



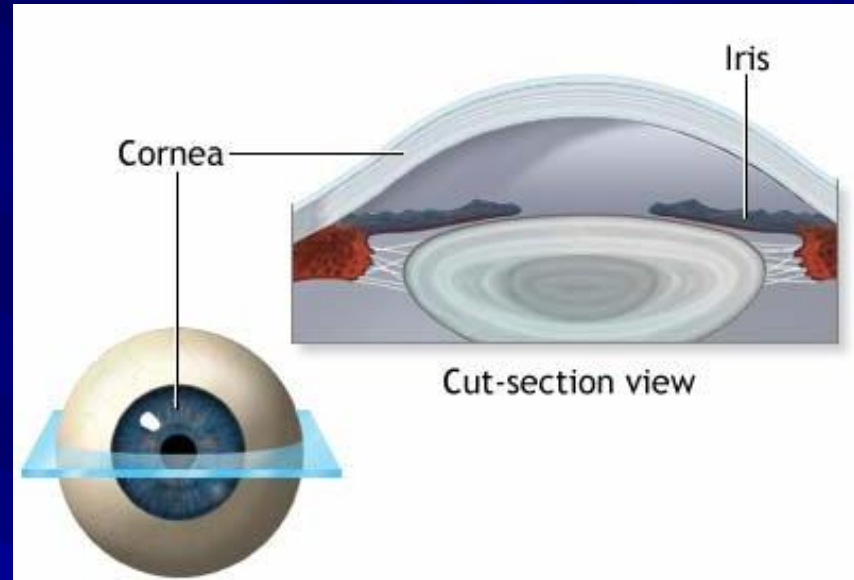
# Eye Structure and Seeing Light

The eye is like a camera: Light enters, is focused on a surface, and a picture is made.



Light enters your eye through a clear portion of the **sclera** (the tough, white, outer covering of the eye), called the **cornea**.

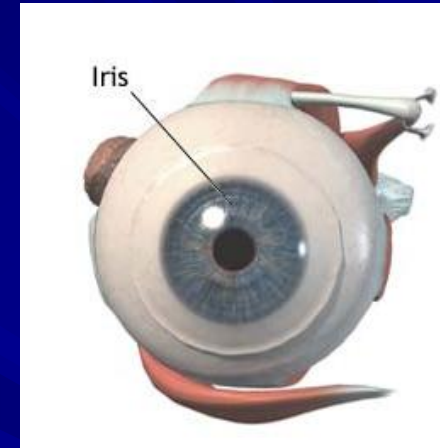
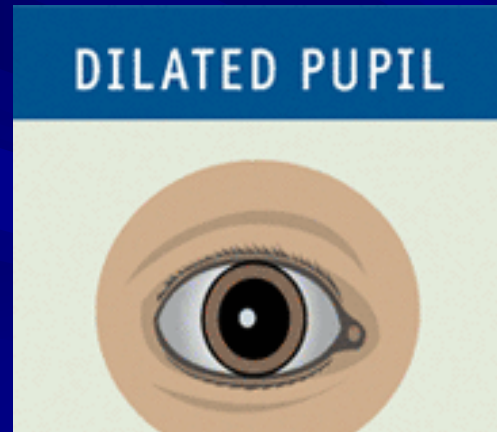
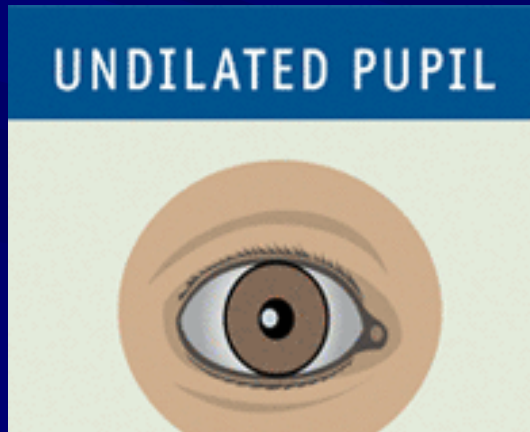
The **cornea** is curved, so it slightly bends the light as it goes through.



