

Vision

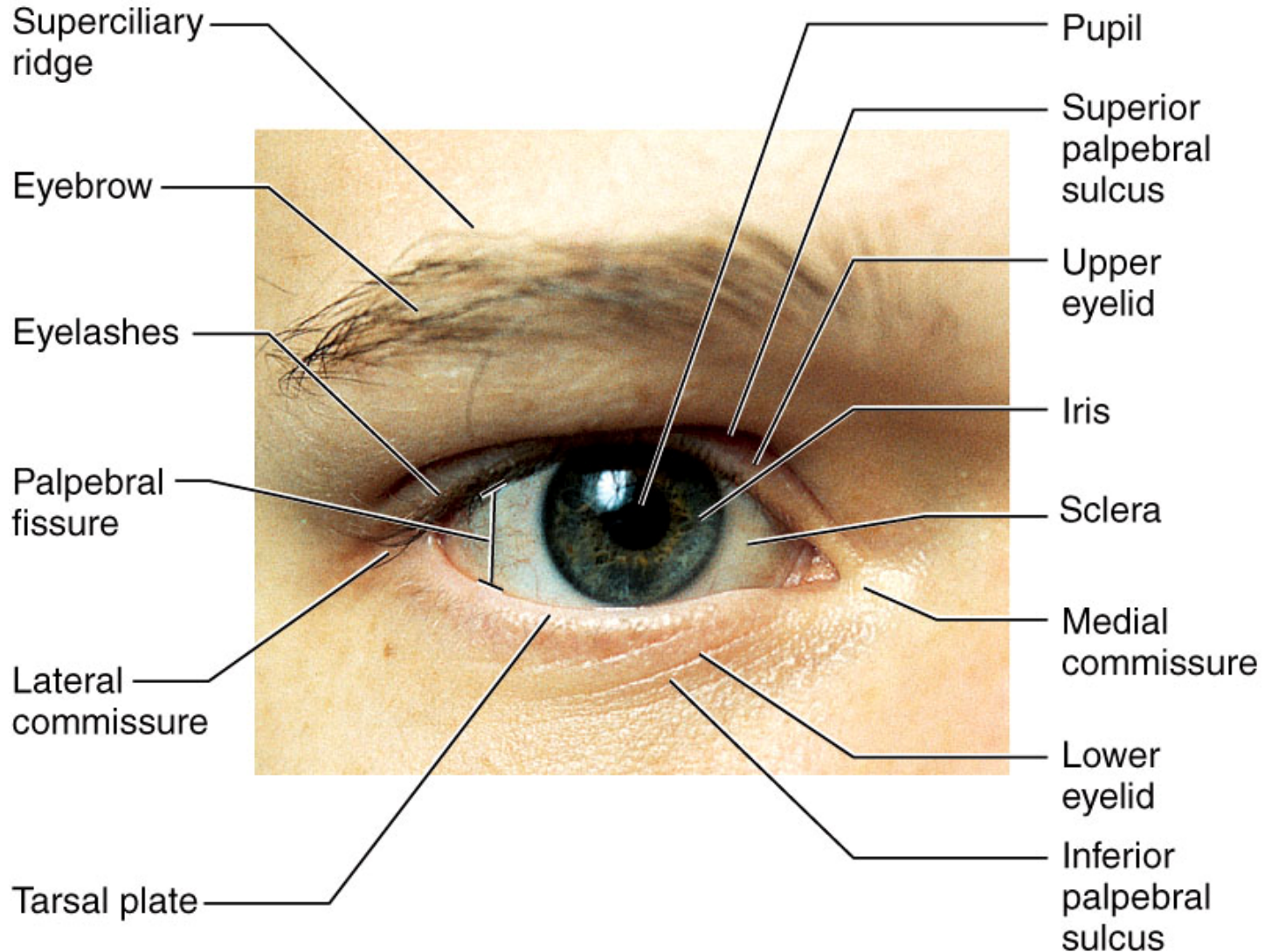
Anatomy of Sight

Vision and Light

- **Vision - perception of light emitted or reflected from objects in the environment**
- **Visible light**
 - **electromagnetic radiation with wavelengths from 400 to 750 nm**
 - **must cause a photochemical reaction to produce a nerve signal**
 - **radiation below 400 nm; energetic, kills cells**
 - **radiation above 750 nm; too little energy to cause photochemical reaction**

