Macular Chats

Innovative Science Driving Macular Degeneration Progress
August 27, 2025
1:00 PM EDT
Transcript of Teleconference with Diane Bovenkamp, PhD

The information provided in this transcription is a public service of BrightFocus Foundation and is not intended to constitute medical advice. Please consult your physician for personalized medical, dietary, and/or exercise advice. Any medications or supplements should be taken only under medical supervision. BrightFocus Foundation does not endorse any medical products or therapies.

Please note: This Chat has been edited for clarity and brevity.

SHARYN ROSSI: Hello, everyone, and welcome. I'm Dr. Sharyn Rossi. I'm the Senior Director of Neuroscience Programs at BrightFocus Foundation, and I'm pleased to be your host for today's Macular Chat titled, "Innovative Science Driving Macular Degeneration Progress." Macular Chats are a monthly program supported in part by sponsorship from Genentech and Regeneron designed to provide people living with macular degeneration and the family and friends who support them with information straight from the experts.

The information provided in this program is for educational purposes only and should not be considered medical advice. Always consult a qualified health care professional regarding any medical concern or conditions.

BrightFocus Foundation's Macular Degeneration Research Program has supported more than $56 million in scientific grants exploring the root causes and potential prevention, treatment, and cure of macular

degeneration and is currently investing in 44 active projects across the globe. Today, I have the pleasure of speaking with our fierce leader, Dr. Diane Bovenkamp, the Vice President of Scientific Affairs at BrightFocus Foundation. And she will highlight each of the 12 newly awarded research grants that we've awarded to exceptional vision scientists around the world. Diane, thanks so much for joining me today.

DIANE BOVENKAMP: Absolutely. Thank you. It's such a pleasure to be here to discuss science with you.

SHARYN ROSSI: Always a pleasure, Diane. And can you please start off by giving the audience a brief overview of our grant application process and how we go through our scientific vetting of the proposals that we receive?

DIANE BOVENKAMP: Absolutely. We have a rigorous scientific process in place to ensure that the most innovative science gets funded in a timely manner to move the field forward. Kudos to the phenomenal scientific experts who make up our Scientific Review Committee, or SRC. And Dr. Rossi helps to lead the Alzheimer's Scientific Review Committee. But today, we'll be talking about the Macular Degeneration Research Scientific Review Committee. But most importantly, everything that BrightFocus does is to move the field forward to benefit you, affected individuals and their families. Most importantly, I'd like to thank you and all of our donors for supporting us in this goal.

So, the process that we do for macular degeneration—well, for all of our programs—we put out one call every year and leave the applications open. It's what we call investigator-initiated. So, we don't put out a specific call for, say, "Hey, we want genetics," or something like that, like specific ideas. We leave it open, so that means that we end up in the end with a diversified portfolio of scientific topics that we call our 360-degree approach. And I'll talk more about that later, about the categories. I'll categorize the 12 grants. Right now, in all three of our programs, we're overseeing more than 185 grants worth over $48 million and taking place in 16 countries. It's so exciting, the science that's taking place, and we leave no stone unturned.

So, for the Macular Degeneration Research Program, we have a two-step

review process. It's a little different from our other programs. We start with an initial two- to three-page letter of intent application. Normally, we have a due date received by the end of July. And after review, we give out an invitation to the top candidates to submit a full proposal due the beginning of December every year. So, after review of the approximately 180-a-year letter of intent applications—and in consultation with the Chair of the Macular Degeneration Research SRC—the Director of Vision Science Programs assigns each proposal three reviewers based on expertise and the research area of the proposal. So, after ranking, the Director works with the Chair and invites full proposals, which is normally about 40 to 50 full applications. And each of those receives a full critique from reviewers. So, all of these proposals are checked against a pool of available reviewers. There's avoidance of conflict of interest and they assess the overall impact score for each of the grant applications. They'll look at significance and relevance and budget and innovation and approach, and mainly how whatever they're proposing, how is it going to move the needle forward for macular degeneration prevention, treatment, or finding a cure. So, then the SRC, at the end of that, recommends applications for funding to the BrightFocus Board of Directors, and that's where we are today. And so, this resulted in the 12 promising projects.