Light then passes through the **aqueous humor** (a clear fluid for eye nourishment, in the **anterior chamber**) and through the pupil.

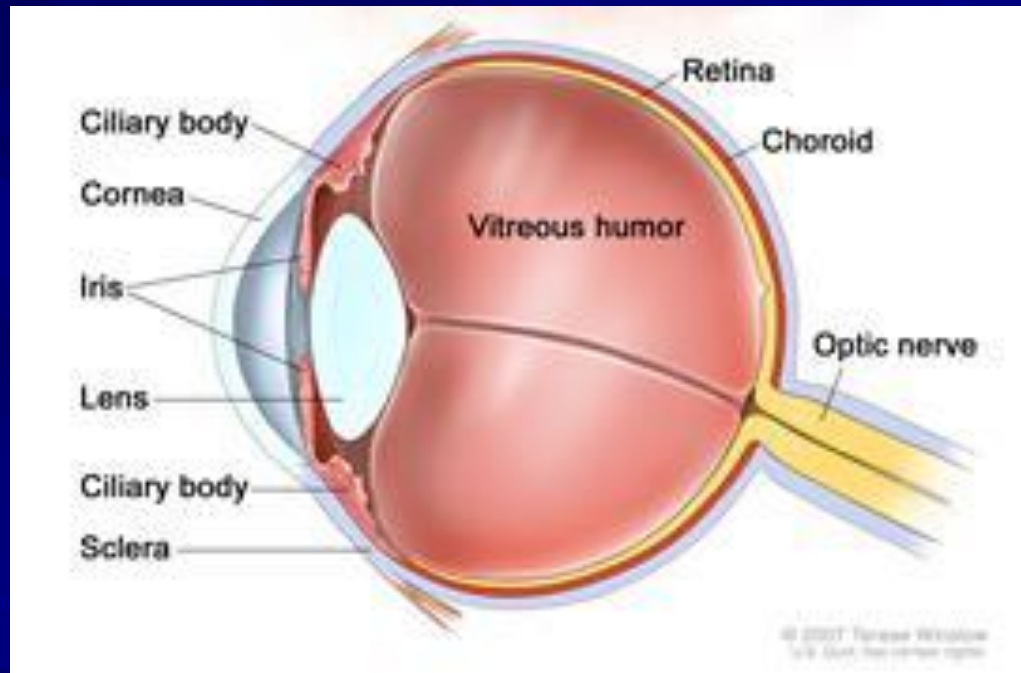
The **pupil** is simply a hole in the iris.

The **iris** is a muscle that controls the size of the pupil. The iris is the colored part of the eye.