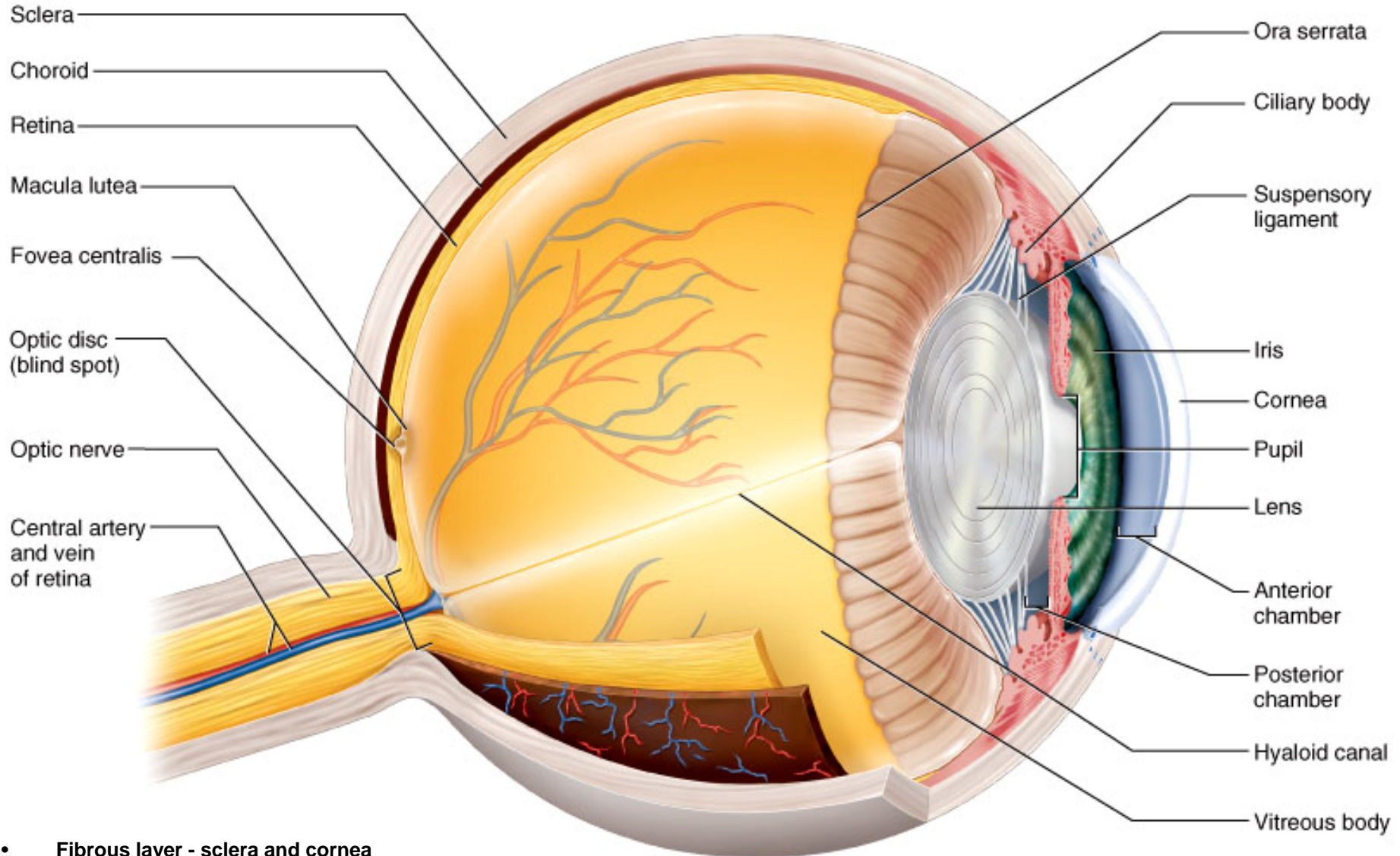
External Anatomy of Eye

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Tunics of the Eyeball

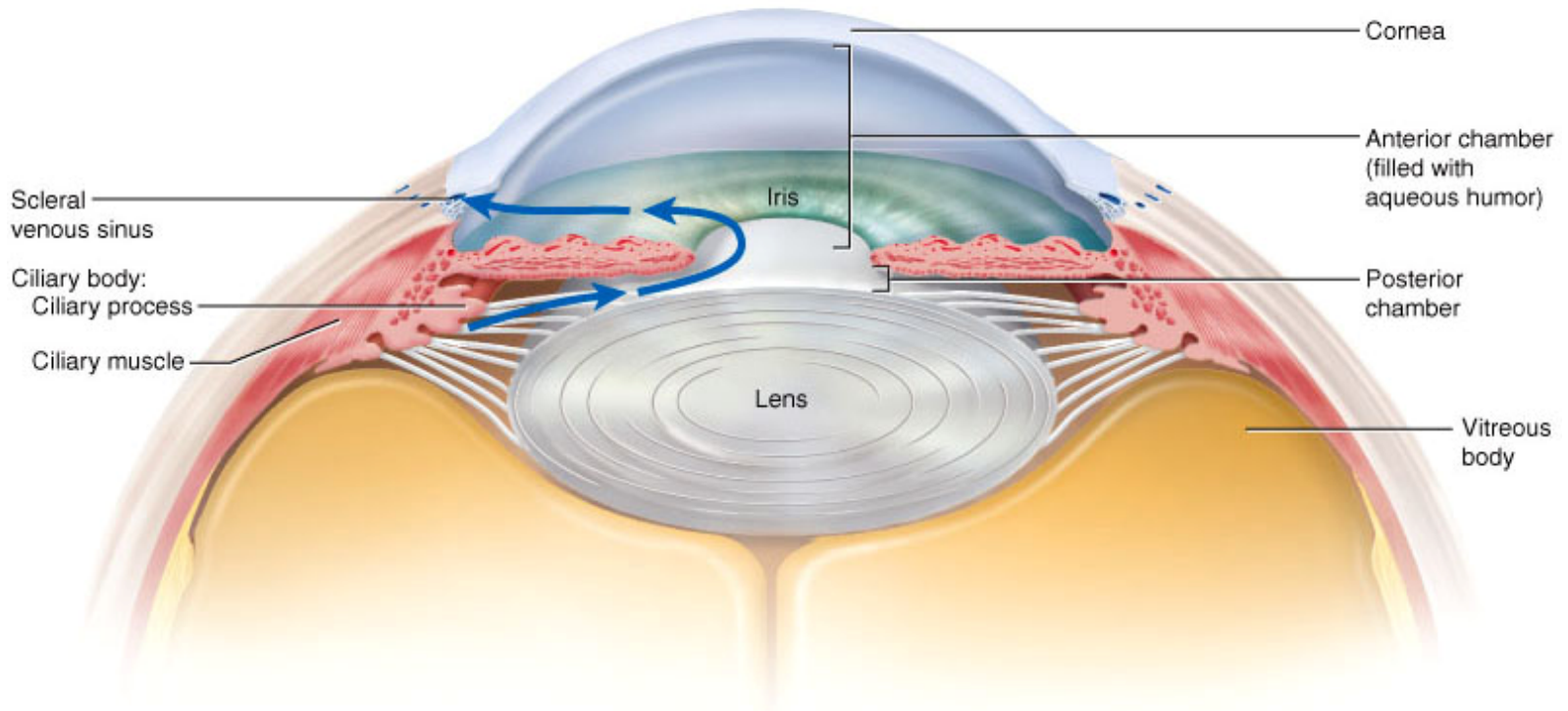
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- **Fibrous layer - sclera and cornea**
- **Vascular layer - choroid, ciliary body and iris**
- **Internal layer - retina and optic nerve**