SHARYN ROSSI: Wow, yes. And I can attest. I mean, thanks for sharing all of that information, Diane, but it is quite the rigorous process to ensure we're funding the best proposals. So, once we receive the 200 or so proposals, it takes a lot to sift through and really try to decipher what's the best science, and this is why we have some of the best expert scientists on our committees to help us do that. And we're really excited to talk about these 12 promising projects. These scientists are investigating some of the most innovative and cutting-edge ideas in the field, and we'll discuss how researchers are studying how aging, diet, and inflammation contribute to macular degeneration, and also the new therapies that will be tested for dry AMD. So, let's jump into the science, Diane. Can you tell us more about the 12 new MDR grants that just started on July 1?

DIANE BOVENKAMP: Absolutely. So, to split these 12 grants into four of

our general 360-approach areas—as a note, you will be able to read about these 12 new projects as we add them and they become integrated into our macular degeneration research portfolio yearbooks that get published every fall. So, stay tuned for that. The 2024 booklet is available online right now, and we can always provide a link at the end. So, I'm ready. Are you ready?

SHARYN ROSSI: I am so ready. Let's start.

DIANE BOVENKAMP: Okay. So, the first topic is called "Understanding Early Stage Age-Related Macular Degeneration, or AMD." So, for as long as people have been studying AMD, and this is something for a trivia … I looked this up. The first descriptions of AMD started in the 1840s. That blew my mind when I read that. And since then, we still don't understand all of the basics of how this disease starts and how it develops from an early stage to late, but why exactly does it move on to vision-damaging stages? So, MDR-funded research helps to tackle these unknown origins. The first person I'll talk about is Dr. Joëlle Vergroesen at Erasmus University Medical Center Rotterdam in the Netherlands. So, remember, we fund all over the world, so it's great that there's no border to the next best idea. This one will be taking place in the Netherlands, and they'll be talking about tracking biological responses to lifestyle changes in people with AMD. So, in this proposal, they're aiming to develop a better tool to understand how the disease starts and predict the chances of progression on a personalized basis. I don't know if maybe you've heard in the news, precision medicine or personalized medicine, but they're going to use a combination of just taking photos of the back of the eye and genetic history, taking family history, and then just getting more information about clinical background. And then, if this tool that they're developing does eventually become available in an office, this will help guide you and your health care professional to make more precise decisions on timing of follow-up testing and whether or not a clinical trial is for you or whether you should start treating earlier versus later. So, that's really exciting.

The second project that I'll talk about is Dr. Jerzy Szablowski at William Marsh Rice University in Texas. And the title is, "A Blood Test to Measure Genes Associated with Macular Degeneration." So, it sounds like, "Oh,

well, genetic tests are around," but Dr. Szablowski is using a cutting-edge technology that was created specifically by his group to measure the expression and activity of genes ... right now, it's like a retina in a dish, with a single blood test. Specifically, they're focusing on two genes that are suspected of increasing the risk of developing AMD, particularly how they're affecting the cell layer of these retinal pigment epithelium, or RPE, that are involved in cell cycling and nourishing the cell that go haywire in AMD. They're testing out their theories in a dish, and then eventually they'd like to take this to a clinic. And so, this kind of live, what I'm calling spatial–temporal timing monitoring within the retina will enable doctors to measure expressions of your genes in the retina without doing anything damaging.

SHARYN ROSSI: Wow, that's super cool.

DIANE BOVENKAMP: Yeah. And this project was so well-liked by our Scientific Review Committee that Dr. Szablowski was awarded the 2025 BrightFocus Dr. Joe G. Hollyfield New Investigator Award for Macular Degeneration Research. So, that signifies it was the most competitive project submitted last year in this category of new investigator grants. So, that's really cool.

SHARYN ROSSI: Wow, this is so awesome. I've heard about this, this new, innovative imaging technology, like exactly what this is doing, this live imaging of the retina, which nobody has been able to achieve in the past. So, this is really going to give us so many insights into how the cells are functioning or dysfunctioning in disease, so this is great that we're funding this. This is super innovative and exciting. And as with all degenerative diseases, we know how important early detection is, right, Diane?

