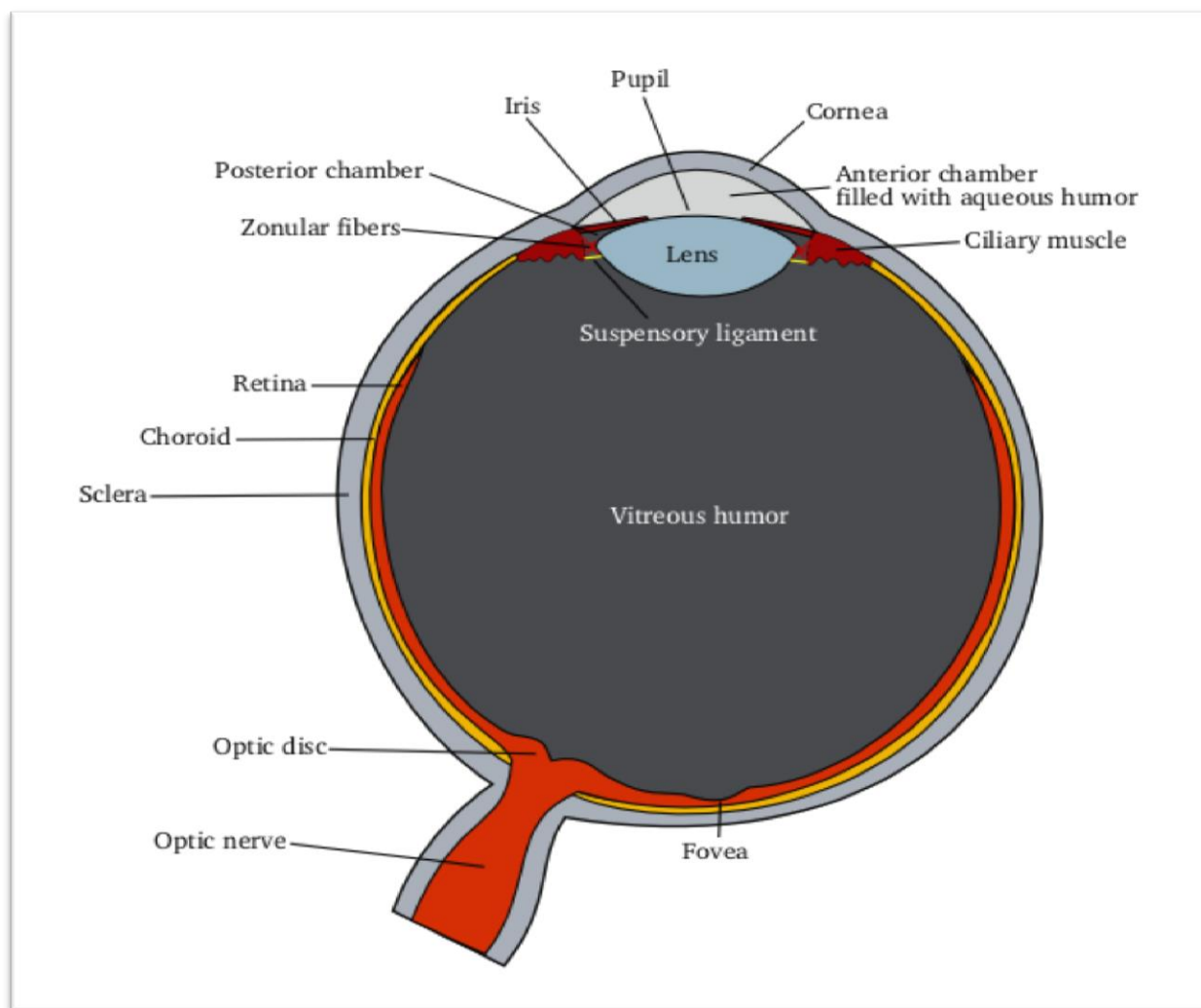


HUMAN EYE



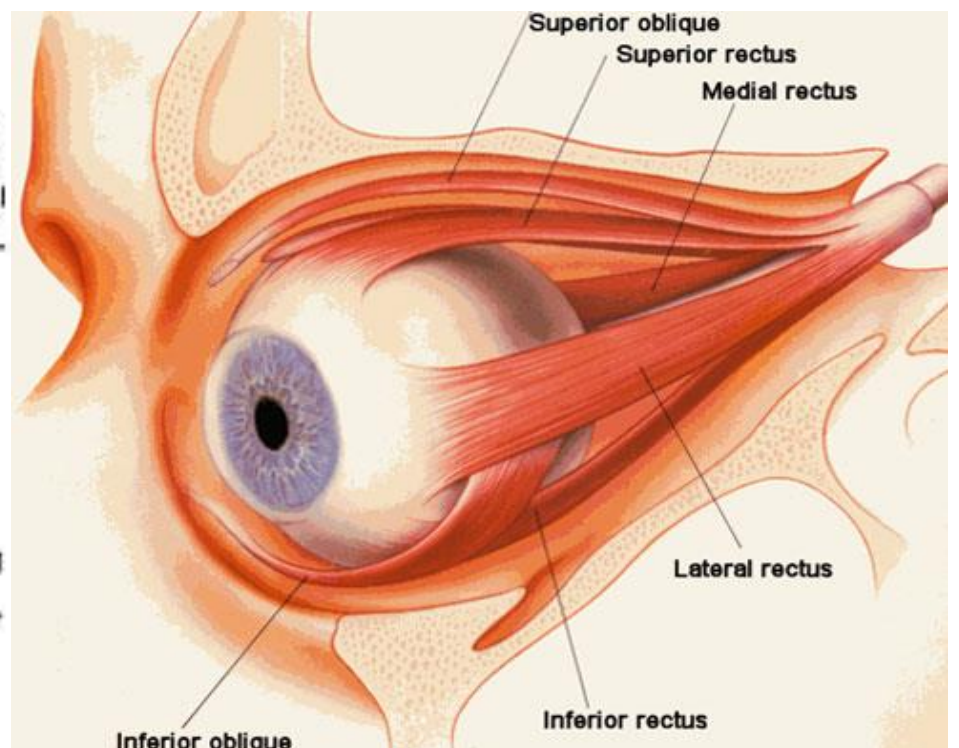
