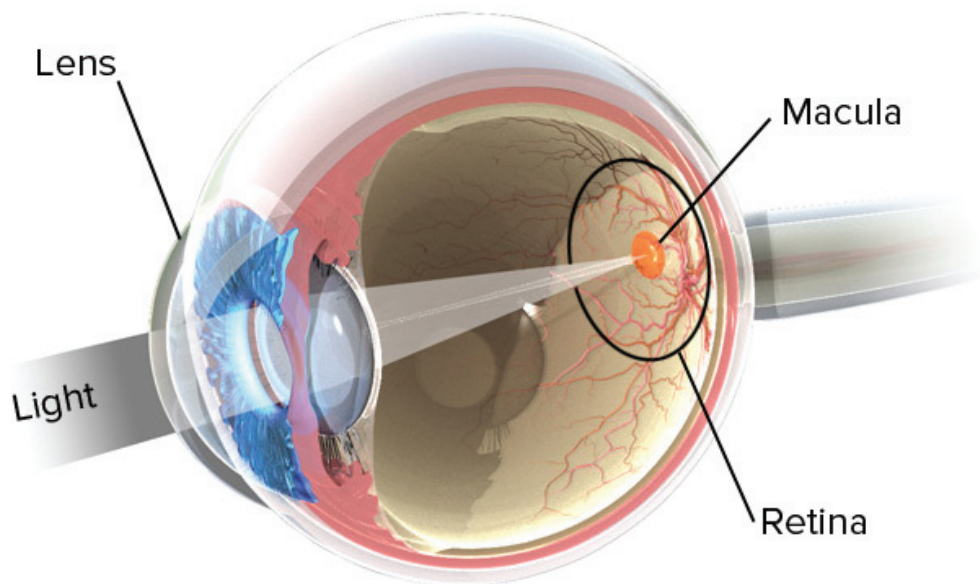


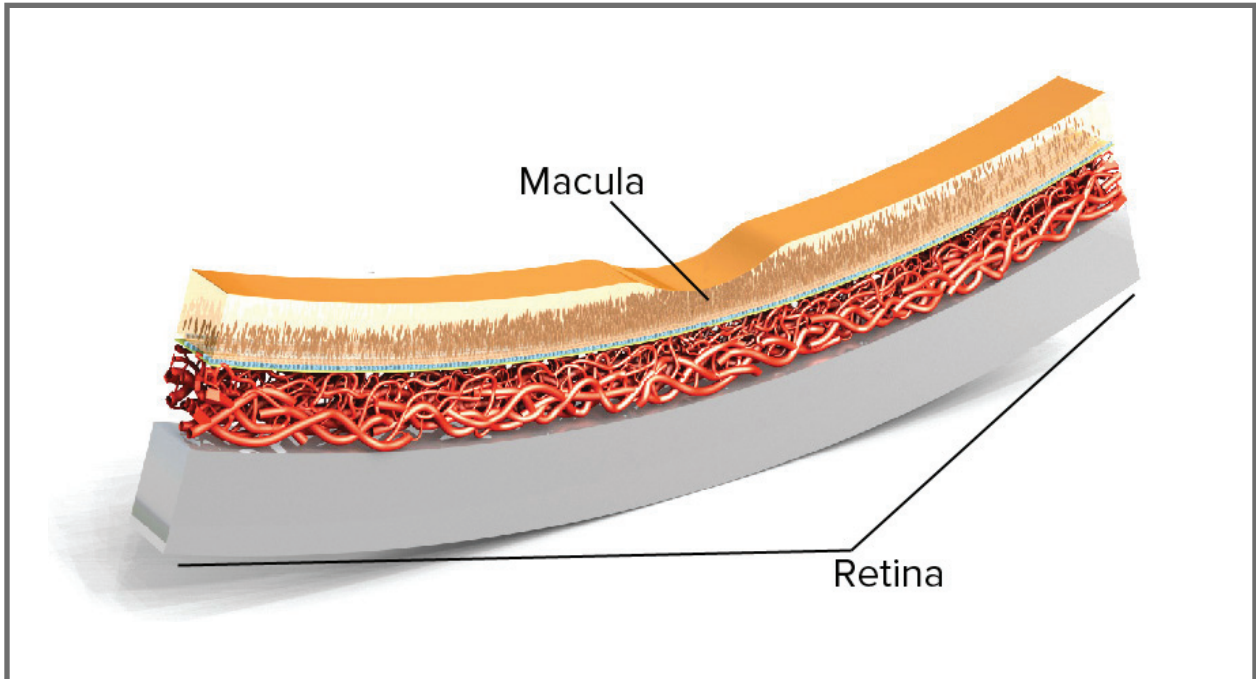


# the science of **AMD**

An illustrated explanation of AMD: learn how AMD causes visual impairment.



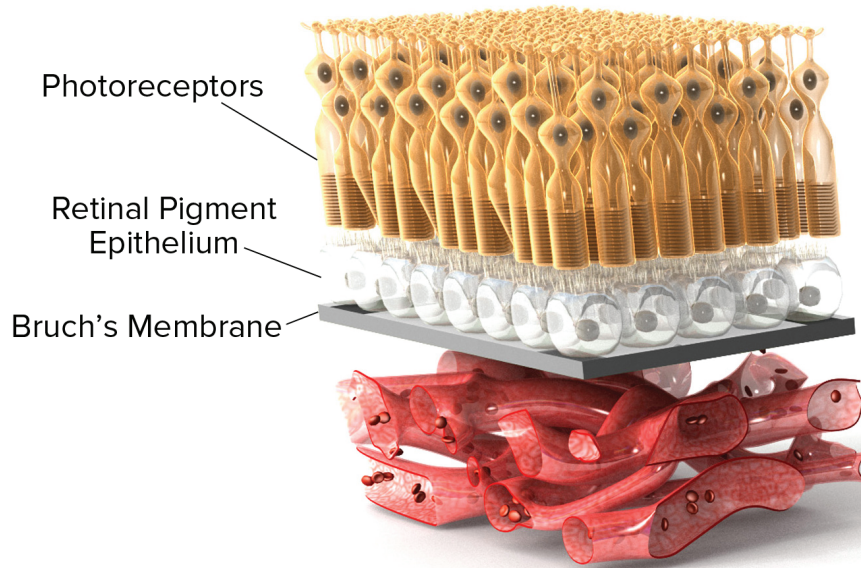
Age-Related Macular Degeneration (AMD) is a disease that causes progressive damage to the macula, a