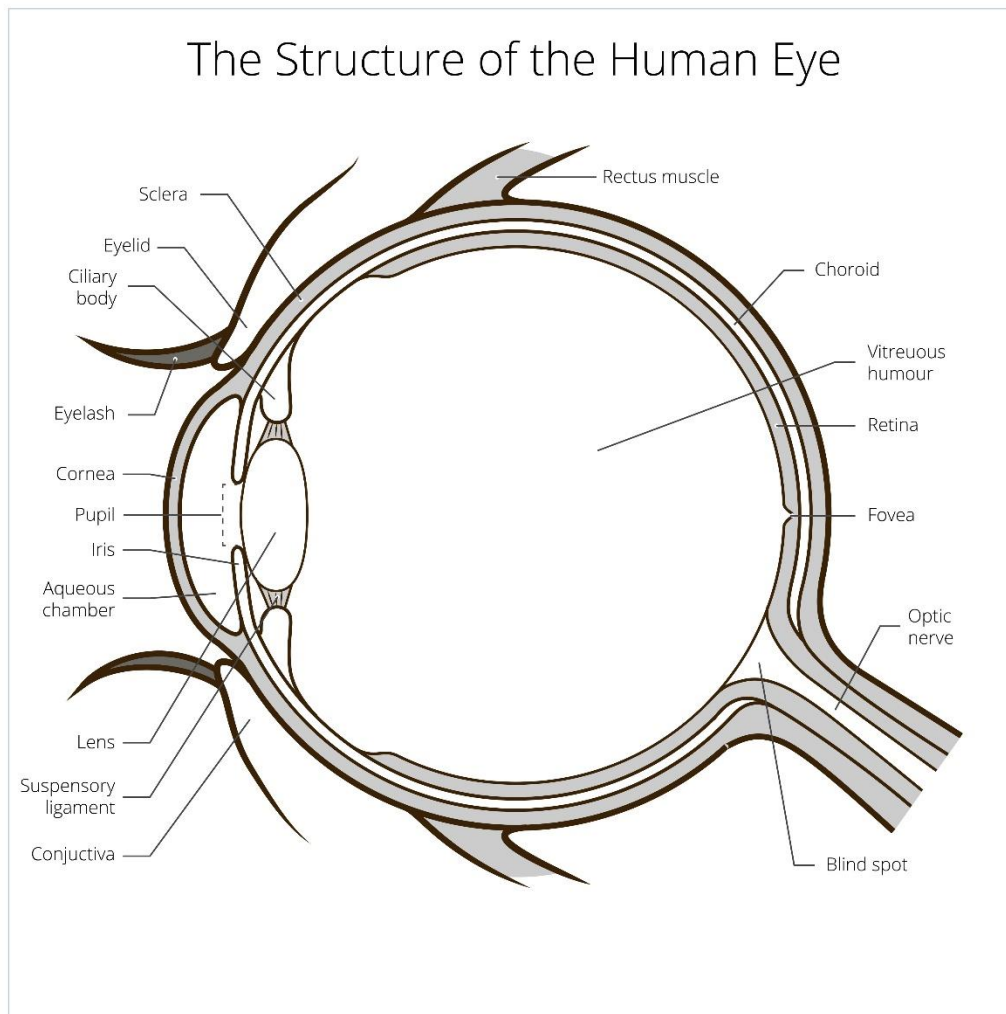


## Anatomy Fact Sheet for the Human Eye



- Index of Refraction (n value)
  1. Air (Vacuum) – 1.00
  2. Cornea – 1.376
  3. Aqueous – 1.336
  4. Crystalline Lens
    - Outer layers – 1.386
    - Central Portion – 1.406
  5. Vitreous – 1.337

- Sclera is the tough white outer layer of the eye.
- Approximately 70 -80% of the refractive power occurs at the cornea; about 20 - 30% in the crystalline lens. The bulk of refraction occurs as light passes from air ( $n = 1.00$ ) to the cornea ( $n = 1.376$ ). The difference between n values within the eye structures are small, ergo, less refraction occurs.

