
RETINA RESEARCH FOUNDATION NEWSLETTER

Foresight for Sight

Number 1/2011

Nanotechnology Applications for the Eye

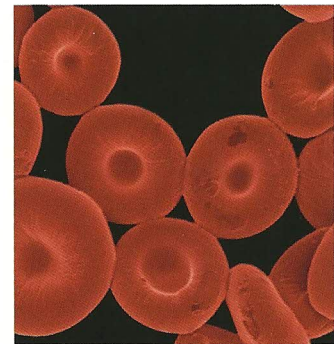
Nanotechnology is an explosive research area that has the potential to revolutionize the diagnosis, prevention and treatment of disease.

Nanotechnology is broadly defined as the techniques and methods used to research, design and engineer materials on a molecular scale of one to 100 nanometers. Research in nanotechnology involves manipulating atoms and molecules with nanodevices in ways that allot the structures new properties and functions. It involves the application of nanotechnology where the manipulation of molecules can aid in drug delivery, monitoring devices, sensors, nanoscale prosthetics and gene therapy, with the ultimate hope of repairing damaged tissues and curing disease.

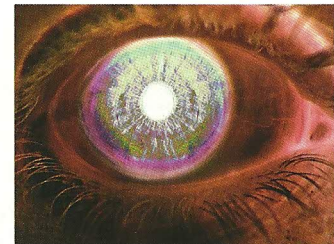
Protein-based topical eye drops are a common route of drug delivery, but they can be inefficient and cause systemic side effects secondary to absorption into the blood stream. However, disposable, nanoparticle-laden contact lenses would increase efficacy and decrease systemic side effects of medications.

To develop these contact lenses, researchers encapsulate proteins that are involved in wound healing (i.e. growth factors) in nanoparticles and then cross-link into hydrogel poly-HEMA by UV curing. The protein releases through a diffusion-based mechanism and is monitored for 25 days. It was shown that hydrophilic proteins can be encapsulated in different types of nanoparticles, and it is expected that they will be considered a new mechanism of protein drug delivery.

While ocular drug delivery mechanisms are a huge area of research, so is the role of nanotechnology in gene therapy. A healthy corneal endothelium is necessary to maintain corneal clarity and normal function. Corneal endothelial disease



1.



2.

1. *Nanotech sunscreens*
2. *Nanoparticle-laden contact lens*

(continued on page 6)

Dr. Harbour Is the Recipient of the RRF Macula Society Research Award for 2011.

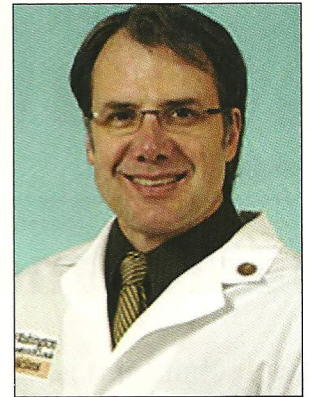
J. William Harbour, MD

Professor of Ophthalmology and Visual Sciences

Director of Ocular Oncology

Alvin J. Siteman Cancer Center at Barnes-Jewish Hospital

Washington University School of Medicine



3.

Gene Identified for Spread of Deadly Melanoma

Washington University researchers have identified a gene linked to the spread of eye melanoma. Reporting in the journal *Science Express*, the team found mutations in the BAP1 gene in 84% of the metastatic eye tumors they studied. By contrast, the mutation was rare in tumors that did not metastasize. BAP1 is short for BRCA1-associated protein 1, and BRCA1 is linked to breast cancer in some women.



4.

Ocular melanoma, also called uveal melanoma, is the most common eye cancer and the second-most common form of melanoma, striking about 2,000 adults in the United States each year. Up to half of those with the cancer eventually develop metastatic disease, which is universally fatal.

Dr. J. William Harbour and co-investigator Anne Bowcock, PhD, Professor of Genetics, of Pediatrics, and of Medicine, have been looking at DNA in tumor cells for clues about why some tumors spread.

