Macular Chats

TRANSCRIPT

Understanding Macular Degeneration: A Listener Q&A Session

Date: March 25, 2026
Featuring: Joshua L. Dunaief, PhD, MD

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

DR. DIANE BOVENKAMP: Hello and welcome. My name is Dr. Diane Bovenkamp, the Vice President of Scientific Affairs at BrightFocus Foundation. I'm so pleased to be your host for today's Macular Chat, called, "Understanding Macular Degeneration: A Listener Q&A Session." And I have to say I'm really excited about today because this is all your questions.

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 concerns or conditions. Please note that BrightFocus does not endorse or promote any specific brand or product.

BrightFocus Foundation's Macular Degeneration Research Program has supported over $56 million in scientific grants exploring the root causes and potential preventions, treatments, and cure, and ultimately a cure of macular degeneration, and is currently investing in 44 active projects across the globe.

It is my distinct honor to introduce today's guest speaker. Dr. Joshua Dunaief is the Adele Niessen Professor of Ophthalmology and Vice Chair for Research at Scheie Eye Institute, at the Perelman School of Medicine at the University of Pennsylvania. He began caring for patients with age-related macular degeneration, or AMD, in 2000, and his lab focuses on developing new understandings and ultimately treatments for AMD. Dr. Dunaief's lab has published over 150 peer-reviewed articles related to AMD. He was given the Cogan Award by the Association for Research in Vision and Ophthalmology

in 2006—which is a very prestigious award in the global vision research community—and has served as a moderator and speaker at several recent international meetings on AMD. His lab is funded by the NIH and has received grants from the BrightFocus Foundation. Welcome, Dr. Dunaief.

DR. JOSHUA DUNAIEF: Thank you so much, Diane. It's always a pleasure to be here.

DR. DIANE BOVENKAMP: Oh, I can't wait for today. Today is a really special day because normally during every Chat throughout the year, listeners send in questions to our guest expert like you, and some of them don't quite fit the topic at hand, but we save them, and today we're going to answer all of those questions. So this Chat is all Q&A, and starting with questions we received in advance, and moving to questions that you, our listeners, submit today. So, Dr. Dunaief, are you ready to dive in and see how many we can get through today?

DR. JOSHUA DUNAIEF: Yes, let's do this, Diane.

DR. DIANE BOVENKAMP: Let's do it. All right. So, the first one is: Many people have questions about differentiating between the types of macular degeneration. How do you talk with patients about the similarities and differences between what they call wet AMD, dry AMD, and something called geographic atrophy?

DR. JOSHUA DUNAIEF: Sure. So, many people who are diagnosed with AMD didn't even know they had it. They were just seen by an optometrist or an ophthalmologist for a routine eye exam for glasses, and the doctor noticed little white spots in the retina in the back of the eye. Those are called drusen. That's a German word that means "pebble." So, it's like these patients have tiny little pebbles underneath the retina, and those alone don't cause much vision loss, but they're an indication that people can in the future lose vision due to either wet AMD or the advanced form of dry AMD, which is called geographic atrophy. So, in geographic atrophy, there's a little patch of retina that dies—the vision cells die—and that causes a little blind spot near or in the center of vision, and that will typically expand over time—not wiping out the entire retina, so, even in the worst case, people keep their side vision, but they can lose their central vision from geographic atrophy.

And then, in the wet form of AMD, new blood vessels are recruited into the retina. The retina thinks that it needs them. It thinks that it needs more blood, but these vessels are abnormal, and they leak, and they bleed, and they ultimately damage the center of the retina, the macula, and they can cause a fairly rapid loss of central vision. But I do want to emphasize that many people with drusen keep good vision for their whole life. Many people who come to see a retina specialist for the first time, who have received the

diagnosis of AMD because of these drusen, these white spots, are relieved to learn that they have a good chance of keeping good central vision for their whole life.

DR. DIANE BOVENKAMP: That's amazing. Actually, thank you for ending on that hopeful note. And I have to say, I've been learning about age-related macular degeneration for 21 years now, and I never knew the origin of the word drusen, that it meant little pebbles. So, thank you for teaching me something new today, Professor.

DR. JOSHUA DUNAIEF: Oh, you're welcome. I think it helps put it in context and makes it easier for people to understand what drusen are, because they're going to hear that word fairly often. And the number of drusen and the size of the drusen is actually an indicator of the risk for vision loss. So, people who have smaller drusen and fewer drusen are at lower risk. Over time, typically, the number and size of the drusen will increase. And once they get to a certain size and number, then the risk of either geographic atrophy or wet AMD increases.

