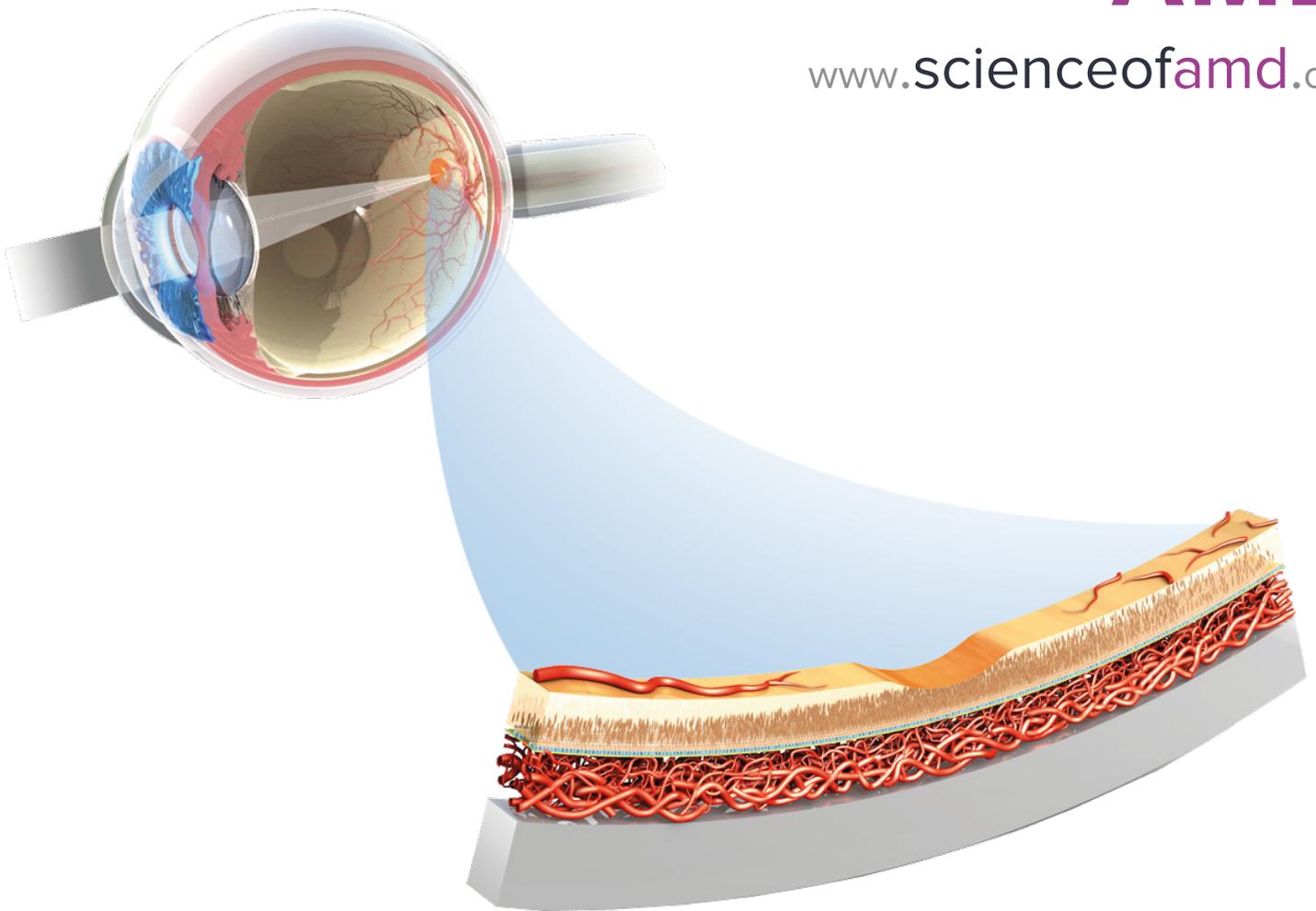




the
science
of **AMD**

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Our vision is to save your vision

