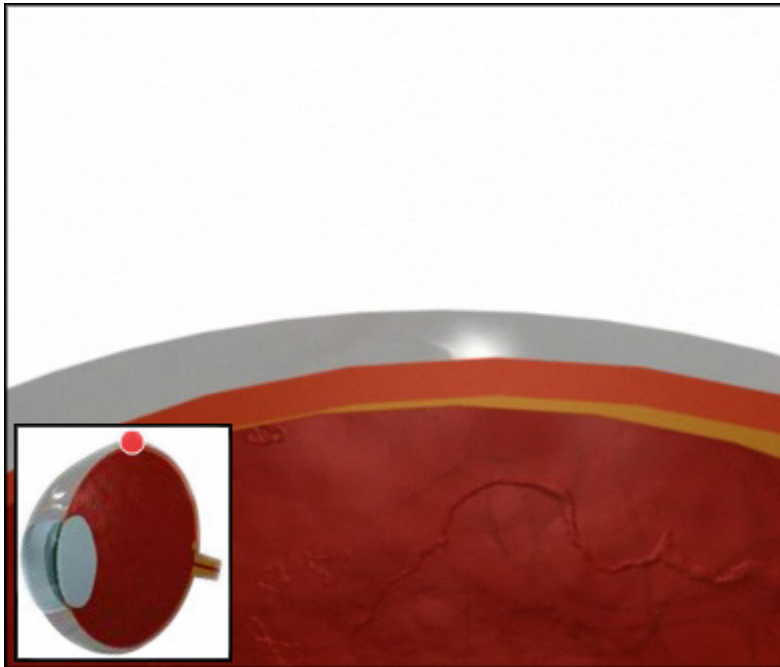


Anatomy of the eye

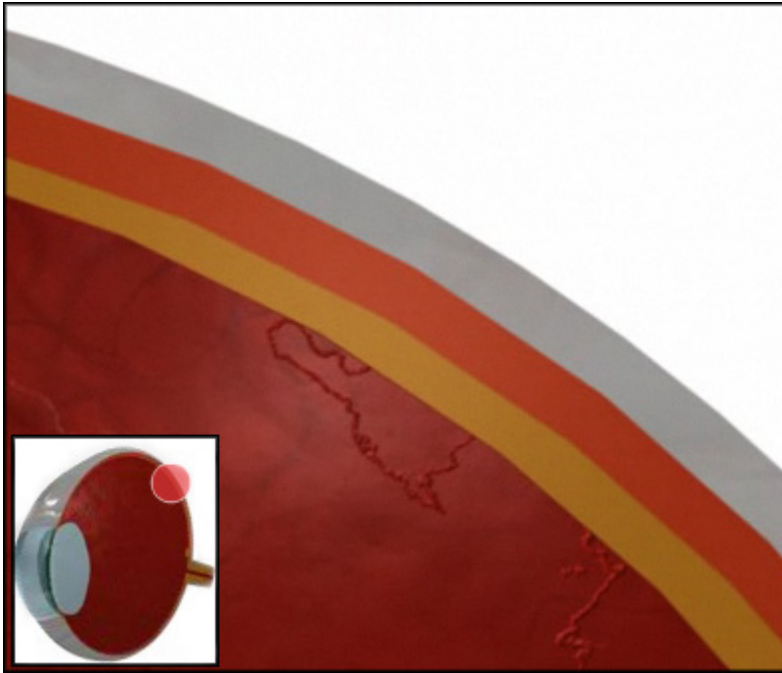
This document has kindly been provided by **LensShopper**. For a better learning experience, please follow the link to view the document as an interactive flash animation:

