

RETINA RESEARCH FOUNDATION NEWSLETTER

Foresight for Sight

Number 2/2011

Stem Cells From Patients Make 'Early Retina in a Dish'

A team of University of Wisconsin-Madison stem cell researchers, led by Dr. David Gamm of the UW School of Medicine and Public Health and former UW scientist Dr. Jason Meyer, has made a series of discoveries that may lead to future new treatments for blinding eye diseases using retina-like tissues produced from the patient's own skin.

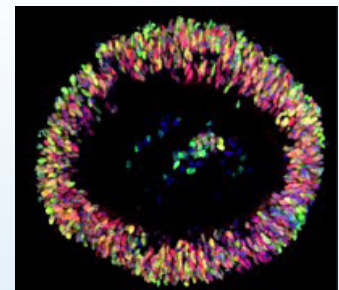
The team used human embryonic stem (ES) cells and induced pluripotent stem (iPS) cells to generate three-dimensional structures that are similar to those present at the earliest stages of retinal development. The Gamm laboratory, based at UW-Madison's Waisman Center, isolated these early retinal structures from other cell groups and grew them in batches in the laboratory, where they produced major retinal cell types, including photoreceptors and retinal pigment epithelium (RPE).

Importantly, cells from these structures matured and responded appropriately to signals involved in normal retinal function, making them potentially valuable not only for studying how the human retina develops, but also how to keep it working in the face of disease. The results show the clinical promise of stem cell research, but Gamm is careful to point out that much work is left to be done. "However, it is remarkable to think that something resembling the retina, one of the most specialized tissues in the human body, may one day be generated from a person's skin," says Gamm.

Gamm and Meyer's research team included:

- Lynda Wright, Kyle Wallace and Amelia Gerner, as well as Dr. James Thomson and Dr. Sara Howden of the Morgridge Institute for Research at UW-Madison
- Bikash Pattnaik, PhD, of the UW School of Medicine and Public Health's Pediatrics Department

<http://www.med.wisc.edu>



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2.

1. *Human induced pluripotent stem cells beginning to form into a structure like a retina.*

2. *Dr. Gamm in Laboratory*

Dr. Gamm holds the **Murfee Chair** sponsored by RRF. He is Assistant Professor of Ophthalmology and Visual Sciences and a member of the UW Eye Research Institute.

Dr. Pattnaik holds the **R. M. Brown Professorship** sponsored by RRF.

Hearing Loss Linked With AMD Vision Loss

Investigators in Turkey have recently found a link between the prevalence of age-related macular degeneration (AMD) and age-related hearing loss in subjects 50 years or older.

Fifty patients with AMD and 43 healthy subjects underwent both eye and hearing exams. Age-related hearing loss and pure tone averages were compared between the macular degeneration group and the healthy control group.

Researchers found that fifty percent of the macular degeneration group had mild hearing loss and twenty percent had moderate loss. In comparison, the control group reported only thirty-five percent had mild hearing loss and five percent moderate loss. Within the macular degeneration group, hearing loss was significantly greater in the dry type compared to the wet type.

Researchers concluded that patients who are experiencing hearing difficulties should be referred to an ophthalmologist for evaluation.

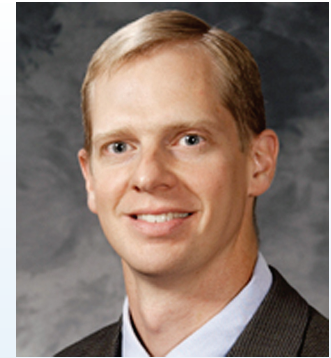
www.sightnation.com

Did you know?

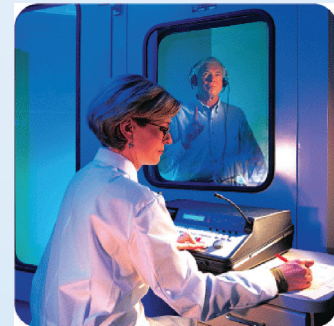
In 1604, Johannes Kepler (Germany) first proposed that the lens of the eye focuses images onto the retina. A few decades later Renee Descartes (France) demonstrated that Kepler was correct.

Both Kepler and Descartes were prominent physicists of their time, and much of their work applied the physical concepts of light rays and geometric optics to the vision process.

http://www.accessexcellence.org



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4.

3. *David M. Gamm, MD, PhD*

4. *Hearing Test will Determine Type and Degree of Hearing Loss*

Throwing Light on the Retina

New Optical Contrast Agents for Eye Microsurgery

The precision and versatility of microsurgical methods have markedly improved in recent years. This is particularly true for surgery on the tissues at the back of the eye, but the new techniques also present considerable challenges to the eye surgeon.

Optical contrast agents help to provide a clearer view of the area of interest, and compounds with improved properties could make the surgeon's task that much easier. Like the contrast agents used by radiologists, optical contrast agents enhance the visually perceptible contrasts between the various tissues, thus making it possible to recognize and distinguish subtle differences in their structures.