DIANE BOVENKAMP: Mm-hmm.

SHARYN ROSSI: So, the sooner we can identify these changes, especially with these innovative, noninvasive methods like the spatiotemporal monitoring of the retina and blood tests, the sooner we could try to intervene, then, with the lifestyle changes that the first grant is talking about. And I think that this can really empower a lot of people to take control of their eye and brain health and feel like they have control over

it, because we do know that lifestyle changes can support brain and eye health. Thoughts on that at all, Diane?

DIANE BOVENKAMP: Yeah, I think it's great that you're pointing to the different projects that I just mentioned, because AMD is a very complex disease, and there are so many things that we want to learn, from basic, like, "How is it even caused?" all the way through to. "What can we do with lifestyle?" And so, each of these grants is almost like breaking down the steps toward the cure and prevention and treatment into little bite-sized steps.

SHARYN ROSSI: Yeah, and then we have the bird's eye view to start linking it all together and drawing the connections and the lines and the researchers together. So, it's such an exciting time for science. And that's a perfect segue, I guess, into the second topic, a little bit away from diagnostics but more into mechanisms. So, do you want to talk about the second topic?

DIANE BOVENKAMP: Absolutely, and it's very important. It's using some words that I'll explain a little bit later. Maybe you've heard of drusen. So, it's called "Drusen Formation and Immune Response," and those are actually linked. And they're major risk factors for developing AMD, but we still don't know what causes them to go out of control and to make a switch to disease. So, drusen are actually ... when you go in, it's kind of what the doctors are looking for when you're going in to do a dilated eye exam. They're looking to see if there's these little spots on the back of your eye, kind of like little plaque on your teeth or whatever. And they're trying to see whether or not there's formation there. Normally, they shouldn't be there. Sometimes, a little bit is okay. But sometimes, there can be too much, and it can cause the layers of the cell to separate and lose communication and get panic, and cells start dying off because they can't communicate with each other. Anyways, and then inflammation and immune response is connected with a lot of diseases. So, anyway, so that's a bit of background.

The grants in this area, I'm really excited that for the first time we're funding someone in Japan. So, Dr. Masayuki Hata from Kyoto University in Japan is looking at how aging of the immune system affects age-related

macular degeneration. Aging is the number one risk factor for AMD. And as immune cells age, the immune cells are what protect your body from invading viruses and bacteria and parasites, etc. So, they're involved in health, but as they age, they can "go bad" and disrupt blood vessel growth during AMD. But little is known about how this impacts disease development. Since most AMD is diagnosed after the age of 60, perhaps ... well, what they're looking for is to assess what types of immune cells are modified and what cell systems are disrupted to try and lead to developing new targeted treatments.

Dr. Nobuhiko Shiraki, who's at Duke University School of Medicine in North Carolina, is looking at microglia roles in AMD to inform therapies. And microglia is just another type of immune cell. Normally, immune cells help to clear harmful debris, and that's the good side. But then, as I said, if they "go bad," they can go out of control and increase inflammation, and that leads to disease. Dr. Shiraki has found that reducing certain protein expression and activities of some proteins in some cells could reduce retinal damage after light exposure. And they're going to try and clarify how these microglial cells are involved in this transition during damage from light exposure to AMD.

So, I have two more in this category I'll talk about. Dr. Jaesoo Jung from the University of California, San Diego, is going to be looking at this protein called heparan sulfate. And it's going to be ... I mean, this title is a bunch of alphabet soup, but it basically says heparan sulfate regulates the HTRA1-mediated proteostasis in Bruch's membrane. Okay, so I'm going to explain what all of those are. Bruch's membrane is basically the barrier between the eye and the rest of the body, right? It's like a physical wall that keeps out bad characters and gives the brain, and also the retina, a safe place to exist. But behind those damaging drusen deposits actually can get deposited around the Bruch's membranes, kind of on the wall—someone's dumping on the wall. Then this could lead to dry AMD. So, there's this protein called HTRA1. You don't need to know what that stands for. It interacts with this other protein called heparan sulfate, which is basically a sticky protein. It likes to stick things together. And it's also elevated in AMD, and they don't know why. But maybe it's involved in sticking drusen and sticking things onto the wall, right? Like throwing

spaghetti on a wall, maybe it's involved in sticking the drusen on the wall, right? So, findings could guide new therapy for that.