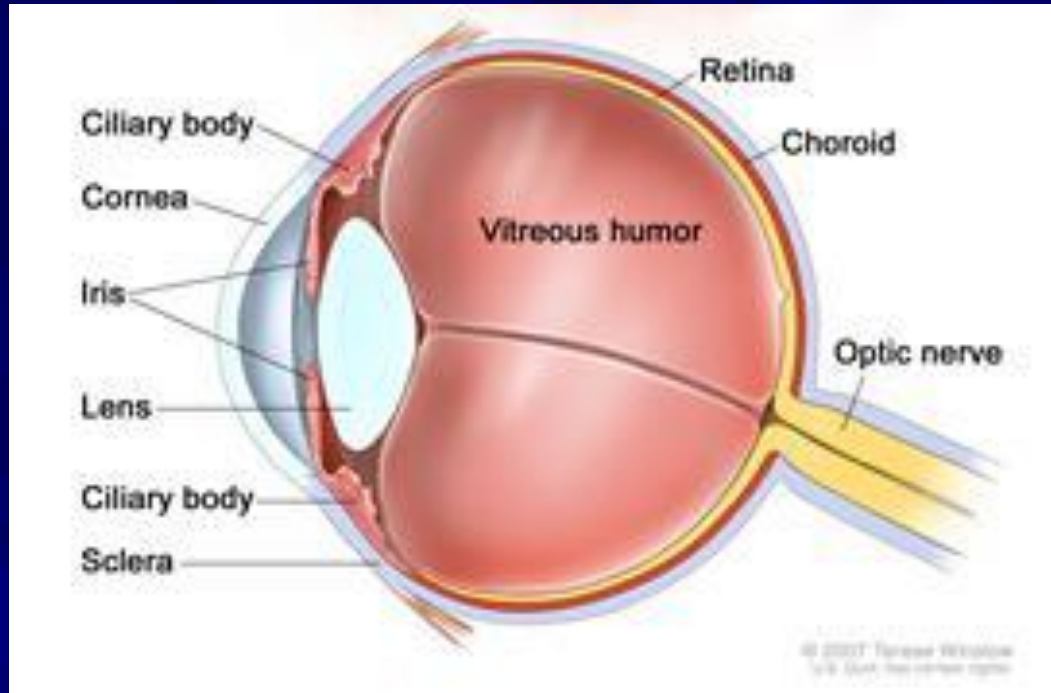
- In bright light, the iris expands and the pupil gets smaller
- In low light, the iris contracts and the pupil gets bigger

Directly behind the **iris** is the **lens**. This structure changes shape to focus the light so that we can see clearly. Its shape is convex, meaning it curves outward on both sides.



The **ciliary muscles** above and below the lens control the shape of the lens.

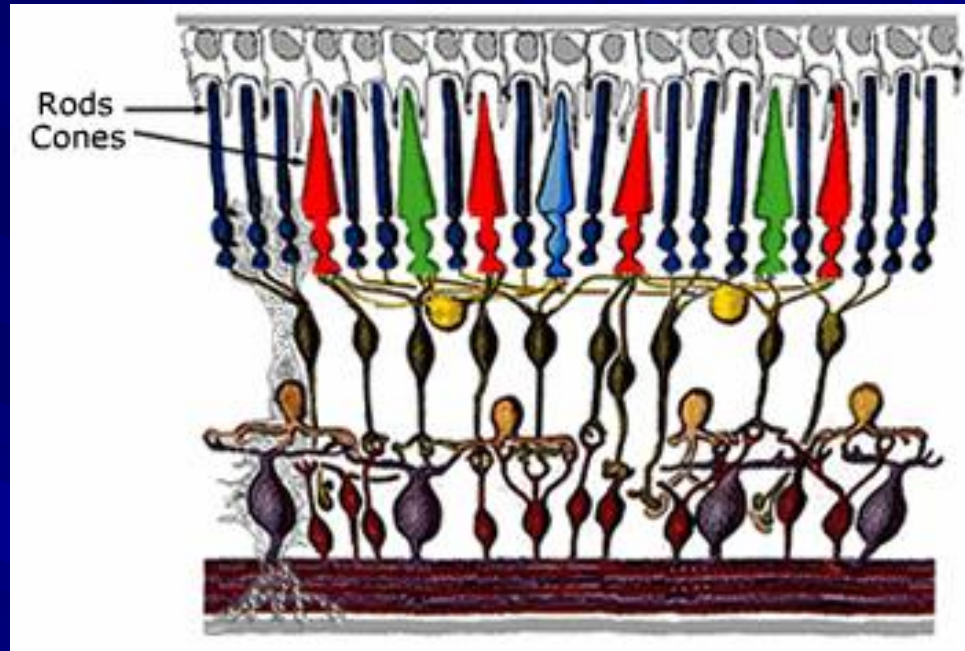




Behind the **lens** is a clear gel called the **vitreous humor**. After moving through the vitreous humor, the light strikes the **retina**. The retina is the lining on the inside of the back of the eye that contains two types of light-sensitive cells: **rods and cones**.