DR. DIANE BOVENKAMP: Right. So, jumping off of that, how common is it for dry AMD to switch or convert to wet AMD?

DR. JOSHUA DUNAIEF: You hear a lot about wet AMD because it can cause a fairly sudden decrease in central vision. But actually, only about 10 to 15 percent of people who have AMD will get wet AMD.

DR. DIANE BOVENKAMP: Yeah. And, you know, and the good news is—and I think we'll talk about it later—there are treatments for wet AMD, and now there's some for dry AMD, but only 10 to 15 percent move. So, if you're diagnosed with age-related macular degeneration before age 60, because I think—I can't remember if you had mentioned this already—more likely people get it; you know, it's called age-related, so you get it after age 60. But if you're diagnosed before 60, are you likely to get a worse case of AMD?

DR. JOSHUA DUNAIEF: Yeah, that typically is true, because as time goes on, usually the number of drusen increases, the size of the drusen increases, the condition of the retina gets a little worse with aging. So, the longer we live with it, the higher the chance that we're actually going to lose some vision from it. But again, like you said, there are treatments now for the advanced form of macular degeneration. So, for wet macular degeneration, we've had treatments for about 20 years now. These treatments can be injected into the eye, and they stop the leakage from these abnormal blood vessels for a period of a month to several months. And, you know, that sounds terrible to inject something into the eye, and when I would first talk about it with patients, I'd spend a long time explaining that the eye is numb with eye drops first, and the needle is tiny,

it's about as wide as a hair. So, it's a little bit uncomfortable, but it's really not quite as bad as you would think. And patients who get these treatments do keep coming back, because they typically work. They sometimes will improve vision, and in most cases, they'll at least stop or slow the progression of vision loss. So, they are so much better than what we had before these injections were available, which was basically nothing, and people would inevitably lose central vision if they had the diagnosis of wet AMD.

DR. DIANE BOVENKAMP: Yeah, I'm so glad that there's options. And like you said, no matter when you get diagnosed, it's really important to keep going back to the doctor. So, moving on to cause, can you tell us what causes age-related macular degeneration? You know, are some forms hereditary, or can we inherit it from our family, or is only some versions?

DR. JOSHUA DUNAIEF: Yeah, it's partly hereditary, and partly lifestyle, and partly just bad luck. So, the people who have parents who've had macular degeneration are at a somewhat increased risk of getting it, typically about a twofold increase in risk. And the genes that are involved are related to inflammation. They're called complement genes. Complement is an arm of the immune system that helps fight off bacteria or viruses, and it gets inappropriately activated in macular degeneration. And people who inherit certain genes are more likely to have that inappropriate activation. There's also some genes that are involved in lipids that play a role in macular degeneration. So, heredity does play a role, but also lifestyle is important. Smoking is a significant risk factor. Diet is very important. People who eat green leafy vegetables are at decreased risk. Also, fatty fish, like salmon, twice a week, decreased risk. People who exercise have decreased risk and who maintain a healthy weight have decreased risk. So, there are things that we can do to reduce our risk, even if we're dealt a more risky set of genes.

DR. DIANE BOVENKAMP: And then the other thing to add on that for lifestyle is light exposure, right? Like, in terms of UV light and wearing sunglasses, I think that's part of the lifestyle prevention, right?

DR. JOSHUA DUNAIEF: Yeah, light exposure is thought to play a role. It's hard to measure, hard to study and know for sure, because it's hard to know exactly how much light exposure people have had over their lifetime.

DR. DIANE BOVENKAMP: Yeah.

DR. JOSHUA DUNAIEF: But there have been some studies that have tried to estimate, like the Chesapeake Bay Waterman Study. And those suggest that bright light over many years may increase the risk. So, sunglasses are recommended, especially when out in very bright light, like driving on a sunny day or at the beach.

DR. DIANE BOVENKAMP: Or on water or skiing, actually, I guess, because the light will bounce off of the snow or the water, right?

DR. JOSHUA DUNAIEF: Yes, especially in those activities, exactly. The light is amplified by the snow or by reflecting off the water.

DR. DIANE BOVENKAMP: One listener asks: How is it possible that I got wet macular degeneration in both eyes with near-perfect vision, with dark eyes, never having smoked, without ever having had the dry version of macular degeneration? This is a really, really good question.