“There have been several previous attempts to find better contrast agents, but they met with little success,” says Professor Heinz Langhals of the Department of Chemistry at LMU. In collaboration with Professor Anselm Kampik and Professor Christos Haritoglou of the Ophthalmic Clinic at LMU Munich University Hospital, he has now been able to develop new optical contrast agents, which have the potential to broaden the therapeutic applicability of microsurgical techniques in eye surgery.

In the new study the researchers first chose a type of fluorescent dye – a so-called chromophore – and chemically modified it to make its properties compatible with the optical sensitivity of the eye and the lighting conditions used during eye operations. They then coupled the modified chromophore to a molecule that specifically binds to the target tissue.

“The new optical contrast agent not only allows one to visualize the target tissue with very good contrast, the high fluorescence yield means that it can be used successfully at high dilution,” explains Langhals.

The newly developed dyes have no untoward effects on patients, and they are degraded relatively rapidly following the operation. The new compound will soon be ready for routine use in patients, and promises to open up new opportunities for eye surgery, which should in turn lead to effective treatments for otherwise intractable diseases of the retina.

www.research-in-germany.de



5.

“To me there has never been a higher source of earthly honor or distinction than that connected with advances in science.”

*– Isaac Newton
(1642-1727)*

5. Retinal Digital
Photography

Many Elderly Have Preventable Eye Problems

A large fraction of elderly people have age-related degenerative changes in their eyes that put them on a path to blindness – but could be preventable – a new study finds.

Eye exams given to more than 5,000 elderly Icelanders found that over one in 10 people in their 60s and nearly one in four in their late 70s have an early form of age-related macular degeneration (AMD), the leading cause of blindness.

The risk of later-onset forms of the condition also increased with age, the authors report in the journal *Ophthalmology*. People 85 and older appeared to be 10 times more likely to have late AMD than people aged 70 to 74.

Recent evidence suggests that there may be a way to prevent the progression of some of these lesions, study author Dr. Fridbert Jonasson of Landspítali University Hospital and the University of Iceland told Reuters Health.

There is no cure for AMD, but a U.S. government clinical trial has found that a specific high-dose mix of antioxidants – vitamins C and E, beta-carotene and zinc – can slow the progression of AMD that is in the intermediate stages, and doctors now commonly prescribe it for such patients.

Another study published earlier this year found that older adults who eat fatty fish at least once a week may have a lower risk of serious vision loss from AMD.

Jonasson and colleagues captured detailed images of the eye interior of 5,272 people aged 66 and older living in the Reykjavik area. They found that 11 percent of people in their late 60s had an early form of AMD. As they aged, the rate of early AMD increased to 36 percent of people 85 and older.

Icelanders tend to have less pigment in their skin than other populations, and therefore less pigment in their hair, eye color and retina. “We do not know if this makes the retinal pigment (tissue) more vulnerable to AMD; however, several studies have shown, for instance, blacks are less likely to develop late AMD than are whites.”

And there may be one more reason why Icelanders may be more prone to AMD, Richer noted – a relative lack of dark, leafy vegetables in their diets. Research suggests that people who consume more xanthophylls – found in green leafy vegetables or orange peppers, for instance – tend to have healthier eyes.

<http://www.nlm.nih.gov>



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7.

“Truth has no special time of its own. Its hour is now – always.”
– Albert Schweitzer
(1875-1965)

6. Icelanders may be more prone to AMD

7. Dark, leafy vegetables for eye health

Dry AMD Progress

Progress on treating the dry form of macular degeneration may be hastened with new theories of pathogenesis and new therapeutic targets that could result. According to the Centers for Disease Control, over eight million Americans either have geographic atrophy or are at serious risk for degenerating macular vision.

Wet poses more immediate risk of devastating vision loss BUT dry affects from 10 to 20 times as many people. The pathogenesis of dry AMD is not thoroughly understood, and according to Paul Sternberg Jr., MD, “Drug development follows breakthroughs in understanding the cause of a disease.”

Dry AMD Research has been more elusive due to:

1. Lack of suitable animal models;
2. Difficulty finding a suitable clinical endpoint;
3. Cost of bringing product to market.

Unlike CNV, dry AMD tends to spare the fovea until the disease is advanced. There is no acute loss of vision in dry AMD, and in fact the spectrum covers those with normal vision to those with legal blindness.

New theories have led to new trials. Since only primates have maculas, mice are not good models so easier access to human donor eyes would accelerate progress.

Visual acuity (VA) is the standard endpoint in clinical trials, but doesn't accurately portray vision loss in dry AMD patients. In 2006, the FDA agreed to a new endpoint: GA, using enlargement of the atrophied area as an outcome measure. This endpoint requires fewer number of patients and a shorter follow-up period than VA endpoint.

Big pharmaceutical companies may more aggressively pursue these new lines of research because it is anticipated that the market for whatever treatment emerges is over a billion dollars.

Note: Almost all clinical studies are described in detail at www.clinicaltrials.gov – enter “dry AMD” in the search field.

*From EyeNet (AAO magazine) – January 2011
<http://www.aao.org/publications/eyenet>*



8.

“Somebody said that it couldn't be done, but he with a chuckle replied that maybe it couldn't, but he would be one who wouldn't say so till he'd tried.”