**Rods** sense black and white and work in low light.

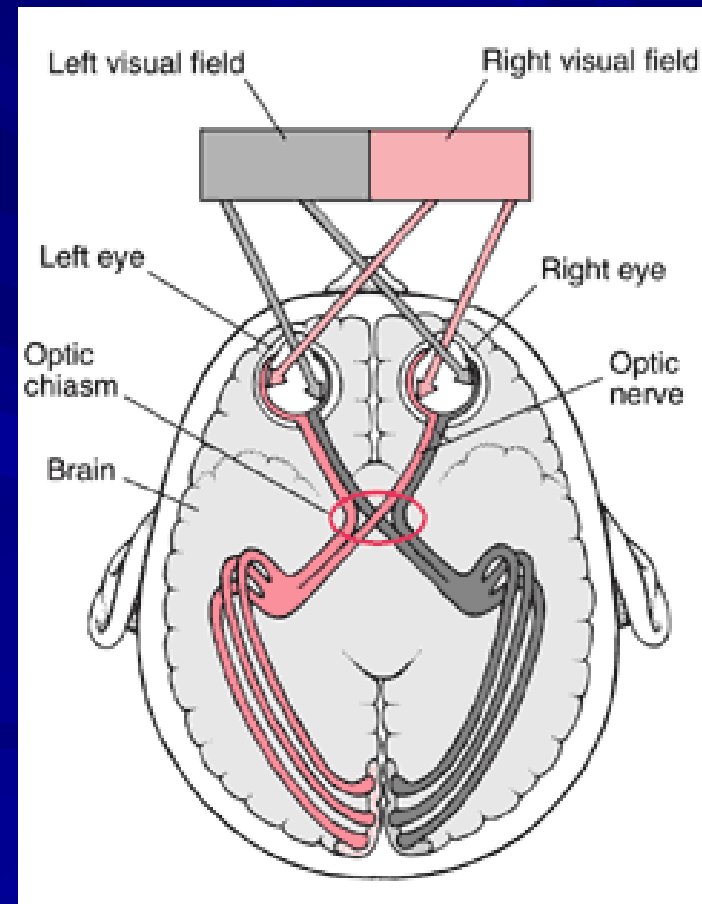
**Cones** sense color and must have more light than rods to work. Three kinds of cones:



- **L-cones** sense long wavelengths in the red range
- **M-cones** sense mid-range wavelengths in green range
- **S-cones** sense short wavelengths in the blue range

The **rods and cones** send messages to the brain through the **optic nerve**. The brain makes sense of all the information it receives.