And then the last one is ... technically, I'm going to put it in Cell Metabolism, but it's trying to figure out how stress that happens to your cells from metabolism changes during disease. How can this drive a disease? So, these RPE cells I talked about before, this retinal pigment epithelium, normally, they nourish the retina and get rid of the toxic waste that's created by the normal practice of photoreceptors creating light. There's just toxic byproducts that have to be cleared out of your eyes every night, and the system has to be reset. But chronic inflammation, fat accumulation, and injury to the little pockets inside your cell called mitochondria, which are kind of like the energy factory that gives your cells energy to do everything, if there's problems to those three things, they kind of act together and they compromise the RPE health. So, that's almost like, "If mama's not happy, no one's happy." So, the RPE is what keeps everything going, right, in the eye. And so, what he's trying to do is try and figure out how to keep the RPE happy, because if they go, then everything in the eye is going to go.

SHARYN ROSSI: I love your analogies, Diane. The RPE will now forever be the mom of the eye, in my thoughts.

DIANE BOVENKAMP: Mama's not happy, no one's happy, yeah. All right. So, they're specifically narrowing in on this protein called STAT3, which is a master regulator of cell health. And they're going to see whether they can target that AMD. So, anyway, I think what's exciting about this, because ... and I think the SRC agrees, because she was awarded the 2025 BrightFocus Helen Juanita Reed Award for Macular Degeneration Research. And that signifies it was the top-scoring postdoctoral fellowship project that was submitted last year. So, I'm expecting some really cool things to come from this.

SHARYN ROSSI: Wow, that's great. Congratulations to Dr. Fernandes on that award. And I think that this is my favorite topic, just because it's so crosscutting: the inflammation, the mitochondrial dysfunction. I mean, I really think that these are common features across a lot of different neurodegenerative diseases. This is a place that BrightFocus is really

interested in. How can we leverage information from all these different diseases? What's the same? What's different? Is there one common immune change or metabolic driver that when it goes awry it's driving the neurodegeneration, or does each disease have a unique pathway? And how can we start to ascertain what are the different drivers of each of these diseases? And can we find a common mechanism in order to treat across diseases, which is really the gold standard that we're trying to shoot for? But I also think it's really interesting in this category, because you're talking about drusen, and since you brought up trivia and macular degeneration being such an old disease from the 1840s, it's just really interesting to me that some of the first findings of amyloid plaque in the brain were called drusen in the early 1900s, because we knew about macular, but we didn't know about toxic, sticky proteins in the brain. And so, it's really interesting that some of the first reports of amyloid in the brain were called drusen.

So, again, just really pointing to these common mechanisms in all three of the diseases that we focus on and fund. So, really exciting research, and really looking forward to what's coming down the pipeline. And Diane, so what is the next exciting topic?

DIANE BOVENKAMP: I'm glad you asked, but first, I want to actually emphasize that, yeah, I totally agree. I love those crosscuttings, and I think that's why you introduce a lot of Alzheimer's researchers with vision researchers. And likewise, the Director of Vision Science Programs will introduce vision researchers with Alzheimer's researchers, because a lot of times there's macular with glaucoma, because I think that a lot of times another scientist working in another field might have an answer to a question that you have that might actually simplify things and accelerate things. So, that's what we're here for.

SHARYN ROSSI: Yeah.

DIANE BOVENKAMP: So, the third topic is one I'm going to call innovative approaches to treatment. So, for macular degeneration, there's now a lot of shots that can be had in the eye for both dry AMD and wet AMD. But, of course ... and they're targeting certain proteins, but there's so much more that can cause the disease, and so there's a lot of innovative ideas that are

coming down the pipeline that we're helping to fund here.