DR. JOSHUA DUNAIEF: It is. So, smoking, as I mentioned, is a significant risk factor. So, you know, it's really good that this person didn't smoke. With dark eyes, there's some thinking that maybe blue eyes let in more light and might be a risk factor, but that's not really been strongly proven in studies. But significantly, the person was never diagnosed with the dry version of macular degeneration and then got wet macular degeneration. So, one possibility is that this person actually did have dry macular degeneration, it just was never detected. And there are other possibilities, too.

There are other things that can cause bad blood vessels to grow into the retina, into the macula. So, for example, there's a fungus called ocular histoplasmosis that's fairly rare but more common in certain regions of the U.S. that can cause this. People who are extremely nearsighted can get new blood vessels growing and leaking in the macula. People who have had a traumatic eye injury can also get this. And there's also a condition called central serous. This causes leakage of fluid in the macula. It's related to stress. People who have more stress have a higher risk of this. And the onset can actually be in younger people, sometimes even in their 30s or 40s. And occasionally, people with central serous can have these abnormal blood vessels growing into the macula and leaking and bleeding.

DR. DIANE BOVENKAMP: Yeah. So, the one with the nearsighted, there's something I've heard called high myopia. That has to do with the eyeball being a little bit longer and then it could cause breaks in the eye/brain barrier and that's where the vessels come in. Is that what you were talking about with the nearsightedness?

DR. JOSHUA DUNAIEF: That's exactly right. So, it's called high myopia. Myopia is nearsightedness or pathologic myopia. It most often will affect people whose glasses prescription is minus 6 or higher. These people can't really even see far enough to see the alarm clock when they're in bed, when they're not wearing glasses. And it is because the eye is abnormally long. It grows abnormally long. And that can cause breaks in the thin membrane in the back of the retina. And that can allow abnormal

blood vessels to grow through the breaks in the membrane.

DR. DIANE BOVENKAMP: Okay, great. I just wanted to clarify that because I know I'm nearsighted, but I didn't want anybody listening who was nearsighted to start to worry.

DR. JOSHUA DUNAIEF: Most people aren't so nearsighted that they have this risk.

DR. DIANE BOVENKAMP: Yeah.

DR. JOSHUA DUNAIEF: As I said, it's like minus 6 or higher is when the risk really starts to come into play. And, you know, at that level of nearsightedness, it's very, very hard to even find your glasses if you're not wearing them. So, that wouldn't be most people, but there are some that are affected by this.

DR. DIANE BOVENKAMP: Great. And so, I hope that the listener who asked that question got information on that. And you can always take that back to your doctor to discuss that if you like. Okay. So, the next question I'm going to put out, this is a very popular one: We always receive a lot of questions about the AREDS2 vitamins and supplements in general. And so, could you tell us a little bit more about at what stage of the macular degeneration process or diagnosis, I guess, are the AREDS2 vitamins most effective? And are they suitable for if you have both dry and wet AMD?

DR. JOSHUA DUNAIEF: Sure. Yeah, great questions. So, the people who seem to benefit the most from AREDS2 vitamins are people with so-called intermediate AMD. So, those are people who have a certain number and size of drusen. If they hardly have any drusen or they're not that big, then their risk of vision loss is quite low. And studies have not proven that taking the vitamins reduces risk. For people who have somewhat larger drusen or more numerous, the risk of vision loss is reduced by 25 percent by taking the AREDS vitamins. That was shown in a large trial run at the NIH over a 10-year period. And they had to enroll thousands of people into the study and follow them over this length of time in order to measure the risk, because the progression of the disease is so slow. So, kudos to the folks who ran that study at NIH.

For geographic atrophy form of macular degeneration, the advanced dry form, there is some evidence that the AREDS vitamins slow progression, but that's somewhat controversial. One study, the AREDS study, actually showed that it slows progression, but another study showed no difference in progression rate in people who were taking the vitamins versus those who weren't. So, the jury's really still out as to whether the AREDS vitamins slow progression or growth of the atrophic area in geographic atrophy. And also with wet AMD, there's no strong evidence that taking the vitamins reduces risk. So, overall, I think it's clear that for people with intermediate AMD, the AREDS

vitamins will reduce risk, but for geographic atrophy or wet AMD, it's not as clear. For people who eat a really healthy diet, it's actually not as important to take the AREDS vitamins. People who eat a lot of green leafy vegetables and fatty fish, like salmon, sardines, mackerel, or tuna, once or twice a week, they, in the AREDS study, didn't seem to benefit as much from the vitamins. So, they seem to be getting the healthy nutrients and antioxidants from their diet and didn't need to supplement quite as much.

