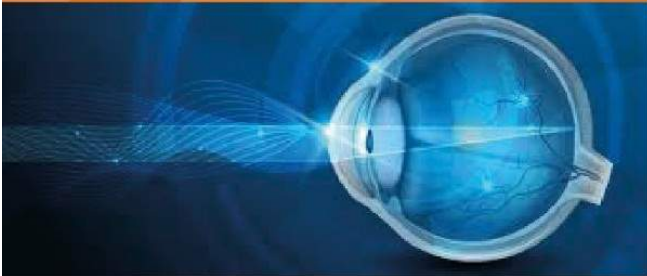
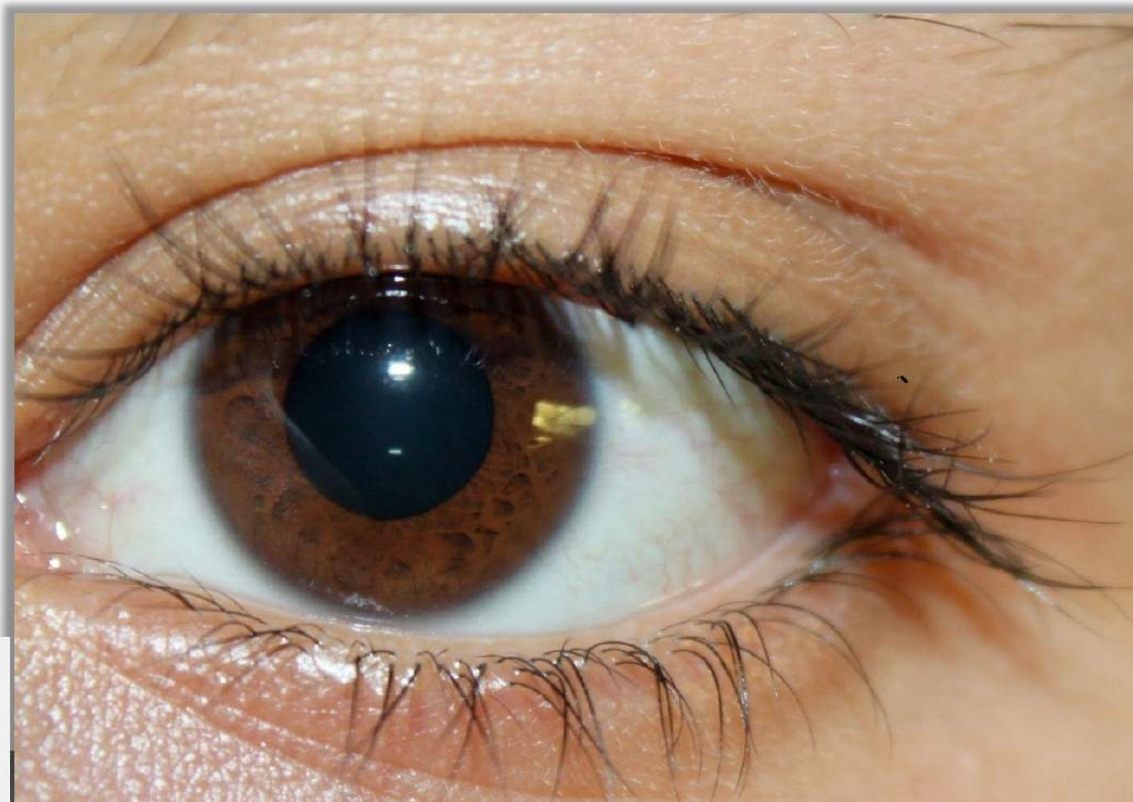


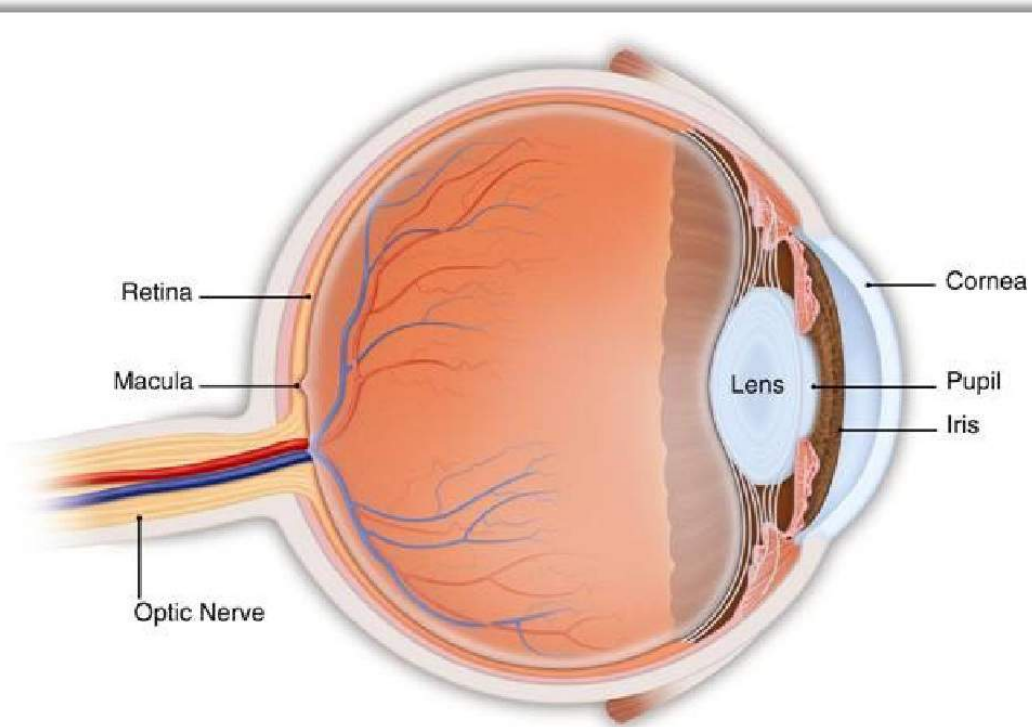
Eye Anatomy & Function



External ocular appearance



Key Eye Functions



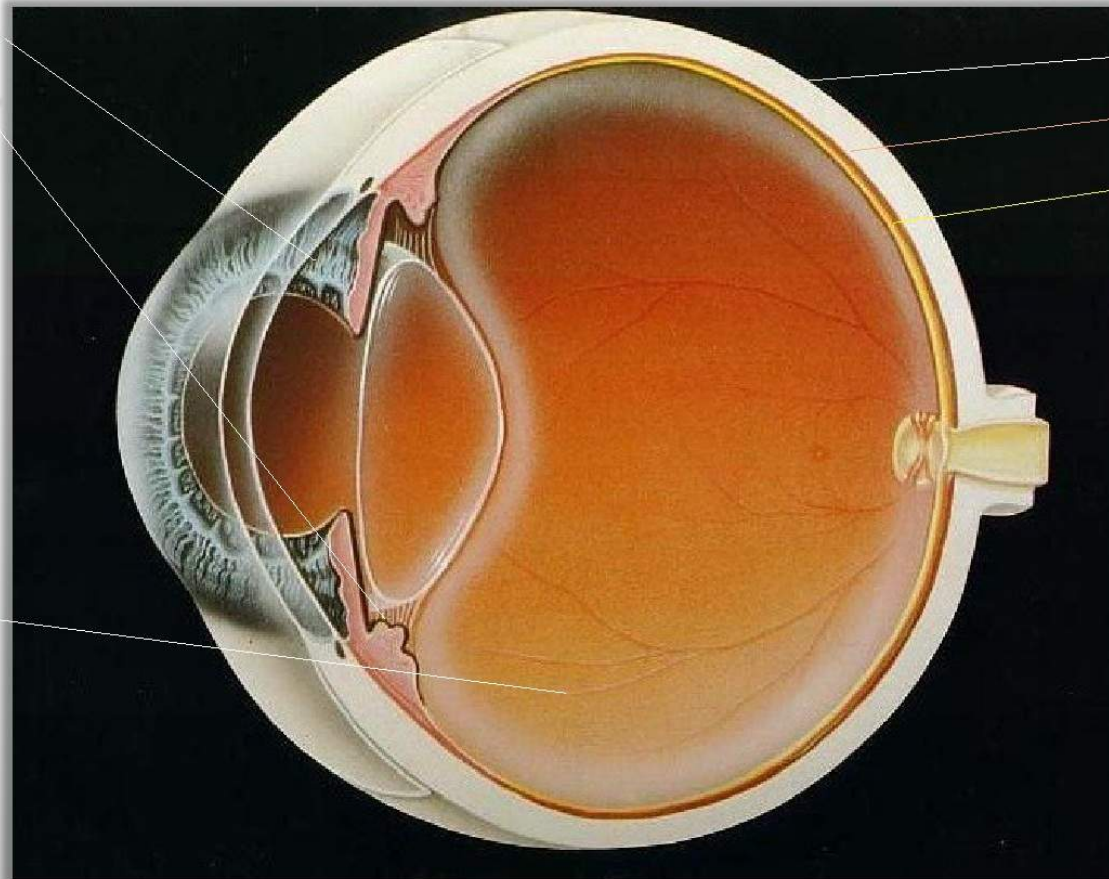
- Transmits and refracts light from the front to the back of the eye
 - *Transparent light path*
 - *Includes structures that bend light (refract)*
- Converts light energy into action potentials transmitted to brain

Layers and chambers of the eye

Anterior Chamber
Posterior Chamber

Fibrous Tunic
Vascular Tunic
Nervous Tunic

Vitreous Chamber

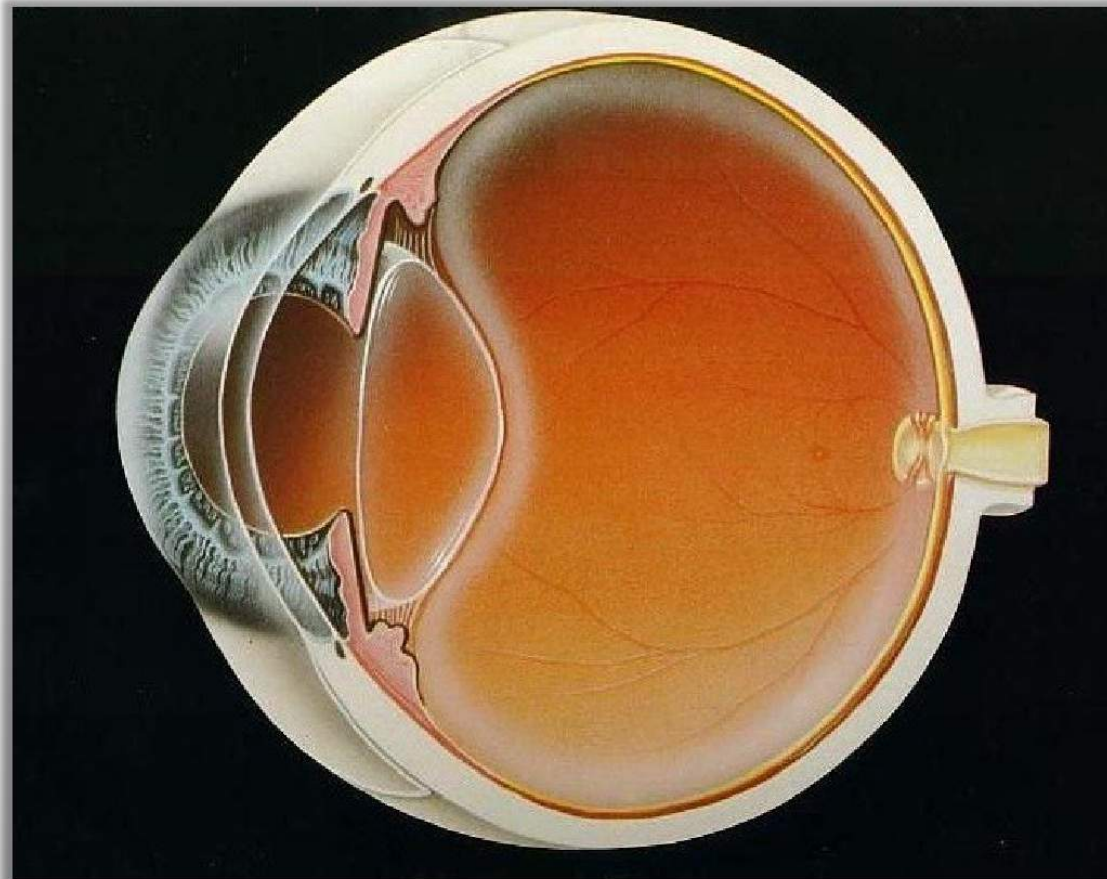


Defining ocular segments

Anterior segment:

Structures in front of vitreous:

Cornea,
iris,
ciliary body,
and lens

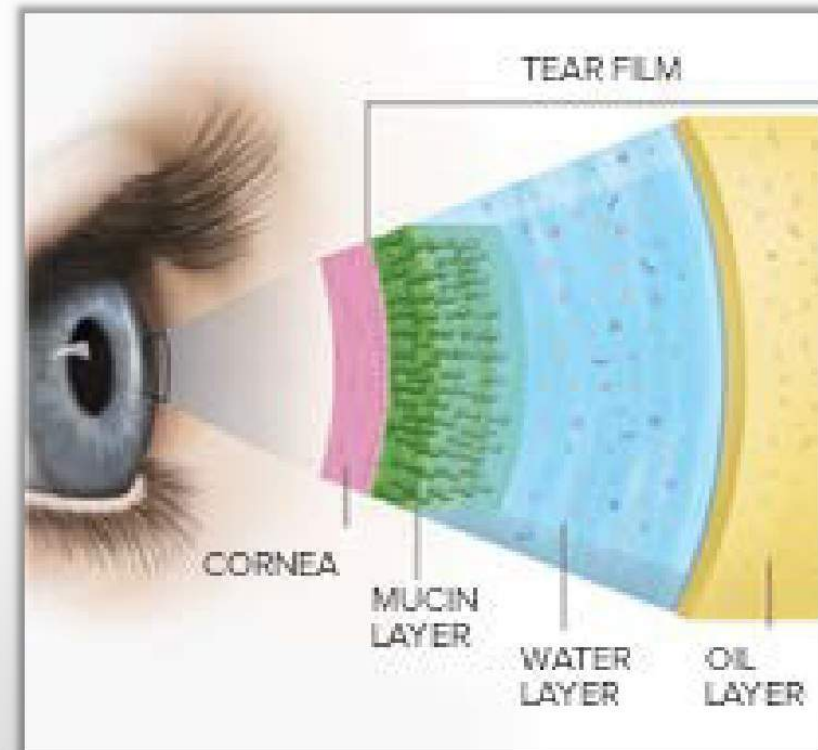


Posterior segment:

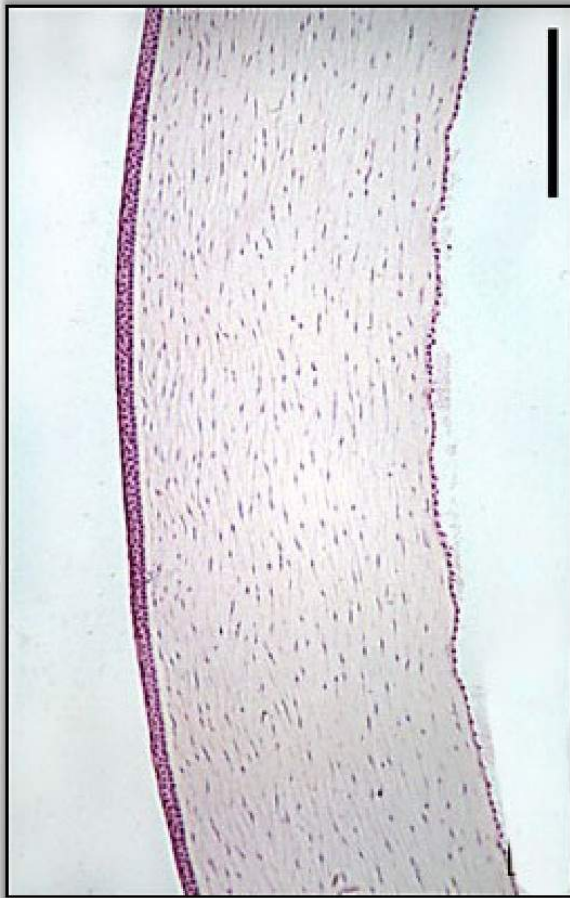
Vitreous,
retina,
choroid,
optic nerve

Tear film layers and functions

- **Oil layer:**
 - Meibomian glands
 - Prevents evaporation
- **Water layer:**
 - Lacrimal glands
 - Lubricates
 - Allows blinking
 - Washes away debris
 - Forms smooth surface
- **Mucin layer:**
 - Goblet cells of conjunctiva
 - Attaches tear film to eye
 - Spreads water evenly

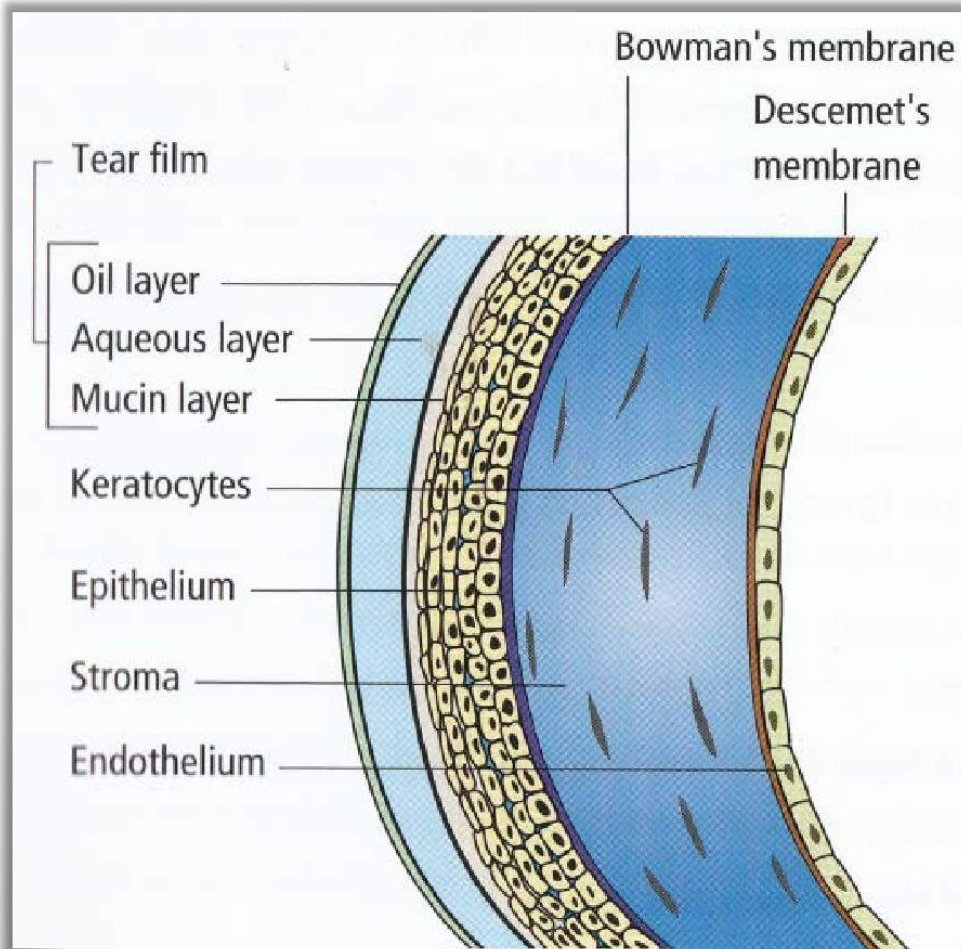


Cornea functions



- **Transmits light, transparent**
 - Collagen and matrix
 - Aligned
 - Spacing
 - Relative dehydration is maintained by endothelial cells
 - No blood vessels
- **Refracts light +40-44 dioptres**
 - Curvature
 - Has different refractive index from air

Corneal anatomy



Epithelium:

Barrier to fluid loss and pathogen penetration

Stroma:

Collagen, ECM, keratocytes

Endothelium:

Maintains relative dehydration

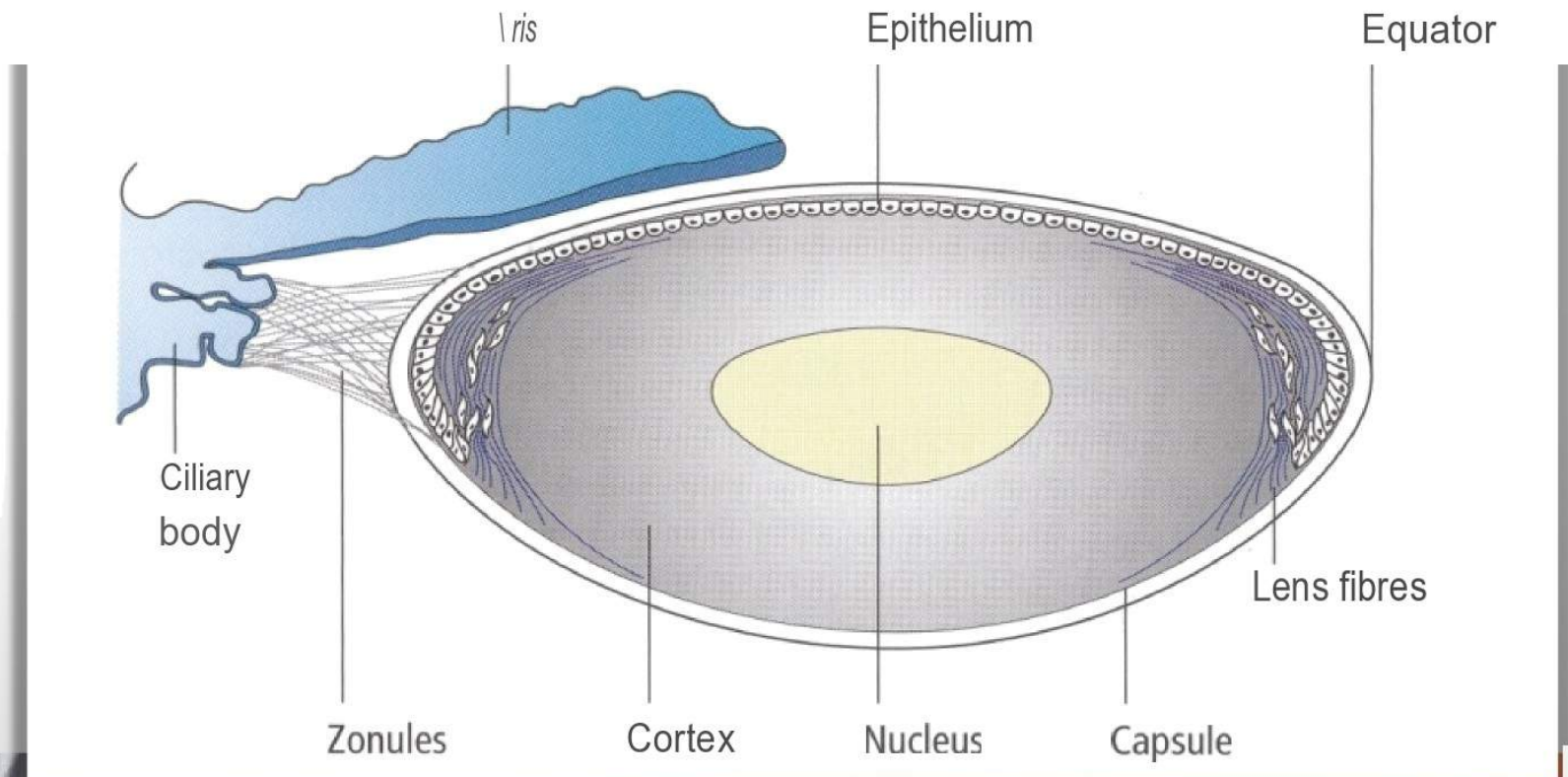
Dense innervation:

Most sensitive organ in the body
Immune privilege
Rapid tearing reflex

The cornea:

