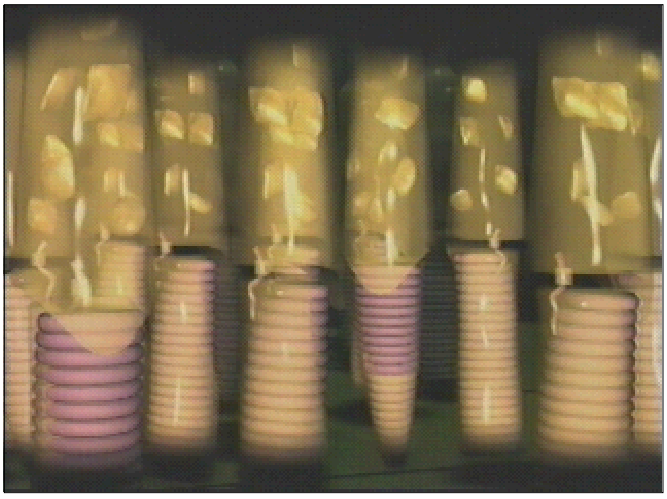
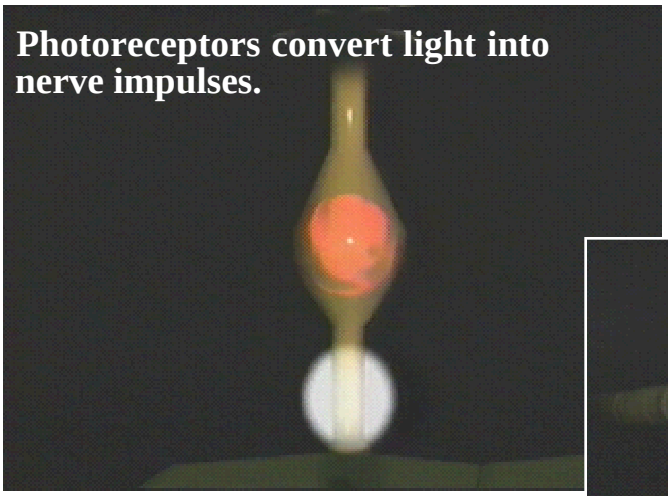
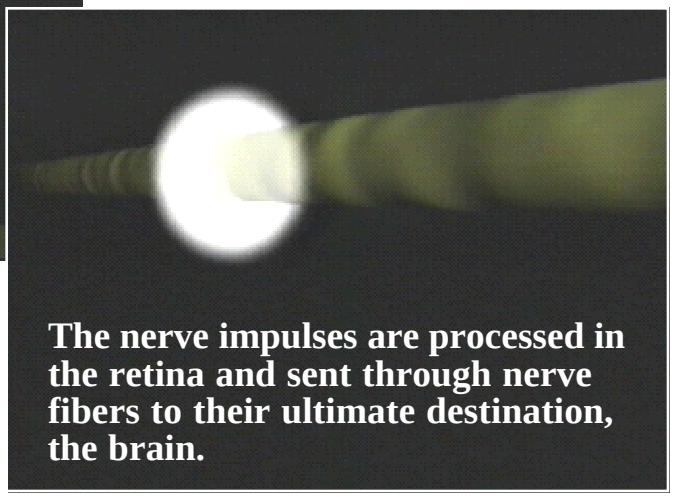
Macular Degeneration: The Inside Story
Part #2

There are two types of photoreceptor cells: the **rod** and **cone** cells.

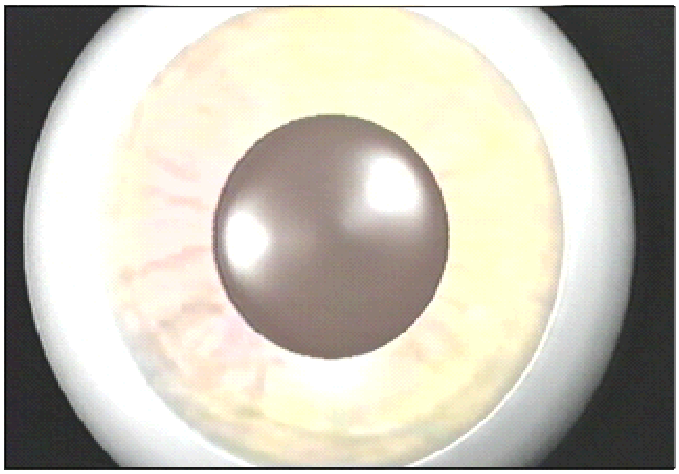


Rods are responsible for **peripheral and dim light vision**. **Cones** are responsible for central, **bright light, fine detail and color vision**. The macula has the highest concentration of cone cells. The **fovea** is the very center of the macula. There are only cone cells in the very center of the fovea.