## Anatomy Fact Sheet for the Human Eye

- The crystalline lens has a diameter of 9 – 10 mm and a thickness of 4 mm. The thickness does change as a function of accommodation.
- The length of the eyeball is typically close to 24mm or about an inch.
- The dioptric power of the cornea is 40 to 45 D, the crystalline lens is 16 to 20 but can add several diopters during accommodation.
- Layers of the cornea
  1. Epithelium
  2. Bowman's layer
  3. Stroma (thickest layer)
  4. Dua's layer
  5. Descemet's membrane
  6. Endothelium
- The eye produces the fluid called aqueous humor and it drains at a point near the intersection of the edge of the iris and the sclera. Blockage can create glaucoma.
- The iris (anterior colored part of the eye) can dilate or constrict to control the light entering the eye; that changes the size of the pupil.
- The crystalline lens is held in place by fibers called zonules.

They connect the ciliary body with the lens.

- The ciliary body creates the aqueous fluid and is the muscle that controls the shape of the crystalline lens and allows for accommodation.
- Accommodation is the process that changes the shape of the crystalline lens to change focus from distance to near. The reduced ability to accommodate, typically after 40 years of age, can be corrected with reading glasses or a bifocal that adds plus power to the system.
- The retina contains specialized cells (rods and cones) that convert visible electromagnetic radiation into neural signals.
  1. Rods are tuned to grayscale sensory input; are concentrated more towards the edges of the retina and provide low light vision. There are over one hundred million rod cells in each eye.
  2. Three types of cone cells provide color vision and are highly concentrated at

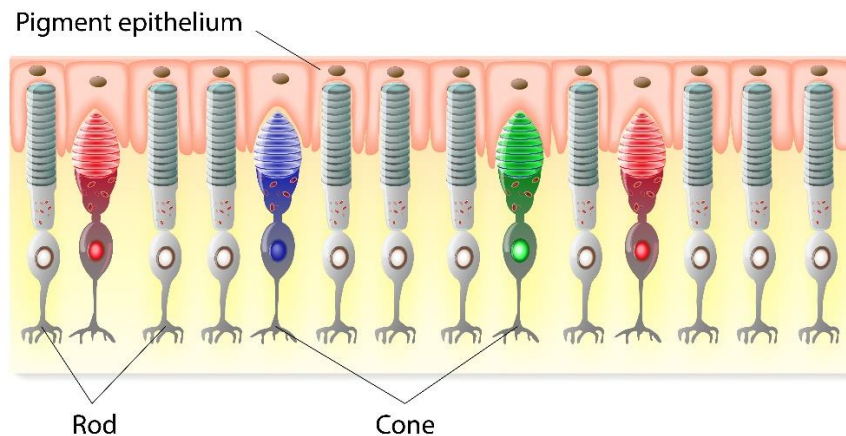
## Anatomy Fact Sheet for the Human Eye

the macula; the fovea is the central portion of the macula with densest photoreceptor cells. About

six million cone cells in each eye.

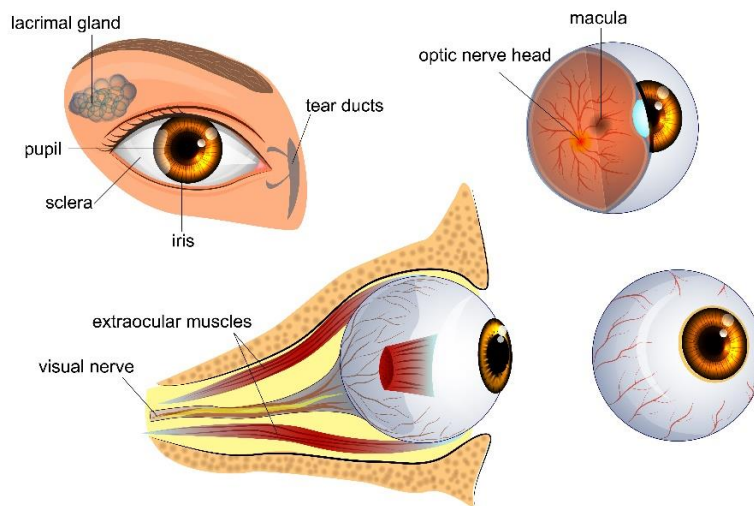
- Blue cones – 10%
- Red cones – 60%
- Green cones – 30%