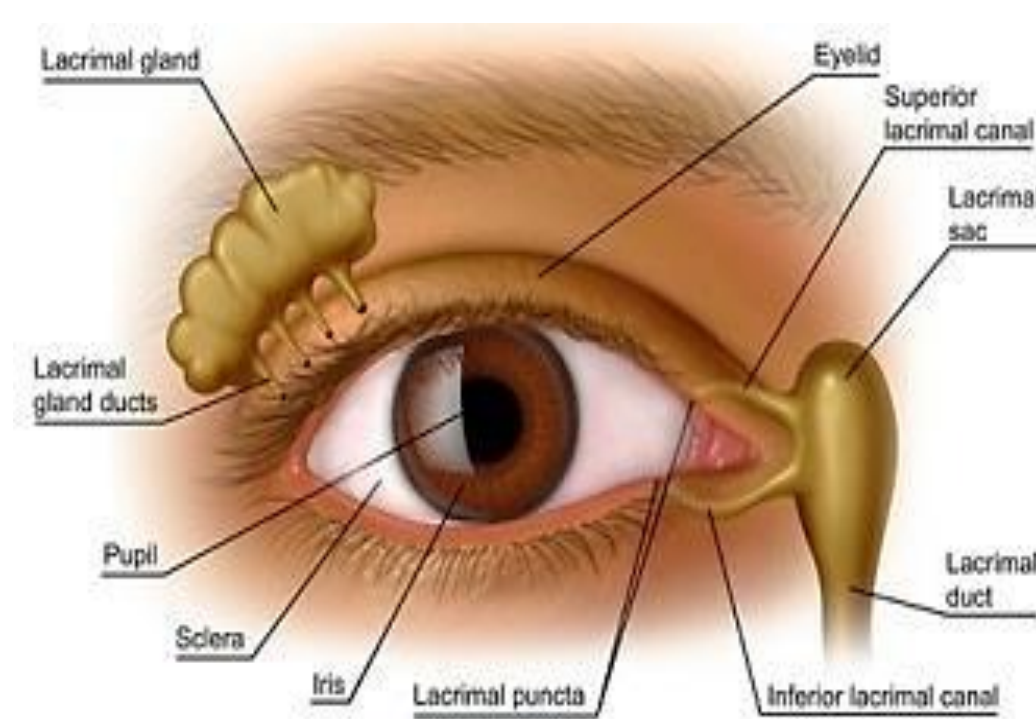
GENERAL DESCRIPTION