<http://www.lensshopper.com/eye-anatomy.asp>



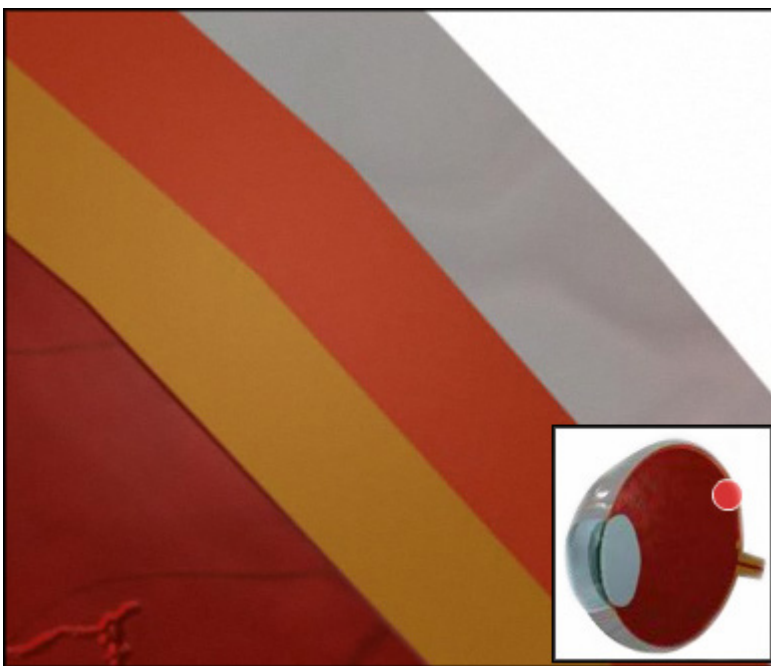
Sclera (shown here as gray outer layer)

The sclera is a membrane of tendon in the eye, also known as the white of the eye. Rugged and robust, the sclera works to protect the inner, more sensitive parts of the eye like the retina and choroidea. It is about 0.03 of an inch thick except for where the eye muscles append, where the depth is no more than 0.01 of an inch. Four of six eye muscles on each eye are known as straight eye muscles (Mm. Recti) but all six control the movements of the eye. On top of the sclera, the episclera is located. The episclera contains blood vessels that nourish the sclera with oxygen and nutrients. These vessels are thus visible on the surface of the white of the eye.



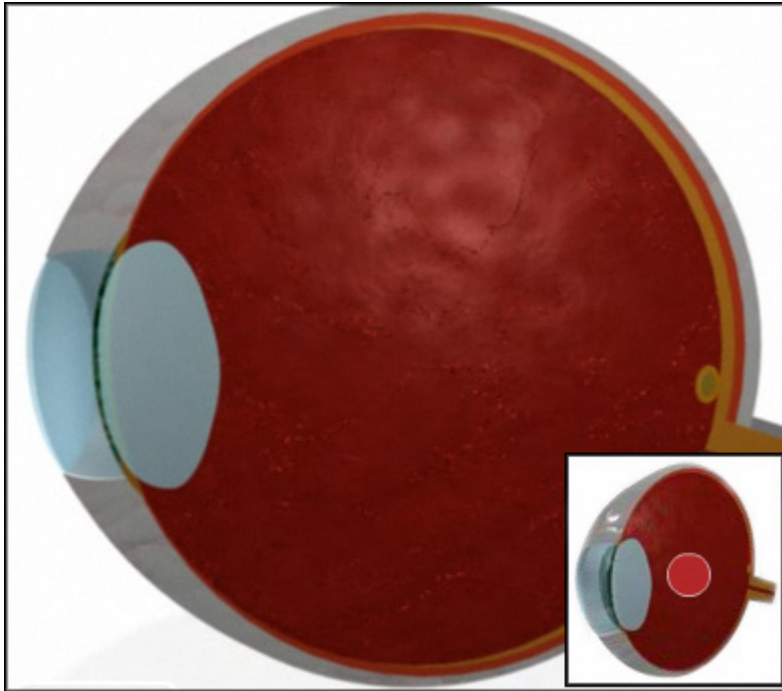
Choroidea (shown here as orange middle layer)

The choroidea is the layer located within the sclera. The layer consists of a network of vessels that nourish the retina with oxygen and nutrients. Proliferative macular degeneration is an eye condition that is directly caused by malfunctioning blood vessels within this layer.