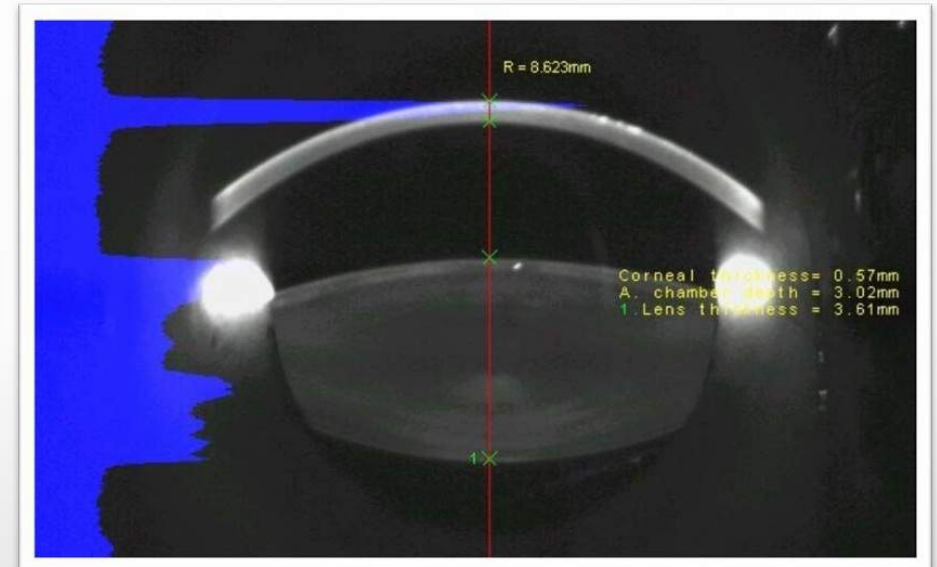
Transmits light
Refracts lights
Protects ocular interior

Structure of the crystalline lens



Crystalline Lens: Structure and function

- Composed of α , β , and γ crystallins (water soluble proteins)
- Transmission of light
- Refraction of light. +17 dioptres
- Variable refraction of light - accommodation

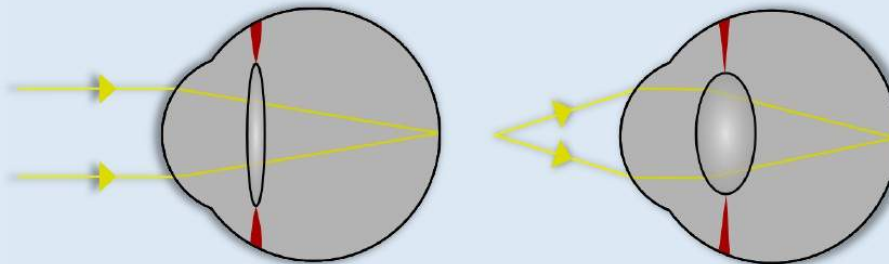


Cornea 2/3rd and lens 1/3rd refracting power

Accommodation

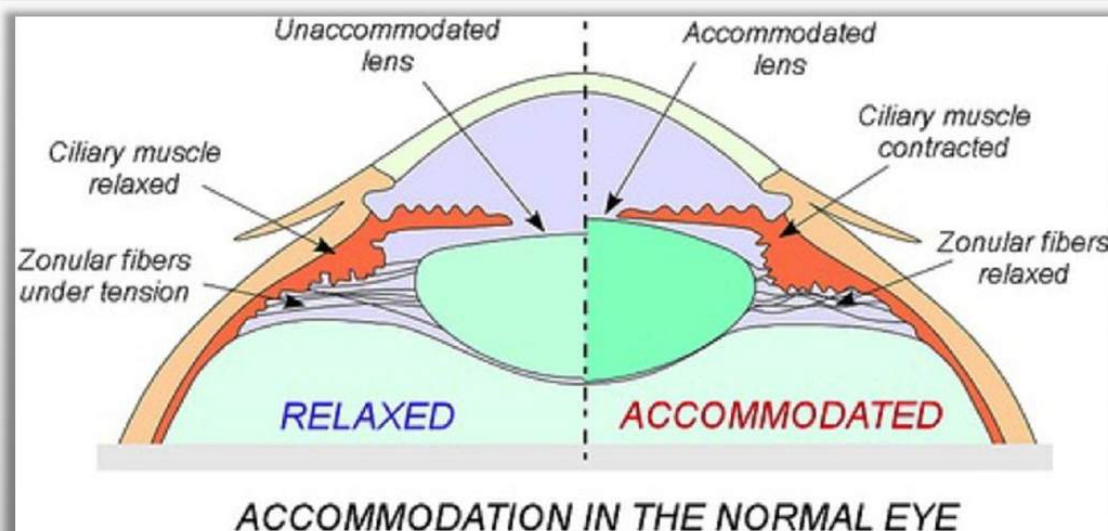
Far objects:

Ciliary muscle relaxed
(↑ diameter)
Zonules tight
Lens flatter i.e.
distance

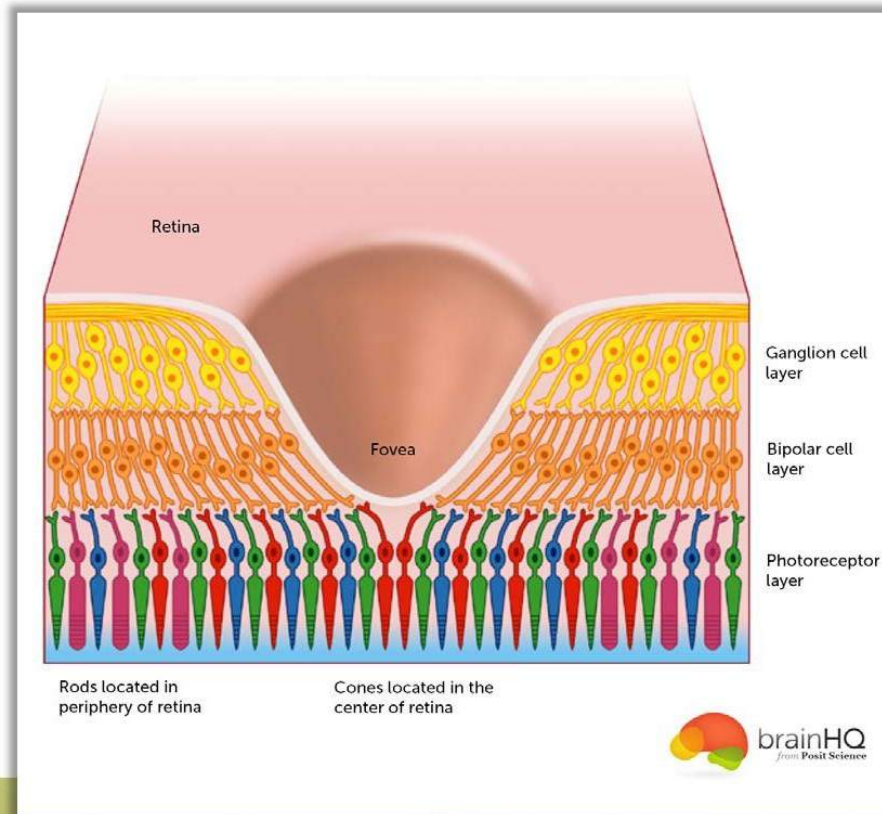


Near objects:

Ciliary muscle contracts
(↓ diameter)
Zonules relaxed
Lens increases in convexity
'accommodation' i.e. near