central region of the retina. The retina is the light receiving nerve layer located in the back of the eye.



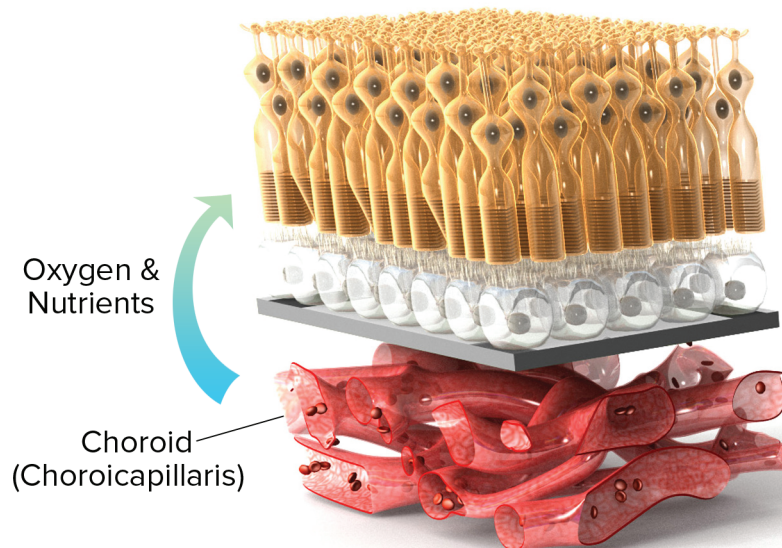
The macula contains the densest population of nerve cells, called photoreceptors, and is particularly important for seeing detail and maintaining the central part of our vision.



