



**Macular  
Degeneration  
Research**

# News

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## HOW EXOSOMES COULD LEAD TO EARLY DETECTION BEFORE SYMPTOMS APPEAR

Miguel Flores-Bellver, PhD, an assistant professor of ophthalmology at the University of Colorado School of Medicine and principal investigator at the *CellSight* Ocular Stem Cell and Regeneration Research Program, is breaking new ground in the study of macular degeneration. His work, funded by Macular Degeneration Research, focuses on understanding how drusen—tiny protein deposits under the retina—form and contribute to the progression of the disease.



Miguel Flores-Bellver, PhD

The presence of drusen signals the onset of dry macular degeneration, a form of the disease with no known cure that makes early intervention crucial. Dr. Flores-Bellver studies exosomes, fluid-filled sacs in the eye that carry proteins and other cellular products. His team seeks to identify specific molecules in exosomes that could serve as biomarkers for macular degeneration, thereby enabling earlier diagnoses and improved treatments.

The research uses advanced technology and tissue samples from donor eyes to track exosome release from retinal pigment epithelium (RPE) cells and then analyzes their role in drusen formation. Dr. Flores-Bellver's findings could pave the way for diagnostic tools using exosomes from blood or tears to detect the disease before symptoms appear.

Knowing how drusen forms could shed some light on how macular degeneration develops, paving the way for treatments and a cure. For Dr. Flores-Bellver, whose father was diagnosed with dry macular degeneration, the work is personal. "I'm motivated to address the unknowns of macular degeneration and preserve vision for those at risk," he says.

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A variety of resources are available for people living with macular degeneration. To receive a copy of our Resource List, which has information about government programs, transportation assistance, and other special services, please call Macular Degeneration Research at 855-345-6637 or visit our website at [brightfocus.org/MDRresources](https://brightfocus.org/MDRresources).

**Macular Degeneration Research is a BrightFocus Foundation Program**

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## SCIENCE CORNER

I am fortunate to speak with scientists around the world who are leading some of the most innovative studies in the fight against macular degeneration.

Their teams are using our grant funding to search for new treatments to help prevent and slow disease progression, as well as groundbreaking discoveries that might lead to a cure.

For example, in this issue you'll read about Albert Gonzales, PhD. His research on choroidal blood flow is crucial to understanding central vision loss.

All of us know people with this disease. It is a leading cause of blindness that impacts 20 million people over age 40 in the U.S. alone. An estimated 200 million people worldwide have macular degeneration, with numbers expected to reach 288 million by 2040.

Time is of the essence if we're going to stop it. Thank you for helping us advance science with your generosity.

Diane Bovenkamp, PhD  
VP, Scientific Affairs

## COULD A NEW NIGHT VISION TEST SAVE SIGHT?

The groundbreaking research of Maximilian Pfau, MD, of the Institute of Molecular and Clinical Ophthalmology Basel in Switzerland, is set to transform the early detection of macular degeneration. Funded in part by Macular Degeneration Research, his project focuses on developing innovative vision tests that assess how well the eye adapts to darkness, a key issue in the early stages of the disease. By identifying subtle night vision changes, these tests aim to detect macular degeneration earlier than current diagnostic methods allow.



Dr. Maximilian Pfau, MD

This approach involves studying both healthy volunteers and individuals with macular degeneration to refine testing techniques. The goal is to create reliable, clinic-ready tools that can detect macular degeneration before significant vision loss occurs, something that current testing methods lack. Early detection could lead to timely interventions, such as nutritional or low-risk treatments, to slow disease progression and preserve vision.



With these advancements, Dr. Pfau and his team hope to set the stage for large clinical trials that evaluate new treatments capable of halting or delaying macular degeneration. This would mark a significant step forward in managing the disease and improving the quality of life for those at risk.

“The funding from Macular Degeneration Research is and will be critical,” Dr. Pfau says. “It will enable us to conduct the necessary studies with healthy volunteers and participants with macular degeneration, refine our testing methods, and ultimately bring these new tools to the clinic.”

Without your support, advancing this and other innovative research wouldn't be possible.



# INFLAMMATION AND GENDER UNLOCK KEY INSIGHTS INTO MACULAR DEGENERATION

With the support of Macular Degeneration Research, Willard Freeman, PhD, and Ana Chucair-Elliott, PhD, of the Oklahoma Medical Research Foundation, are exploring how age and biological sex influence inflammation in the retinal pigment epithelium (RPE), a key layer in the retina affected by macular degeneration. Their research found 437 genes that became more active in aged mouse models, with many linked to inflammation. Interestingly, some genes showed age-related changes only in males, underscoring the importance of sex-specific research.

These findings indicate that inflammation could be an early contributor to macular degeneration leading to damage and functional

loss in the RPE. This insight may pave the way for future treatments that would suppress inflammation to protect the retina.

The scientists hope their work will guide new macular degeneration therapies, promote healthy aging, and preserve vision for millions affected by the disease. Their extensive dataset is available for other scientists to access, potentially sparking further breakthroughs in macular degeneration research.