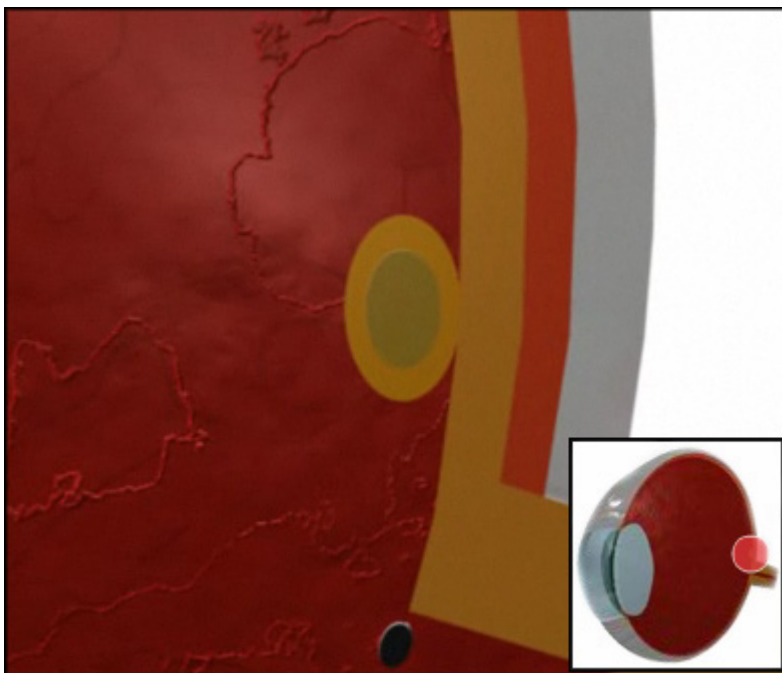
Retina (shown here as yellow inner layer)

The Retina refers to the light sensitive tissue in the back of the eyeball. The retina absorbs light that ultimately is sent as visual signals to the brain. The retina contains two kinds of light receptors, the cones and the rods. The cones, which are color sensitive, are located in the center of the retina and mainly absorb stronger light. The rods absorb softer light in black and white and are located peripheral to the fovea. A serious eye condition related to the retina is amotia reniae or retinal detachment. Common symptoms are sensations of light flashes in the field of vision or partial to full vision loss that, if left untreated, can lead to permanent vision loss. If any of these symptoms occur, immediate medical care is required.



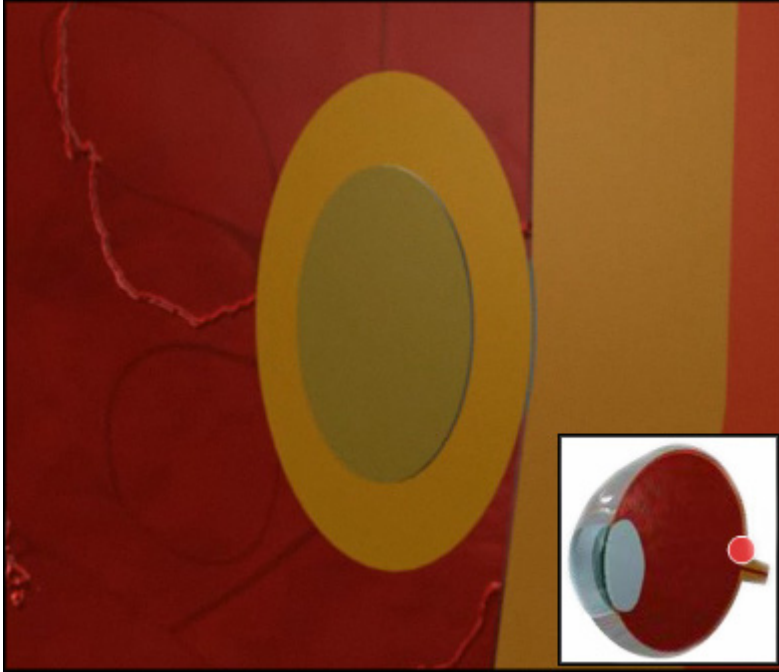
Vitreous Body (shown here as red mass)

The vitreous body is a gel-like mass within the eyeball, behind the lens. Aqueous fluid fills the space in front of the lens. When you get older, the vitreous body shrinks in volume. When the vitreous body decreases in size it can detach from the retina. This is referred to as vitreous body detachment and is in itself not a dangerous phenomenon. It is only when the vitreous body drags along the retina that complications can occur. This is called retinal detachment.