The eyeball is not a simple sphere. The small piece, occupying about one-sixth of the whole, has a radius of eight millimetres (0.3 inch); it is transparent and is called the cornea; the remainder, the scleral segment, is opaque and has a radius of 12 millimetres (0.5 inch). on looking directly into the eye from in front one sees the white sclera surrounding the cornea; because the latter is transparent one sees, instead of the cornea, a ring of tissue lying within the eye, the iris. The iris is the structure that determines the colour of the eye. The centre of this ring is called the pupil. It appears dark because the light passing into the eye is not reflected back to any great extent.

EXTERNAL STRUCTURE OF HUMAN EYE

Externally human eye is protected by eye lids and are located inside the orbital cavity of skull. The eye lids and eyelashes provide continuous protection to eye with constant blinking. In addition, they are protected by glands. Externally a vestigial plica semilunaris represented by a pink mass is present at the nasal side of each eyeball.

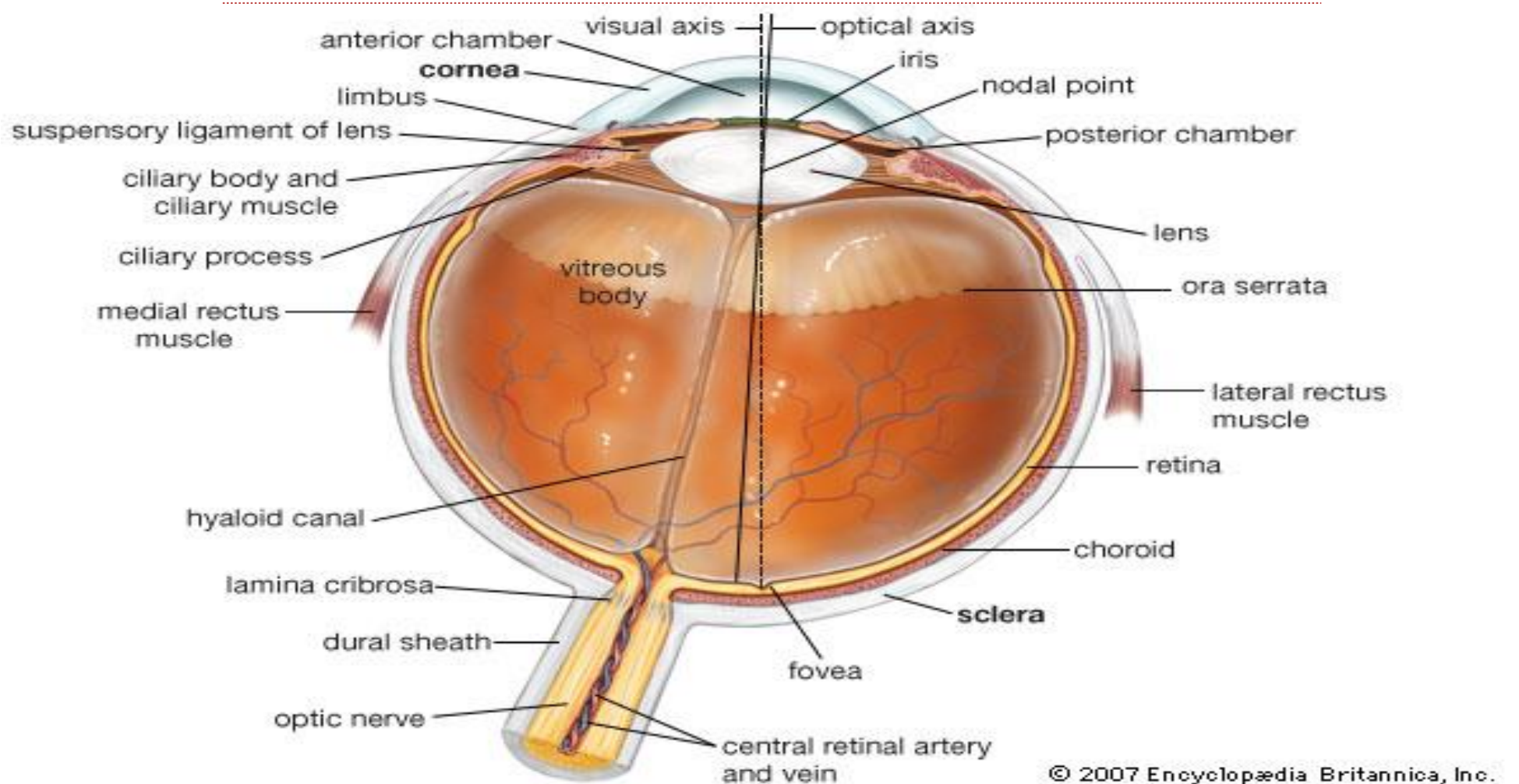
There are 6 set of muscles holding eyeball which are present to help in the rotation of eyeball in different direction. Four set of straight rectal muscles; Superior, inferior , medial, Lateral rectal muscles and two set of oblique muscle; superior and inferior muscle.