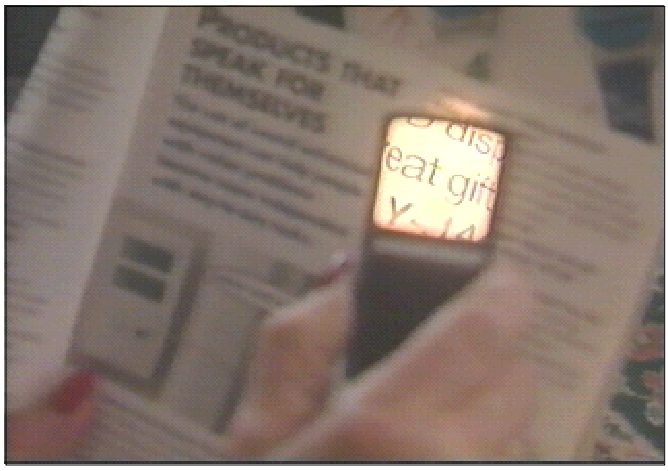
This process works flawlessly when the retina is healthy, and when there are no abnormalities in the front part of the eye, including the **lens** and **cornea**.



A normal eye sees the world in exquisite detail. Should any part of the eye fail, however, visual quality is lost.

Macular degeneration causes visual impairment in millions of people over the age of sixty. It can destroy central vision, making it difficult or impossible to read, sign checks, recognize faces, and pass driver's license examinations.

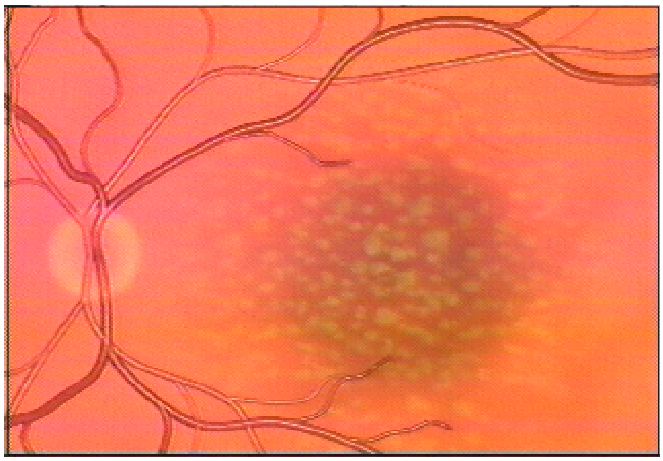
It is important to understand that macular degeneration cannot cause total blindness. The macula is less than 5% of the total area of the retina, or about the size of the period at the end of this sentence. Even when the entire macula is lost, all the rest of the retina is available for vision. Thus, most people with advanced macular degeneration can get around with little or no assistance. The remaining retina can frequently be used for some detailed vision, but **magnifying devices** are needed.



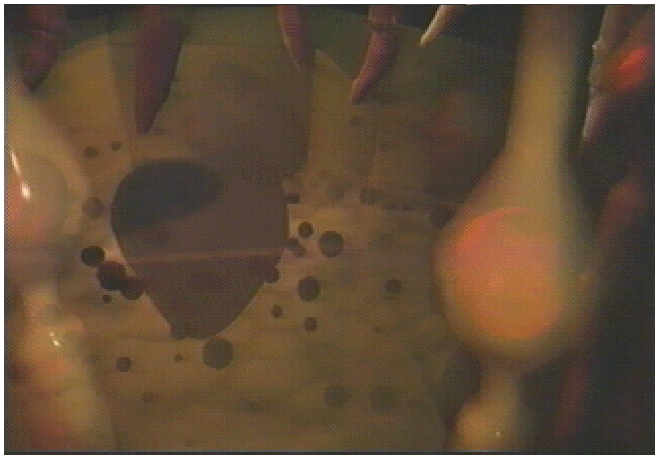
These low vision devices allow people with macular degeneration to continue leading independent, productive lives.

