Generating Retinal Ganglion Cells in a Dish

New Research into the Causes of Glaucoma, Drug Screenings, and Therapeutic Strategies

In a new National Glaucoma Research-funded study, lead scientist Xiuqian Mu, MD, PhD, is setting out to improve existing procedures and establish new ones to generate retinal ganglion cells (RGCs, the cells affected by glaucoma) in a petri dish. If successful, the RGCs generated can be used to model the disease for further study, to screen for drugs that may prevent cell death, and to develop new treatments by cell replacement.

Dr. Mu's major research interests are the molecular and genetic mechanisms underlying the generation of the diverse cell types in the retina. He says, "Defects or damages to the retina can lead to devastating vision loss and even blindness. Therefore, bridging the basic research of retinal development with relevant retinal diseases became a logical and necessary transition in my research."

Major contributions to our understanding of the gene regulatory network controlling the formation of RGCs comes from Dr. Mu's work. His research focuses are on both RGC fate determination and differentiation of retinal neurons for therapeutic purposes.

In their current study, Dr. Mu's research team is relying on their recent finding that just two transcription factors (proteins that turn genes on and off) are sufficient for the generation of RGCs during development. This information will be utilized to develop procedures in which these two factors can be used to generate RGCs from stem cells.

The outcome is expected to be beneficial in furthering our understanding of glaucoma and developing new strategies to prevent, treat, and possibly cure this sight-stealing disease.
President’s Corner

Summer is upon us and the days are getting longer. For some, the season means lounging in the summer sun. (Don’t forget your sunglasses!) But glaucoma doesn’t take a vacation.

The hard work of unraveling the mysteries of this sight-stealing disease continues for glaucoma researchers. Throughout the year, National Glaucoma Research is on the lookout for innovative research to fund and there are many scientists in search of support.

Funding promising new scientific research is the only way to move us closer to stopping and reversing vision lost to glaucoma. We don’t want to turn away even one promising research study, because all it takes is one study to find a breakthrough treatment—or the cure—for glaucoma.

Thanks to generous donors like you, we’re able to continue our vital work and stay strong in the fight to end glaucoma. I can’t thank you enough for your partnership.

Stacy Pagos Haller
President

SPOTLIGHT ON ...
Meredith Gregory-Ksander, PhD

Dr. Meredith Gregory-Ksander is an expert in cell biology and immunology and has had a longstanding interest in how age-related changes in immune privilege and subsequent inflammation contribute to the development of glaucoma.

In her National Glaucoma Research-funded study, Dr. Gregory-Ksander and her team will identify an important new regulator of inflammation in the optic nerve head and test whether inhibiting this regulator will stop glaucoma development and vision loss.

“I have met people who suffer from glaucoma and listened to their stories of how this disease has affected them and their families, [and] that really reinforces the importance of our research,” says Dr. Gregory-Ksander. “More recently my own father was diagnosed with glaucoma, which brought the reality of this disease and how many people it affects even closer to home.”

Dr. Gregory-Ksander is an associate scientist at Schepens Eye Research Institute, and assistant professor in the Department of Ophthalmology, Harvard Medical School.

National Glaucoma Research is pleased to be able to fund this and other innovative researchers through the extraordinary support of our generous donors.
Glaucoma: On the Front Lines of Discovery

Q&A with Jeffrey Goldberg, MD, PhD, Professor and Chair of Ophthalmology at the Byers Eye Institute at Stanford University

Q. Why did you choose to research glaucoma?
A. Glaucoma is a major neurodegenerative disease and a cause of irreversible blindness. I wanted the chance to bring ophthalmology and neuroscience together.

Q. What are some of the most exciting glaucoma research projects happening right now?
A. Basic research is most exciting—discovering molecular pathways; human research testing new candidate therapies and biomarkers. Advances in stem cell biology and transplant could restore vision. Of course, it’s important to check safety and move to human testing carefully. There are many promising glaucoma trials.

Q. What is the most pressing challenge today in glaucoma research?
A. We need therapies that target the retina and optic nerve, not just eye pressure (a major factor in glaucoma). We need to bridge candidate therapies from the lab to the clinic.

Q. What’s the biggest myth about glaucoma?
A. The biggest myth is, “If I don’t notice a problem in my vision, I don’t have to take my drops or make my doctor’s appointments.” I stress with my patients that, other than the promise of new therapies being tested, the vision lost to glaucoma is gone forever. You must stay ahead of your disease!

Q. What can someone do to prevent glaucoma?
A. It’s important to get checked in order to catch glaucoma early. Eat healthy and exercise regularly. What is generally good for your body is good for your eyes!

Q. What questions should I ask my eye doctor about glaucoma?
A. Make sure you’re on the right treatment(s), getting tested regularly, and tolerating your drops. Ask if there are any new trials you’d be appropriate to participate in.

Q. What tests should I get at the doctor’s office for glaucoma?
A. Not just testing your eye pressure, but also regular examinations of the optic nerve, visual field testing, and structural measures using optical coherence tomography (“OCT”).

Ask the Expert: Are some people at greater risk of developing glaucoma?

Glaucoma is a leading cause of blindness among African Americans and Hispanics in the United States. Open-angle glaucoma is three to four times more common in African Americans than in non-Hispanic white people. Between the ages of 45-64, glaucoma is fifteen times more likely to cause blindness in African Americans than in Caucasians.

People older than 60 are at a greater risk of developing glaucoma than people who are younger. However, the prevalence of glaucoma rises rapidly in Hispanics over age 65.
Help Shape Our Future and Receive Payments for Life

Have you ever wondered how to turn your personal experience with National Glaucoma Research, a program of BrightFocus Foundation, into a legacy that will impact future generations?

By including National Glaucoma Research in your long-term estate or financial plans, you can make a powerful testament of your priorities. And because there are several ways to accomplish this, you have the flexibility to fulfill your goals in a way that works best for you. One option, called a charitable gift annuity, allows you to help shape our future while you receive fixed, dependable payments for life.

For more information about this type of giving, or if you have any questions, please visit www.brightfocus.org/plannedgiving or call Lauren Fields at 1-855-345-6647.

Deliciously Easy Vegetable Soup

This easy recipe celebrates the season with nutrient-dense vegetables, which may help reduce the risk of many chronic diseases.

Ingredients

1 Tbsp extra-virgin olive oil
¼ red cabbage (about 2 cups, finely shredded)
2 ripe tomatoes (medium, seeded and chopped)
½ cup canned artichoke hearts (drained and chopped)
1 cup green peas (frozen or fresh)
2½ cups low-sodium vegetable or tomato juice
1 cup water
2 tsp dried basil
Salt and freshly ground black pepper, to taste

Directions

1. In large soup pot, heat oil over medium heat. Sauté cabbage, tomatoes, artichoke hearts, and peas for 10 minutes.
2. Add juice and water. Bring to boil. Reduce heat, add basil and simmer for 10 minutes, or until all vegetables are tender and soup is piping hot.
3. Serve in individual serving bowls. Season to taste with salt and pepper.

Makes 4 servings. Source: www.aplaceformom.com

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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