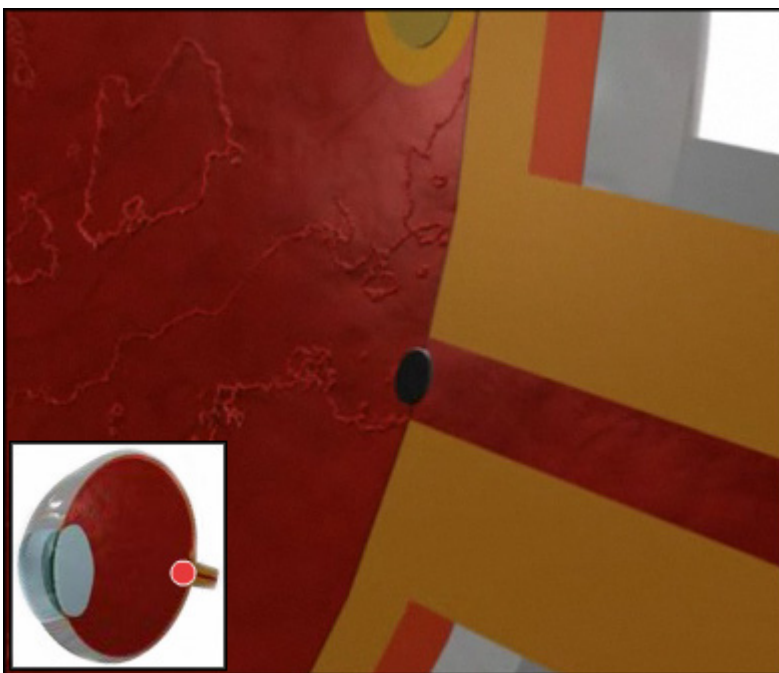
Macula (shown here as the yellow circle)

The macula is the area around the fovea. Closely-packed visual cells in the macula result in high image resolution, or high visual acuity. Around the macular area, visual cells are not as closely packed as in the macula itself, but they are good enough for our peripheral vision to work properly. A common eye disease amongst the elderly, is macular degeneration. This condition can be divided into two sub-categories: proliferative or non-proliferative. Proliferative macular degeneration is treatable, but often affects the eye worse than non-proliferative macular degeneration. Non-proliferative, however, is an incurable eye disease.



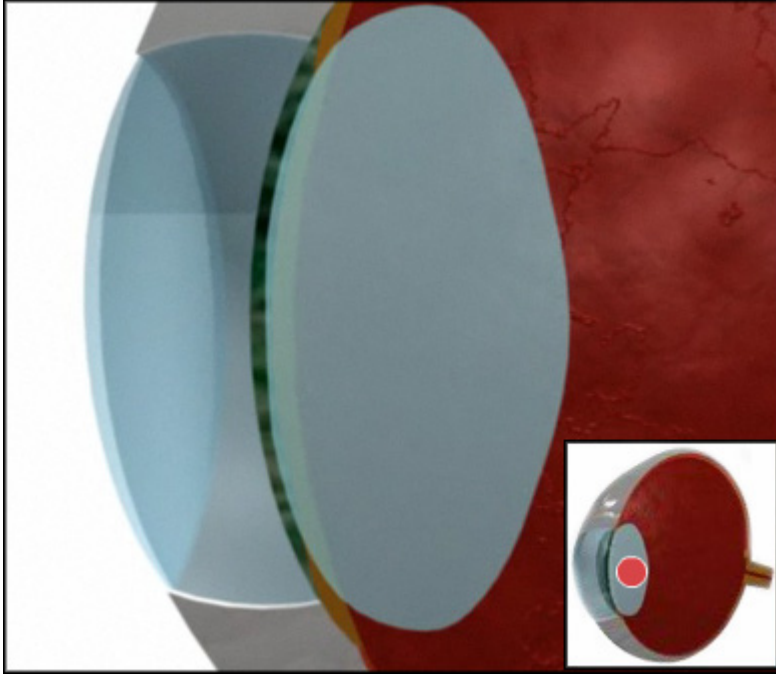
Fovea (shown here as green disc)

The fovea is the most central part of the macula. The visual cells located in the fovea are packed tightest, resulting in optimal sharpness of vision. The fovea covers about 5 degrees of the vision field.