So, I think I have three I'm going to talk about, approaches in this area. So, Dr. Charles DeBoer from Stanford University School of Medicine in California is creating a novel implantable device to treat wet macular degeneration. So, as I said, many treatments are injected; some of them just into the internal jelly of the eye, some of them actually into the retina itself. But for the ones where the injections go into the jelly of the eye, the actual site of damage is a little bit further away, right, at the level of what they call the choroid, which is the healthy blood vessels and/or the retina cells, and those retina cells are the RPE and photoreceptors. So, at the injection site, that means that the actual local concentration of the drug could be variable based on many factors, like distance from the injection site and diffusion of the drug, etc. So, the diseased, leaky vessels that grow in wet AMD, which are different from the natural blood vessels, are in contact with a healthy tissue. So, Dr. DeBoer is thinking that direct targeting could increase local drug concentrations and possibly improve efficacy. So, he's proposing to use a novel device that has a refillable drug reservoir in a tiny tube that's inserted into this disease-healthy space border that will allow for extended localized drug delivery. And pretty much, it might be like filling up ink in a printer cartridge, right, on your printer. You just go into the doctor's office and have some more drug. And what's really cool about this is that this device could be used for whatever drug comes down the pipeline. So, he's trying to create a treatment that will have better delivery.

The next one, Dr. Daisy Yao Shu, who is at the University of New South Wales in Australia—so, we're very international this year—has some other new drug delivery approaches. Maybe some of our listeners here know that some treatments can help some people, but sometimes, for no apparent reason, treatments that are working could just all of a sudden stop working or they just don't work in others, leaving many without effective treatment options, because I think it's about 30 to 40 percent of each of the drugs. It's great there's a great portfolio, so if one doesn't work, you can go to the other, but there's plenty of space for new drugs. And so, this project is looking at two innovative approaches. And again, I'm going to say some alphabet soup and explain what it is later. So,

they're repurposing something called fumaric acid esters, or FAEs—I'll just use FAEs—including dimethyl fumarate, and that's an FDA-approved drug. And the second is to test what they call microtubule inhibitors to target abnormal blood vessel growth and scarring. So basically, FAEs are anti-inflammation and antioxidative drugs from other diseases that she's testing in macular degeneration. And microtubules are really cool. You can think of them as like the load-bearing beam that make up a cell's infrastructure, just like in a house, but at the same time they can also be roads that some proteins travel in packs from one part of the cell to the other, rather than just diffuse aimlessly through the cell. So by developing nanoparticle-based injectable therapies, Dr. Shu is going to try to enhance drug delivery, reduce treatment burden, and improve outcomes for people with AMD. So, we're really looking forward to—

SHARYN ROSSI: Diane, I have a question. Sorry to interrupt. These microtubule inhibitors, so they're targeting the blood vessel growth, but those microtubules exist in other cells, as well, so how is she just targeting blood vessels and not harming anything else? Is it just a blood vessel–specific inhibitor?

DIANE BOVENKAMP: I think, again, it has to do with localized delivery.

SHARYN ROSSI: Oh, okay.

DIANE BOVENKAMP: You're right, because microtubules and inflammation and oxidation happen in every cell, right—are in every cell. So, maybe this project could be combined with the last project when they're both working, when Dr. Shu has a great drug, and then she could get together with Dr. DeBoer and use their—

SHARYN ROSSI: Didn't we see it from 10 years away, 5 years away? Nice.

DIANE BOVENKAMP: But you will definitely have to, yeah, introduce them for possible collaborations in the future.

SHARYN ROSSI: Yeah, this is really interesting. Okay.

DIANE BOVENKAMP: Yeah. And so, then the last one in this category is Dr.