Introduction: The Science of AMD

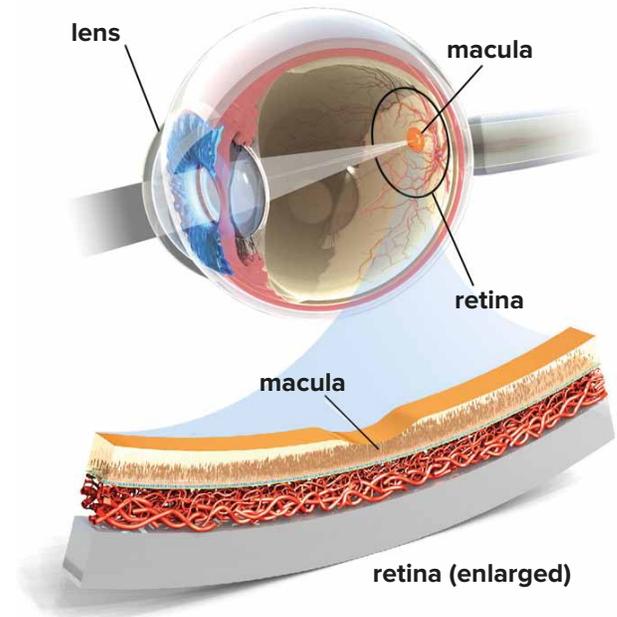
OVERVIEW

Age-Related Macular Degeneration (AMD) affects more than 30 million people worldwide and is the leading cause of blindness in people over the age of 50 in developed countries. Those affected by AMD may have difficulty with daily activities such as reading, driving, and recognizing faces. AMD has two forms, wet and dry, that both affect the macula—the part of the eye responsible for central vision.

OUR MISSION

The mission of the Angiogenesis Foundation is to prevent blindness and enhance the quality of life for people with wet AMD. We seek to empower patients worldwide, their advocates, and their healthcare providers with knowledge about antiangiogenic treatments for wet AMD.

“We believe that wet AMD as a cause of blindness will become a problem of the past. New treatments for wet AMD can prevent vision loss and save eyesight.”



TAKE ACTION

The Science of AMD resource is here to inspire you to take the steps necessary to prevent vision loss:

1. **LEARN** about wet AMD.
2. **FIND** the right kind of doctor to discover if you have wet AMD: a retinal specialist.
3. **GET** the right treatment for wet AMD. Early detection and treatment of AMD are crucial to preserving your vision.
4. **KEEP UP** with the treatment – wet AMD is a chronic disease, so saving your vision requires lifelong treatment.
5. **SPREAD** the word about wet AMD to your friends, family, and colleagues.



LEARN: The Science of AMD

WHAT IS AMD?

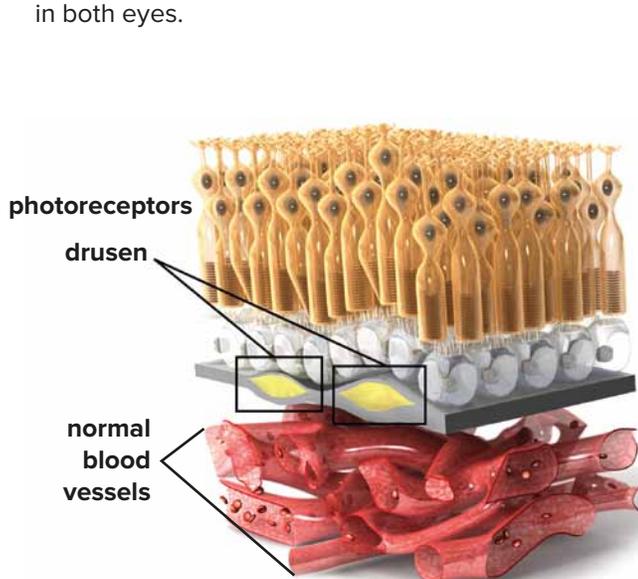
Age-related macular degeneration (AMD) is a disease associated with aging that gradually destroys the sharp, central vision needed to read, recognize faces, drive a car, and in general see things clearly. AMD affects the macula, which is located in the center of the retina, the light-sensitive tissue at the back of the eye. The macula is the part of the eye needed to see fine details.

DRY AMD

Dry AMD is the most common form of AMD and occurs in multiple stages. In the early stages of dry AMD, yellow deposits known as drusen begin to accumulate in the back of the eye. Drusen can vary in size and number, and are considered a natural part of the eye's aging process.