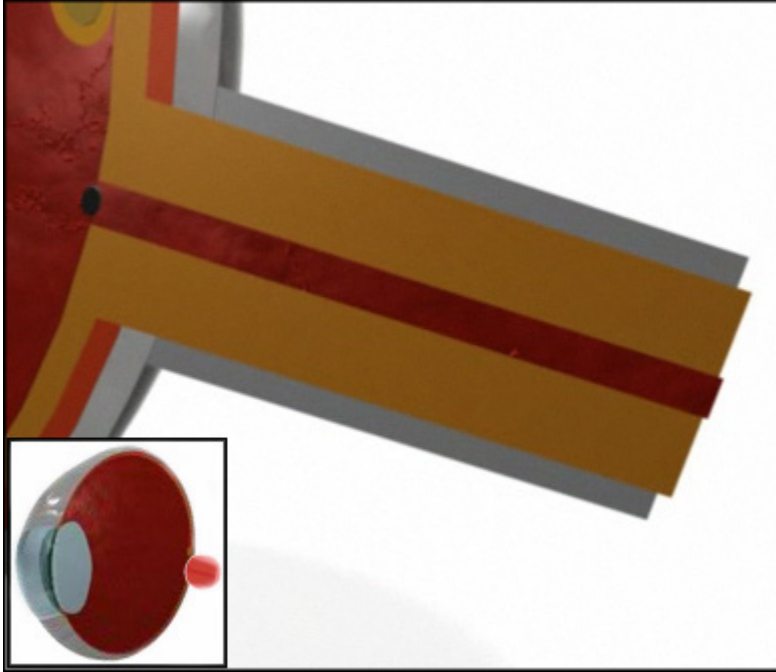
Optic Disc (shown here as black dot)

Also known as the optic nerve head or the blind spot, the optic disc is where the optic nerve attaches to the eye. All visual cell nerve threads, including some blood vessels, have their entrance to the eyeball here. The absence of visual cells in the optic disc causes the appearance of a blind spot in your field of vision.