Mohajeet Balveer Bhuckory from Stanford. Their official name is Leland Stanford Junior University School of Medicine, California, and his title is, "Cellular-Sized Electronic Photoreceptors for the Restoration of High-Acuity Vision in AMD." And acuity just means how sharp your vision is, right, because some of your sharpness can disappear, and things can go wavy, and especially if blood is making the sheet of your retina moving and bubbling. But what he's looking at is at later stages of disease. So the good news is we're funding people to look at this. So for the most part, you have the treatments right now, you try and save what you have. That's why early detection is important. But should you lose your light-detecting photoreceptors in advanced AMD, you can lose your sight, but Dr. Bhuckory is looking into perhaps connecting the remaining neurons, because there's other neurons in the retina that just don't detect light. So, maybe, you could take the remaining neurons that are just used in relaying the visual signals to the back of the brain from the photoreceptor and try and hook that up with something, with an implant that can detect the light.

So, you can think of the remaining connecting neurons and optic nerves as the cord, the electrical cord ready to be plugged back into the monitor or the detector. Maybe, actually, it's more like these electronic photoreceptors are almost like you see when you go out on top of people's houses or you go out to a farm, there's solar panels. So, it's almost like he created these electronic photoreceptors, kind of like solar panels, that have been shown in the past can stimulate these relay neurons to restore the flow of low-level visual information to the brain. So, what he's trying to do is to ... I mean, it's great. People can see shadow and darkness, but wouldn't it be great to see the face of your grandkid on a photo, right? So, this project aims to significantly enhance resolution by developing cutting-edge cell-sized electronic photoreceptor implants to then hook into this remaining cord that's there, and then have the potential to improve this prosthetic vision. So, that would be so cool to have this ready for if the cells do die, then there's this other option, that we could get an implant.

SHARYN ROSSI: Wow. I mean, this is cutting edge. This is probably one of the most innovative proposals I've seen come through, especially in our

vision programs. Prosthetic vision, I mean, I don't know that anybody is kind of thinking on this level, so I just think we're in the right space here with Dr. Bhuckory. This sounds like it has so much potential, especially for these advanced stages when you can't really get anything back, right? We're talking about these neurodegenerative diseases, and you can't really regrow the brain, although there are attempts to do so. But what innovative research here, and I can't wait to hear more about their successes. Hopefully, maybe next year or in 2 years, we could have a Chat to highlight these innovative interventions and talk about their successes, hopefully.

DIANE BOVENKAMP: Where are they now? Yeah.

SHARYN ROSSI: Yeah, that would be a great update, for sure. And I know that there's one last category that encapsulates the last few grants, if you would want to touch on those.

DIANE BOVENKAMP: Yes. I kind of have three grants that are technically in three other … because we have a larger portfolio, they would go into those other buckets, but I'm lumping them together as clinically relevant research, so they're kind of more relevant to the latter stages.

So, Dr. Ana Chucair-Elliott at the University of Oklahoma Health Sciences Center in Oklahoma is looking at the role of aging, diet, and inflammation in RPE-degenerative processes. So, that's kind of in what we call the Diet and Nutrition's Impact on Macular Degeneration Risk. Since aging is the main risk factor for AMD, but diet and inflammation also increase AMD risk, since, as you know, what's good for our heart is normally what's good for our eyes and brain. So, this research aims to study how aging and diet interact with immune cells, in particular immune cells called microglia and macrophages, and how this affects the RPE cell, and integrate it with genetic risk and other functions. So, I know there was another project that was trying to look at aging, but this is just trying to pull that all together, I think, in later stages. Anyway, so this could potentially for candidate targets. So, she received the 2025 BrightFocus Elizabeth Anderson Award for Macular Degeneration Research. So, this signifies it's a project of much interest all in the future.

Another project that is under the Regenerating Cells Damaged by Macular Degeneration or Regeneration section is kind of what you were relating to. It's great. So, Dr. Bhuckory is looking at putting in an implant, and Dr. Ashley Farre from the University of Idaho is looking at shaping neuronal connections by resident immune cells. So, she's going to be studying the natural regenerative power of the zebrafish, and I know all of you have listened to me before. I love zebrafish. I used to work with them. But it's cool because we can learn a lot of lessons from them. And that can then help people who have AMD because if there's damage to zebrafish retinas or optic nerves, they regrow their eyes and regrow the optic nerve, which is something we want to attain. So, she's going to be studying them, and this project kind of straddles with the inflammation 360 category we talked about before, but the main focus is on trying to regenerate damaged retina. So, that's why it's kind of going to be categorized here. And the other cool thing is since zebrafish are transparent for part of their life, their pigment, right, or skin pigment, eye pigment, whatever, doesn't really start until later stages in their life, so we can look in a microscope and since fish basically are in water, you can just put them under a microscope and see inside the zebrafish. And so, this group will be able to observe live cell-to-cell interactions between neurons and microglia in living zebrafish retina.

