

# Macular Degeneration

**A**ge-related macular degeneration (AMD) is a vision disorder caused by abnormalities in a portion of the eye's retina called the macula. Early symptoms of AMD are blurred central vision and a waviness of straight lines. The blurriness may progress to blind spots, affecting reading, TV watching and many other pleasures of independent living. There are two stages of AMD. Early AMD is far more common but late AMD has a far greater impact on vision.

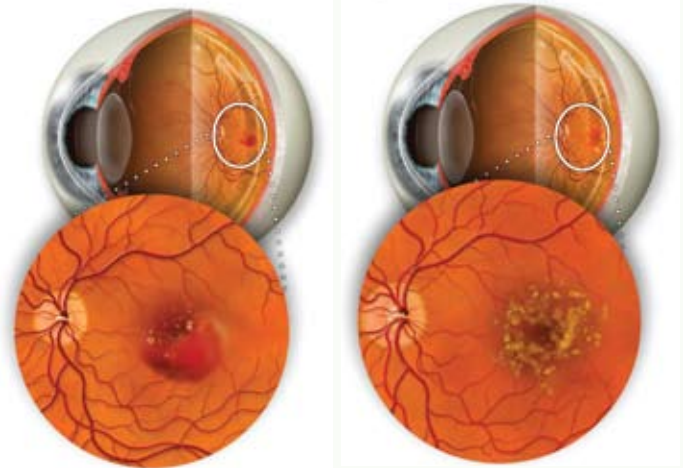
Early AMD is characterized by tiny clusters of soft, plaque-like deposits called drusen. Early AMD progresses slowly and central vision typically remains intact. Early AMD can advance to late AMD.

Late AMD can be subdivided into the dry, or non-neovascular, form and the wet, or neovascular, form (*see illustration*). Dry AMD is characterized by more extensive pigmentary abnormalities in the macula and by a somewhat extensive loss of pigment cells and vision cells in the central macula. It is called dry because it is not associated with abnormal blood vessels or leakage of blood or fluid.

Wet AMD occurs in about 10% of patients who have late AMD. It is characterized by an overgrowth of blood vessels, behind the macula, that leak blood or fluid or both. This leads to damage of the vision cells.

Age is the single greatest risk factor for macular degeneration. An estimated 1.75 million Americans over age 40 have decreased vision from AMD. That number is expected to increase to 3 million by 2020. Research is advancing to understand and prevent macular degeneration, to halt its progression, and to develop optical devices to offset vision loss.

**Wet Macular Degeneration**      **Dry Macular Degeneration**



**Extensive drusen deposits (right) or leaky blood vessels under the macula can cause changes in vision.**

## Important Vision Saving News

Studies supported by Research to Prevent Blindness (RPB) show that lifestyle choices may influence the onset and progression of AMD.

- Current and past smokers have increased risk of AMD.
- Moderate or high blood pressure appears to be linked to wet AMD.
- Lowering overall dietary fat while increasing omega-3 essential fatty acids (found largely in fish) may reduce risk of advanced AMD.
- Obesity dramatically increases the risk of developing AMD in those with genes associated with the disease.

## Recent Strides by Researchers

- Restored vision lost to AMD in mice using stem cells
- Demonstrated ability to grow photoreceptor cells from non-embryonic stem cells
- Identified AMD-related genes connected to most AMD patients
- Advanced therapies to help control faulty blood vessel growth beneath macula

## Hope Through Research

**R**esearch to Prevent Blindness (RPB) mobilizes financial resources in support of eye research, making available essential laboratory space, sustaining scientific personnel and providing advanced technological equipment in its mission to preserve vision and restore sight.

### Blind mice see again

Scientists have restored vision in mice with retinal degeneration using transplanted stem cells. While restoring vision in humans through a similar process is still years away, according to the researchers, the groundwork has been established for an approach that may also be applied to transplantation-based therapies for other neurodegenerative diseases.

### You see how you eat

Findings show that more frequent fish intake and higher levels of omega-3 fatty acids reduce AMD risk, but they also show that the protective effects of omega-3 fatty acids depend on a proper ratio between omega-6 fatty acids (found in processed foods containing or cooked in vegetable oils) and omega-3 fatty acids. The ideal ratio is approximately 3/1 omega-6/omega-3 fatty acids. The average American diet currently ranges from 10/1 to 50/1.

### Exercise to avoid AMD

One report indicates that, in people over 75, exercising at least three times a week has been connected to a lower incidence of AMD. Another report goes further, finding that exercising enough to sweat, three times a week, reduces the likelihood of developing AMD 70% for people 43-86.

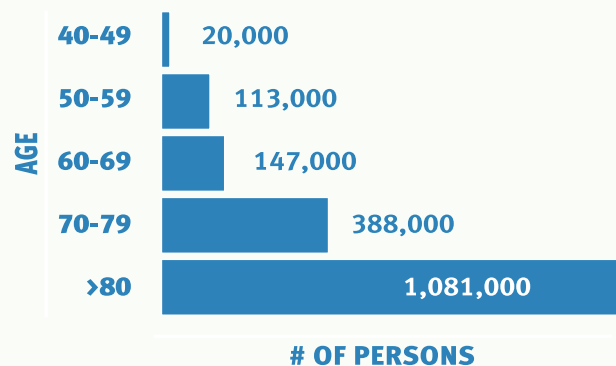
### Keep in Mind

Certain factors increase a person's risk for AMD, including the following:

- Older age
- Family history of AMD
- Diet high in vegetable oils and/or animal (but not fish) fat
- Cigarette smoking
- Elevated blood pressure
- High body mass index

Discuss your AMD risk factors with an eye care professional. Regular eye exams are important for maintaining healthy vision.

## Prevalence of AMD Among U.S. Adults



## Restoring Sight Lost to AMD

RPB scientists have identified adult retinal cells, called Muller glia, that may function as stem cells. What is most compelling about these Muller cells is that they can be stimulated under appropriate conditions, without transplantation, to repair damaged retinas.

On another front, patients will soon test a smaller artificial retina that contains four times as many electrodes as the earlier version. RPB resources have been used to develop a polymer that will allow future versions of the implanted retina to contain many more electrodes, hopefully producing greater visual information.

## Invest in Your Vision

You can join RPB in supporting critical research in the fight against vision loss by sending your tax-deductible donation to the address shown below or online at [www.rpbusa.org](http://www.rpbusa.org). You may also call RPB at (800) 621-0026. All donations, up to a million dollars, are doubled through the Jules and Doris Stein Matching Fund. *RPB is a public 501(c)(3) foundation.*