DR. DIANE BOVENKAMP: Could you just clarify, because I know that there's a lot of formulations out there, and there was an original AREDS, and it's recommended you have AREDS2. Can you just say what are the vitamins and minerals that are the recommended AREDS2?

DR. JOSHUA DUNAIEF: Sure. So, it's lutein and zeaxanthin, which are related to beta carotene, which is also related to vitamin A, vitamin C, vitamin E, zinc, and copper. And they did do some subgroup analysis and found that the most protective component was the zinc. Zinc plus copper is really the most active ingredient. The lutein, zeaxanthin, vitamin C, and vitamin E, when tested on their own, had a little bit of an impact, a little bit of a reduction in risk, but zinc was the most potent micronutrient in that study.

DR. DIANE BOVENKAMP: And they moved to the AREDS2 because I think beta carotene was not recommended for smokers because of, I think, their lung cancer risk or whatever was there, correct? So, that's why they went to lutein and zeaxanthin.

DR. JOSHUA DUNAIEF: That's exactly right. In the AREDS1, they had beta carotene. And not in the AREDS study, but in other studies there was a connection found between beta carotene supplement and increased risk of lung cancer among smokers. So, that's why they decided to switch from beta carotene to lutein and zeaxanthin in AREDS 2. Also, all of these carotenoids are antioxidants. And theoretically, any of them could protect the retina, but lutein and zeaxanthin in particular are known to be concentrated in the macula. And it's been shown that if we eat them, we can actually increase the concentration of those chemicals in the macula. And once they're in there, they will protect the macula from free radicals or oxidative damage, which is thought to play a role in macular degeneration.

DR. DIANE BOVENKAMP: Yeah. And I always like to think of it, you know, in my mind … lutein and zeaxanthin are kind of like these yellow pigments. So, I almost think they're like little molecular yellow sunglasses that you're eating. So, it's protecting your little macula. So, that's one way I try and think of it. If that's appropriate.

DR. JOSHUA DUNAIEF: That's right. They are yellow. And ophthalmologists can see a

yellow color to the macula because of the chemicals are there. And actually, the full name of macula is macula lutea, which means yellow spot. And again, it's because of the presence of those chemicals in the macula, the lutein and zeaxanthin.

DR. DIANE BOVENKAMP: Oh, my gosh. I'm going to school with you today. It's always a pleasure when I talk with you. Thank you for that. All right. So, I think you talked a little bit about this, but one question is: What is the best nutrition to keep eyes healthy? And then on the flip side, are there foods or vitamins that accelerate or make AMD worse?

DR. JOSHUA DUNAIEF: Yeah. So, the green leafy vegetables are going to reduce risk. So, we're talking, like, spinach, kale, chard, also cruciferous vegetables, broccoli, and fatty fish seems to decrease risk. And the reason for that might be fish oil. So, people have probably heard of fish oil because some are taking it for heart disease. Fish oil is also known as DHA, or docosahexaenoic acid. And so, the fatty fish are the best source of that. Surprisingly, when DHA was added to the AREDS supplement in the AREDS2 trial, it actually did not provide any additional protection. So, it's either, it needs to be in the mix of things in fish to be absorbed properly or something else in the fish is protective. And you asked about harmful things. So, red meat, consuming a lot of it has been associated with increased risk in a study out of Australia, where I guess they barbecue a lot.

DR. DIANE BOVENKAMP: And what about sugar? Because that can cause inflammation or has that not been proven scientifically?

DR. JOSHUA DUNAIEF: Yeah, that's a good question. Yeah, there is a study out of Boston showing that a high glycemic index or foods that are high in refined sugar are a risk. So, good to limit those for macular degeneration and for general health.

DR. DIANE BOVENKAMP: Great. Okay. I'm going to start to eat a little bit better, I guess. So, anyway, so as the disease progresses, lots of cruciferous and, leafy greens. I did have a salad today with arugula. So, there you go. That's probably good, right?

DR. JOSHUA DUNAIEF: Yes, definitely.

DR. DIANE BOVENKAMP: All right. So, moving on from nutrition. As the disease progresses, some of our listeners are wondering how best to adjust to changes in depth perception and blurriness that can happen.

DR. JOSHUA DUNAIEF: Yeah. For people who have lost a fair amount of central vision, sometimes they can learn to use their side vision more. So, as I said earlier even in the worst case, the most advanced cases of macular degeneration usually do not affect the

peripheral or side vision, only the central vision. So, sometimes people can learn to look off to the side a bit—like not directly at the thing they're trying to see, but, intentionally look away from the thing they're trying to see and then they can see it better because it's not landing on the macula, which is damaged.