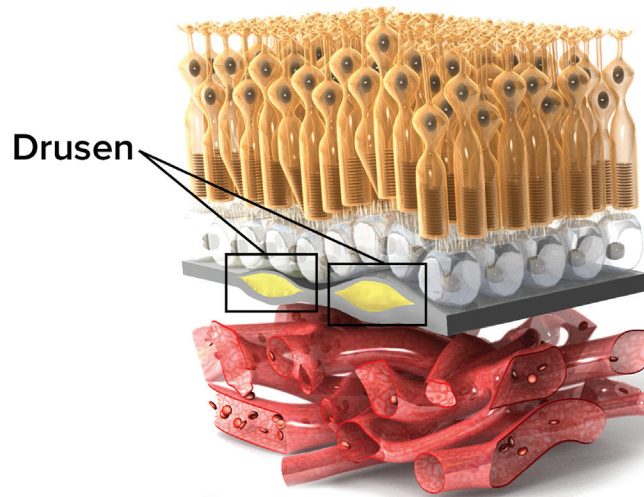
Central vision is important for ordinary daily activities like reading, driving, dialing the telephone, and recognizing faces.



The macula is composed of several layers of specialized cells. A layer of photoreceptors sits atop a layer of cells called retinal epithelial cells (RPE). Underneath these two upper layers is a thin lining called Bruch's membrane.

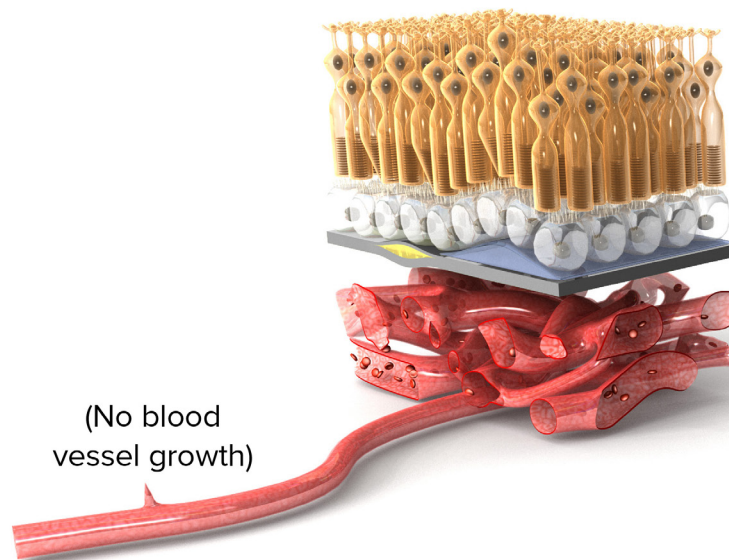


Beneath Bruch's membrane is the choroid, a network of blood vessels called the choriocapillaris that provide oxygen and nutrients to the macula.