Over time, the disease can progress into advanced dry AMD and eventually wet AMD. In advanced dry AMD, the progressive increase in the number and/or size of drusen is accompanied by the deterioration of the light-sensing cells and surrounding tissue in the macula. This causes significant vision problems.

One eye or both eyes may be affected by AMD. When only one eye is affected, vision loss is harder to detect because the "good eye" works harder to compensate for the affected eye. Thus, frequent self eye exams and regular visits to a retinal specialist are needed to keep tabs on visual acuity in both eyes.



“Periodic eye examinations are crucial for people at risk for wet AMD.”

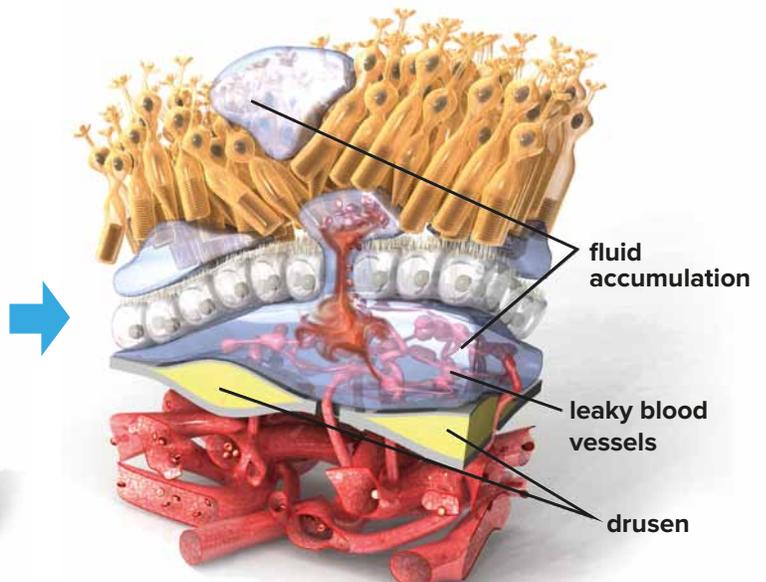
WET AMD

Wet AMD, also called neovascular macular degeneration, is the most severe form of AMD. About 10% to 15% of people with dry AMD will progress to the wet form.

In wet AMD, blood vessels grow abnormally beneath the macula, through a process called angiogenesis. These abnormal vessels leak fluid and blood, which may cause a blister-like pocket to form beneath the macula. These blisters distort vision in the affected eye, making straight lines appear wavy. The patient may see a dark spot or various spots in the center of their vision. This is due to blood or fluid collecting under the macula.

Unlike dry AMD, which develops slowly and in stages, wet AMD can rapidly progress and damage the macula, causing a loss of central vision. Periodic eye examinations are crucial for people at risk for wet AMD. If wet AMD is left untreated, bleeding in the eye can cause scar tissue to form, leading to irreversible vision loss.

The good news is that there are now several effective, FDA approved treatments for wet AMD. These treatments can stabilize or, in some cases, reverse vision loss if used before scar tissue forms.



Wet AMD and You: Risk Factors

AM I AT RISK FOR AMD?

There are various factors that can put you at risk for AMD:

- ▶ **Age** is the greatest risk factor. Your risk starts increasing at age 50.
- ▶ If you have **immediate family members who have been diagnosed** with AMD, you are at a higher risk of developing the disease.
- ▶ If you have **AMD in one eye**, you are at higher risk of developing AMD in the other eye.
- ▶ **Smokers** are two to three times more likely to develop AMD than non-smokers.
- ▶ **Women** have a slightly higher risk of developing AMD.
- ▶ **Obesity** increases the progression of early AMD to advanced AMD.
- ▶ Uncontrolled **high blood pressure** increases the risk of developing AMD.
- ▶ **Genetic** factors also contribute to risk of AMD.



WHAT CAN I DO TO DECREASE MY RISK?

- ▶ Do not smoke.
- ▶ Maintain a healthy body weight.
- ▶ Monitor your blood pressure.
- ▶ A diet high in leafy, dark green vegetables, and fruit, lowers the risk of developing AMD. These foods contain substances that naturally balance angiogenesis.
- ▶ Eat fish high in omega-3 fatty acids and avoid other dietary fats to lower your risk.
- ▶ Regular exercise may decrease your risk of developing AMD.