Also, they can see specialized optometrists called low vision optometrists, who are trained to prescribe special glasses with magnifiers and special lights or electronic devices that can magnify objects or reverse the contrast in ways that help people see and read better. There are also occupational therapists who are trained to work with people who have reduced vision, and they can come into the home and do things like mark unevenness in the floor or mark steps with bright tape, mark the oven or the stove dials with bright tape in ways that make it easier to see them and, of course, the decrease in depth perception increases the risk of falls, which is really significant. People want to avoid falling and breaking a hip. So, having adequate lighting and any kind of hazards well marked is really important and sometimes, you know, some kind of an aid—a walking aid—like a cane or a walker. Definitely want to avoid the falls.

DR. DIANE BOVENKAMP: Great. And then I think I remember we would put out articles for holidays that if you have guests over to your house, you know, maybe tell your kids or grandkids, like, don't move things from where I have them because, you know, then you might trip over them because you're not expecting them to be there.

DR. JOSHUA DUNAIEF: That's right. Really good advice, and don't trip over pets, also. If somebody brings a pet into the house or a pet likes to sleep in the path between the bed and the bathroom, that's a risk.

DR. DIANE BOVENKAMP: Oh, great. Good point. Well, speaking of the bed, the next question has to do about: Do poor sleep habits have any effect on macular degeneration?

DR. JOSHUA DUNAIEF: Great segue there. So, yes, chronic sleep deprivation and sleep apnea have been associated with increased risk of macular degeneration and another eye disease, glaucoma. So treating any kind of sleep-related illness is important to try to get that restorative sleep that protects the nervous system and the retina of the eye, which is part of the nervous system.

DR. DIANE BOVENKAMP: All right. Great. Thank you. And then, another question is about symptoms and side effects: Listeners have reported seeing flashes, a burning feeling in the eye, experiencing dry eye, and even having ocular migraines. Are these common in those with age-related macular degeneration?

DR. JOSHUA DUNAIEF: Yes. And for several different reasons. So, the burning feeling in the eye and experiencing dry eye is not caused by macular degeneration. It's just caused by aging, and it is very common, and so it's just called dry eye. It's very common, and it will feel uncomfortable. People will feel stinging. They'll have an urge to blink. Sometimes, they'll get a reflex flood of tears all of a sudden. So that kind of seems strange, when it's called dry eye. So, what happens is the dryness on the surface of the eye irritates the nerves on the surface, on the cornea, and then they suddenly call for a flood of tears, but that's not adequate to keep the cornea wet on an ongoing basis. So, there's chronic irritation of the nerves in the cornea. For that, people are given artificial tears, and sometimes little tiny plugs are put into the … we have little holes in our eyelids that you can't see, but they drain the tears. So, if there isn't enough tear production, then those tiny little holes can be plugged in. The tears will stay on the eye for longer.

There's also another thing you asked about, which is flashes. Sometimes people with wet macular degeneration may see occasional flashes in the center of their vision. The flashes are caused by some traction or pulling on the retina. But flashes at the edge near the edge of the vision like an arc are a sign of something else, which is called a vitreous detachment. So, the vitreous is a jelly in the center of the eye, and it shrinks over time and eventually it'll separate from the retina. Usually it does that cleanly, but when it happens, it pulls on the peripheral retina and causes the sensation of an arc of light in the peripheral vision. That's usually not a problem, but when it does happen, it's important to have it checked out with a dilated eye exam because in a small percent of patients who have the vitreous detachment, there will be a little hole torn in the peripheral retina, and that hole can enlarge and turn into a retinal detachment, and that's a big problem. So, better to catch that little retinal tear early, and we can get it sealed with a laser rather than go on to the retinal detachment. So, again, to summarize that: If people see an arc of flashing light in their peripheral vision, they should go and see an ophthalmologist, get a dilated eye exam, and make sure they don't have a tear in their peripheral retina.

DR. DIANE BOVENKAMP: And then the ocular migraines are those common with AMD?

DR. JOSHUA DUNAIEF: Not especially, but people will notice some distortion in their vision if they have large drusen. So, that's different from an ocular migraine, which has a vascular cause, but large drusen in the macula can cause some distortion. That can be measured using something called an Amsler grid. People close one eye, look at the grid with their reading glasses, and they'll see maybe missing or wavy lines. And they should try to get a sense of what their baseline is, and then if there's a sudden change—more waviness, more missing lines—that can actually be an indication of wet macular

degeneration coming on. So, that should be a trigger to see the ophthalmologist.