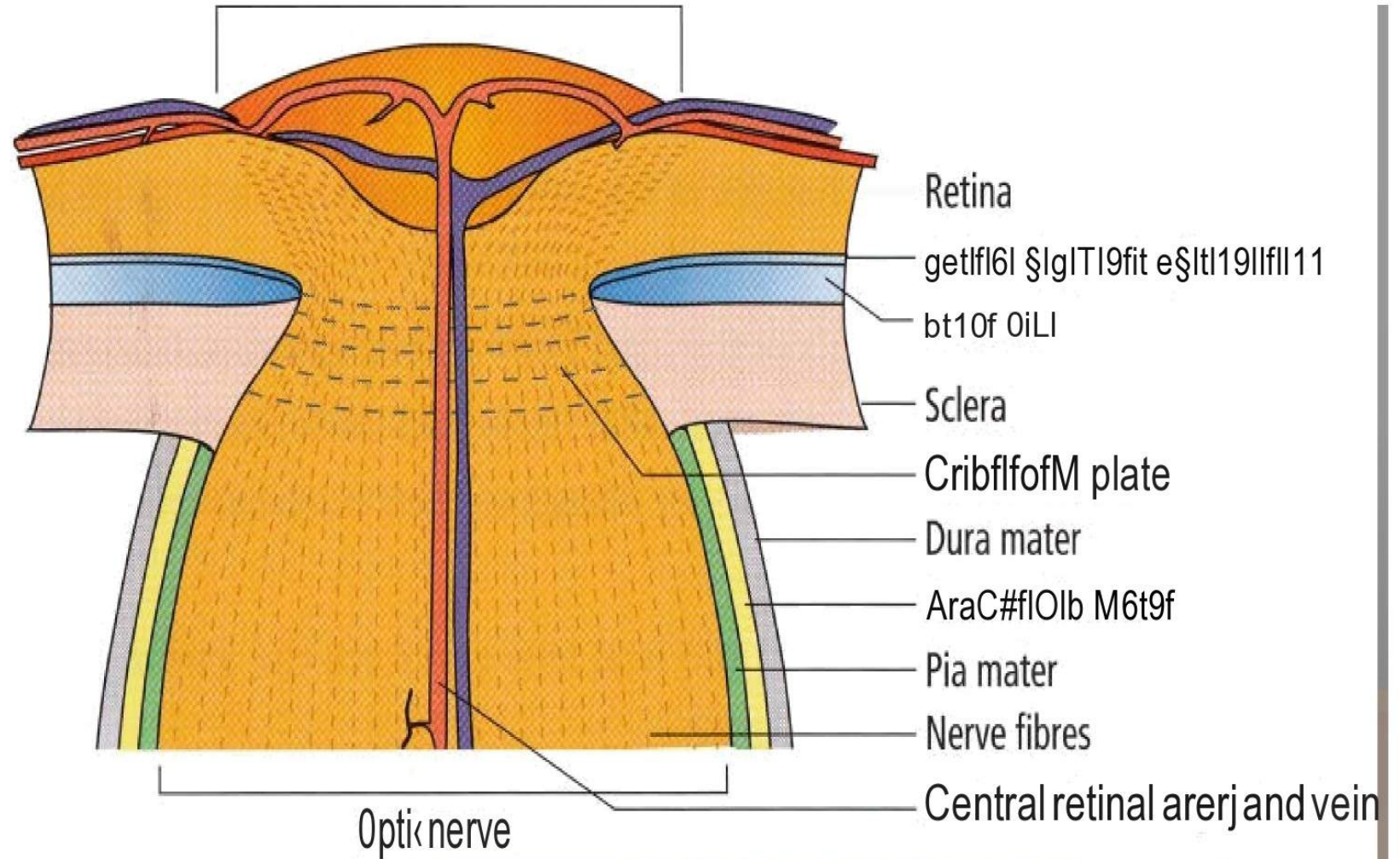


Fovea is within the central macula

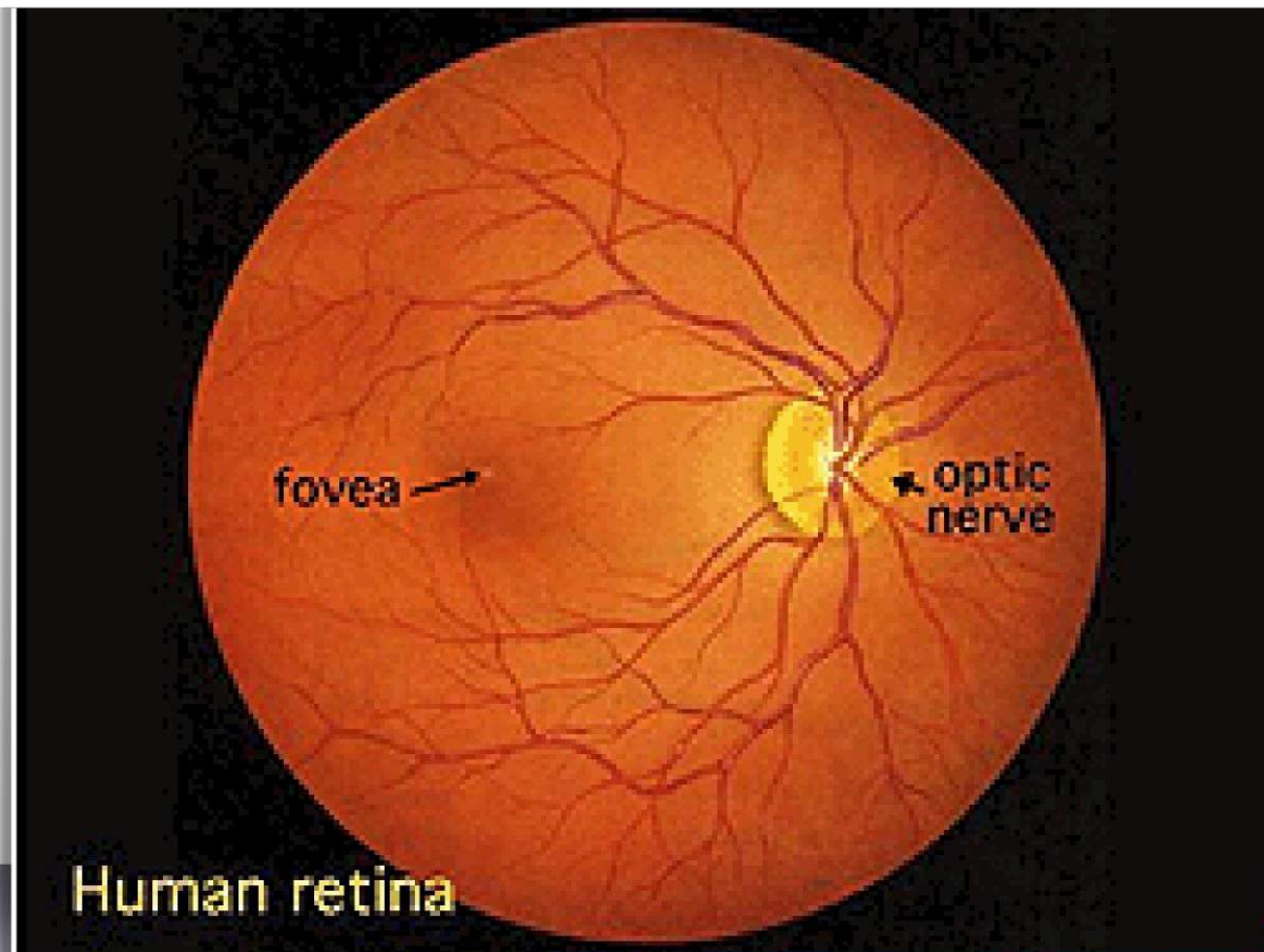


RETINAL MICRO-STRUCTURE

Optic Jisc



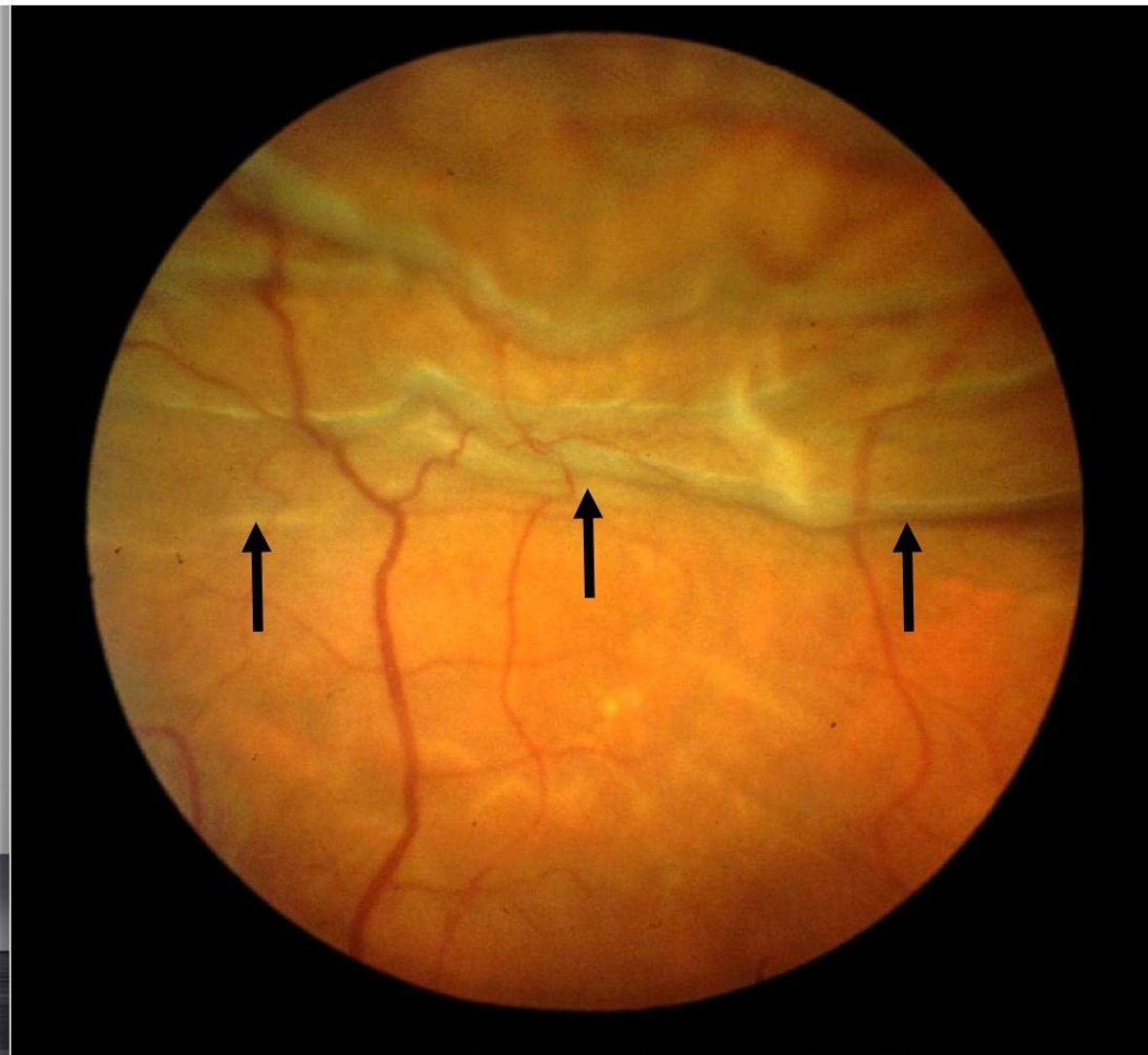
Temporal



Nasal

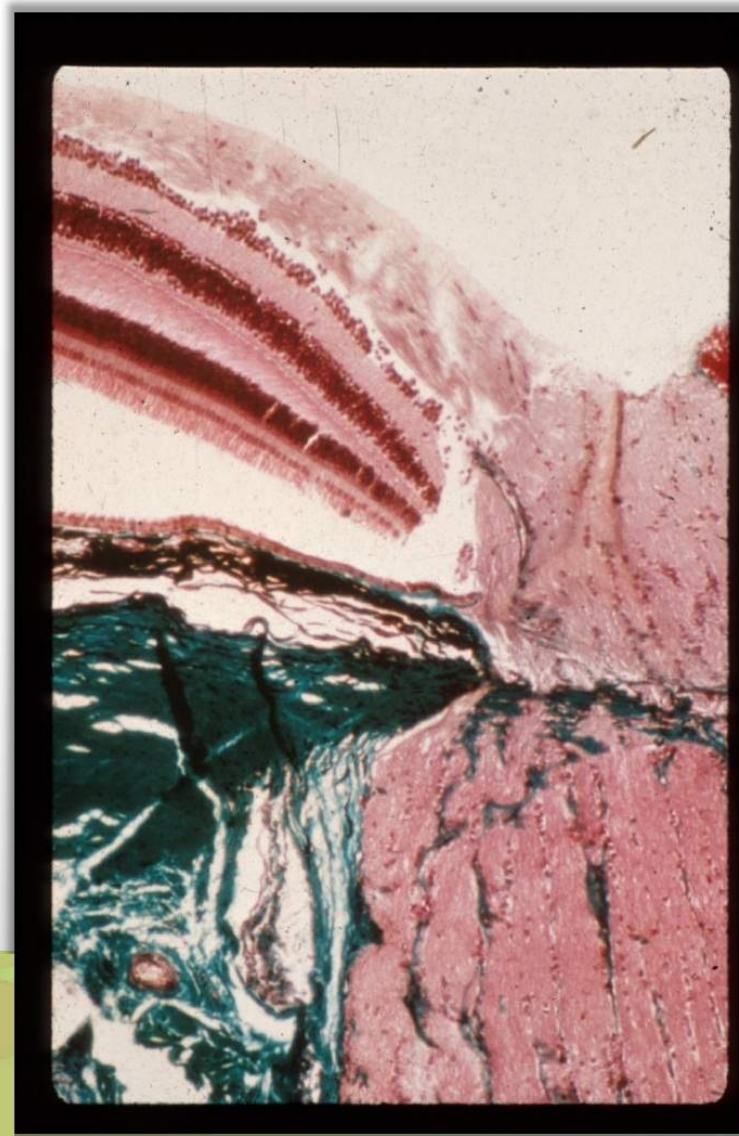


Superior Retinal Detachment



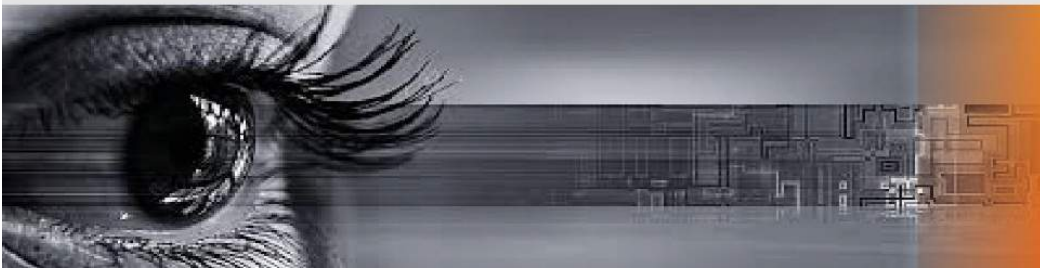
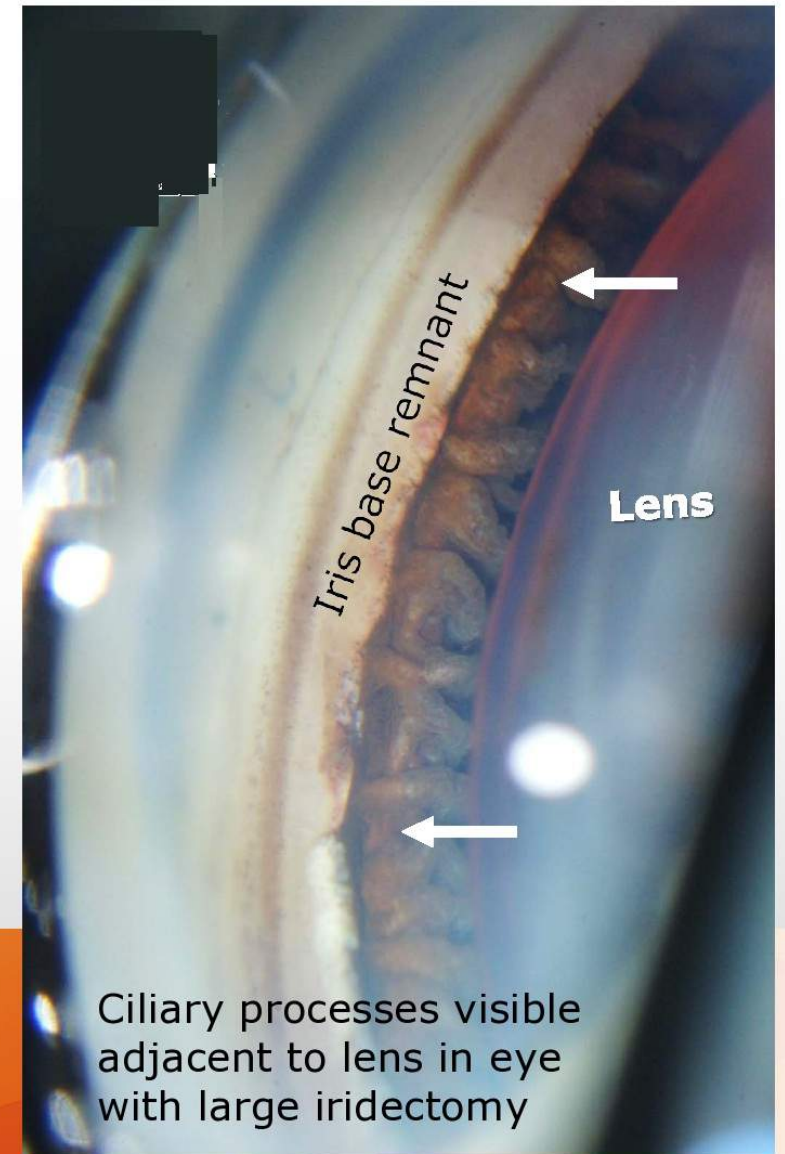
Optic nerve head and adjacent retina

