Getting Closer to Restoring Sight

Donor Dollars at Work

A team of National Glaucoma Research-funded scientists has successfully demonstrated an ability to begin “rewiring” the eye and brain by transplanting cells into living eyes. In this study, researchers have succeeded where prior studies have failed. They’ve shown amazing progress in coaxing transplanted neurons to coordinate signals in the retina and extend connection into the brain.

This groundbreaking study is gaining attention in the vision world as a new concept for restoring sight to damaged eyes, including those affected by glaucoma.

The study, “Transplanted Neurons Integrate into Adult Retinas and Respond to Light,” co-authored by Praseeda Venugopalan, PhD; Kenneth Muller, PhD; and Jeffrey Goldberg, MD, PhD, was recently published in Nature Communications and acknowledges the support of National Glaucoma Research (NGR) donors.

In the study, mature retinal ganglion cells (RGCs), a type of neuron located near the inner surface of the eye’s retina, were tagged with a tracer and injected into healthy animal eyes.

The transplanted RGCs were able to extend through the optic nerve and target the appropriate areas of the brain in about one of six animals.

Electrical signals from these cells were found to respond to light. The transplanted RGC cells also appeared to communicate with nearby neurons. These research findings offer a promising direction for retinal cell transplantation in diseases involving RGC degeneration.

More studies are needed to improve the viability of the transplanted RGCs and increase the number of successful outcomes, as well as to see if RGCs make similar connections when transplanted into eyes with glaucoma or other diseases.
New Research Grants Approved for 2016

After thorough peer review by our Scientific Review Committee, new glaucoma research grants for 2016 were recently approved by our Board of Directors. The names of this year’s grant recipients will be announced and shared with you later this summer, after completing final agreements with researchers and supporting institutions.

Research is our only hope for defeating this sight-stealing disease. An estimated 3 million Americans are currently living with glaucoma and that figure is expected to double by 2050, which means we must act with greater urgency than ever.

Funding promising new scientific research projects is the only way for groundbreaking studies like the one featured in our cover article, “Getting Closer to Restoring Sight,” to move us closer to not just stopping glaucoma, but reversing the lost vision.

National Glaucoma Research currently manages a portfolio of 35 glaucoma research projects around the globe with no government funding. The generosity of our donors alone makes it possible to support some of the most promising, innovative research in the world. Thank you for standing with us in the fight to cure glaucoma.

Stacy Pagos Haller
President

Researchers turn Patients’ Own Cells into Retinal Ganglion Cells

Research led by Jason Meyer, PhD, a National Glaucoma Research grantee, has successfully demonstrated the ability to turn skin cells into retinal ganglion cells (RGCs), the neurons that conduct visual information from the eye to the brain. In patients with glaucoma, RGCs are damaged or severed, leading to blindness.

In the study, which was published in the journal Stem Cells, Meyer and his team genetically reprogrammed skin cells biopsied from volunteers with and without glaucoma to become pluripotent stem cells, meaning they are able to differentiate into any cell type in the body. The researchers then directed the stem cells to become RGCs.

While the implications for replacing lost cells are evident, Meyer points to another advantage in testing new drugs. “Now we want to see if compounds we add to these RGCs can slow down the degeneration process or prevent these cells from dying off. In the future, we may be able to use healthy patient cells as substitute cells as we learn how to replace cells lost to glaucoma,” he says.

The ultimate goal of this research is the development of therapies to prevent or cure glaucoma. However, this work also has potential implications for treatment of optic nerve injuries like those incurred by soldiers in combat or athletes in contact sports.
SPOTLIGHT ON ... Vicki Chrysostomou, PhD

It’s no wonder that Vicki Chrysostomou—a competitive runner, rock-climber, and triathlete—pursues research involving the impact of exercise on the aged retina and optic nerve, and its response to injury.

“My current research brings together two of my great passions in life: investigating preventative measures for eye disease and exercise,” Chrysostomou shares.