There's also a condition where people lose a lot of central vision and then will have hallucinations because the brain gets bored. The part of the brain that gets input from the eyes starts making things up because it's not getting input from the maculas anymore. And the hallucinations can look like wallpaper, animals, people, just about anything. And I mention this because people think they're going crazy because they're seeing these things, but it has nothing to do with their cognitive function. It's just because they've lost the input from the retinas. This is called Charles Bonnet syndrome and once people know what it is, I think it's not as bothersome.

DR. DIANE BOVENKAMP: Wow. That's a really important public service statement right there. So, I think that if there's anything unusual, just get to the doctor, and—the eye doctor—and they can do an exam. That's Charles Bonnet syndrome. Well, maybe we should do, like, another session on that. So, do blood pressure medications interfere with macular degeneration treatments?

DR. JOSHUA DUNAIEF: So, that's a good question. High blood pressure is actually a risk for development of wet macular degeneration. So, you would think that lowering it with blood pressure medications would be universally good. There is some evidence that the type of medication is important. So, there are blood pressure medications called ACE inhibitors or ARBs and those are considered safest for macular degeneration. There's some evidence that beta-blockers and another type of drug or class of drugs that are used for high blood pressure may increase the risk of wet macular degeneration. It's a bit controversial, but it's important to talk to the ophthalmologist, as well as internist, about the safest choice of blood pressure medication.

DR. DIANE BOVENKAMP: Great. Especially, if you're at family risk. And the one thing before I go on to the next question is: Bright Focus does offer Amsler grids that you were talking about, and we'll put a link at the end of this Chat when we put out the transcript that people can look for that, how to get that.

DR. JOSHUA DUNAIEF: Great. Yeah. That's really helpful, and people can just print that out and put it on their refrigerator and then just look at it, make a habit of looking at it, maybe once a day, cover one eye at a time, keep your glasses on, notice the baseline pattern, maybe some missing or wavy lines. And if that changes, then call the ophthalmologist's office, let them know, they'll want to make sure you're not developing wet macular degeneration.

DR. DIANE BOVENKAMP: Perfect. Thank you. So, for treatments, how does the doctor

determine what treatment is necessary and when to start?

DR. JOSHUA DUNAIEF: So, for people with just drusen, early macular degeneration, the treatment—or intermediate macular degeneration—the treatment is the AREDS vitamins, the healthy diet, the healthy lifestyle, stop smoking, monitor your vision with the Amsler grid, and follow up every 6 to 12 months with the ophthalmologist as directed. If wet macular degeneration sets in, then it'll be necessary to get medicines that block the abnormal blood vessels injected into the eye. Initially, it's usually once a month, and then after that, the frequency can often be reduced to every 2 or 3 or even every 4 months. These longer and longer–lasting medicines keep coming out as a result of lots of research. So, the interval between injections, fortunately, has become longer. So, these medicines commonly used now are Avastin®, Eylea®, and Vabysmo®. For people with geographic atrophy, recently the FDA approved a couple of medicines that inhibit the complement pathway we were talking about before, which is an arm of the immune system that causes inflammation. So, those are called Syfovre® and Izervay™, and patients can get injection of those every month or every other month if they have geographic atrophy and they're very concerned about the expansion of the geographic atrophy. Not everybody wants these because they only reduce the rate of expansion by about 25 percent and actually increase the rate of wet macular degeneration by 10 percent. So, those need to be considered with a careful discussion with the ophthalmologist.

DR. DIANE BOVENKAMP: Great. And, for those injections, what can listeners do to make their eyes more comfortable? Like, for example, do you recommend an ice pack or sit under low lights?

DR. JOSHUA DUNAIEF: I recommend taking Tylenol an hour before the injection, and as long as you don't have any problems taking Tylenol, it'll reduce the discomfort of the injection and after the injection. And, then afterwards, you can put a gentle cool compress on the eye. It's also really helpful if the eye doctor's office, often the technician, will rinse out the iodine that's used to sterilize the eye before the injection. The iodine can be really irritating—some people more than others. Actually, the iodine is the part that's most irritating in this whole procedure. So, like, rinsing that out afterwards can be really helpful.

DR. DIANE BOVENKAMP: Yeah. I'm going to skip down to that question. So, is that sometimes called Betadine, the iodine? And so, it's like an antiseptic, so it's used just so that you don't get an infection, right, when there's an injection, but is there anything else that can be used if people are really allergic or really react to the iodine or Betadine?