It appears that what the gene is supposed to do is to act as a metastasis suppressor. When it is damaged, the tumor can spread.

“If we could detect BAP1 mutations at an earlier stage, we might be able to monitor a patient’s blood for detectable melanoma cells as an early sign that they’re developing metastatic disease.”

3. J. William Harbour, MD

4. Eye Melanoma

26.2 Miles: Blind Runner Completes Marathon With Goal To Raise Money for Retinal Research

Having lived with a serious hearing impairment for most of his life, Ed McDaniel thought he'd been dealt his fair share of challenges. Then, in his 20s, he learned that he had a progressive vision-robbing disease called retinitis pigmentosa that would gradually steal his vision. This combination of hearing and vision loss is a disease referred to as Usher Syndrome, and Ed's diagnosis with this condition was devastating for him.

"It was very difficult," he remembers. "I had finally gotten to a point in my life where I was feeling more comfortable with my hearing loss and then got hit with the news that I was losing my vision. I felt a great sense of loss." Equally devastating was the fact that Ed's two brothers were also diagnosed with Usher Syndrome.

As time went on, Ed started to notice a gradual decrease in his vision. He remembers difficult turning points in his vision loss such as when he gave up driving at age 29, and when he started using a white cane because it was basically a public declaration that he was blind. "There was a period of adjustment, but it took a lot of stress off of me."

Ed learned about a race to raise funds to cure blindness that allows individuals competing in any sort of racing event to raise money for research. Having been a runner for many years, Ed challenged himself to compete in the Ridge to Bridge marathon in North Carolina. He set a goal to raise \$2,620, or \$100 for every mile he would run.

For several months, Ed trained to complete the marathon, which would be his first ever. He gradually increased the distance he ran, white cane in hand. While training, Ed also started working alongside his family to reach out for donations. His two biggest cheerleaders were his wife and his mother.

His efforts paid off –literally because he finished the race and exceeded his goal. "I felt a great sense of pride after completing the marathon," says Ed.

– www.blindness.org



5.



6.

*It is better to trust
the eyes rather than
the ears.*

– *German proverb*

5. *Ed running Ridge to
Bridge*

6. *Cindy and Ed after the
race*

The Lifecycle of a Typical Bequest Donor

It is an established fact that the majority of adults have not taken steps to draft even the most basic last will and testament. A number of factors, including wealth, education, religion, age, and marital status, can help determine whether or not an individual is likely to have a will or other estate plan in place.

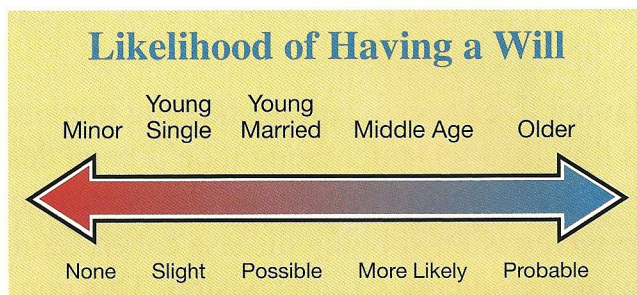
At the earlier stages of life, charitable bequests, if any, are relatively rare and likely to be small. Many young people in their 20s and 30s choose to marry and trade apartment life for a home or condominium. It is not uncommon at this point for net worth to become “negative” because of mortgages, automobile loans and consumer debt.

Once a couple has children, things get more complicated. Estate plans must now resolve issues such as guardianship of minor children, potential distribution of assets under state law, and other considerations. Often additional life insurance is purchased. If a will is drafted, any charitable provision is likely to be either a relatively small specific bequest or a gift contingent upon some remote occurrence such as a disaster that may affect the entire family.