Aqueous Humor

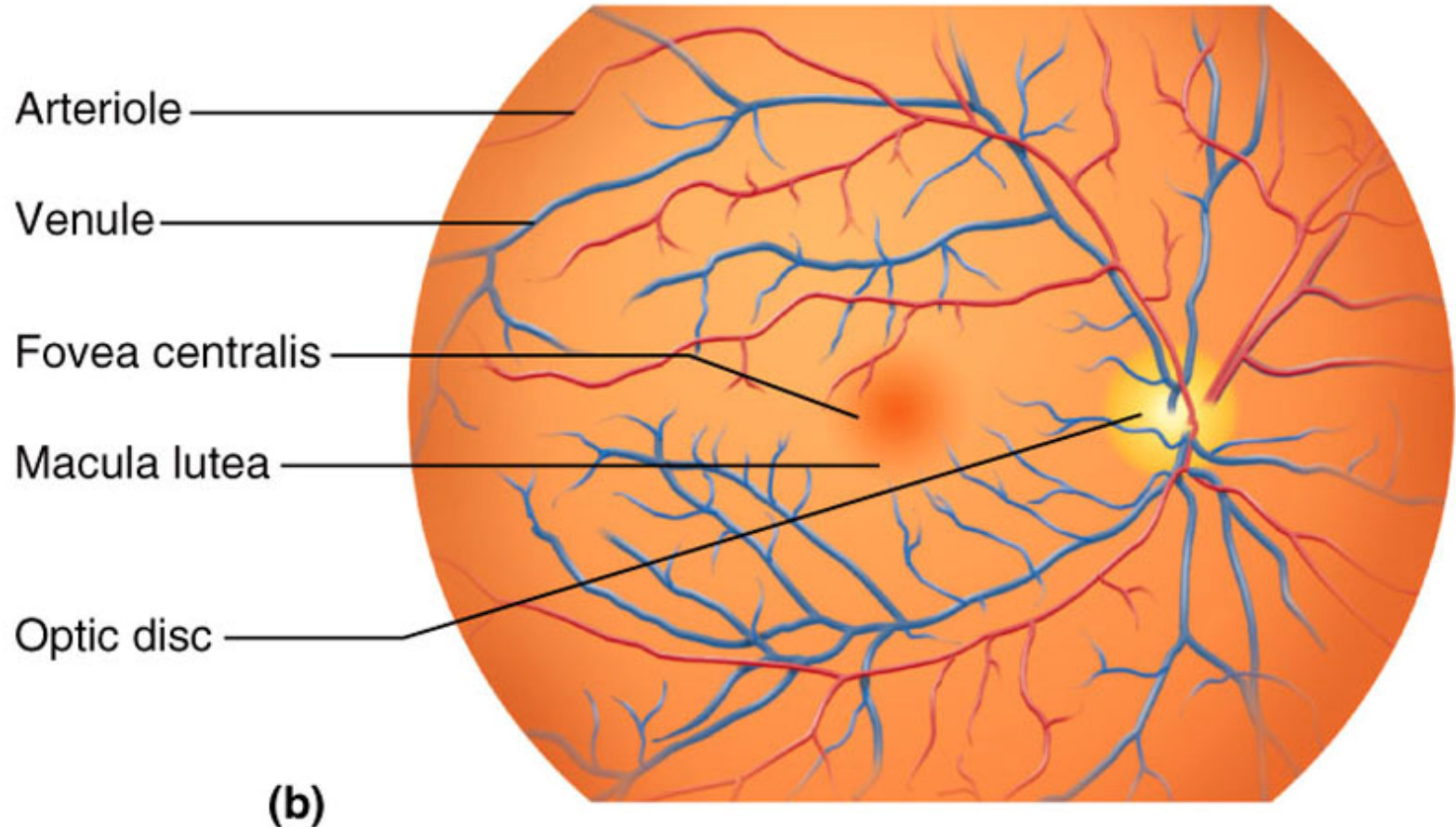
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Produced by ciliary body, flows to posterior chamber through pupil to anterior chamber - reabsorbed into canal of Schlemm