DR. JOSHUA DUNAIEF: Yes, the iodine is called Betadine, and it is the best proven antiseptic to reduce the risk of infection with these injections. The risk of infection overall is about 0.1 percent. So, it's a low risk, but it's a very serious thing if it happens, and if it does happen, then people will get pain in the eye in the day or two after the injection and reduced vision. And then, they need to come back immediately and get another injection of an antibiotics. Since it is the best antiseptic to prevent this infection, it is highly recommended that people get the Betadine and then if it burns or is uncomfortable, it should just be washed out, rinsed out with sterile saline in the doctor's office afterwards. Are there other things? Yes. But we're really reluctant to use them because Betadine is proven to be the best for preventing infection.

DR. DIANE BOVENKAMP: Great. So, that washout is a good example. Before we move on to other questions, what part of the eye is the drug injected into?

DR. JOSHUA DUNAIEF: The drug is injected into the vitreous jelly, which fills the center of the eye. It's the part I was talking about before related to flashes and floaters. When people get a vitreous detachment, they'll notice these peripheral flashing lights at the edge of their vision and sometimes little floating spots in their vision. So, it's in that vitreous where the drug is injected and then depending on which drug, it'll stay there and go into the retina for a month or a couple of months.

DR. DIANE BOVENKAMP: Okay. Great. So, we have a few more questions left, and we received a few questions about AMD and cataracts. A couple of questions: Is cataract surgery safe with AMD, both wet and dry? And are there any special considerations that apply to AMD patients considering to get cataract surgery? And then, is laser better than standard surgery? I guess that's kind of a combined for you.

DR. JOSHUA DUNAIEF: Yeah, these are good questions. So, cataract surgery does not increase the risk of AMD. If people have wet AMD and they're getting injections and they want to talk to their ophthalmologist about the timing of the injection relative to the cataract surgery, that needs to be worked out. There are special lenses that some people will get, they're called multifocal lenses and they enable people to see at all distances without reading glasses. I don't recommend those for people with AMD for a couple of reasons. One is that people with AMD often have reduced contrast sensitivity, and the multifocals will further reduce the contrast. The other reason is the multifocals can make it harder for the ophthalmologist to see the retina and determine whether there's wet AMD going on. So, I wouldn't go with the multifocals for people with AMD, but cataract surgery with standard monofocal lenses with one focal point and then reading glasses is safe.

DR. DIANE BOVENKAMP: Perfect. Thank you.

DR. JOSHUA DUNAIEF: Oh, and you asked about laser during the cataract surgery. It's fine. Whatever the surgeon is most comfortable with is what I would go with. If the surgeon likes to use laser, let them use laser; if they don't say anything about it, then just let them do, you know, what they're most comfortable doing.

DR. DIANE BOVENKAMP: Great. So, the next question is really a hot topic right now and that's the Valeda® light treatment: Can you tell us a tiny bit about it and how effective it is?

DR. JOSHUA DUNAIEF: Yeah. So, this is interesting. So, patients will get treated with a device that shines three wavelengths of light into their eyes. It's yellow, red, and infrared. And they receive multiple treatments every few months. And in theory, this is supposed to kind of rejuvenate the retina, activate the mitochondria so they provide more energy. And in kind of a medium-sized clinical trial involving 100 patients, there seemed to be some possible benefit, like, a little bit of improvement in vision, in visual acuity by about one line on the eye chart. And also maybe some slowing of geographic atrophy growth. I'm not completely sure about it because the study ... kind of medium-sized, the geographic atrophy slowing, there were not very many people who had geographic atrophy in the study. So, it's hard to know for sure, but the FDA has authorized it. So, it can be used, and now larger studies are going to be done that should be more definitive. So far, there's no evidence that it's harmful, and there's a possibility that it might be helpful.

DR. DIANE BOVENKAMP: Okay, great. I'm just going to mention that in regard to treatment, we get a lot of questions about stem cell therapy, but we're going to be covering that topic in depth on next month's Chat. So, don't need to mention about that, but our listeners want to just know in general, where can they find out about clinical trials for AMD?

DR. JOSHUA DUNAIEF: The best information comes from the retina specialists, who will typically know about the active clinical trials and which clinical trial a specific patient might qualify for. If somebody wants to go on the internet and look for them, you can type in ClinicalTrials.gov and then search for AMD clinical trials, and you'll see a list. It's not so easy from that to figure out which ones are enrolling patients and which ones you might qualify for given your stage of macular degeneration. So, really, the retina specialist is the best way to find out who might qualify for which trials.