In one’s mid-40s, 50s, and 60s, most people are likely to be at the peak of their careers and may be earning more than at any point in their life. Those who have managed to accumulate any significant wealth are faced with multiple estate, gift, and financial planning considerations. The number of people that would at least consider a charitable bequest may be large, but most decide against making a gift because they feel there are not yet enough assets to provide for family, friends, and charity.

Most people retire in their 60s or early 70s. For many, their net worth has never been higher. Even though their net worth is at a peak or may continue to grow, after retirement the loss of earned income may affect an individual’s ability to give the same amount to charity as before. In addition to the loss of discretionary income, family assets may need to last two or three decades longer, given today’s life expectancies. Estate planning begins to take on greater importance.

In the case of a couple, the operative last will and testament for charitable purposes is usually drafted only after the death of the spouse. This final will is increasingly drafted later in life.



7.



8.

7. The chart shows the range of probabilities of having a will

8. People of all ages

– Give and Take, September 2010

Stem Cell Clinical Trials for Stargardt Disease and Dry AMD Set To Begin

A leading biotechnology company has received authorization from the FDA to begin the first-ever human study of a retinal degenerative disease treatment derived from human embryonic stem cells. The Phase I/II clinical trial will evaluate the treatment in people with Stargardt disease, a juvenile form of macular degeneration that causes progressive, devastating vision loss.

“This clinical trial is a critical, groundbreaking milestone in the development of stem cell therapies for retinal diseases,” says Stephen Rose, Ph.D. “Stem cells offer enormous potential for saving and restoring vision, and we are delighted to see this treatment directed toward Stargardt disease, a vision-robbing condition in children and young adults for which there are currently no treatments or cures. In the long-run, stem cells offer significant potential for restoring vision in people with the most advanced retinal disease.

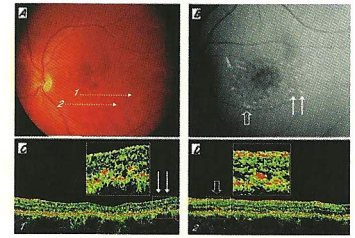
Twelve people will participate in the three-site study, which will be led by Dr. Marco Zarbin, University of Medicine and Dentistry of New Jersey; Dr. Shalesh Kaushal, University of Massachusetts; and Dr. Peter Francis, Oregon Health & Sciences University.

The company has also received FDA authorization to launch a Phase I/II clinical trial of the same treatment for people with dry age-related macular degeneration. The trial will enroll a total of 12 participants. Potential dry AMD trial sites include Stanford and the University of California, Los Angeles.

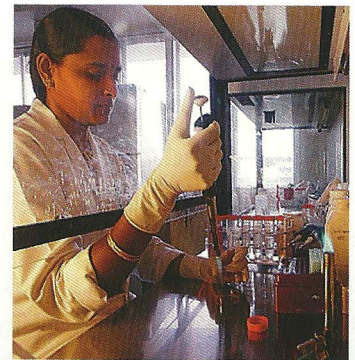
The treatment involves the transformation of human embryonic stem cells into retinal pigment epithelial cells (RPE). RPE cells degenerate in several retinal conditions, including Stargardt disease and age-related macular degeneration. RPE cells provide essential supportive functions for photoreceptors, the cells that provide vision. By placing healthy RPE cells in the retina, researchers believe they can save photoreceptors and slow or halt vision loss from a variety of retinal degenerative conditions.

“Recent progress in the advancement of stem cell therapies has been outstanding,” says William T. Schmidt, chief executive officer, Foundation Fighting Blindness.

– <http://www.blindness.org>



9.



10.

*Tears are nature's
lotion for the eyes.
The eyes see better for
being washed by them.*

– *Christian Nevell Bovee
(late 19th century American
author and lawyer)*

9. *Analysis of retinal flecks
in Stargardt disease
using optical coherence
tomography*

10. *Scientist using stem cells*

Dry Eyes Prevention and Treatment Tips

Eyes dry out when moisture evaporation is occurring faster than our tear glands can produce fluids to maintain the protective, moist coating around our eyes.