Wet AMD and You: Symptoms

IMPORTANCE OF EARLY DIAGNOSIS

Wet AMD is associated with impaired quality of life, social isolation, clinical depression, increased risk of accidental falls and hip fractures, and premature admission to nursing homes. The important thing to know is that wet AMD can be treated. You must recognize the symptoms and take immediate action to seek effective treatment.



Early detection is the key to saving as much vision as possible. Regular eye exams are critical because in the early stages of AMD, there may be few or only subtle, barely noticeable symptoms. Going to a retinal specialist to be tested for AMD is the most important first step.

If wet AMD is left untreated, irreversible vision loss can occur. Prompt diagnosis and early treatment can preserve as much vision as possible by stabilizing the disease and preventing further decline of vision.

Is it possible to reverse vision loss due to wet AMD?

Yes. New treatments have been found in some individuals to reverse vision loss.

MAIN SYMPTOMS OF AMD

In its early stages, AMD may not cause any noticeable symptoms. Over time, you may notice blurring of vision, particular difficulty seeing sharp details, both up close and from a distance. Straight lines appear wavy or fractured in parts of the visual field. You may notice distortions of lines and shapes in everyday objects, such as crooked doorframes.

Here are some other **warning signs**:

- ▶ A blurry or dark spot appears in the center of your vision
- ▶ Faces begin to blur
- ▶ It becomes difficult to distinguish colors
- ▶ Contrast sensitivity decreases
- ▶ Adjusting from bright to dim lighting becomes challenging
- ▶ Depth perception is impaired
- ▶ Sensitivity to bright lights increases
- ▶ Vision improves at night
- ▶ Close work like threading a needle becomes impossible

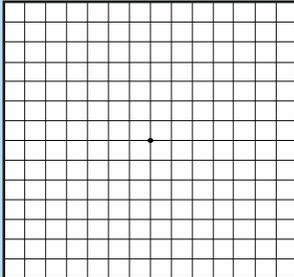
Note: these symptoms may change from day to day.



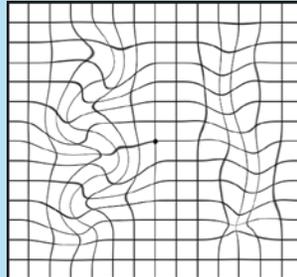
TREAT: Getting Diagnosed

HOW DOES A DOCTOR TEST FOR AMD?

Distortions in vision are detected through a simple test using an Amsler grid. Your retinal specialist will look for signs of blind spots and visual distortions when viewing the grid. Using an Amsler allows for detection of very subtle changes in your vision, which can occur even when there is a small amount of fluid under your macula.

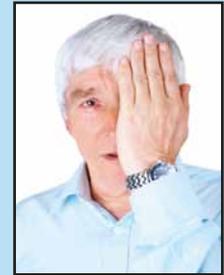


Amsler Grid



Distorted View

Test yourself at home for wet AMD by checking your vision in each eye individually and looking for signs of distortions. You can use a print-out of an amsler grid or simply look at your surroundings and pay close attention to how things appear.



Self Test

WET AMD TREATMENTS

There are a growing number of effective treatment options available for wet AMD. Treatments aimed at angiogenesis (new blood vessel growth) in the eye are called “antiangiogenic” therapies or “anti-VEGF” therapies. The VEGF (Vascular Endothelial Growth Factor) family of proteins stimulates the growth of new blood vessels. Anti-VEGF therapies can slow the progression of wet AMD and in some cases improve vision. The treatments are especially beneficial when they are used before scar tissue develops, when therapy can prevent irreversible vision loss.

Anti-VEGF Therapies

There are four different VEGF inhibitors that have been shown to be effective for wet AMD:

Macugen (Pegaptanib) – first VEGF inhibitor to be approved for treating wet AMD

Lucentis (Ranibizumab) – highly effective treatment for wet AMD

Eylea (Aflibercept) – highly effective treatment for wet AMD, prescribed with a lower dosing frequency

Avastin (Bevacizumab) – cancer drug with anti-VEGF activity that has been prescribed as an off-label therapy by retinal specialists to treat wet AMD

All anti-VEGF therapies for wet AMD are injected into the eye by a retinal specialist. Retinal specialists are trained to perform this simple procedure in a safe and painless way. The frequency of treatment is determined by a retinal specialist based on your condition.