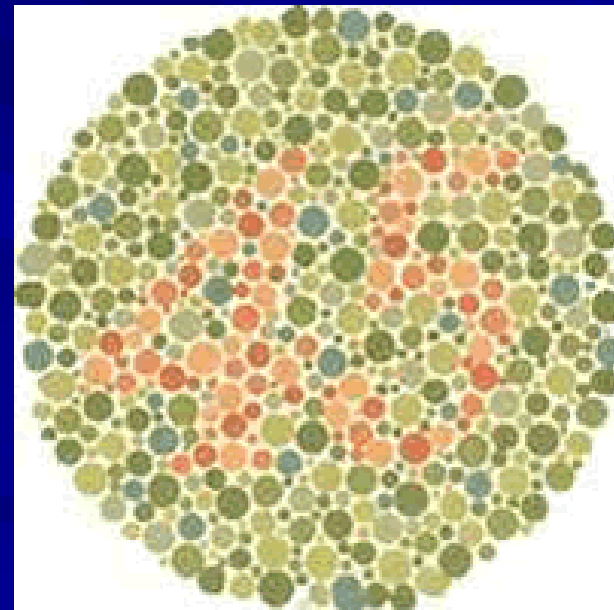
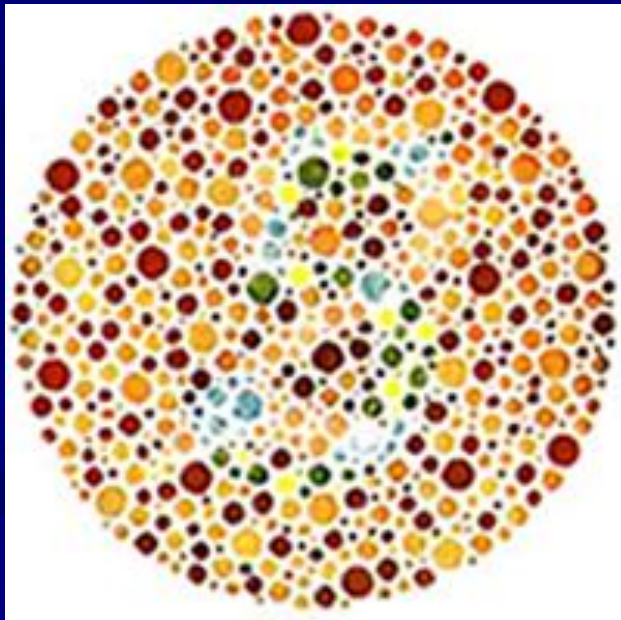
In your brain, the sight center is in the back, **between your ears**. This location explains why a blow to the back of your head might cause blindness, even though your eyes are fine.



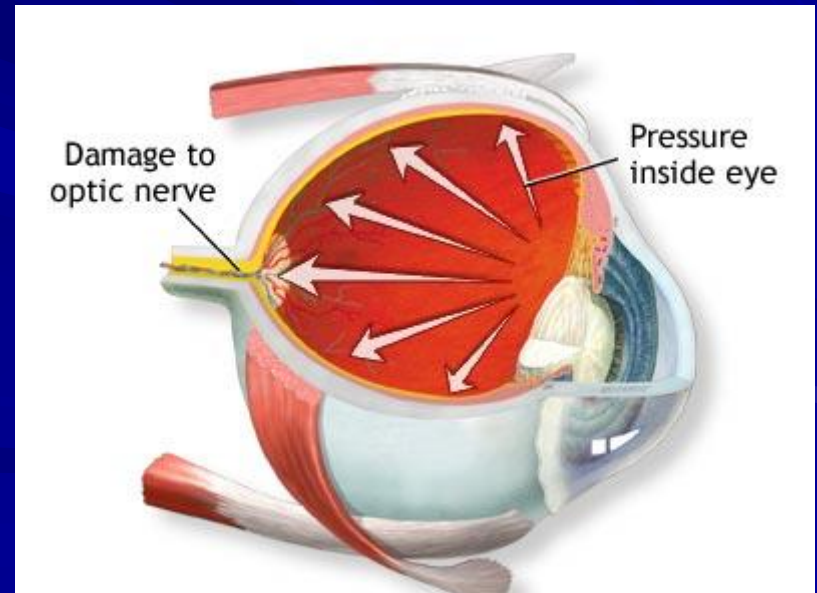


# Two Causes of Color Blindness

**1. Genetic** (you are born with these types) Sometimes a cone is missing, or the cone does not recognize the correct wavelengths of light. L- and M-cone problems result in red-green color blindness, the most common.

