



**Macular
Degeneration
Research**

News

FALL 2023

IS TREATING INFLAMMATION THE ANSWER?

New research suggests that a drug previously approved to treat inflammation in psoriasis and multiple sclerosis could delay age-related macular degeneration progression. Led by Daisy Yao Shu, PhD, at Harvard Medical School, this Macular Degeneration Research-funded study investigated inflammation of the retinal pigment epithelium, a layer of cells next to the retina that's believed to be where age-related macular degeneration begins.

The team focused on the role of tumor necrosis factor-alpha, which is a protein that triggers the body's inflammatory response. This response deregulated the way cells work within the retinal pigment epithelium. By pre-treating the retinal pigment epithelium cells with the anti-inflammatory drug, dimethyl fumarate, it was found to block the effects of the inflammation.

“Our results indicate that dimethyl fumarate serves as a novel therapeutic avenue for combating inflammatory

activation and metabolic dysfunction of retinal pigment epithelium in age-related macular degeneration,” Dr. Shu stated in a summary of the research, which concluded that this would be a promising therapeutic option for combating age-related macular degeneration.

Dr. Shu's work is especially promising because the drug's safety, effectiveness, and how it works in the body have already been established, enabling a new treatment to be developed in a more efficient and cost-effective way.

This kind of scientific advancement is possible thanks to caring people like you. Thank you.



Dr. Shu's research focuses on how inflammation affects the retinal pigment epithelium, believed to be where age-related macular degeneration begins.

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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.

Macular Degeneration Research is a BrightFocus Foundation Program

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PRESIDENT'S CORNER

Thanks to caring people like you, the frontier of science continues to expand. Cutting-edge research is being conducted by scientists who are at the top of their field, and it is only a matter of time before the next Macular Degeneration Research-funded research makes the next big discovery.

In this issue, you'll read about Dr. Yifan Jian, who is working to create a new device that will allow him to study a normally invisible layer of the retina. You'll also learn about two new treatments for geographic atrophy and what hereditary factors are present for people with macular degeneration.

These scientific studies and advancements are made possible by your support of Macular Degeneration Research. Thank you!

Stacy Pagos Haller
President

OBESITY AND MACULAR DEGENERATION: WHAT'S THE LINK?

Obesity is associated with myriad health risks ranging from heart disease and type 2 diabetes to sleep apnea and stroke. Now, a new study has linked it to age-related macular degeneration.

Stress on the body from obesity can make people more likely to develop age-related macular degeneration, even if they have returned to a normal weight.

Thanks to your generous funding, this study, published in the prestigious journal *Science* and led by Macular Degeneration Research grantee Dr. Przemyslaw Sapielha from the Maisonneuve-Rosemont Hospital Research Center, describes how stressors on the body can reprogram the cells of the immune system.

Immune system cells become activated when they fight pathogens such as bacteria and viruses. But they also become activated when the body is exposed to stressors, such as excess fat in obesity. These inflammatory cells can travel to other parts of the body, including the eye, where they spark changes that promote age-related macular degeneration.

Understanding how age-related macular degeneration develops in the body is the key to finding novel treatments and ultimately, a cure to this disease. Your gifts help our researchers find these connections. Thank you.



Macular Degeneration Research grantee connects obesity to the development of age-related macular degeneration.

NEW FDA-APPROVED TREATMENTS FOR GEOGRAPHIC ATROPHY



Two new treatments for geographic atrophy were approved by the FDA in 2023.

At least 1 million people in the U.S. live with geographic atrophy, an advanced form of dry macular degeneration that causes blind spots and blurred vision, making daily activities a challenge.

Geographic atrophy develops rapidly. Two-thirds of people who are diagnosed with it can no longer drive within 36 months, and half lose the ability to read two lines on an eye chart within two years.

In early 2023, the first-ever FDA-approved treatments became available. Syfovre was the first, and another, IZERVAY, has been proven to

slow geographic atrophy by targeting the source of photoreceptor cell death.

In clinical trials, people receiving IZERVAY experienced a slower progression of geographic atrophy compared to those in the control group. Side effects were shown to be minimal throughout the trials.

