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October 8 is World Sight Day

Make a plan to get your eyes checked!

Unraveling the Mystery of Normal Tension Glaucoma

Could an Existing Drug Help Glaucoma?

BrightFocus grantee Beatrice Yue, PhD, and her colleagues recently published the results of their research into optineurin, a protein and gene whose mutations are linked to normal tension glaucoma (NTG), a puzzling, infrequent form of primary open angle glaucoma (POAG). Their results from animal studies also point to an already-approved drug, rapamycin, as a possible way to inhibit or reverse optineurin’s effects.

The researchers identified several ways in which optineurin can modify its molecular structure, changing its function in ways that contribute to diseases of sight and mind. In NTG, the eye’s inability to clear optineurin seems to accelerate cell death.

Certain mutations to the gene have the effect of increasing optineurin protein levels in cells, which in turn triggers changes in how optineurin is processed, leading to the death of image-preserving retinal ganglion cells (RGC). Animal studies gave credence to the mutation’s role in causing or contributing to NTG.

The team reports success from intervening in this process with rapamycin, an existing FDA-approved cancer drug. Rapamycin is known to influence autophagy, one of the ways cells have of recycling or eliminating unwanted substances and a key process that becomes interrupted in cancer and neurodegenerative diseases.

In their experiments, Yue and her team found rapamycin to be effective in reducing over-expressed optineurin, thereby rescuing RGCs from cell death. This early evidence that rapamycin or a compound like it might...(cont’d on pg 2)
interfere with downstream effects of optineurin mutations represents a significant step toward a potential NTG treatment approach. Though exciting, the finding must be confirmed in further research.

This research provides early evidence in animal models that an existing FDA-approved drug might intervene in this disease process. This brings us closer to both understanding and curing NTG, and these insights could also further our understanding of other forms of glaucoma.

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Announcing 15 New Research Grants

Scientific Advances Under Way

Recently, we’ve awarded 15 new research grants that will allow scientists around the world to delve deeper into the mysteries of glaucoma.

Researchers will forge ahead into various studies, including:

• Investigating a class of drugs shown to reduce neurological damage and other treatments targeting inflammatory proteins.

• Developing novel biomarkers to detect glaucoma.

• Measuring the effects of exercise on the progression, prevention, or delay in damage to the optic nerve.

• Examining an inherited anomaly that affects eye development.

• Understanding why persons with African ethnicity may have up to five times the risk of developing primary open angle glaucoma.

We’re excited about this research into causes, early diagnosis, and better treatments for glaucoma.

President’s Corner

BrightFocus is known for putting top-notch professionals to task, and as you’ll read in this issue of National Glaucoma Research Report, we’re continuing to build on that reputation. Our funding of innovative scientific research – 15 new grants! – shows that our commitment is stronger than ever.

The search for new therapies and the need for public education and awareness is ongoing. After all, more than three million Americans are living with glaucoma, but only half of them even know that they have it, due in large part to lack of early symptoms of the most common form of the disease, open-angle glaucoma.

Let’s continue partnering together to put an end to this sight-stealing disease. With your support, vital research, clinical studies, technology advances, and public education are possible. It’s my hope that one day you may be reading about a cure in these pages.

Stacy Pagos Haller
President
Is Glaucoma a Brain Disease?

BrightFocus Foundation has a 40-year history of exploring unexpected connections between diseases of sight and mind. Because glaucoma is a disease of the optic nerve, the long “cable” that connects the cells that transmit all of the visual information from the retina to visual targets in the brain, it can be thought of as a neurodegenerative disease of the eye. There are some influences of the brain on glaucoma and vice versa.

Brain Pressure and Glaucoma

BrightFocus grantees Dr. Brian Samuels, Dr. Michael Fautsch, and Dr. Peter P. DeDeyn are studying whether the difference between pressures in the brain and eye may cause damage to the optic nerve when pressures inside the brain are lower than normal and the pressures in the eye are normal.

These studies will help shed light on the impact of brain pressure on the development and progression of glaucoma. Perhaps in the future there will be treatments to influence brain pressure and thus glaucoma.

Retina Cells and the Brain

Dr. David Calkins and Dr. Kevin Chan are working to uncover ways in which the degeneration of the retinal cells in glaucoma affects the visual pathways of the brain.

A complete understanding of how the visual pathways are affected early in glaucoma neurodegeneration will help investigators identify new targets for treatment and better ways to detect glaucoma progression.

So, Is Glaucoma a Brain Disease?

Certainly, glaucoma is a disease of the optic nerve, which can be considered an extension of the brain. And the optic nerve and brain influence each other in the neurodegenerative processes that results in glaucoma. By studying changes in the optic nerve and the brain, researchers will be advancing our understanding of glaucoma and developing new ways to diagnose, assess, and treat this potentially blinding disease.

BREAKING NEWS: Metformin May Reduce Risk of Open-Angle Glaucoma

BrightFocus grantee Julia E. Richards, PhD, coauthored a study recently published online by *JAMA Ophthalmology* which suggests that in a large population study, taking metformin hydrochloride reduced the risk of developing the sight-threatening disease open-angle glaucoma in people with diabetes.

Medications that mimic caloric restriction such as metformin can reduce the risk of some late age-onset disease. It is unknown whether these caloric mimetic drugs affect the risk of age-associated eye diseases.

While the study is being replicated, it points out the importance of understanding the potential impact of caloric restriction mimetic drugs on the risk of developing other medical conditions that affect older persons.
Help Fight Glaucoma with Planned Giving

Through planned giving, you can create a legacy that supports your charitable values long after your death. Continue fighting glaucoma by leaving money or assets to National Glaucoma Research, a program of BrightFocus Foundation, at the time of your death through your financial or estate plan. It may also enable you to receive a stream of income for life, provide a charitable income tax deduction, and reduce or eliminate estate taxes.

The bequest you make will serve as a significant tribute to your legacy. For more information or if you have any questions, visit www.brightfocus.org/plannedgiving or call 1-855-345-6647.

Refreshing Kale Salad

Yield: 2 side salads or 1 generous main dish

Ingredients

2-3 stalks kale  
¼ cup dried cranberries  
2 Tbsp. sliced almonds  
¼ cup matchstick-sized slices of peeled jicama (optional)  
1 Tbsp. olive oil  
2 Tbsp. orange juice  
1 Tbsp. orange marmalade

Directions

1. Wash kale and pat dry. Remove and discard tough portions of stalk and tear leaves into bite-sized pieces.
2. Toss kale in large bowl with cranberries, almonds, and jicama.
3. In small lidded jar, combine olive oil, orange juice, and marmalade. Shake well and pour over kale mixture.
4. Toss gently and serve.