“Combining these two loves in life is exciting and wonderfully satisfying. I’m so grateful for the support of donors who enable me to undertake this research and pursue my passions.”

Exercise is a positive lifestyle choice that reduces the risk for a wide range of diseases and conditions. Yet, the role of exercise in eye health and eye disease is largely unknown.

In a recently launched National Glaucoma Research-funded study, Chrysostomou is investigating how exercise may benefit the optic nerve, the bundle of nerve fibers that carries information from the eye to the brain, which is primarily affected in glaucoma.

The information gained from this work will contribute to the development of new approaches that incorporate physical activity for preventing or delaying optic nerve damage and subsequent vision loss in glaucoma.

Medical vs. Surgical Treatment for Glaucoma

Should newly diagnosed advanced glaucoma be treated first with a trial of medications, or directly with surgery?

During a debate at the most recent American Academy of Ophthalmology annual meeting, Yvonne Ou, MD, assistant professor of ophthalmology at the University of California, San Francisco, a new grantee and recipient of the Dr. Douglas H. Johnson Award for Glaucoma Research, and a BrightFocus expert on glaucoma, argued for first giving medications a try. Complications from surgery, while rare, tend to be more serious than those from medication, and therefore present a greater risk of harm to the average patient.

In the test case involving an elderly patient whose glaucoma was diagnosed at an advanced stage and severe, Dr. Ou advocated for the standard approach of an initial trial to see if the patient could use eye drops comfortably and whether the drops would lower intraocular pressure sufficiently. However, if the patient’s eye pressure did not respond, she advocated moving on to surgery quickly.

Dr. Ou’s debate opponent, Dr. Brian Francis, an associate professor of ophthalmology at the Doheny Eye Institute, Keck School of Medicine, University of Southern California, argued that there was no time to waste in bringing the patient’s severely elevated intraocular pressure under control. Given the patient’s advanced age, the training and skill required to use drops correctly could present an obstacle. Thus, Dr. Francis felt that surgery might be warranted as an initial treatment approach.

Both approaches can be reasonable first steps, depending on each patient’s specific situation. Glaucoma patients should consult their physician. For more information about types of glaucoma, treatment options, and more, you can download our brochure, Glaucoma: Treatment Options, at www.brightfocus.org/glaucomatreatments.
Planning Your Legacy in the Fight Against Glaucoma

You play an important role in the fight to end glaucoma. Create a lasting legacy now with a Charitable Gift Annuity to support National Glaucoma Research. This enables you to receive a stream of income for life and have a charitable income tax deduction, as well as the potential to reduce your estate taxes while fighting glaucoma.

A bequest may be made through a will, trust, or as a beneficiary designation on a savings account, IRA, 403(b) account, and/or a life insurance policy.

For more information, visit www.brightfocus.org/plannedgiving or call 1-855-345-6647.

Santa Fe Chicken Salad Scoops

Yield: 4 servings

Ingredients
- 2 cups diced cooked chicken breast
- 1/3 cup small diced avocado
- 1/3 cup frozen yellow corn kernels, cooked
- 1/3 cup chopped tomato
- 1/4 cup chopped sweet onion
- 1/2 cup drained and rinsed canned black beans
- 2 Tbsp. snipped parsley
- 2 tsp. lime juice
- 1 tsp. chopped chipotle pepper in adobo sauce
- 4 romaine lettuce leaves

Directions
1. Combine all ingredients except lettuce; mix well.
2. Fill lettuce leaves, dividing equally, and serve.
Tip: Prepare filling ahead of time and then spoon into lettuce leaves just before serving.

Thank you for supporting National Glaucoma Research!

Please share this newsletter with someone you know who might be interested in learning about some of the latest advancements in research to diagnose, prevent, treat, and cure glaucoma. This newsletter is published by National Glaucoma Research, a program of BrightFocus Foundation, a nonprofit organization located at 22512 Gateway Center Drive, Clarksburg, Maryland 20871, 301-948-3244, www.brightfocus.org.

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