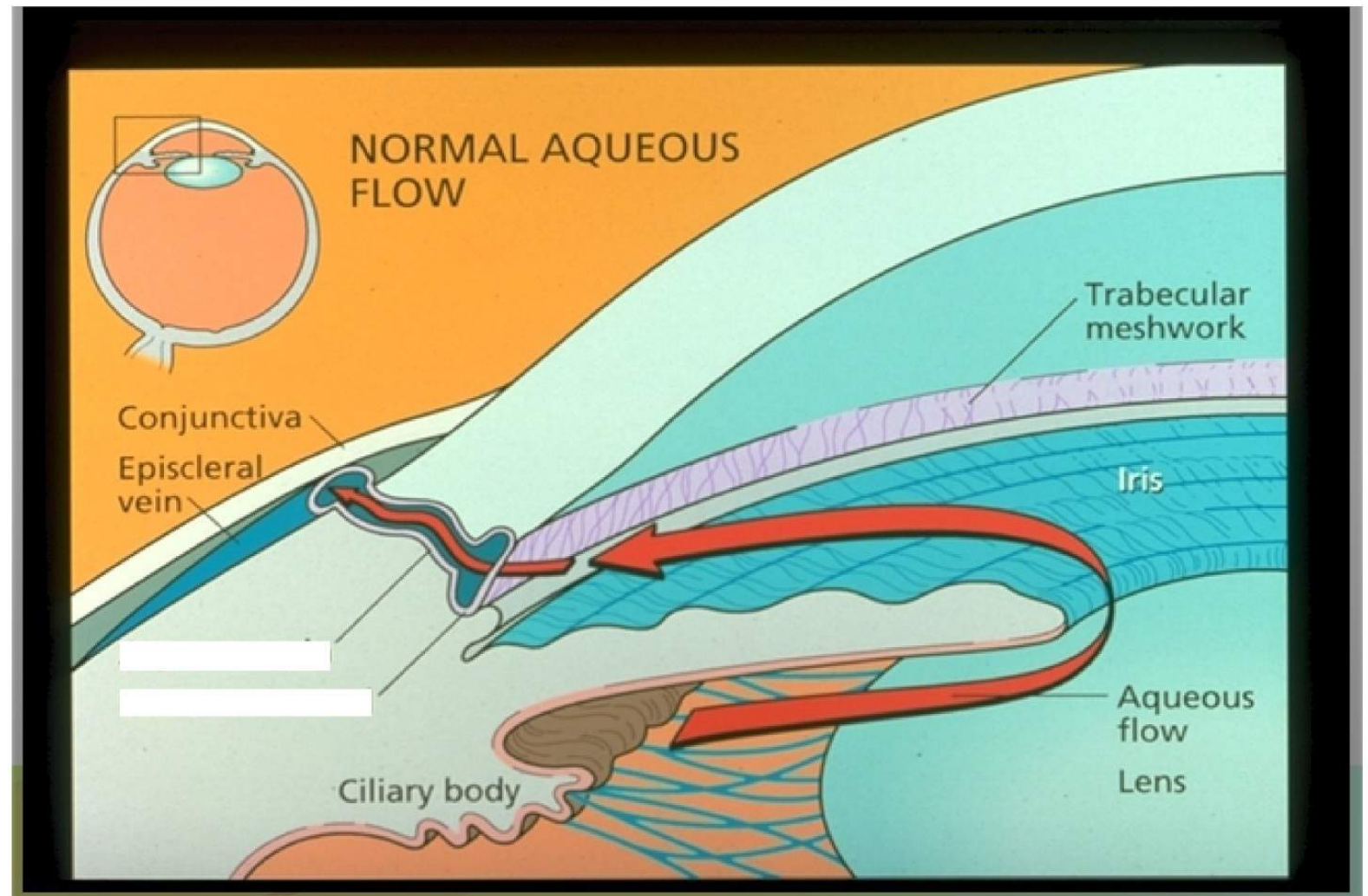
(Masson's trichrome)



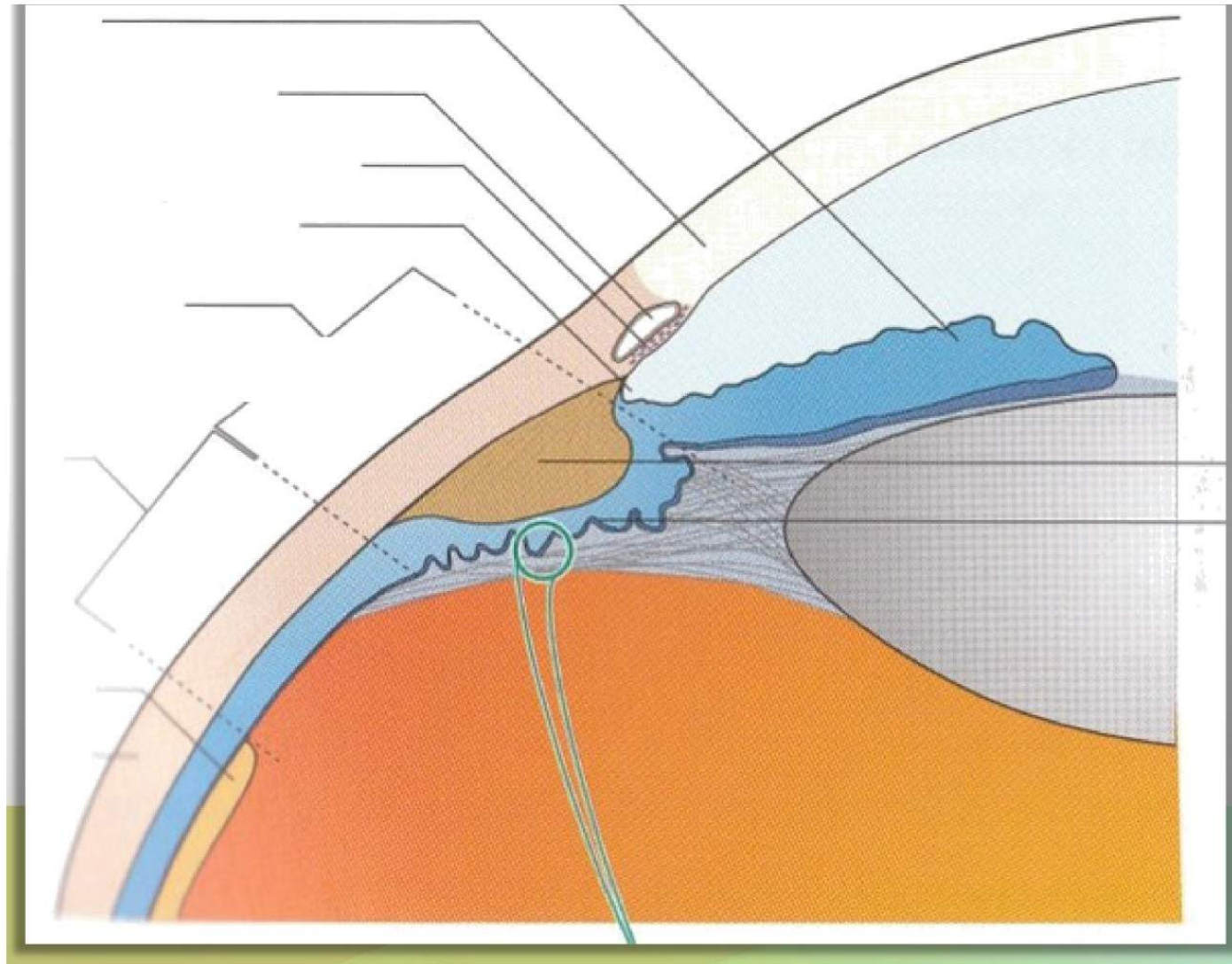
Ciliary Body

- Attachment of zonules (suspensory ligament of lens)
- Accommodation. Ciliary body smooth muscle
- Secretion of aqueous humour: Ciliary epithelium
 - Provides nutrition for the (avascular) cornea and lens
 - Maintains intraocular pressure





Name
these
ocular
structures



The Uveal Tract

The eye's vascular and immunological pool

Iris

Variable size of pupil (iris diaphragm) with light level with nearness of fixation