Glands Associated With Eye

1. Meibomian gland:- Modified form of sub aceous gland, present along edges of eye lids; secrete oily secretion to lubricate eyelids and eyelashes.
2. Lacrymal gland:- One pair, modified form of sweet gland, present in superior and lateral surface of eyeball; secrete watery alkaline lachrymal secretion or tears to keep the eye moist and clean the cornea and provide nutrition to cornea. The secretion is mixture of NaCl, NaOH, carbonate and small amount of urea. Also contains lysosome to kill bacteria entering the eye. Lacrymal gland has numerous ducts; superior and inferior canaliculis, a lacrymal duct and nasolacrymal duct. The tear flows into the nasal cavity through Nasolacrymal duct.
3. Canals of Schlemm:- A venous sinus or small tubular capillaries which drains out excess of Aqueous humorus. Closing of canal of schlemm may increase intraocular pressure in aqueous chambers, which contains glaucoma and finally a person becomes blind.

INTERNAL STRUCTURE OF HUMAN EYE



Internal structure of eye shows the wall of eyeball & eye chambers. The eye wall consist of 3 distinctive layers; sclera, choroid & retina.

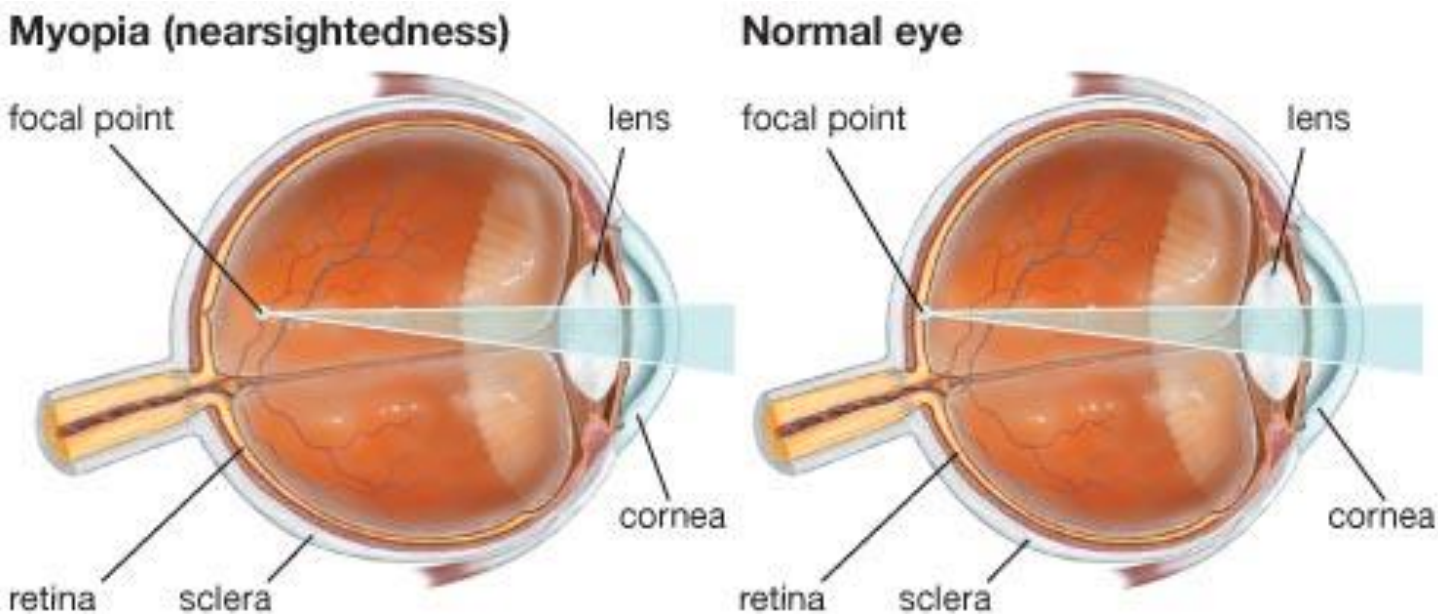
1. **Sclera:-** The outermost layer, tough, opaque, white colored, fibrous in nature; provides shape to the eyeball & protection.
2. **Cornea:-** The Anterior $1/6^{\text{th}}$ part of sclera bulged and transparent layer which allows light inside; also called window of eye; light ray refracts through it and passes into the lens.
3. **Conjunctiva:-** A thin transparent layer, covers cornea, Anteriorly it ends in upper eyelid and posteriorly in the lower eyelid; protects the cornea.