Ophthalmoscopic Exam of Eye

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- **Macula lutea - cells on visual axis of eye (3 mm)**
 - fovea centralis - center of macula; finely detailed images due to packed receptor cells
- **Direct evaluation of blood vessels**

Test for Blind Spot

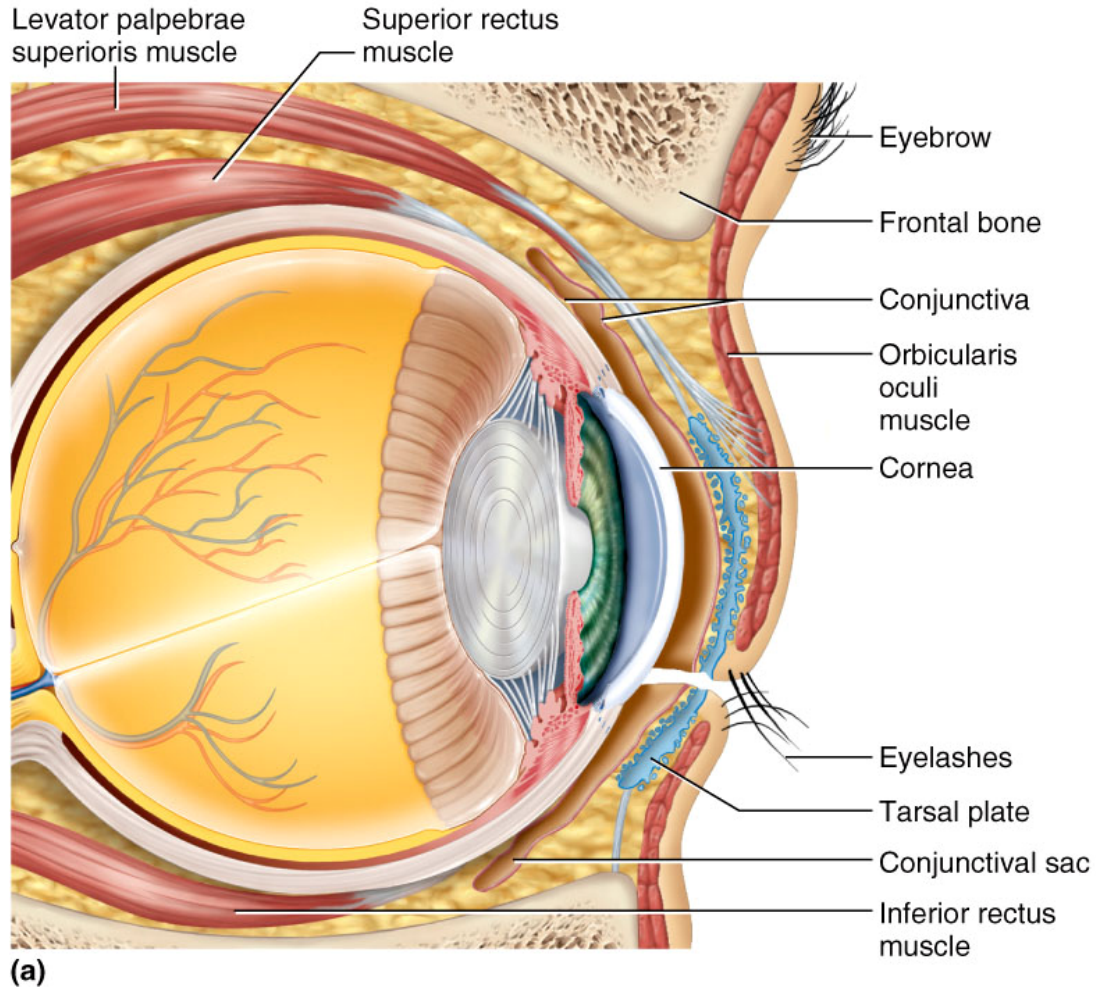
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- **Optic disk = blind spot**
 - optic nerve exits posterior surface of eyeball
 - no receptor cells
- **Blind spot - use test illustration above**
 - close eye, stare at X and red dot disappears
- **Visual filling - brain fills in green bar across blind spot area**