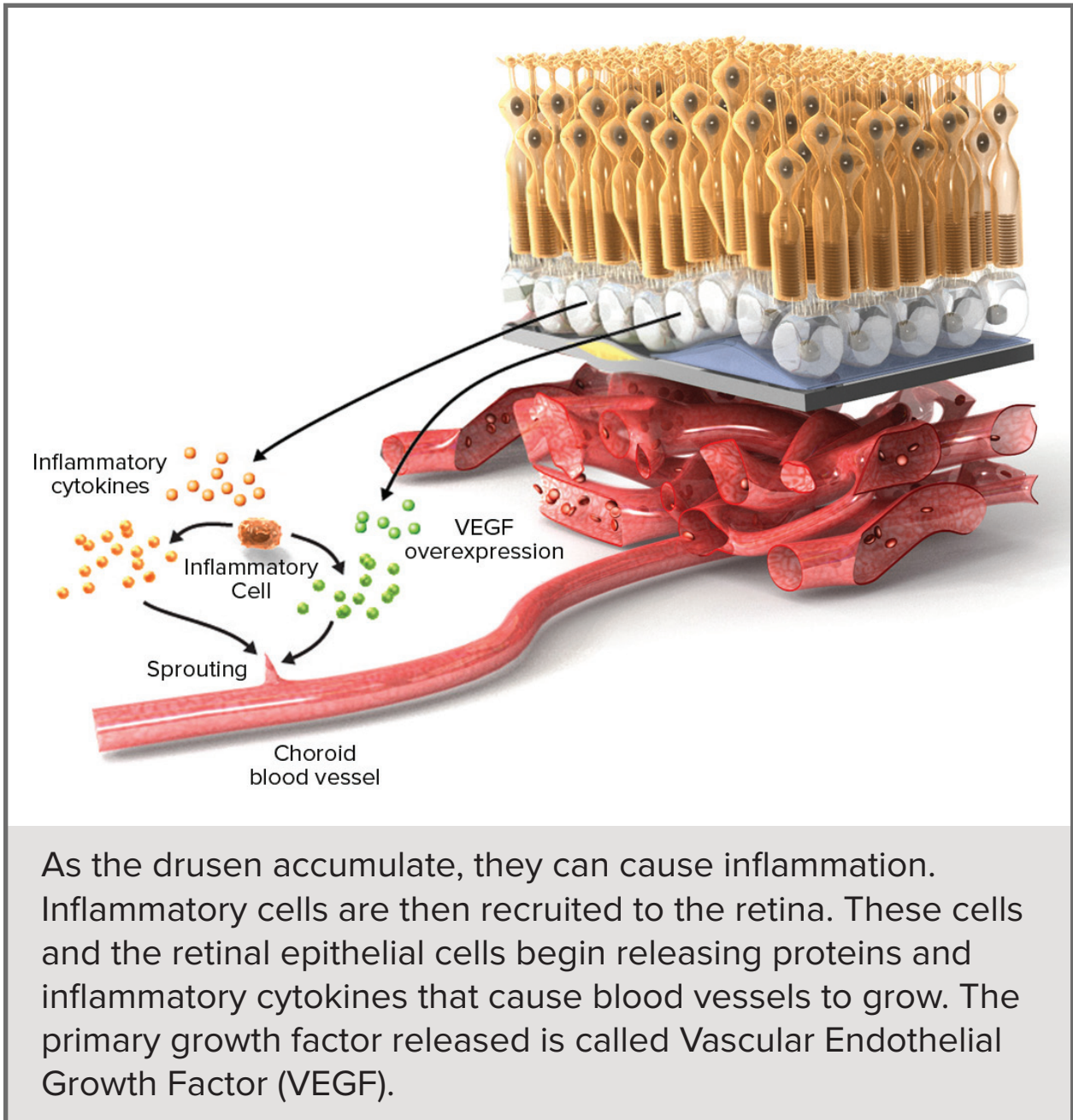


Although the exact cause of AMD is not known, as the eye ages, debris from the retinal pigment epithelial (RPE) cell layer and surrounding tissues accumulates between Bruch's membrane and the RPE.