Ciliary Body

Aqueous, accommodation, zonule

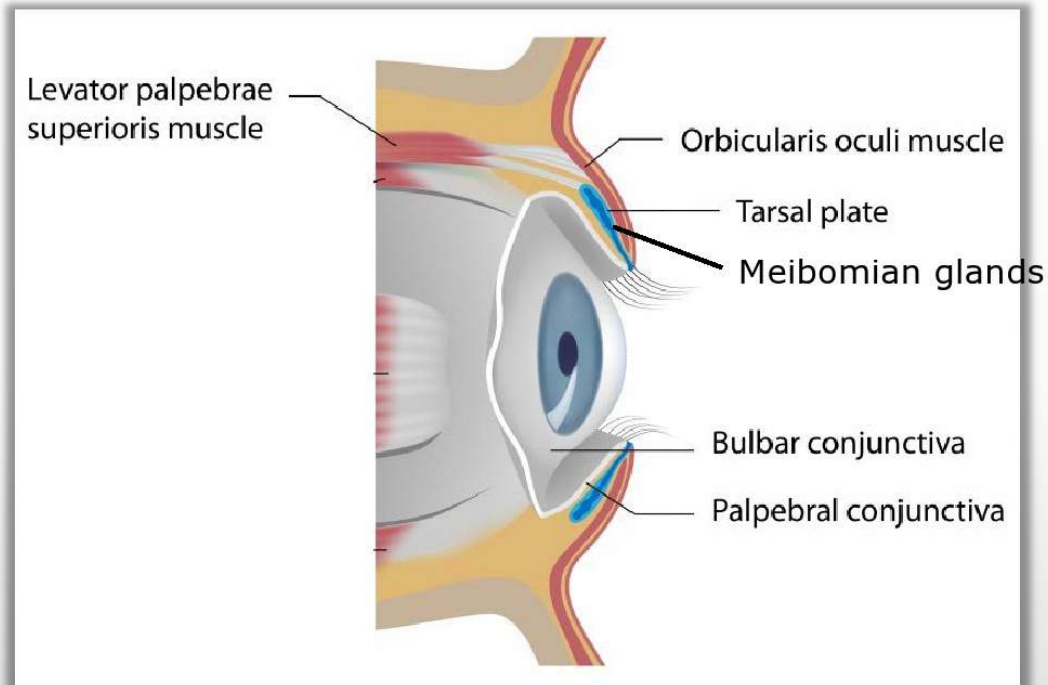
Choroid

Nutrition of retina and sclera

The most vascular tissue in the body



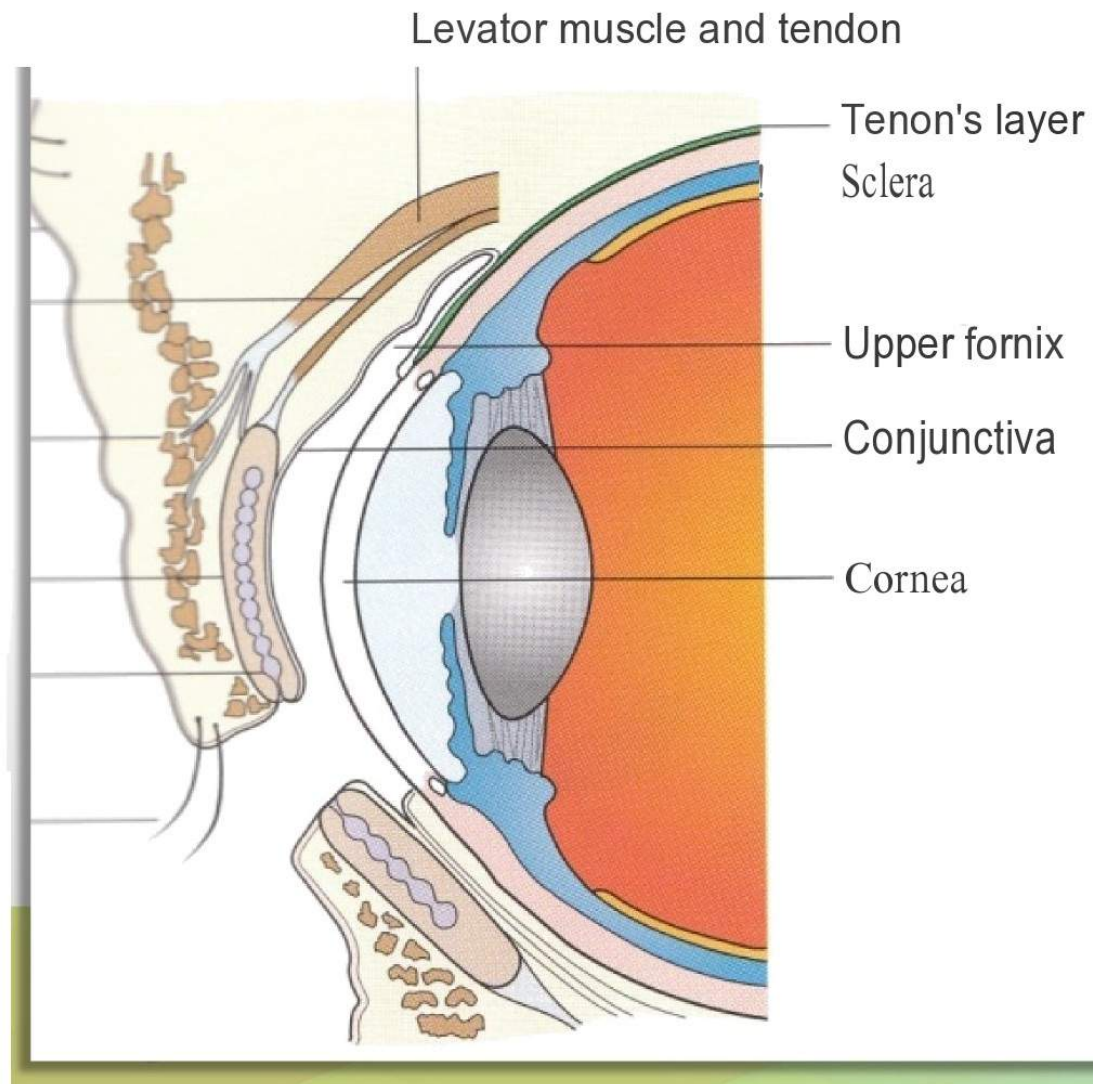
Eyelids and conjunctiva



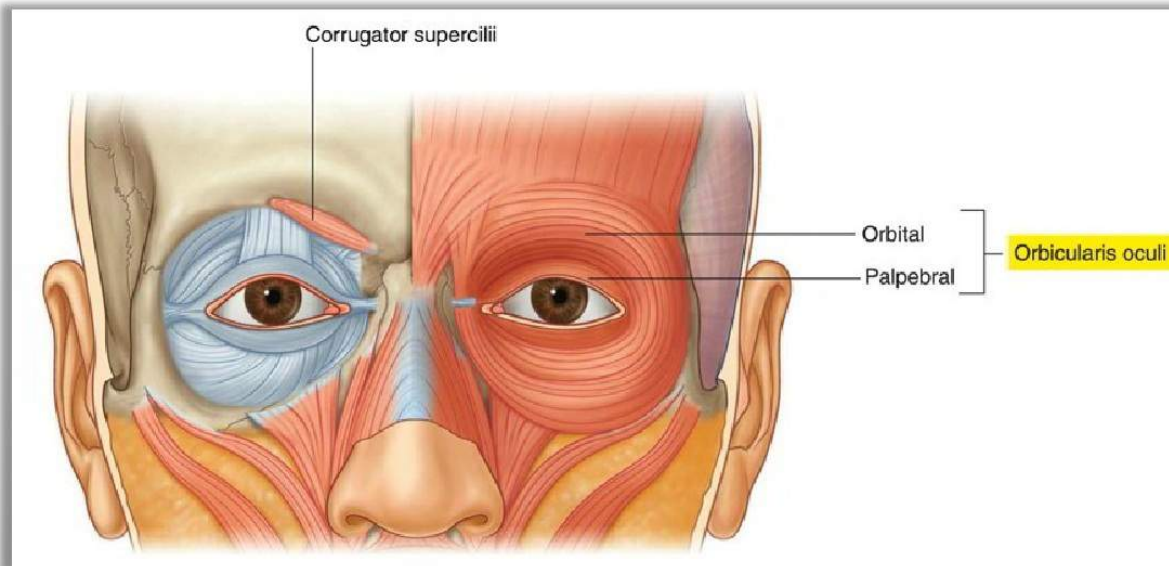
1. Skin
2. Muscles
3. Tarsal plate - mechanical stability & Meibomian glands – oil layer of tear
4. Conjunctiva
Attach eyeball to orbit & lids & permits rotation

Functions: Distribute tears, clear debris, cover eyes during sleep & prevent evaporation, protect from foreign bodies via the blink reflex

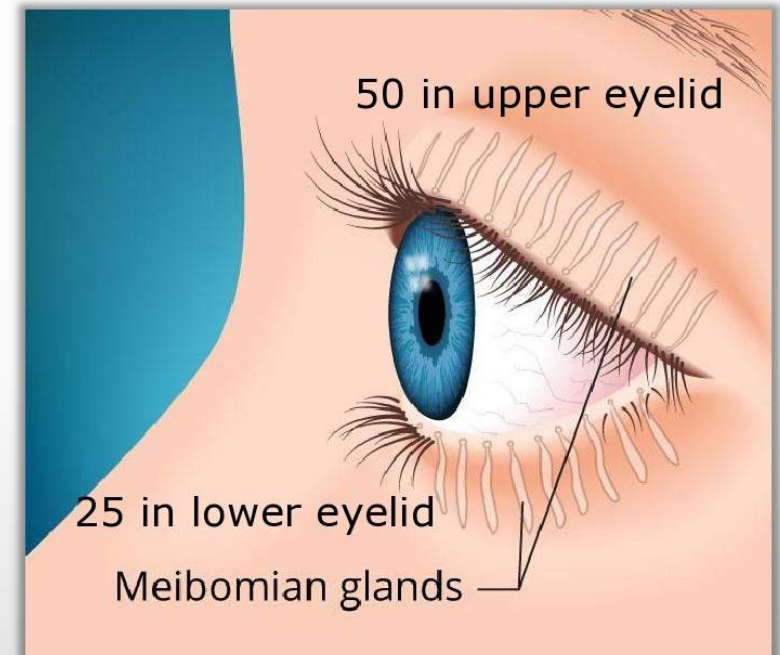
Eyelids and conjunctiva



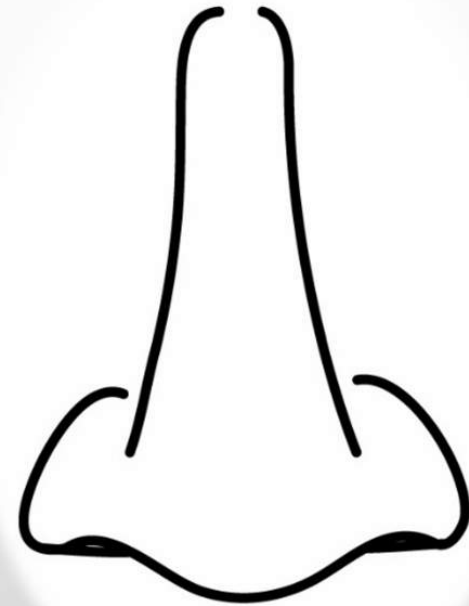
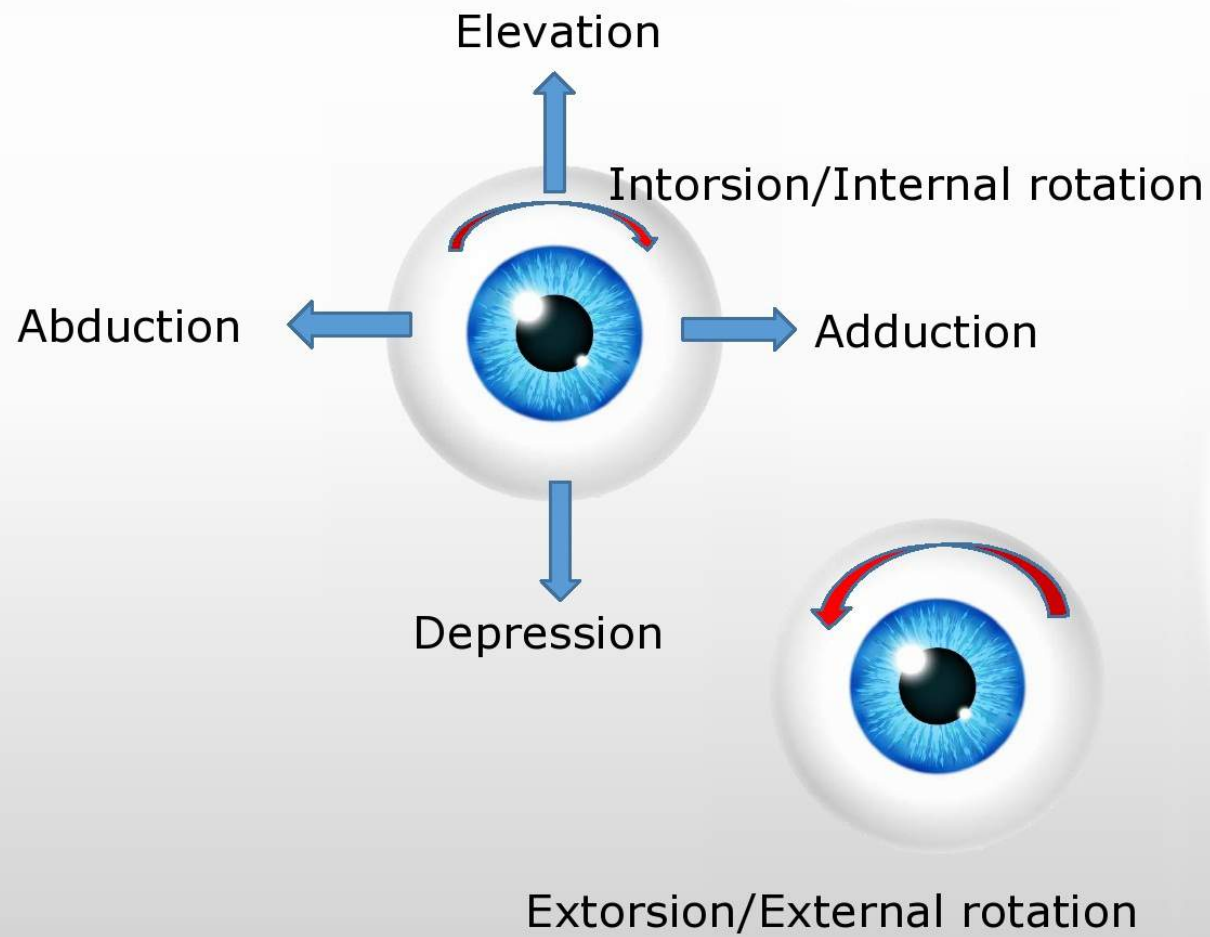
Orbicularis oculi and eyelids



