos Eye Research Laboratories at UC Irvine

INSIDE THIS ISSUE

- Pink Tank III: The Unique Collaboration
- Research Grants to DEF Researchers
- Stock Tips
- MDP & NKCF Program Reports
- Making Lemonade: A Success Story

and more....

Keep your eye on the ball
July 21, 2008

DISCOVERY
EYE FOUNDATION GOLF TOURNAMENT

NEW LOCATION!

Newport Beach Country Club • Newport Beach, CA

DISCOVERY
EYE FOUNDATION

Join us Monday, July 21st, for a fun day on the course, dinner and auction – all to benefit the Morris S. Pynoos Eye Research Laboratories at the University of California at Irvine and our patient outreach and education programs.

Scramble Format • 1:00 PM Shotgun Start
5:30 PM – Reception and Silent Auction • 6:30 PM – Dinner
7:00 PM – Awards Ceremony and Live Auction

RSVP BY JUNE 30

For more information, contact Sheryl Alexander at 310-623-4466 or sjalexander@discoveryeye.org