So, you heard microglia here, too, but it's also up the information. But this is because these complicated microglial cells are involved in many aspects of health and disease. So, they will clean up waste and do regulation of inflammation like we talked about in the other category of drusen and inflammation, but the microglia also aid the connections and communications between the nerve cells that are called synapses. And there's, like, good cop and bad cop versions of microglia, too, so there's a lot that we don't know about microglia yet. But what they'll be studying in addition are the potential roles of microglia to play in this synaptic rewiring of the regenerated photoreceptors so that as we're trying to fix the retinal damage, we'll know that what we're looking at is a horse and not a cow, you know what I mean? So that all of the wires aren't going to get crossed, and they're going to get connected in the right way. The last topic—oh yeah, I guess that's the last grant, the 12th grant—is what I'll kind of put it in the Genes and Macular Degeneration group. But Dr. Ruchi

Sharma at the National Eye Institute of the National Institutes of Health, we're funding research for her to study the role of genes and the tone of our eye pigment in AMD.

Now, you're probably thinking to yourself, "What does the color of our eyes have to do anything with macular degeneration?" Well, I'm going to try and explain it. So, AMD is a common eye disease that affects many people, though people who are called Caucasians or people who have lighter skin are more likely to develop AMD than Black individuals. And this difference in the pigment of your skin is also reflected in the amount of pigment or color in the iris of your eye. So, it's that ring that gives you color. So, it's like someone who is Caucasian might have more blue or hazel eyes versus brown or black eyes. So, that's just the level of pigment that's coded by your genes in your body that you inherit. Dr. Sharma will create a human retina in a dish consisting of the retinal pigment epithelium—because there's pigment in the retina, as well, right—and the good blood vessels to explain why some people are more vulnerable to AMD while others resist it. So, that is more or less pigmentation, certain genetic inheritances, and differences in cellular processes that happen in our body unique to us that could increase or reduce the risk of a person developing AMD. So, she's going to be testing out these theories and, perhaps, hoping that that will lead to new diagnoses, preventions, or personalized treatments.

SHARYN ROSSI: Wow, this is a really interesting interaction that I don't know is really well known or that a lot of people really talk about. So, this is great that somebody is investigating this. But this has been such a great overview of the holistic approach that BrightFocus takes to tackling macular degeneration and all three of the diseases that we fund. But from the lifestyle changes we can make ourselves to the genes we're born with, all of our researchers are leaving no stone unturned when investigating the disease mechanisms and developing cures for macular, glaucoma, and Alzheimer's disease. Diane, do you have any further thoughts on BrightFocus 2025 funding for macular degeneration research?

DIANE BOVENKAMP: Yes. I have a couple things. First, I really want to give congratulations to the 12 awardees that I just kind of gave you a brief

glimpse of about their research. Really looking forward to the results of their research. And also, kudos to everyone who applied to Macular Degeneration Research since it was so competitive this year, so please contact us and resubmit. And then, the other thing I wanted to just mention is I think in these uncertain times ... so, one can hear, "Oh, wow, is the NIH getting cuts? And so, all of these scientists, they might have science that is also cut? And will macular degeneration still have a priority with the NIH or general funding?" So, you might get stressed whether the research will slow down or fear that current scientific experts might leave the field. But I just wanted to assure you that BrightFocus is committed to funding the most innovative research in the world to keep the pipeline going and retain people in the macular degeneration field. And we can't do this alone, so please do your part. Donate as much as you can. Get the word out there that science is awesome. And keep in touch.