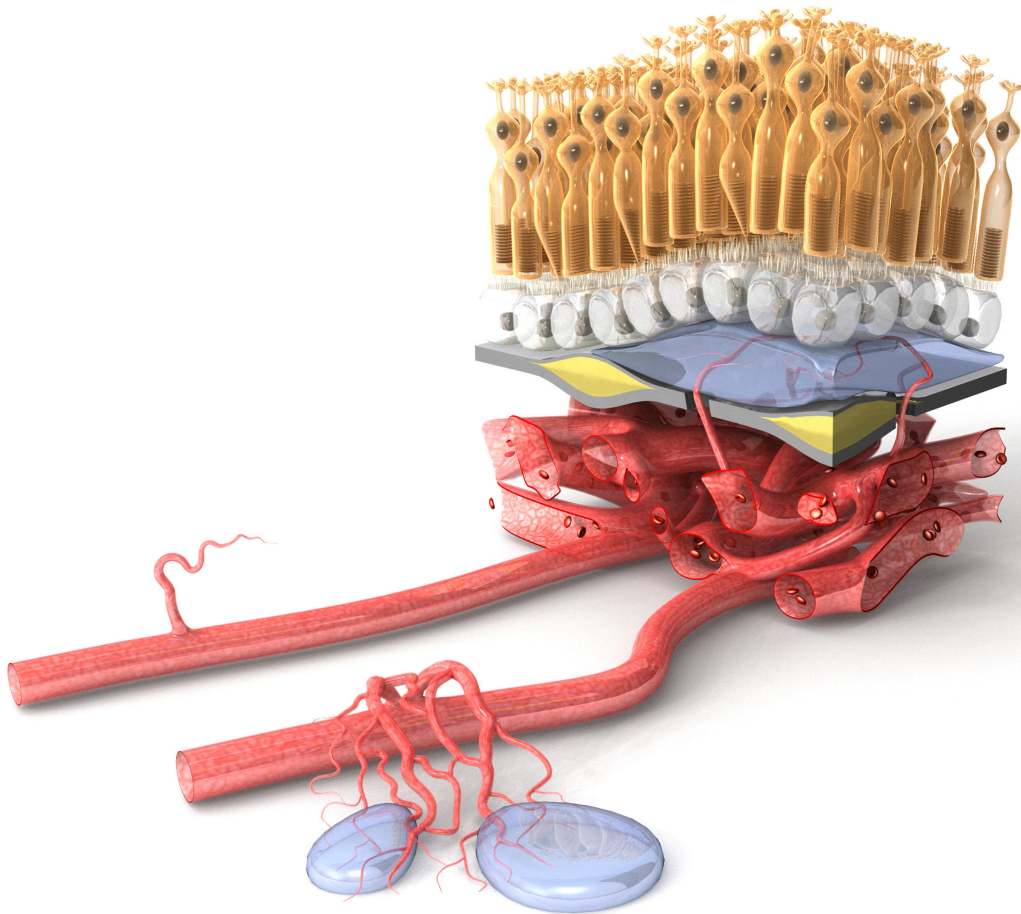
The debris form deposits called drusen above Bruch's membrane. The presence of many small drusen or one or a few large drusen is usually the first sign of early dry AMD.



In a healthy eye, the blood vessels feeding the macula exist only beneath Bruch's membrane and do not grow into the retina.