Dorothy has had the **dry** or **atrophic** type of macular degeneration for several years. It is usually less severe than the **wet**, or **exudative** type. Nonetheless, some macular areas in each of her eyes have withered away, and it is difficult for her to see details.

A look at one of her maculas reveals aged, or atrophic, areas that no longer work. There are also some yellowish deposits called **drusen**.



Drusen are an early sign of macular degeneration. They are small deposits of debris in Bruch's membrane.



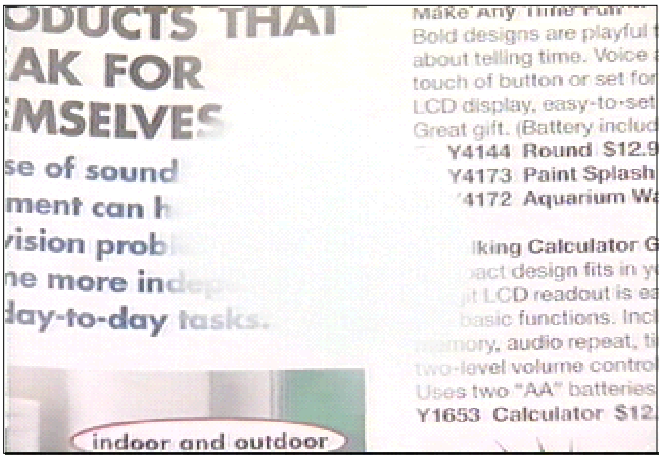
This waste material would have been removed by young, healthy RPE cells.

The areas of her macula that have completely withered away are much more significant. These atrophic areas don't work any longer. They cause blind spots in her central vision called **scotomas**.

There is no proven therapy at this time for dry macular degeneration. Ongoing clinical trials are studying the value of laser therapy for drusen. Research

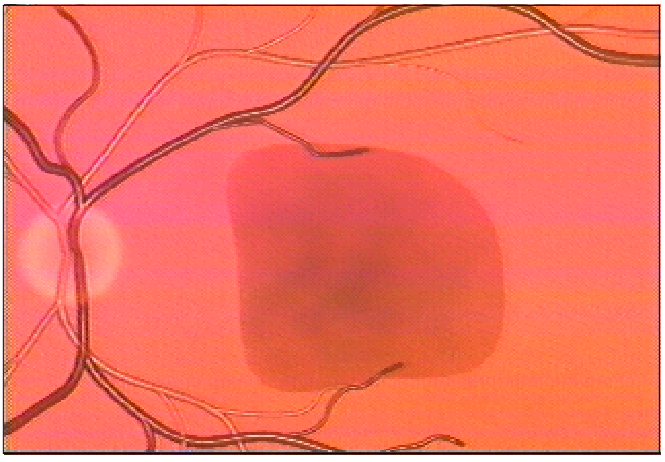
also continues in areas such as **genetic replacement therapy** and **RPE cell transplantation**.

Meanwhile, Dorothy is learning to deal with her small blind spots. When she reads, words often seem to jump around, because letters often fall in non-seeing areas of her maculas.

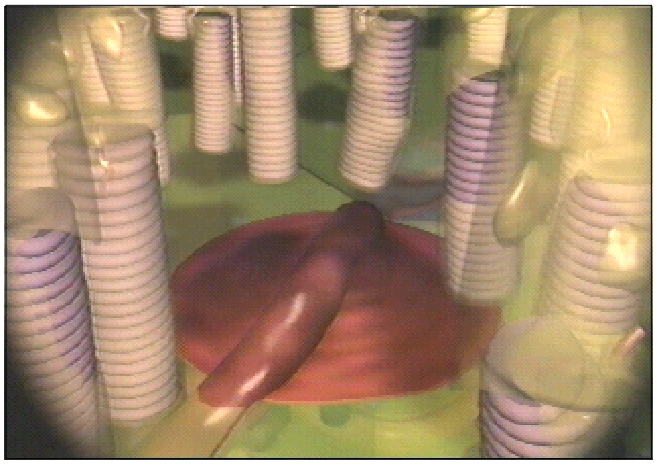


With good lighting, practice, patience, and enough magnification, she can, however, still read what she needs to read. She also knows that more advanced devices are available if her vision worsens.

