

What is age-related macular degeneration?

Age-related macular degeneration, commonly referred to as AMD, is a retinal degenerative disease that causes a progressive loss of central vision. AMD is the most common cause of blindness in individuals over the age of 55 in developed countries. More than 10 million people in the United States have AMD.

What is the biology behind AMD?

The retina is packed with photoreceptors, the cells that enable us to see. Photoreceptors convert light into electrical impulses, which are transferred to the brain via the optic nerve. The macula is a small region in the center of the retina that's rich in cones, the photoreceptors that enable a person to perceive fine details and objects in daylight or lighted conditions. Central vision loss from AMD occurs when photoreceptors in the macula degenerate.

What are the symptoms of AMD?

People with AMD may first notice a blurring of central vision, especially during tasks such as reading or sewing. Also, straight lines may appear distorted or warped. As the disease progresses,

blind spots may form within the central field of vision. In most cases, if one eye has AMD, the other eye has the condition or is at risk of developing it. The extent of central vision loss varies and can depend on the type of AMD — dry or wet.

What is dry AMD?

Dry AMD accounts for about 90 percent of all cases and usually causes less vision loss than wet AMD. A characteristic of dry AMD is the accumulation of tiny protein and fat deposits known as drusen underneath the retina. Many people have drusen, which do not affect vision. However, drusen may interfere with the health of the macula, causing progressive degeneration of the photoreceptor cells and vision loss.

Reduction in central vision from dry AMD occurs gradually over many years. Vision may even remain stable between eye examinations. People with dry AMD may not experience a total loss of central vision, but tasks that require the ability to perceive details may become more difficult.

Most people with AMD start off with the dry form, which puts them at risk for developing wet.

AGE-RELATED MACULAR DEGENERATION, Continued

What is wet AMD?

Wet AMD accounts for about 10 percent of all cases of macular degeneration. With wet AMD, abnormal blood vessels grow beneath the macula. These vessels leak blood and fluid into the macula and damage photoreceptor cells. Wet AMD often progresses rapidly and causes substantial loss of central vision, if left untreated.

What treatments are available for AMD?

Several therapies are now available for the wet form of AMD. Most involve regular ocular injections to halt the growth of leaky, vision-robbing blood vessels.

The Foundation is funding dry AMD research, as well as approaches for preventing all forms of AMD. Current AMD treatments include the following.

AREDS formulation — The Age-Related Eye Disease Study (AREDS) — a landmark investigation conducted by the National Eye Institute (NEI) — determined that antioxidant supplementation can slow the progression of AMD. The AREDS formulation is an over-the-counter antioxidant supplement recommended for people who are at risk of developing more advanced forms of dry or wet AMD.

The AREDS formulation includes the antioxidants beta carotene, vitamin E, and vitamin C, as well as the nutrients zinc and copper. The AREDS formulation

contains specific amounts and forms of antioxidants nutrients; do not try to substitute multivitamins or dietary nutrients for the AREDS formulation.

The NEI has completed a second AREDS study (AREDS2), which led to the recommendation that lutein replace beta carotene in the original AREDS formula.

EYLEA™ (aflibercept) — Regeneron's wet AMD treatment, Eylea, blocks the development of unhealthy blood vessels underneath the retina. Regeneron reports that in clinical trials, Eylea treated wet AMD as effectively as Lucentis, but with fewer intraocular injections. Typically, patients are treated monthly with Eylea for three months and every other month thereafter. Eylea was FDA approved in 2011.

Lucentis™ (ranibizumab) — Developed by Genentech, Lucentis is effective in reducing the risk of losing vision from the abnormal blood vessel growth under the retina associated with wet AMD. The treatment was approved by the FDA and made available in 2006. A two-year study showed that 95 percent of people with wet AMD who received monthly injections of Lucentis experienced no significant loss in visual acuity from baseline. Genentech also reported moderate visual improvement in 24.8 percent of participants treated with a 0.3 mg dose of Lucentis and 33.8 percent of participants treated with a 0.5 mg dose.

A colorectal-cancer drug called Avastin® — a drug similar to Lucentis — has been used “off-label” by some ophthalmologists to treat wet AMD. The NEI completed a large-scale, two-year clinical study comparing Avastin and Lucentis. Results of the study showed that the drugs were similar in safety and efficacy.

Vision-enhancing implantable telescope — The FDA has approved the use of an implantable miniature telescope (IMT) for enhancing the central vision of people with end-stage, untreatable age-related macular degeneration (AMD). The IMT provides improved central and detailed vision by focusing and magnifying images onto the functional, outer regions of the recipient’s retina. People with advanced AMD normally experience degeneration of the macula or central region of the retina. The IMT was developed by VisionCare Ophthalmic Technologies.

Is AMD an inherited disease?

Researchers have discovered that genetics can play a significant role in AMD risk. In 2005, three groups of researchers, including a team funded by the Foundation, discovered that a gene called Complement Factor H (CFH) is linked to at least 50 percent of all cases of AMD. Since that breakthrough, researchers have found several other genes linked to AMD. CFH and many of the other AMD genes are involved in the

innate immune system, which fights off infection. Scientists believe that over activity of the innate immune system increases AMD risk.

What are the other risk factors for AMD?

Smoking is the single greatest modifiable risk factor for AMD. Diet, sunlight exposure, and hypertension may also be linked to AMD risk. Experts recommend a diet that is rich in fruits and vegetables for minimizing AMD risk. They also recommend that people protect their eyes from bright sunlight by wearing sunglasses and a wide-brimmed hat.

Low-vision resources and extensive information on research and clinical trials for AMD are available at www.FightBlindness.org.