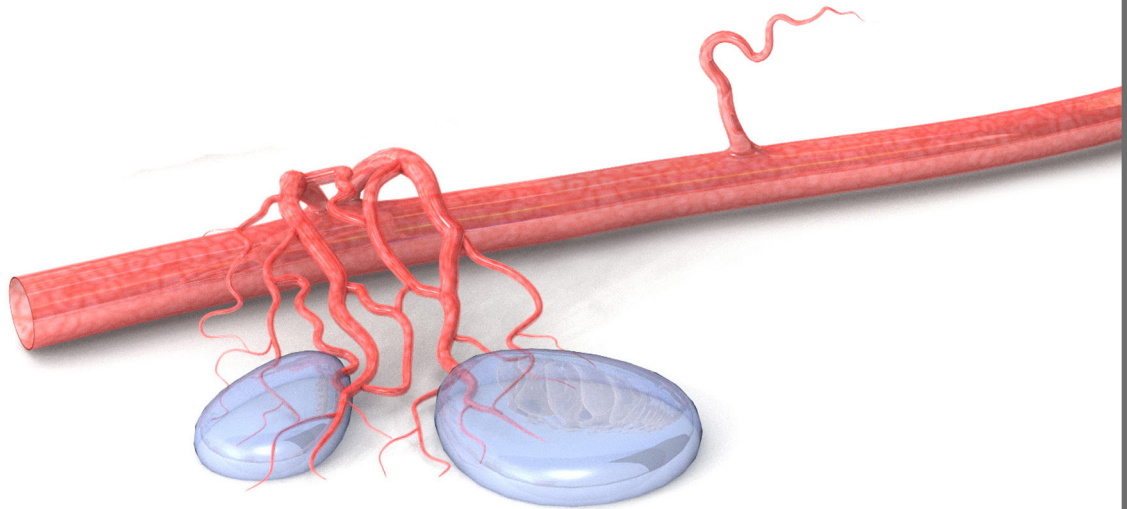


As the drusen accumulate, they can cause inflammation. Inflammatory cells are then recruited to the retina. These cells and the retinal epithelial cells begin releasing proteins and inflammatory cytokines that cause blood vessels to grow. The primary growth factor released is called Vascular Endothelial Growth Factor (VEGF).

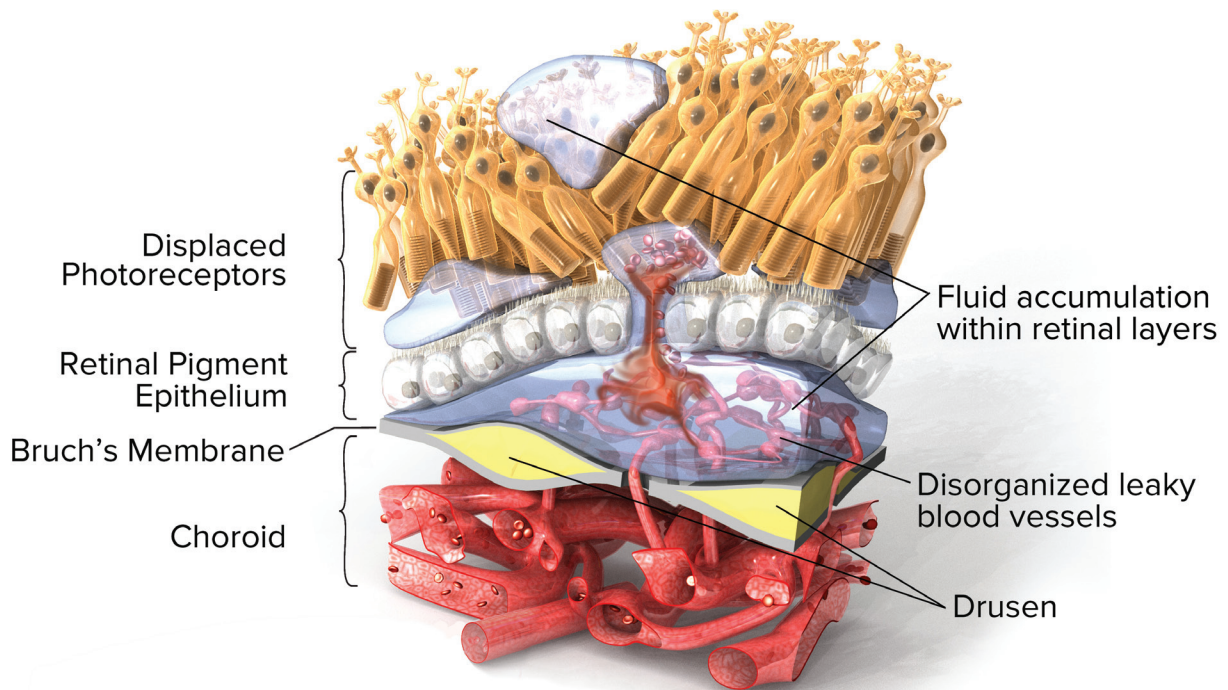


The VEGF protein diffuses into the choriocapillaris, stimulating the growth of new blood vessels. This process is called angiogenesis. The new blood vessels sprout and grow into and through the weakened Bruch's membrane.