John is one of approximately ten percent of macular degeneration patients who have the wet, or exudative, type. Unlike Dorothy's slowly-progressing disease, wet macular degeneration rapidly destroyed John's central vision. His maculas have a dramatically different appearance.



In wet macular degeneration, new blood vessels grow from the choroid, through Bruch's membrane, and into spaces below and above the RPE. These new vessels, or **neovascularization**, are fragile. They often bleed.



New vessel growth is poorly understood. It is controlled by numerous factors. The basic problem is that bleeding damaged John's retinal tissues. His photoreceptors were permanently destroyed and replaced by non-seeing **scar tissue**.

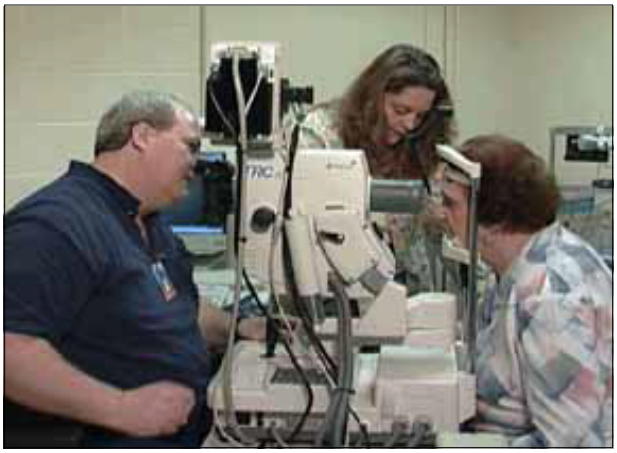
Neovascularization can be a reparative response in other parts of the body. It is ironic that in the macula, it causes devastating scarring and permanent vision loss.

John has learned to get around well with his peripheral vision, despite his macular scarring. With the help of a low vision specialist, he has learned to use his off-center, or **eccentric**, vision. He also uses specialized magnifiers and other low vision aids, such as large print and speech-recognition software for his computer.

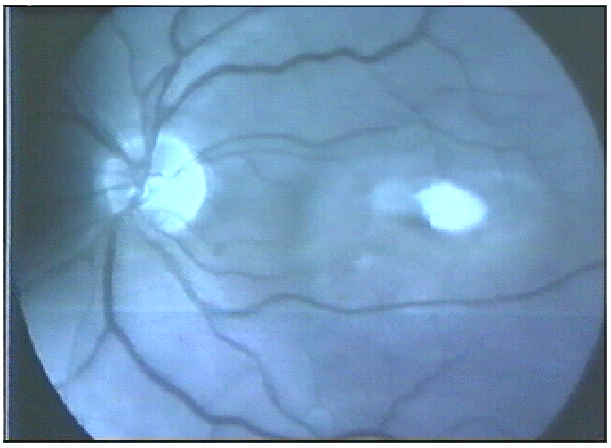
Ruth was luckier than John. She has the wet type of macular degeneration but was able to take advantage of an available treatment. She went to her retinal specialist after she noticed distortion of the central vision in her left eye.

Her doctor examined her and saw a hemorrhage in her macula. **Fluorescein angiography** was performed after Ruth's informed consent, in order to determine if she had a potentially treatable macular problem.

When **fluorescein** is injected into a vein, it travels throughout the body. Photographs of the dye passing through choroidal and retinal blood vessels allow the doctor to determine the location of any neovascularization that may be present.



A special camera was used to take the photos of her retina. The images appear on a computer monitor, and they are recorded by the computer for detailed analysis after the study.



The camera's bright flashes in Ruth's dilated eyes were uncomfortable, but not harmful. The procedure didn't take long.

The doctor discovered that she had new vessels in her left eye, and that immediate treatment might help her. Fortunately, her right eye had only the dry type of macular degeneration, with no new vessel growth.

End part 2 of 3

Use your back button to return to the link for part 3.