Conjunctiva

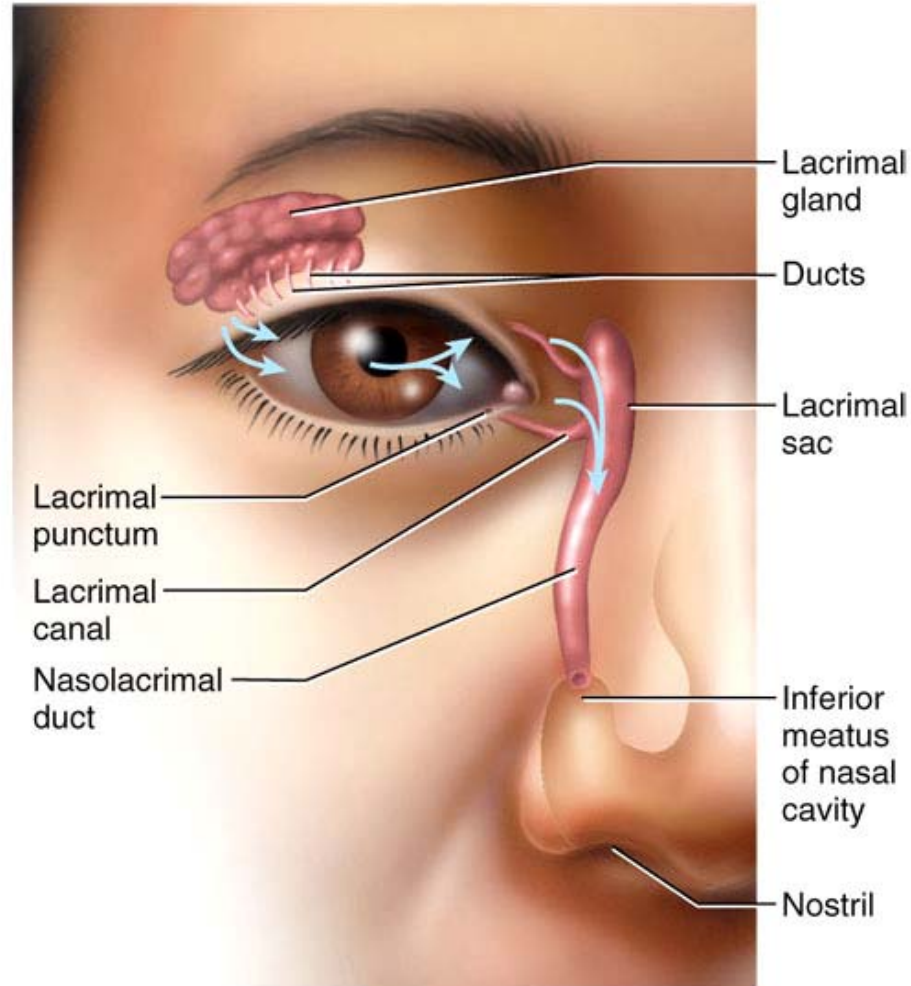
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- **Transparent mucous membrane lines eyelids and covers anterior surface of eyeball except cornea**
- **Richly innervated and vascular (heals quickly)**