*– Edgar Guest
(1881-1959)*

8. Retinal Digital Photography

Blindness No Obstacle for Quilter

Patience may have been necessary to hand-stitch the squares that embellish her eight-foot quilt, but being able to see well wasn't. Kathryn "Kathy" Hodges of Stonington, Illinois, has Stargardt's disease and her vision is 20/800.

Amazingly, Hodges has made two quilts in spite of her low vision. To sew, much of which she does by hand, she uses special eyeglasses. Because of the weight of those glasses, she has to limit wearing them to about eight hours a day because her face is unable to bear the weight any longer than that.

When Hodges is creating, she needs intensive light, like the sunlight that streams into her sewing room window or from 100-watt light bulbs. With her vision aided and holding her project at the end of her nose, she can see colors. Hodges' quilts are embroidered by hand and pieced by hand, using an embroidery hoop to piece small areas at a time.

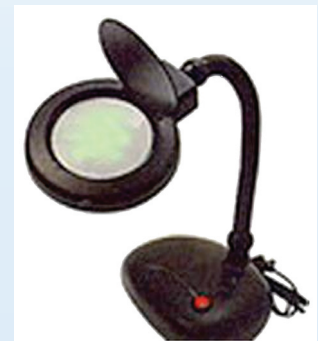
With one of her completed quilts, Hodges received first-place honors in an adult craft competition, part of the American Printing House for the Blind's InSights Art Exhibition.

Hodges doesn't limit her creativity to embroidery and quilting. She also does cross stitch, with her mother marking the grid with a washable marker to enable her to see the pattern.

www.herald-review.com



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SAMUEL M. WU, PhD Alcon Research Institute 2011 Award Recipient

Dr. Sam Wu has been selected to receive the very prestigious Alcon Research Institute Award for 2011. These awards, given by the Alcon Research Institute in Fort Worth, recognize outstanding contributors to ophthalmic research throughout the world.

The Alcon Award is the third major award he has received, and only two other scientists have ever been chosen to receive all three major awards. Dr. Wu was selected for the von Sallman Prize in 2008, the Friedenwald Award in 2009, and now the Alcon Award in 2011.

RRF has sponsored Dr. Wu since 1982, and this support early in his career helped him procure substantial government funding for his research.

**CONGRATULATIONS
DR. WU
2011 Alcon Award**

9. *Quilter with Low Vision*

10. *Magnifier with Light for Detail Work*

Meet the Board

Ben F. Orman, MD

RRF Board Service:

2010 to present

Education:

BA Rice 1958

MD Duke 1962

Career:

Practiced Internal Medicine & Pulmonary Disease in Houston since returning from Army in 1966; Partner, Medical Clinic of Houston until retirement in 2000.

Medical Director, Methodist Wellness Services

Aramco Services Company Clinic - 2001 to present.

Memberships:

Houston Racquet Club

American College of Physicians

Texas Club of Internists

Affiliations:

Memorial Drive Presbyterian Church

Faith in Practice (www.faithinpractice.org)

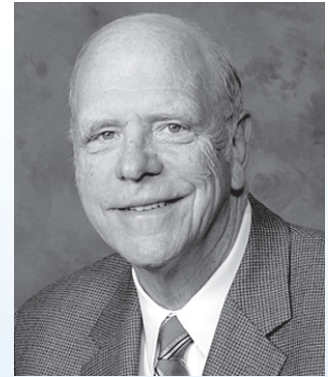
- a medical mission organization to Guatemala
- photos shown here and on website are from most recent trip in April 2011, team #284

Personal:

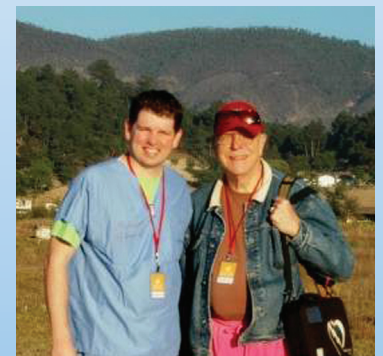
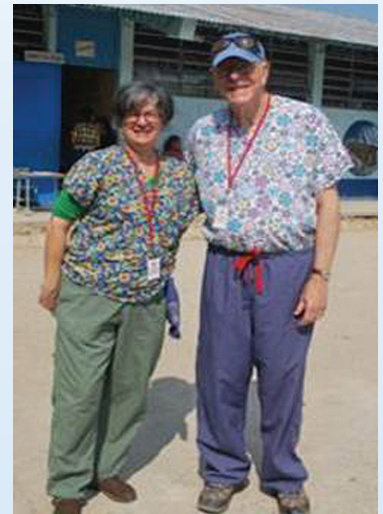
Married to Janet Ford Orman

Three sons and two grandchildren

- Brian, youngest son, graduated this year from Texas Tech University School of Business
- Mark lives in Baltimore
- Neil lives in NYC



11.



11. Ben F. Orman, MD

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Editor in Chief: Alice McPherson, M.D.
Managing Editor: Margaret Faresé

1977 Butler Boulevard, Houston, Texas 77030 (713) 797-1925
e-mail: RRF@retinaresearchnd.org



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