4. **Choroid:-** The middle layer of eye wall, betⁿ sclera and retina; contains blood vessel and pigments; provide nutrition to eye esp. retina; Also maintains darkness inside the eye. Anterior part of choroid gives structure like ciliary body, suspensory ligaments and Iris.
5. **Ciliary body:-** Present at the junction of sclera & cornea; contains ciliary muscles; Its contraction & relaxation cause lens to change its shape and size hence helps in changing focus(focal length) of lens.
6. **Suspensory ligaments:-** Thread like structure attached to the ciliary body at one end and lens at another end; holds lens in position
7. **Iris:-** pigmented and colored part of choroid found before lens; concentration of pigments determines the color of iris; contains 2 types of muscle(radial and circular) which helps to control amount of light entering the eye; contraction and relaxation of iris determines the size of Pupil.
8. **Pupil:-** Gap in betⁿ iris; size of pupil determines the light entering the eye.
9. **Retina:-** The innermost part of eye, where the image of object is formed; also called Screen of eye; composed of 2 types of photosensitive cells(Rod cells and Cone cells)
10. **Rod cells:-** contains Rodopsin pigments, useful in night vision(dim light); produce black and white images as they can't detect colors; Its functional defect cause night blindness. Vitamin A is vital for proper functioning of rod cells.
11. **Cone cells:-** Contains Iodopsin pigments, useful for day vision(bright light); produce colorful images as they can detect the color; Its functional defect cause color blindness, which may also be hereditary disease.

The posterior part of retina consists of the depressed parts, Yellow spot and Blind spot.