How To Prevent Dry Eyes:

- The amount of coffee you drink can cause dry eyes. Coffee contains a mild diuretic, so cutting back on coffee consumption will help.
- Place your computer screen at eye level. Looking up causes the natural tear production from your eyes to evaporate faster, leaving you with itchy, dry eyes.
- Wear glasses or sunglasses anytime you are outdoors to prevent the wind from directly hitting your eyes.
- When using a blow dryer on your hair, keep your eyes closed or use moisturizing eye drops in each eye prior to drying and styling your hair.
- Most everyone will know this last way to prevent dry eyes, but it bears repeating – avoid smoke-filled rooms.

How To Treat Dry Eyes:

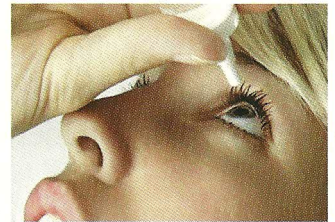
- Moisture, moisture and more moisture. Keep a bottle of artificial tears nearby and use as often as the product recommends, and especially use the artificial tears before going to bed at night. The applied moisture combined with closed eyes to prevent evaporation will soothe itchy, burning eyes and help your eyes recover during the night.
- Give your eyes periodic breaks throughout the day by closing them for five minutes. If you wear contact lens, a switch to glasses, at least part-time, will help treat and prevent dry eyes. Avoid rubbing your eyes when they are itching and burning; this will only make bad matters worse. Apply artificial tears and close your eyes for a few minutes instead.

– www.associatedcontent.com

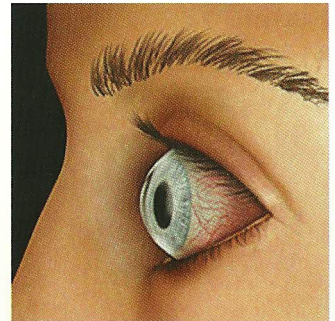
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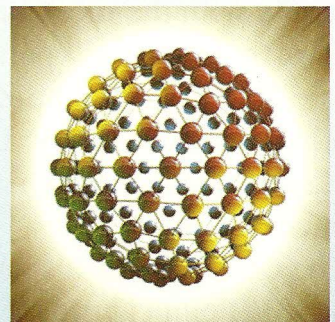
is difficult to treat and often requires a corneal transplant. Researchers found that delivery in therapeutic genes to corneal endothelial cells has potential to cure and treat endothelial disease. Current studies are focusing on defining dose and toxicity of certain vectors.



11.



12.



13.

11. *Applying moisture to the eyes*

12. *Dry eyes can become irritated*

13. *Buckyball*

Meet the Board

Kelli Kickerillo

RRF Board Service: 2009 to present

Education: BBA in Marketing from the University of St. Thomas, Houston, TX.

Career: Executive Vice President and Chief Marketing Officer of Kickerillo Companies

Memberships: Member, Board of Directors of University of St. Thomas and serves as President of the Alumni Board at the University of St. Thomas. Member, Board of Trustees of Duchesne Academy and member, Board of Trustees of the Texas Heart Institute.

Personal: A native Houstonian, she is married to Todd Forester. Both Kelli and her husband enjoy active community involvement, volunteering for their alma mater, avid movie-going, and traveling.



14.



**RRF Announces New Address
assigned by City of Houston
(same site)**

**Retina Research Foundation
1977 Butler Boulevard
Houston, Texas 77030**

**713-797-1925
rrf@retinaresearchfnd.org**

14. *Kelli Kickerillo*

Donations now accepted by credit card.

Please indicate changes in boxes and make any corrections needed next to your name and address, then clip and return entire address label in an envelope.
 Change name or address as shown on address
 Remove name from mailing list.

Address Correction Requested

Retina Research Foundation is dedicated to the eradication of retina disease through programs in research and education.

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FOR THE
BLIND OR
HANDICAPPED

SPECIAL REMEMBERANCES

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