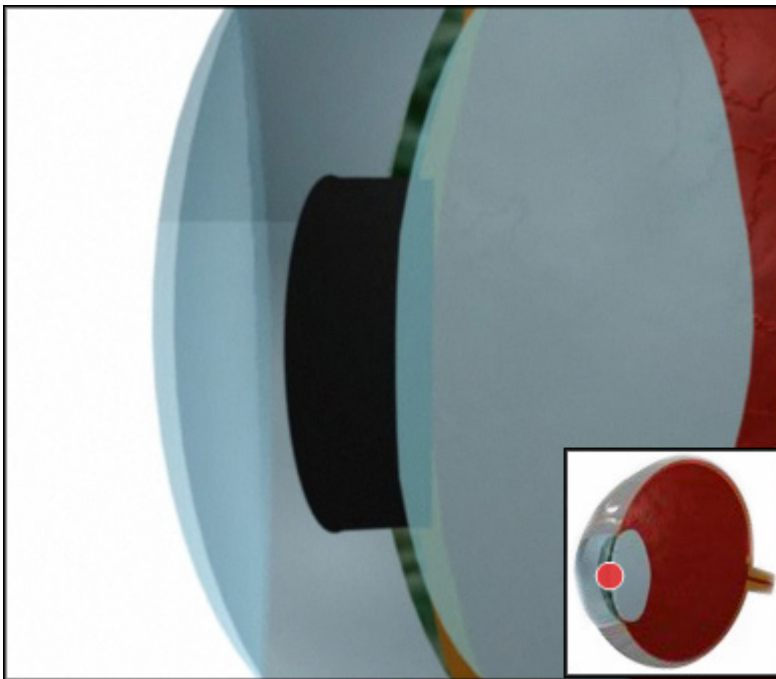
Lens

The lens is where about 20 of the eye's 60 diopters obtain dioptric power. The remainder of the eye's dioptric power is contained in the cornea. Furthermore it is the lens that enables us to change the focus according to different distances, e.g. when we change focus from a TV screen across the living room to a newspaper in our hand. The lens is attached to a mass of threads called zonula threads. The zonula threads are then attached to the ciliary body. We can compare this optic correlation with a bicycle wheel where the lens is the hub, the threads the spokes and the ciliary body the rim. When we then want to focus on a near object, a muscle in the ciliary body retracts. This way the zonula threads can loosen up, allowing the lens to contract in diameter and thicken, thus increasing its acuity. As a person becomes older, the flexibility of the lens decreases. By the age of 45 the lens will often have stiffened to the extent that normal reading vision, without corrective glasses or lenses, is unattainable. Cataracts are an age-related deficiency in the lens that sooner or later affects everybody in some form. The most common symptom associated with cataracts is blurry vision. Cataracts can result in complete removal and replacement of the lens.



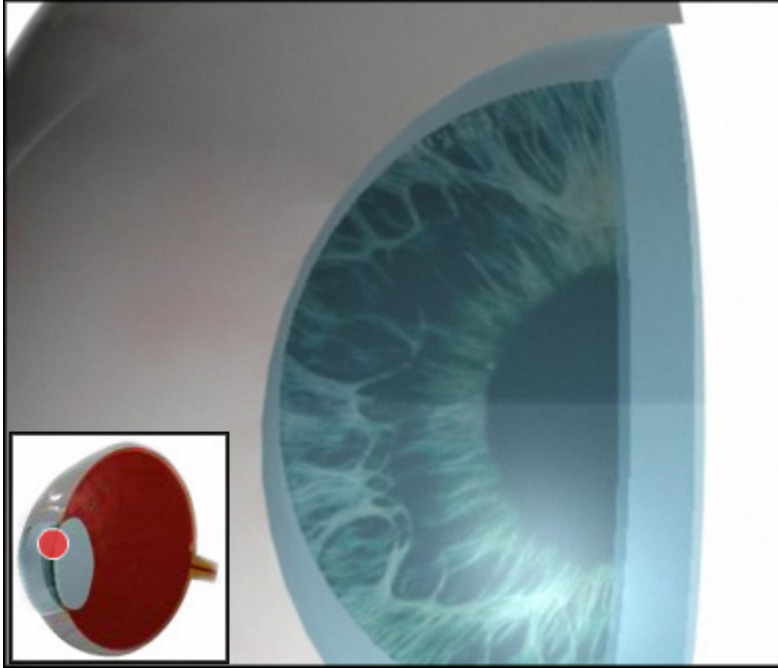
Optic nerve

The optic nerve sends signals from the eye to the different parts of the brain where the signals are interpreted into images. The optic nerve consists of about 1,000,000 nerve threads. The optic nerves from both eyes are reconnected behind the eyes so that everything that is seen in the right field of vision is sent to the left cerebral hemisphere and vice versa.