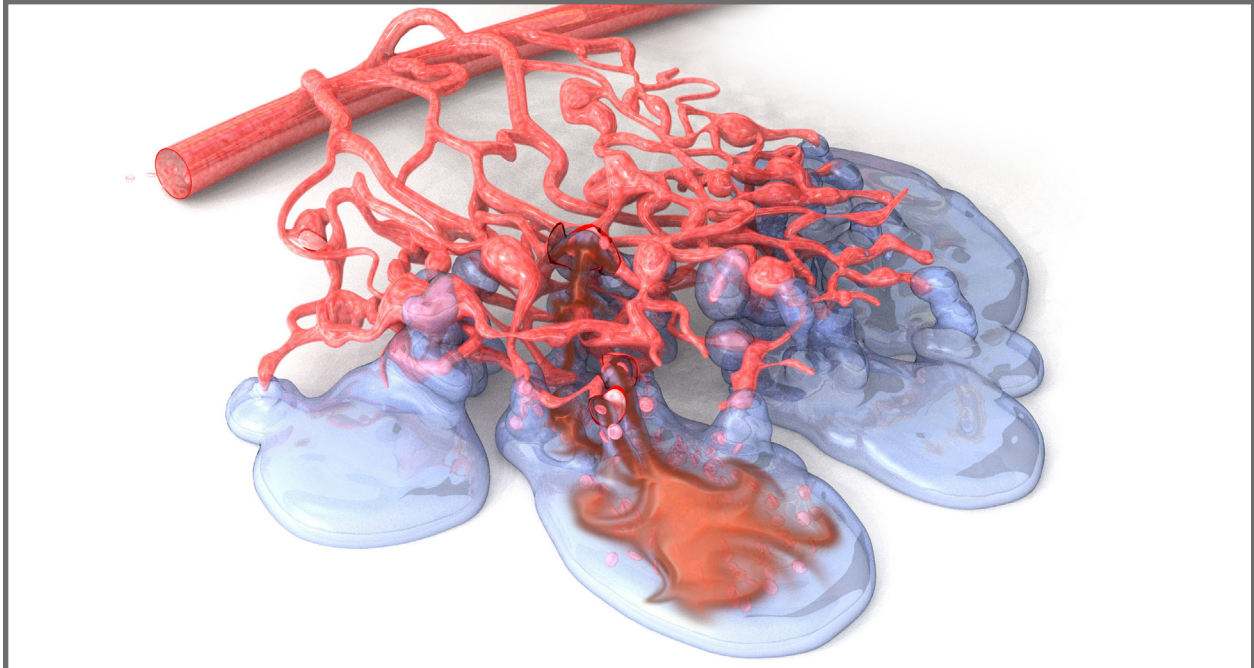
At this point, the condition progresses from dry AMD to a more serious form called wet AMD.



These growing blood vessels are abnormally leaky, which allows fluid to seep into the layers of the macula.



Fluid accumulates between Bruch's membrane and the layer of photoreceptors, damaging to the delicate nerves required for vision. If left untreated, this condition causes permanent vision loss.

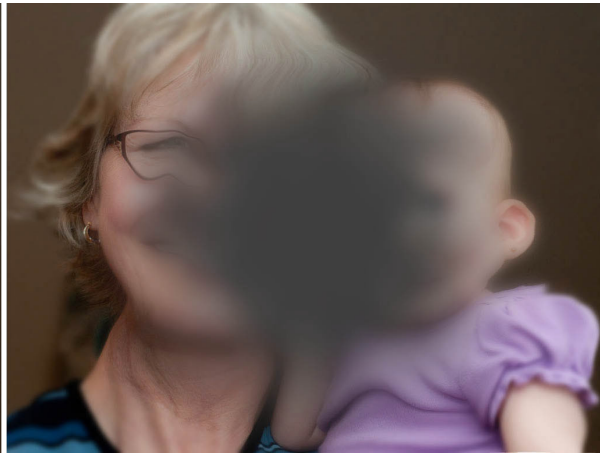


These abnormal blood vessels are also at risk for bleeding, which can permanently scar the macula.

no AMD



wet AMD



In the photos shown here, the first represents normal vision, while the second shows the effects of wet AMD.

The most severe form of wet AMD causes central vision loss and can make daily tasks such as reading, driving, and recognizing faces impossible.