SHARYN ROSSI: Yeah, I mean, that's a great point. We did have a question come in regarding our funding and whether we're in danger of losing funding. And so, as a philanthropic organization based here in Maryland, we've been around for over 50 years. We really survive on generational giving. And we still have 600,000 donor households that we reach through our direct mail, and now we're moving a little bit more into the digital space. But we don't have any one big funder giving us a whole lot of money. We don't have any VC companies or anybody really giving us philanthropic support, but then that's helpful because they're also not dictating how we use those funds, and so we can be nimble. But like I said, I mean, we do really rely on grassroots donations from our donors and our 600,000 donor households that have given to us generationally over the 50 years.

And I think that that speaks a lot to BrightFocus Foundation and the work that we fund and the researchers and the communities that we're building on both sides, the science side as well as the education side. So, we have two arms, and we look to educate people, as well, but I think it's really important that people educate themselves on what the current funding climate is doing to science and research and the next generation of scientists. And as Diane said, I mean, we're steadfast and committed to our mission to fund the science, but we can only do what we can with what

we have. And so, we really do rely on our donors and our community to help reach out and support this research because it is funding your health, your brain health, your eye health. And to us, that's a bipartisan issue, and it shouldn't be politicized. And so, it's just been so wonderful, as always, Diane, to have this discussion with you. I'm so honored to be here to moderate this talk. And to our listeners, thank you so much.

DIANE BOVENKAMP: I just want to say, absolutely. Thank you. It's always a pleasure to chat with you.

SHARYN ROSSI: I know. I mean, we do this all the time, but it's nice to do it for other people to hear, as well. But so again, to our listeners, thank you so much for joining our Macular Chat. I hope you found it helpful. Our next Macular Chat will be on Wednesday, September 24, and thanks again for joining. This concludes today's Macular Chat. Thank you so much for being here.

Useful Resources and Key Terms

To access the resources below, please contact BrightFocus Foundation: (800) 437-2423 or visit us at www.BrightFocus.org. Available resources include—

- Macular Chats Archive
- Research funded by Macular Degeneration Research
- Macular Degeneration Overview
- Treatments for Macular Degeneration
- Macular Degeneration Resources
- Expert Advice for Macular Degeneration
- Apply for a Research Grant
- Scientific Review Committees

Helpful low vision tools or resources mentioned during the Chat include—

- Understanding Early-Stage Age-Related Macular Degeneration
  - Tracking Biological Responses to Lifestyle Changes in AMD Patients – Joëlle Elise Vergroesen, PhD
  - A Blood Test to Measure Genes Associated with Macular Degeneration – Jerzy Szablowski, PhD
- Drusen Formation and Immune Response

    - How Aging of the Immune System Affects Age-Related Macular Degeneration – Masayuki Hata, MD, PhD
    - Microglia's Roles in AMD to Inform Therapies for Vision Loss Prevention – Nobuhiko Shiraki, PhD
    - Heparan Sulfate Regulation of HTRA1-Mediated Proteostasis in Bruch's Membrane in Age-Related Macular Degeneration – Jaesoo Jung, PhD
- Cell Metabolism
    - How Metabolic Stress Can Drive Macular Degeneration – Valencia Fernandes, PhD
- Innovative Approaches to Treatments
    - A Novel Implantable Device to Treat Wet Macular Degeneration – Charles DeBoer, MD, PhD
    - New Drug Delivery Approach to Transform Macular Degeneration Treatment – Daisy Yao Shu, PhD
    - Cellular-size 'electronic photoreceptors' for the restoration of high-acuity vision in advanced Age-Related Macular Degeneration – Mohajeet Balveer Bhuckory, PhD
- Diet and Nutrition impact on AMD
    - The Role of Aging, Diet, and Inflammation in RPE Degenerative Processes – Ana J. Chucair-Elliott, PhD
- Regenerating Damaged Cells

  - Shaping of Neuronal Connections by Resident Immune Cells – Ashley Farre, PhD

- Genes and AMD
  - Studying the Role of Genes & the Tone of Our Eye Pigment in AMD – Ruchi Sharma, PhD