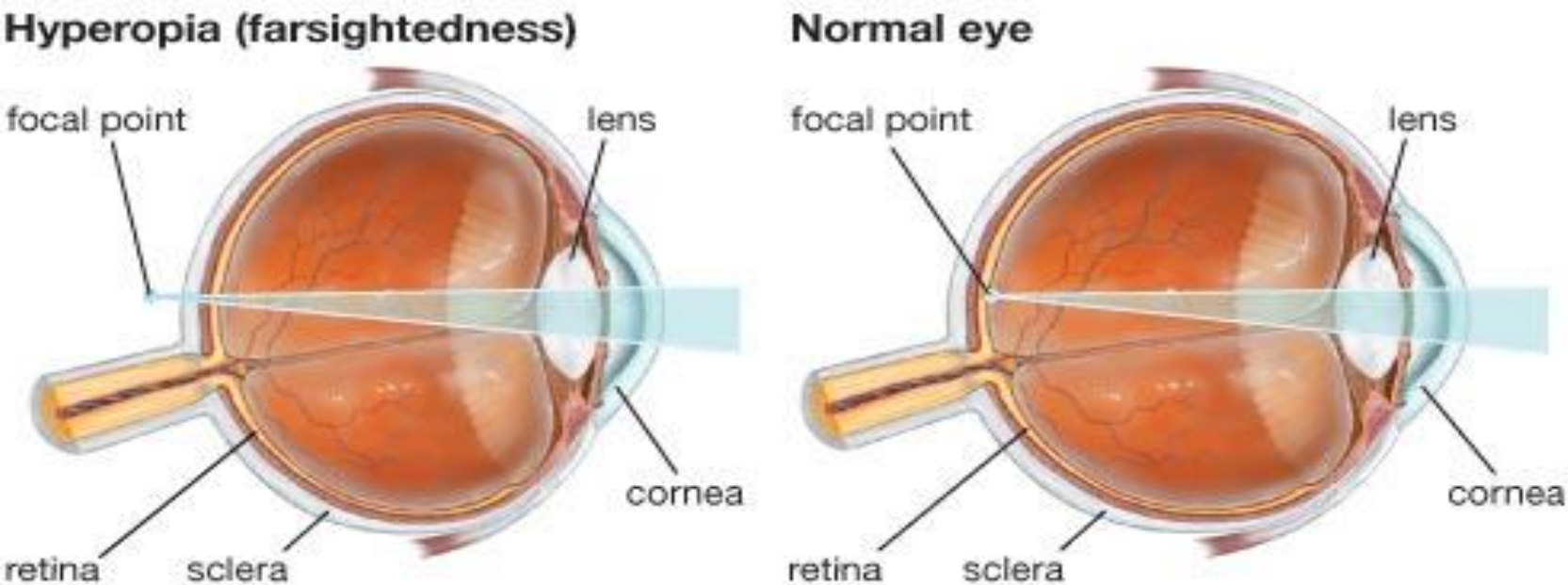
12. **Yellow Spot (Fovea centralis):-** Slightly depressed part of retina, close to optic nerve, contains only cone cells; Also called the area of best vision in bright light.
13. **Blind spot:-** particular area in retina where optic nerve enter into the retina; doesn't contain any photosensitive cells, so called area of no vision.
14. **Optic nerve:-** Posterior part of retina connected with optic nerve carries nerve impulse from eye to brain.
15. **Lens:-** Transparent, biconvex & elastic structured held in position by suspensory ligaments focuses light coming from object to retina; Lens divide eye into 2 parts; Aqueous chamber and Vitreous chamber.
16. **Aqueous chamber:-** - Anterior small chamber between lens & cornea filled with watery fluid called aqueous humor which maintains the shape of cornea & provide nutrient to lens & cornea.
17. **Vitreous Chamber:-** - Posterior large chamber between lens & retina filled with thick jelly fluid called vitreous humor which helps to maintain the shape of eyeball & provide nutrient to retina.

EYE DISEASES

- 1) Myopia: - In some people, the image of the visual field may be focused in front of the retina is nearsightedness, or Myopia. The vision of distant objects is not distinct because the image of a distant point falls within the vitreous and the rays spread out to form a blur circle on the retina instead of a point. In this condition the eye is said to have too great [dioptric](#) (refractive) power for its length. In this condition Victim can't see far or distant objects but can see near objects. Distant objects can be seen clearly only with the aid of concave lenses.



- 2) Hypermetropia: - - In some people, the image of the visual field may be focused behind the retina is farsightedness, or hypermetropia. The vision of near objects is not distinct because the image of a near point falls behind the retina, instead of a point. In this condition Victim can see far or distant objects but can't see near objects. Accommodating for distance can be overcome by wearing convex glasses.



- 3) Cataracts:- Defect of eye in which image formed in retina gets blurred due to coagulation of protein in it.
- 4) Glaucoma:- Defect of eye in which canal of Schlemm is blocked that cause pressure exertion in the wall of vitreous humor that damages optic nerve and the visual cells die resulting Blindness.
- 5) Diplopia:- Defect in optic nerve which results in formation of 2 images of an object at same instant.
- 6) Night blindness:- Defect of eye in which rod cells are damaged, or the decrease in rhodopsin pigment in retina. The victim can't see clearly in the night.
- 7) Color blindness:- Defect of eye in which cone cells are damaged, or decrease in Iodopsin pigment in retina resulting the victim to be unable to distinguish the colors.
- 8) Astigmatism:- In this condition the refractive power of the eye varies in different axes, depending on the path the light takes through the cornea. This is due to the presence of non-uniform corneal curvature and results in the distortion of vision at all viewing distances. Astigmatism is a common condition and can be corrected with the use of cylindrical lenses in eyeglasses or contact lenses.