DR. DIANE BOVENKAMP: Great. And then Bright Focus also has some information on our website. We'll some links below at the end of the transcript. One of the things that

is really interesting is that uncorrected vision loss is now listed as one of the risk factors for dementia. That just seems to be interesting. Can you comment on this connection?

DR. JOSHUA DUNAIEF: Yeah, so it is interesting. There's a couple of levels to that. One is that macular degeneration and Alzheimer's share some mechanisms, like inflammation and oxidative damage. Smoking is a risk factor for both. So, some of the same things that are going on throughout the body could contribute to causing both diseases. Also, for people who have macular degeneration and lost a lot of central vision, they may reduce the amount of stimulation they get and socializing and engagement, you know, with activities in their communities. And these are things that are thought to be important for preventing Alzheimer's or dementia. So, there are really two reasons why AMD and dementia are connected.

DR. DIANE BOVENKAMP: Great. Okay. So, I think that's all the time we have for questions today. We'll definitely bring you back maybe in a few more months or next year, maybe, and we'll have so many other listener questions to our list. Thank you so much, Dr. Dunaief.

DR. JOSHUA DUNAIEF: It's always a pleasure, Diane.

DR. DIANE BOVENKAMP: To our listeners, thank you for joining our Chat. We hope you found it helpful. I'd like to mention our website, www.BrightFocus.org, has a wealth of information about macular degeneration. Dr. Dunaief, before we close, I have one final question for you, and that is a big one: Do you have hope for a cure for macular degeneration in the near future?

DR. JOSHUA DUNAIEF: I do think that we're going to see better and better treatments as research continues, funded importantly by the NIH and by the BrightFocus Foundation and other foundations. All of the drugs that we talked about are the result of that kind of research that then got advanced into clinical trials, and there are a host of other drugs in the pipeline in early-stage clinical trials. And if I can make a brief, shameless plug about one of them, my lab is currently studying a form of fish oil, DHA, that is difficult to oxidize. So, it's like a fortified fish oil, and it appears to be very protective in early studies in mice. And we say that it prevents blindness in the three blind mice, and it's now entering clinical trials. It's a pill that people with initially geographic atrophy can use, and then I'm hoping that it'll also be useful for intermediate macular degeneration in the future.

DR. DIANE BOVENKAMP: Wouldn't that be wonderful that we don't have to have injections! A pill. That's amazing. We're going to be following your work. Again, you're so wonderful. Thank you so much. And to everyone who's listening, our next

Macular Chat will be on Wednesday, April 29. And thanks again for joining us. And this concludes today's Macular Chat.

Useful Resources and Key Terms

BrightFocus Foundation: (800) 437-2423 or visit us at www.BrightFocus.org. Available resources include—

- Amsler grid
- Macular Chats Archive
- Research funded by Macular Degeneration Research
- Overview of Macular Degeneration
- Treatments for Macular Degeneration
- Resources for Macular Degeneration

Helpful terms, prevention aids, or resources mentioned during the Chat include—

- Terms
- Wet macular degeneration, dry macular degeneration, geographic atrophy
- Drusen
- Chesapeake Bay Waterman Study
- Ocular histoplasmosis
- Myopia, pathologic myopia (nearsightedness)
- DHA (docosahexaenoic acid/fish oil)
- AREDS, AREDS2 vitamins
- Dry eye
- Ocular migraine
- Vitreous detachment
- Charles Bonnet syndrome
- Blood pressure medications: ACE inhibitors, ARBs, beta blockers

- Complement pathway
- Betadine
- Multifocal lenses, monofocal lenses (with cataract surgery)
- Oxidative damage
- https://www.macular.org/mindandbrain
- Risk factors
- Age
- Smoking
- Extreme nearsightedness, high myopia, pathologic myopia
- Traumatic eye injury
- Central serous
- Chronic sleep deprivation
- Sleep apnea
- Tips for Risk Reduction
- Keep to a healthy diet, such as cruciferous and green, leafy vegetables, and eating fatty fish, like salmon, twice a week. Limit red meat and foods high in refined sugar.
- Wear sunglasses in bright light to cut down on UV exposure to your eyes.
- Potential treatments
- Avastin, Eylea, Vabysmo
- Treatments for AMD
- Valeda light therapy
- ClinicalTrials.gov
- Vision aids
- Low vision optometrists and occupational therapists
- Bright lights in the home
- Bright tape to highlight uneven marking areas and such household items as stove dials

- Ask family to keep items where you've put them and avoid leaving items or pets in walking paths.