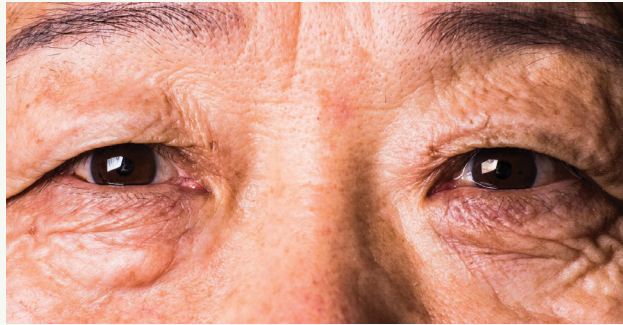
Because of your partnership, critical research like this is uncovering the breakthroughs that bring us closer to a cure.



## EYE-OPENING FACTS AND STATS

Macular degeneration is widespread, affecting more than 20 million people over the age of 40 in the U.S. alone, with cases expected to double in the coming years.

Around 200 million people worldwide are thought to be living with macular degeneration, a number projected to reach 288 million by 2040. Age is a major risk factor, with the likelihood of advanced macular degeneration rising from 2 percent for those ages 50 to 59 to nearly 30 percent for those older than 75.



Macular degeneration is expensive, costing the global economy an estimated \$343 billion, including \$255 billion in direct health care costs. The U.S. alone contributes around \$98 billion of this expense.

There are two forms of the disease: dry and wet. While the dry form accounts for 90 percent of cases, the wet form accounts for approximately 10 percent of cases but results in 90 percent of legal blindness and always follows the dry form.

Early detection is key, and regular eye exams can diagnose macular degeneration. In some cases, geographic atrophy, a severe dry form, can lead to permanent vision loss. Promising treatments are emerging, including a high-dose antioxidant vitamin formula to slow progression, and several FDA-approved drugs are available for treatment of the wet form, such as Beovu® and Eylea™.

To maintain one's vision and reduce the risk of developing macular degeneration, healthy lifestyle habits are essential. You can start by not smoking, eating a balanced diet rich in leafy greens and fish, exercising regularly, and managing your blood pressure. You should also protect your eyes from UV rays and maintain a healthy weight. By adopting these habits and staying informed about advancements, you can help preserve your vision.

Your continued support powers groundbreaking research that brings us closer to new treatments and prevention strategies.

**Please share this newsletter with others who may be interested!**

## Register for Macular Chats

Recently diagnosed with macular degeneration? Know someone who has it? Receive helpful information from our FREE monthly phone call with doctors, researchers, and experts in the field on timely topics. You can submit questions before or during the event. Transcripts and audio recordings are available afterward on our website.

To register, call 855-345-6237 or go to [brightfocus.org/MDRchats](https://brightfocus.org/MDRchats).



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Macular Degeneration Research is a program of BrightFocus Foundation, a charitable organization that complies with all 20 rigorous BBB Wise Giving Alliance Standards.





Albert Gonzales, PhD

## RESEARCHER SPOTLIGHT: ALBERT GONZALES, PHD

Albert Gonzales, PhD, a recipient of a Macular Degeneration Research grant, is delving into the crucial role of choroidal blood flow in maintaining eye health. His work is essential for understanding central vision loss, which is often due to cell death in the macula, and the buildup of protein deposits known as drusen.

Dr. Gonzales's research challenges prior assumptions that blood flow in the choroid capillaries is passive. Instead, he proposes that these tiny vessels actively adjust blood flow to meet the energy needs of the retina, functioning like a skilled gardener who tends to different plants according to their water requirements.

Gonzales and his team are examining how choroidal blood flow reacts to various wavelengths of light. Their findings suggest that certain light exposures can decrease blood flow and encourage the clearing of

cellular waste. Since disrupted waste clearance and blood flow are processes associated with macular degeneration, this research provides valuable insight into how these mechanisms might contribute to the condition.

The findings of this study have far-reaching implications for not only eye health, but also neurodegenerative diseases like Alzheimer's. These conditions share common issues related to cellular waste accumulation.

"Research is moving faster than ever, so I'm hopeful for the future," Dr. Gonzales says. "With more people, effort, and scientific capabilities, we can push for discoveries faster, with hopes that the best ideas rise to the top."





## WANT TO BE REMEMBERED FOR YOUR GENEROSITY?

Making a bequest is a powerful way to leave a legacy while also providing for the future of your loved ones. A bequest is a gift made through your will or trust that can offer several benefits, both personal and financial.

One of the key advantages of making a bequest is the ability to lessen the tax burden on your family by helping to reduce estate taxes. In addition, you may receive estate tax savings, depending on the size of your estate and the types of assets involved. Most importantly, a bequest allows you to be remembered for your generosity, making a meaningful contribution to a cause you care about, such as Macular Degeneration Research.

There are several ways to make a bequest, and it's a simple process. You can specify a gift of a certain dollar amount, a percentage of your estate, or even a gift from the remaining balance or residue of your estate. Additionally, you can name a beneficiary for specific assets like life insurance or retirement funds.

Getting started is easy and we are here to help. Contact us at 301-556-9397 or [plannedgiving@brightfocus.org](mailto:plannedgiving@brightfocus.org) to learn more about including appropriate bequest language in your estate plan today.



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