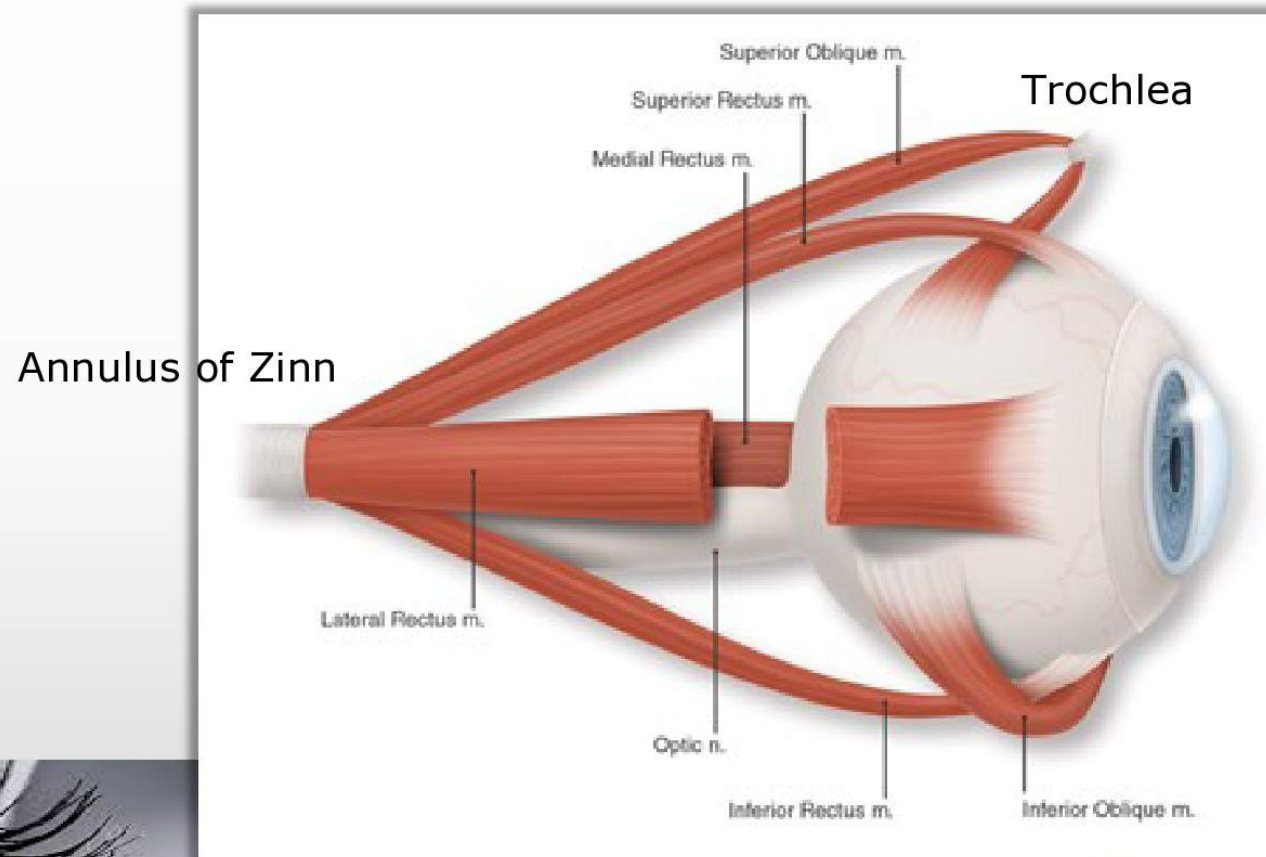
Orbicularis oculi muscle



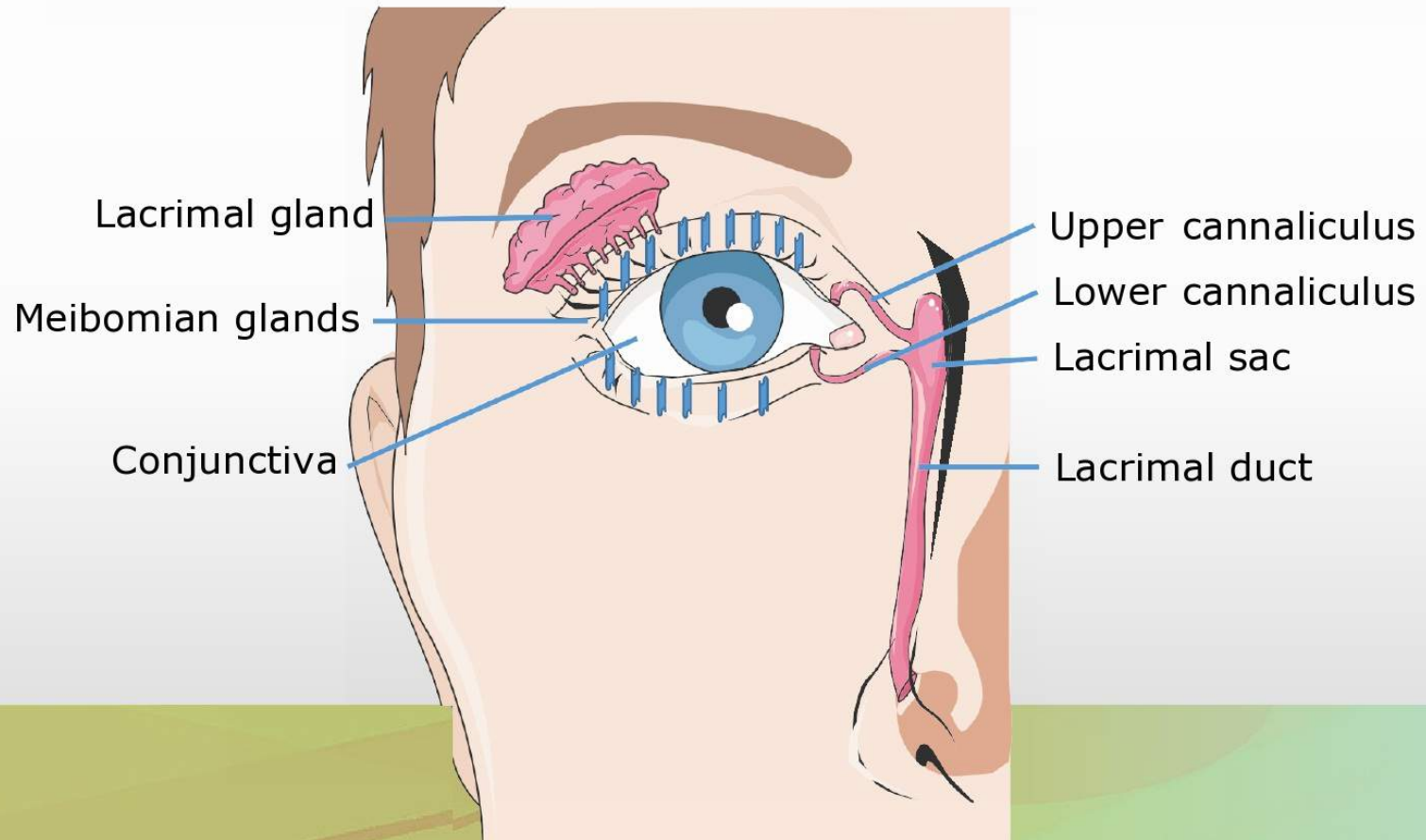
Eye movements

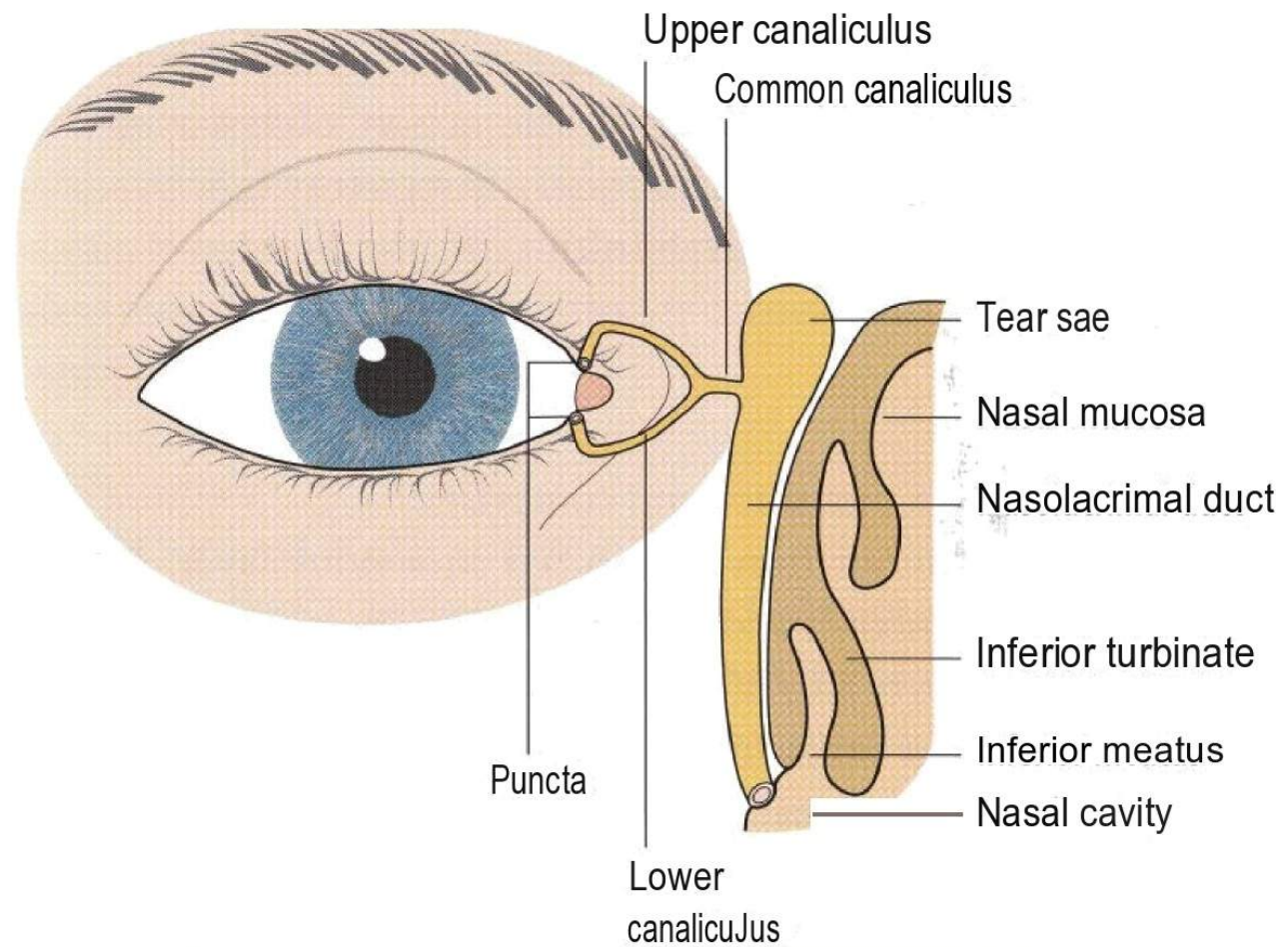


Extra-ocular muscles

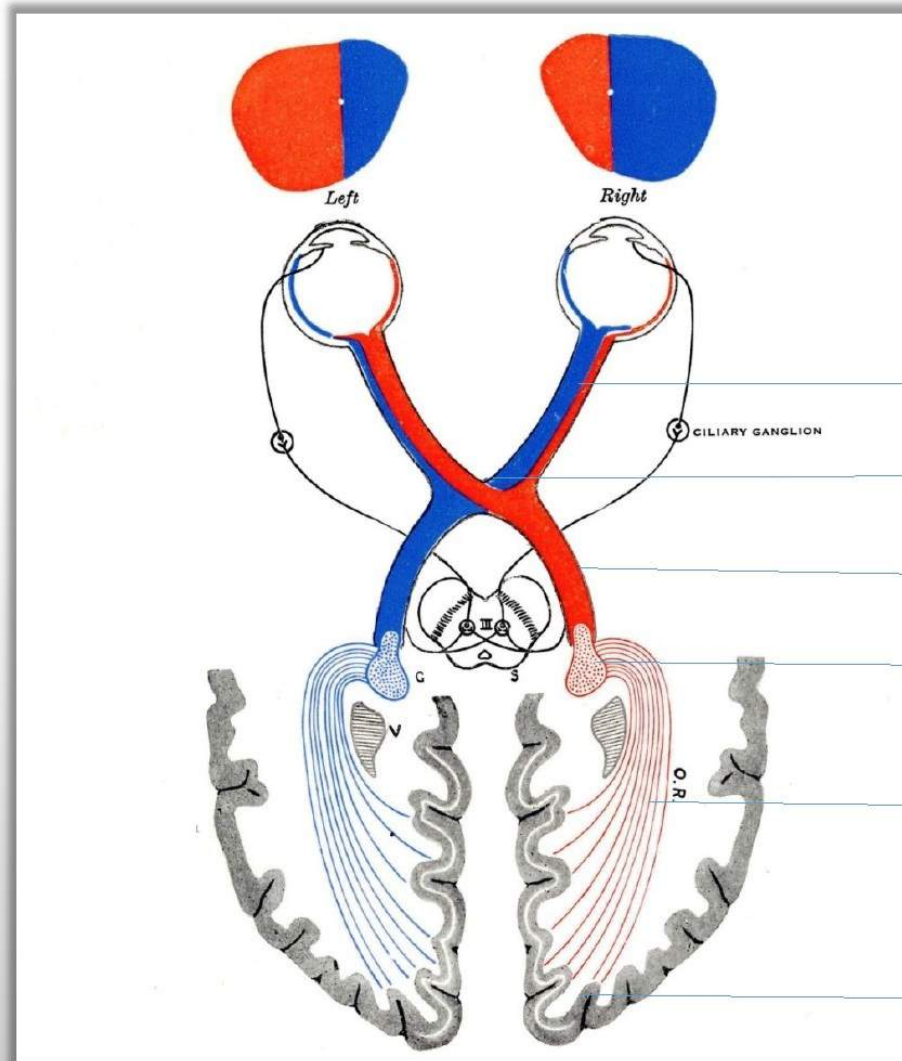


Tear production and drainage





Visual Pathway



Optic nerve

Optic chiasm

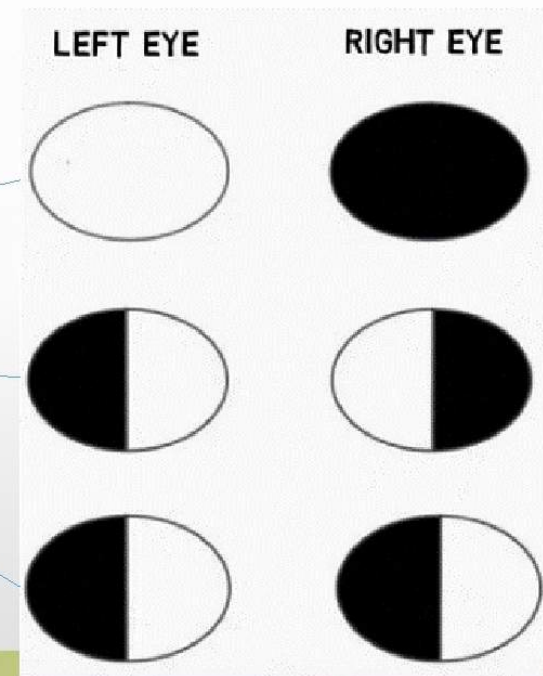
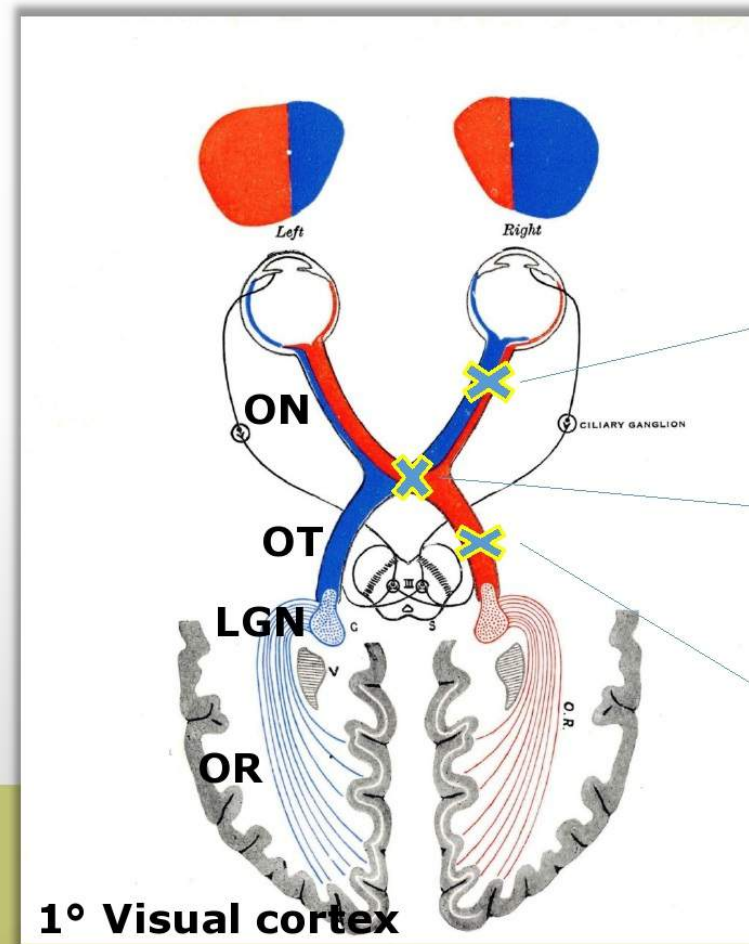
Optic tract

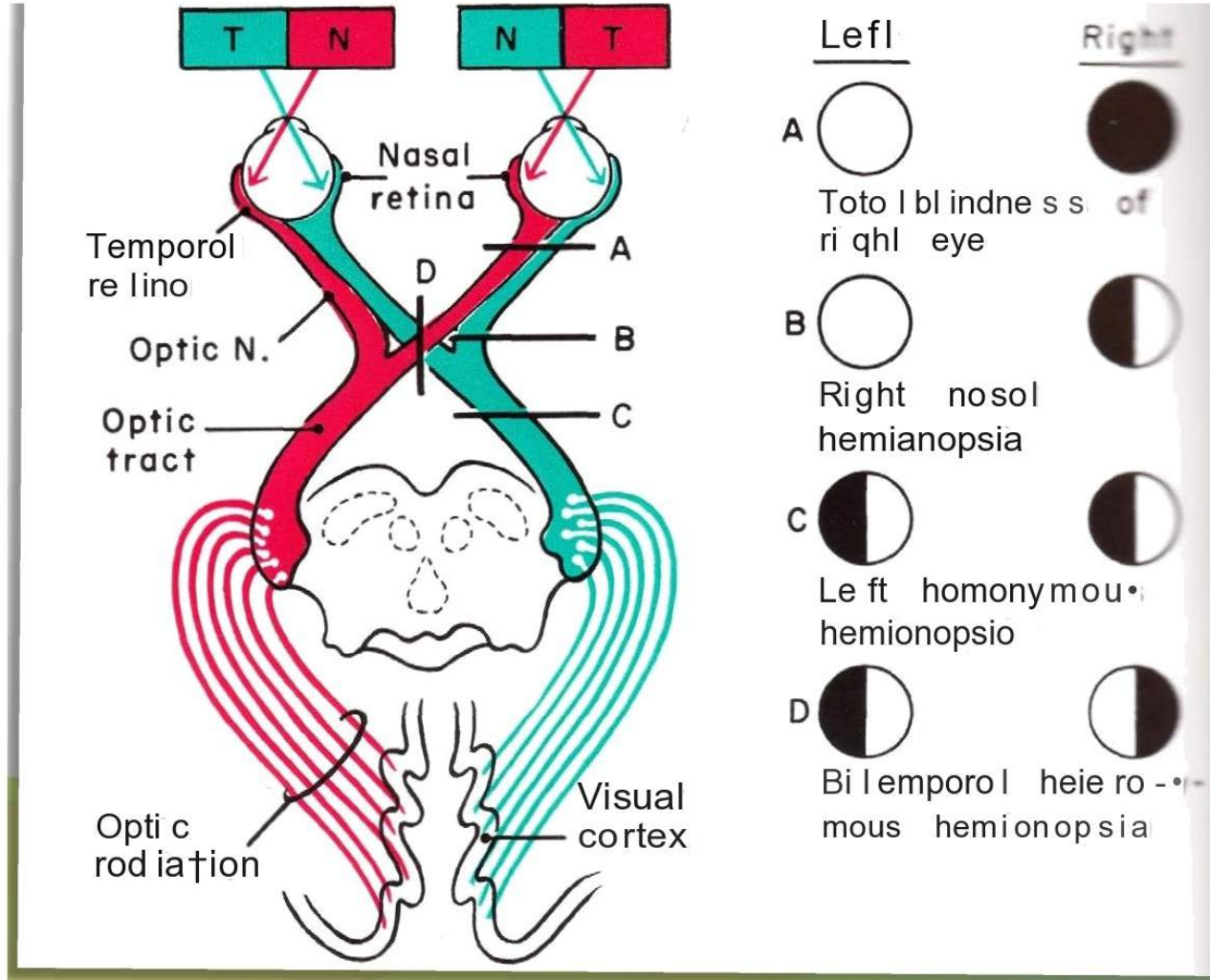
**Lateral geniculate
nucleus**

Optic radiation