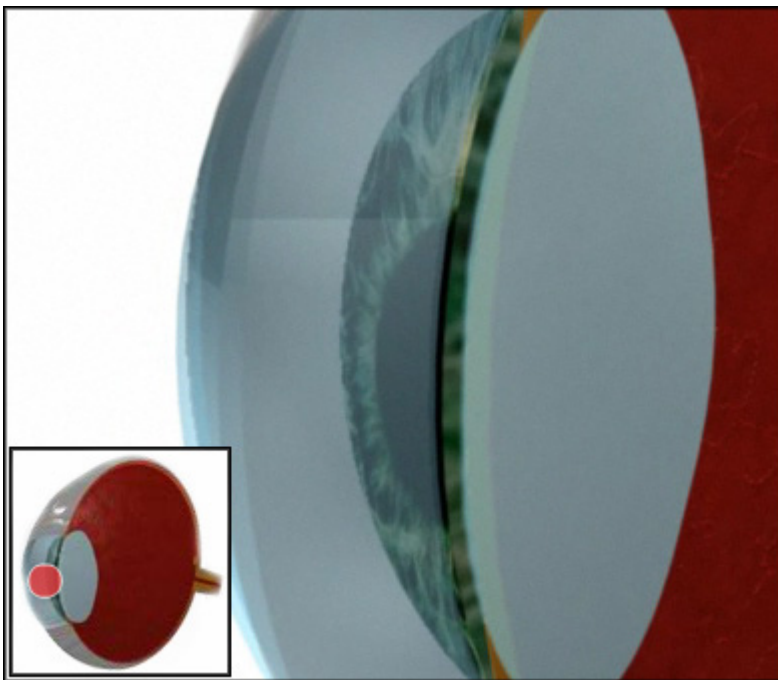
Pupil

The pupil is essentially just a hole in the iris. The reason why it's black is because the layer of pigment inside the eye absorbs major parts of the light, thus resulting in a darker shade. However, when pupils appear red in photos it is actually the color of the retina that is reflected.



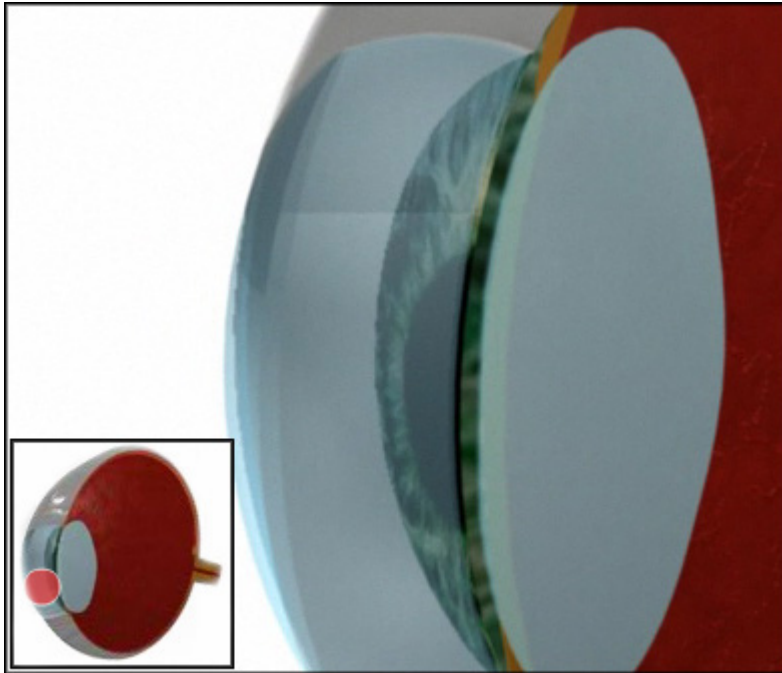
Iris

The iris is the part of the eye that regulates the amount of light that enters the eye. With strong light, the iris sphincter muscles will contract the pupil. In darkness, the iris opens the pupil using the dilator muscles. When focusing on near objects, the pupil decreases in diameter, but it will expand when focusing on distant objects, a reflex known as the Accommodation Reflex. A smaller pupil enables better focal depth.