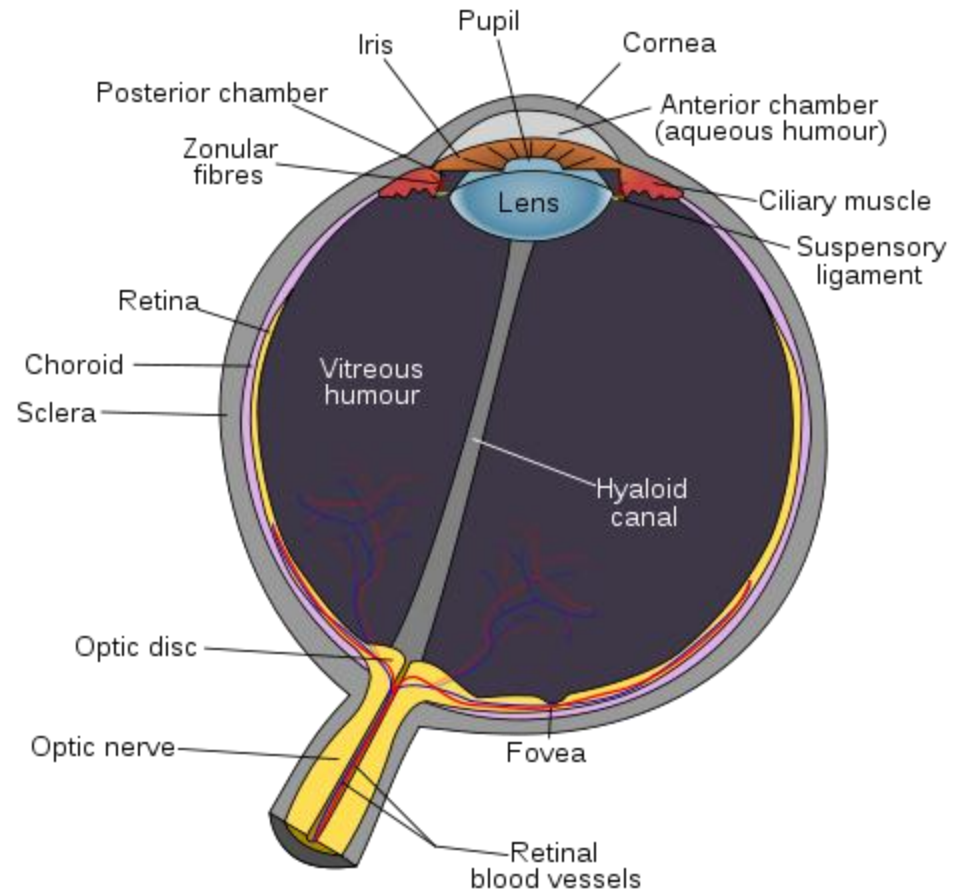


2. **Non-Genetic** (these types occur after birth) Accidents that damage the vision center of the brain, cataracts, glaucoma, Parkinson's Disease can cause S-cone problems, diabetic retinopathy can affect color vision



# Eye Anatomy Review

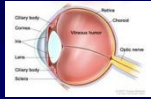
- cornea
- pupil
- iris
- anterior chamber
- aqueous humor
- lens
- vitreous humor
- retina
- fovea
- choroid
- sclera
- optic nerve



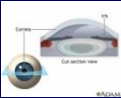
# Image Sources



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Redmond, WA 98052-6399 USA.



National Cancer Institute at the National Institutes of Health  
<http://www.cancer.gov/cancertopics/pdq/treatment/retinoblastoma/patient/page1/AllPages/Print>



MedLine Plus, National Institutes of Health  
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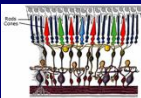
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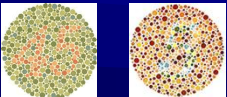
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Wikipedia [http://en.wikipedia.org/wiki/File:Schematic\\_diagram\\_of\\_the\\_human\\_eye\\_en.svg](http://en.wikipedia.org/wiki/File:Schematic_diagram_of_the_human_eye_en.svg)



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Federal Aviation Administration  
<http://www.hf.faa.gov/webtraining/visualdisplays/HumanVisSys6.htm>



Glaucoma, MedLine Plus, National Institutes of Health  
<http://www.nlm.nih.gov/medlineplus/ency/imagepages/9349.htm>