## STRUCTURE OF THE RETINA

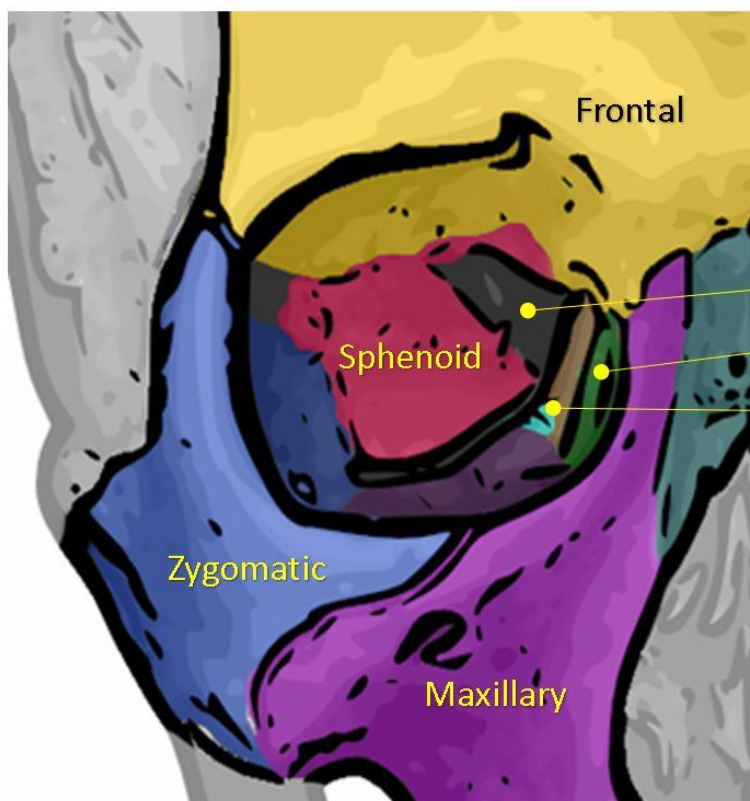
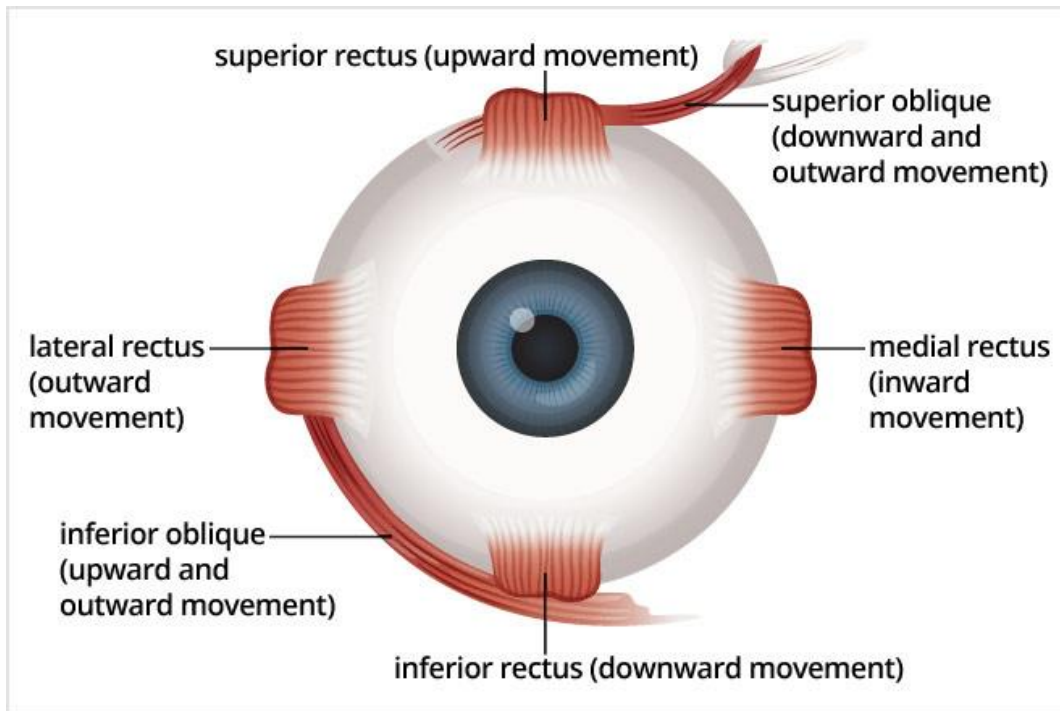


- The choroid is behind the retina and has blood vessels critical to the functions of the eye.
- The lacrimal gland creates tears, the tears ducts drain excess tears.

The tear layer keeps the surface of the eye moist, contains oils to retard evaporation and is part of the optical system as light rays first strike the tear layer.



## Anatomy Fact Sheet for the Human Eye



The seven bones that form the orbit:

Ethmoid

Lacrimal

Palatine