“Anti-VEGF therapies can slow the progression of AMD and in some cases improve vision.”

KEEP UP WITH TREATMENTS

It is important to remember that wet AMD is a chronic disease that requires lifelong monitoring and treatment. With the current anti-VEGF therapies, regular treatments are required to maintain control over angiogenesis and to preserve vision. If treatments are not followed according to the retinal specialist’s orders, vision may still deteriorate and blindness may result.

TREATMENT RISKS

Anti-VEGF therapies are all safe treatments when given by trained retinal specialists. All drugs, however, have risks that need to be balanced with their benefits.

For anti-VEGF therapies, those risks include:

- ▶ Eye infection
- ▶ Increased eye pressure
- ▶ Retinal detachment
- ▶ Vitreous floaters: tiny clumps of gel or cells moving around the fluid in the back of the eye.
- ▶ Other commonly reported adverse events include: inflammation, blurred vision, conjunctival hemorrhage, eye irritation, and eye pain.

TREAT: Current Antiangiogenic Treatments

MACUGEN (Pegaptanib)

Macugen specifically targets VEGF and helps to slow vision loss but does not improve vision. It is injected directly into the eye, and is administered once every six weeks. Macugen stabilizes vision in approximately 65% of people. Data from clinical trials involving 1,200 patients with wet AMD have shown that after treatment, more than half of individuals lost fewer than three lines of visual acuity on the eye chart.



Graphical representation of Macugen

LUCENTIS (Ranibizumab)

Lucentis is a type of anti-VEGF drug called a monoclonal antibody fragment that was developed to treat retinal diseases. It is injected directly into the eye, and can stabilize or even improve vision loss. According to the Lucentis package label, best results occur when Lucentis is given every month. Some Retinal Specialists give Lucentis less frequently than every month.

Data from clinical trials involving more than 1,300 people have shown that after two years of treatment, monthly injections of Lucentis stabilizes vision for about 90% of patients (their vision did not get significantly worse). Vision improved significantly for approximately 30% of treated patients.



Graphical representation of Lucentis

EYLEA (Aflibercept)

Eylea is a type of anti-VEGF drug known as a fusion protein and is directly injected into the eye to treat wet AMD. Eylea targets VEGF, as well as another protein called Placental Growth Factor (PlGF), which has also been found in excess amounts in the retina of people with wet AMD. After an initial 3 monthly injections, further injections of Eylea every other month show comparable effectiveness with monthly injections of Lucentis.

Clinical trials of about 2,400 people with wet AMD compared monthly injections of Lucentis with injections of Eylea given monthly for three months, and then given every other month. After one year of treatment, bimonthly Eylea was shown to improve or maintain vision in AMD patients at a level comparable to monthly Lucentis. The safety of both drugs was also comparable. Overall, patients who were given Eylea needed fewer injections to achieve the same effectiveness as monthly injections of Lucentis.



Graphical representation of Eylea

Off-Label AVASTIN (Bevacizumab)

Avastin is a type of anti-VEGF drug called a monoclonal antibody developed for the treatment of cancer (which also depends on angiogenesis for disease progression). Avastin is structurally similar to Lucentis. Some retinal specialists treat wet AMD patients with Avastin, reformulated to be injected directly into the eye. Since Avastin injections have been shown to be similar to Lucentis in how well they treat wet AMD, some retinal specialists use Avastin because it is significantly less expensive than Lucentis. Injections of Avastin can be given monthly or less often, on a schedule determined by the Retinal Specialist. Avastin has not been approved by the FDA to be used in the eye.



The Angiogenesis Foundation is the world's first and leading nonprofit organization dedicated to conquering diseases using a groundbreaking approach based on angiogenesis, the growth of new blood vessels in the body. Angiogenesis is the “common denominator” in society's most feared diseases, including wet AMD.

Understanding the science behind wet AMD and its treatment guides patients, their advocates, and ophthalmologists to understand the consequences of complacency and the evidence-based need for proactive care and regularized treatments. We believe everyone affected by wet AMD should be empowered with knowledge of available treatments and an understanding of the practical steps they can take to protect their vision.



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