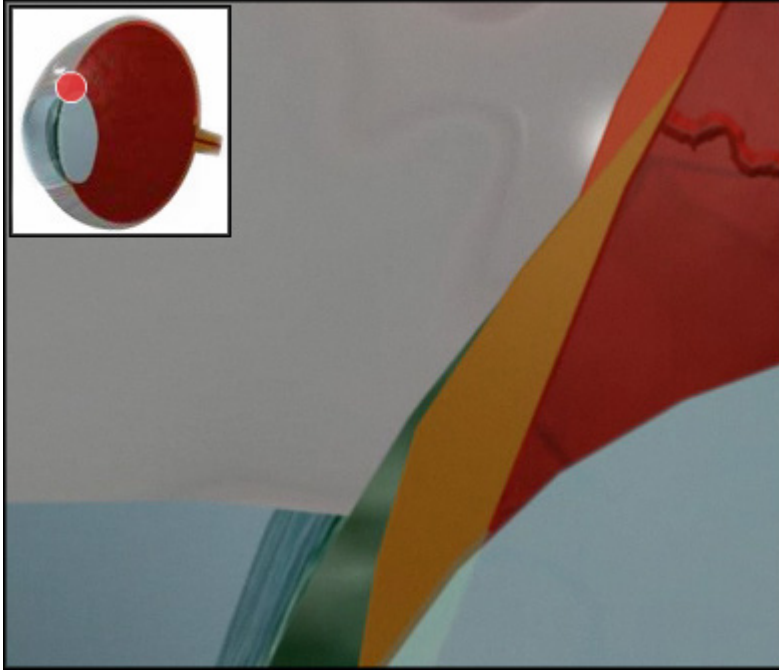
Aqueous humor

Aqueous humor fills the front part of the eye, between the lens and the cornea. This fluid is produced at the back of the ciliary body, then seeps through the pupil, into the anterior chamber and ultimately is drained through the trabecular meshwork. The aqueous fluid's main function is to supply the cornea and the lens with nutrients and oxygen. The anterior chamber is the space located between the iris and the cornea. If an imbalance occurs between fluid production and outflow, thus increasing the amount of aqueous fluid, the pressure in the eye inevitably increases. This is one of the contributing factors that cause glaucoma.



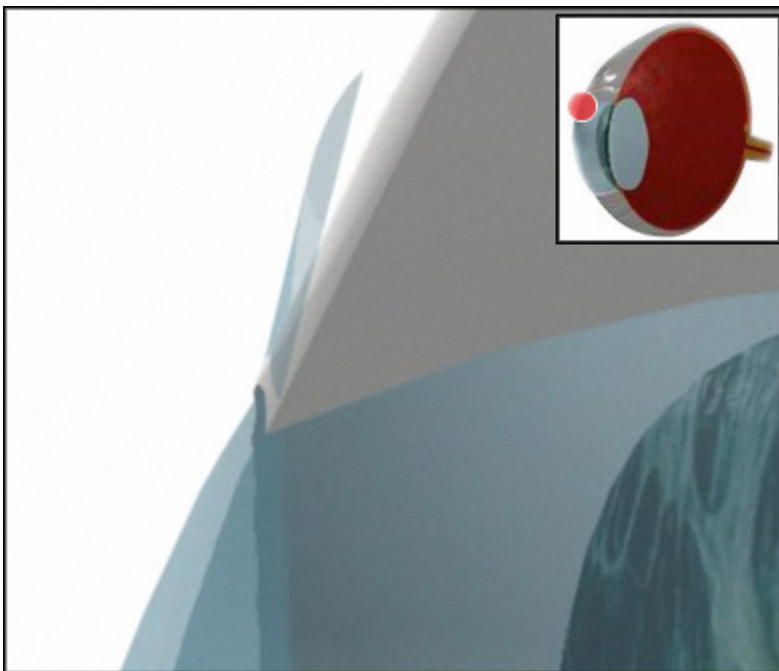
Cornea (shown here as light blue area to the left of the iris)

The cornea is the transparent structure located in the front of the eye, covering the iris, pupil, and anterior chamber. About 40 of the eye's 60 diopters are present in the cornea, meaning it is primarily in the cornea that visual acuity is determined. The cornea is supplied with oxygen and nutrients through tear-fluid and not through blood vessels. That also explains why the cornea is so clear. Overusing contact lenses can lead to oxygen deficiency, ultimately causing blood vessels to appear in the cornea. If the blood vessels grow too close to the middle, it can cause partial vision loss. Refractive eye surgery to correct eye disorders such as Myopia, Hyperopia, and Astigmatism (known as refractive errors), usually involves surgically reshaping the cornea using laser technology (though lasers are not always used). Examples of FDA-approved procedures are LASIK, LASEK and Epi-LASIK.



Ciliary Body (shown here as yellow middle layer)

The ciliary body contains the ciliary muscle, the muscle that controls the vision accommodation reflex. The ciliary body also produces aqueous fluid (aqueous humor) and is a point of attachment for the zonula threads that holds the lens.



Conjunctiva (shown here as light blue outer layer)

The conjunctiva is a mucous membrane that covers the sclera and the inside of the eyelids. Many of the glands that play a part in the production of tear-film are located in the conjunctiva. When the conjunctiva is irritated, often due to an allergy or infection, the membrane swells, becomes uneven and causes blood vessels to expand. This is normally referred to as pinkeye.