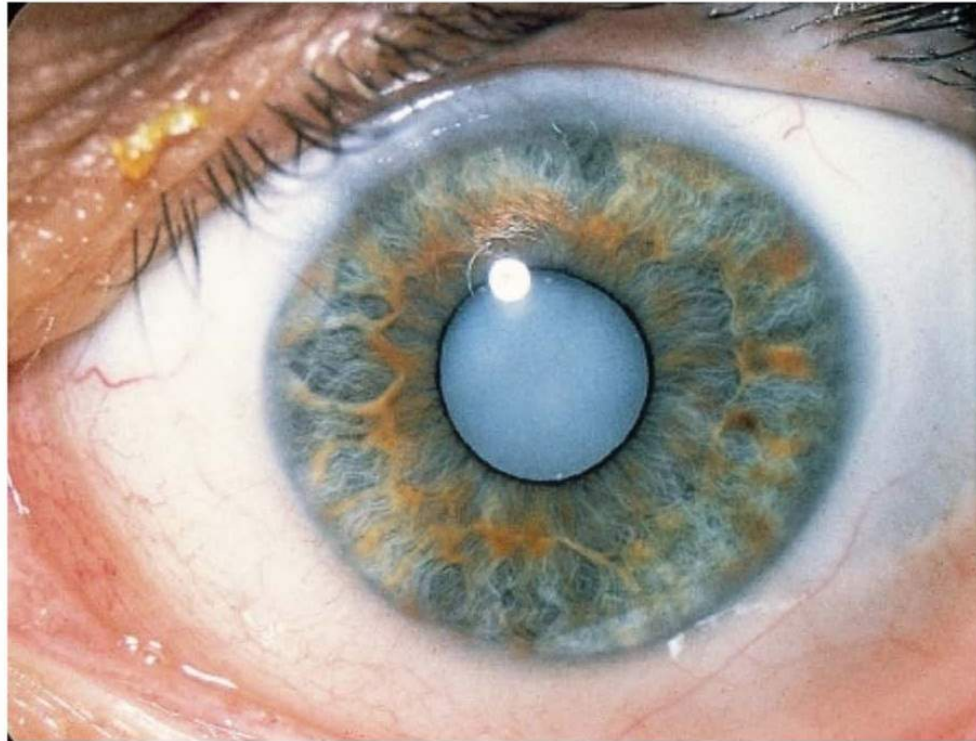
Primary visual cortex

Injuries to Visual Pathway





Cataract of the crystalline lens



Age of onset

- Congenital
- Age-related

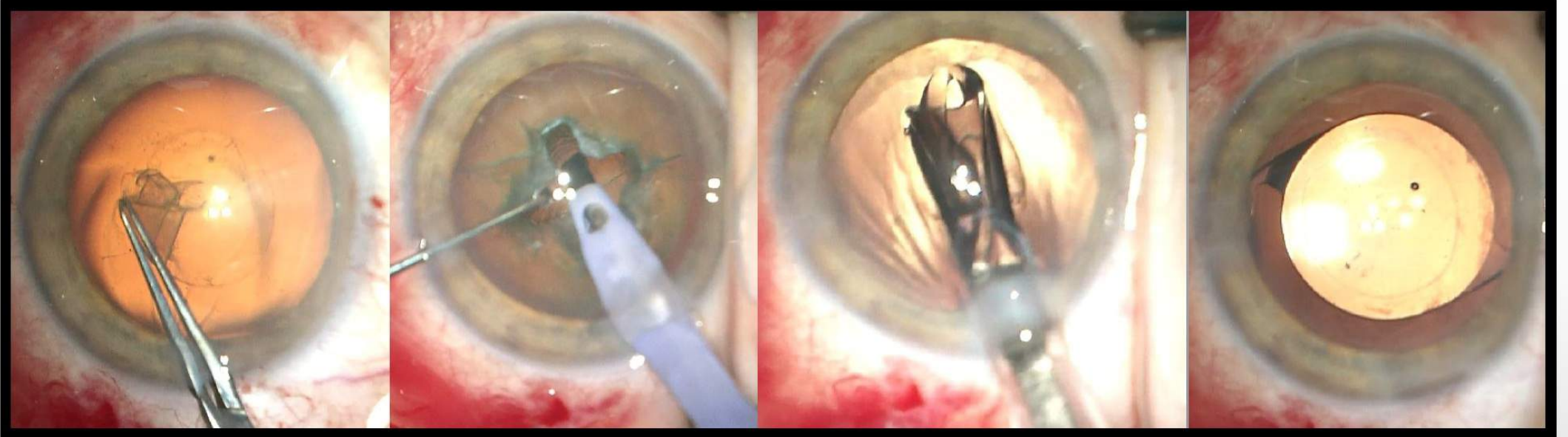
Location

- Nuclear sclerotic
- Cortical
- Posterior
- Subcapsular

Cause

- Age-related
- Traumatic
- Diabetic

Phacoemulsification cataract surgery



Capsulorrhexis

Phacoemulsification

Injection of foldable IOL

IOL in capsular bag

Intra-ocular lens (multifocal and toric)