With geographic atrophy, every moment matters. Thank you for your generous support of fundamental research that contributed to scientists' understanding of complements and their role in macular degeneration—laying the groundwork for the development of both of these drugs.

IS MACULAR DEGENERATION HEREDITARY?

Macular degeneration is caused by several genetic and environmental factors. People with an affected parent have approximately twice the risk of getting the disease than someone whose parents do not have macular degeneration.

Recent advances in gene sequencing and mutation-detecting technology have identified sequence changes in at least 19 genes that can increase someone's risk for macular degeneration, and they can be passed down from family members. Two of these genes increase the risk of macular degeneration more than the others. They are called complement and ARMS2/HTRA.

Complement is part of the immune system that attacks invading bacteria and initiates a cascade of events that pokes holes in bacterial membranes and recruits white blood cells to kill them. It can sometimes inappropriately target our cells, including those in the retina, leading to macular degeneration. While ARMS2/HTRA is the subject of intensive research, the role of these genes in macular degeneration is not understood or as advanced as complement.



Genetic testing is now available to assess some of the macular degeneration risk genes. However, there are no studies firmly demonstrating that genetic testing should influence macular degeneration treatment selection.

As DNA sequencing becomes cheaper and faster, and as information about the meaning of DNA sequence changes is advanced, genetic testing will likely be more practical and helpful in guiding treatments for macular degeneration and a growing list of other diseases.

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To register, call 800-437-2423 or go to brightfocus.org/eyechats.

 **Macular
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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.

RESEARCHER SPOTLIGHT: YIFAN JIAN, PHD



Yifan Jian, PhD

Yifan Jian, PhD, at Oregon Health & Science University, is working to develop a retinal imaging device called volumetric directional Optical Coherence Tomography (VD-OCT), which will help visualize a normally invisible retinal layer and study its role in age-related macular degeneration, thanks to a grant from Macular Degeneration Research.

The VD-OCT will be able to visualize a retinal layer (Henle's fiber layer) that is invisible in the current OCT retinal imaging devices. And this discovery will lead to the precise measurement of the true outer nuclear layer (ONL) thickness, which is an important biomarker for the health of the retina.

Dr. Jian will also leverage the recent development in laser technology to significantly increase imaging speed and artificial intelligence to automate imaging procedures that could significantly improve the use of this technology in the clinic.

The VD-OCT will provide an improved understanding of photoreceptor cell loss around the drusen and in the wider macula, allowing new insights into macular degeneration progression and providing precise imaging biomarkers for clinical trials. OCT biomarkers reflecting photoreceptor degeneration in this study will allow earlier identification and quantification of progression to advanced macular degeneration.

Finally, in the context of current and future gene- and cell-based therapies, precise measurements of the ONL may prove to be an important quantitative imaging biomarker of regeneration.

Thank you for enabling critical, science-advancing research like Dr. Jian's through your support of Macular Degeneration Research.





You can support vision-saving research by including Macular Degeneration Research in your will.

MAKING A WILL PROTECTS YOU AND YOUR LOVED ONES

How a Will Can Keep Giving Long Into the Future

A will or living trust helps you protect your loved ones long after your lifetime, and it can also support the causes you care about. Here are a few basics about making a lasting difference in Macular Degeneration Research's sight-saving work:

How to Make Your Gift

Including Macular Degeneration Research in your will or living trust is easy. Start by contacting us to request the official wording for your gift. Then, ask your estate planning attorney to use this language when you create your will or living trust. If you already have one of these legal documents, simply ask your attorney to update it.

Your Benefits

- It's worry-free. You won't give anything away until after your passing, so you can keep using your possessions and finances like normal.
- You have choices. You can give Macular Degeneration Research a specific item, an amount of money, a gift contingent upon certain events, or a percentage of your estate.

We're Here to Help

We've partnered with FreeWill to make planned giving easier for you. Visit freewill.com/brightfocus to create your estate plan for free. If you have questions, please contact Charlie Thomas, Planned Giving Manager, at [301-556-9362](tel:301-556-9362) or plannedgiving@brightfocus.org.



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