Lacrimal Apparatus

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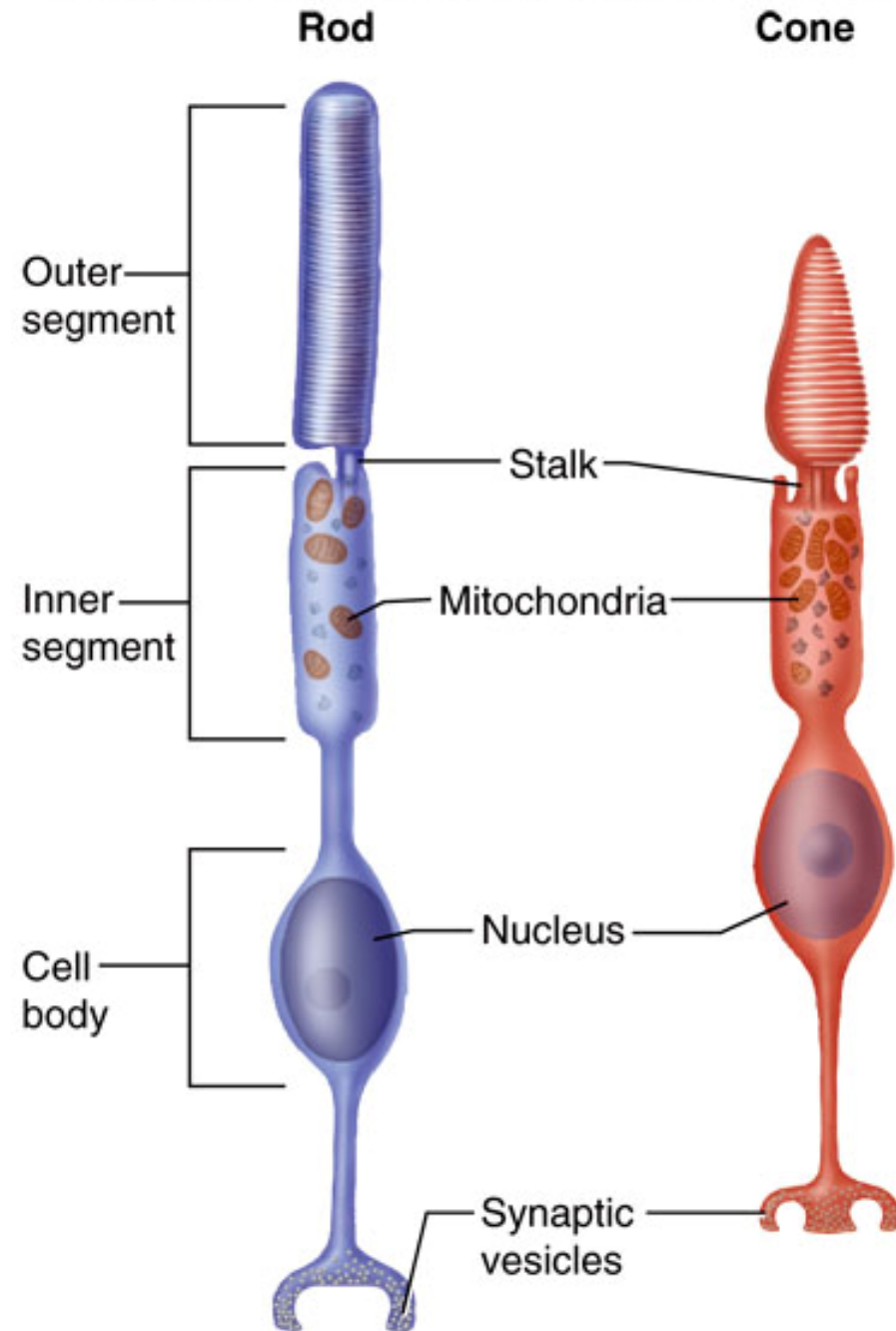


(b)

- Tears flow across eyeball help to wash away foreign particles, help with diffusion of O_2 and CO_2 16-9 and contain bactericidal enzyme

Photoreceptor Cells

- **Posterior layer of retina - pigment epithelium**
 - purpose is to absorb stray light and prevent reflections
- **Photoreceptors**
 - **rod cells (night - scotopic vision)**
 - outer segment - stack of coinlike membranous discs studded with rhodopsin pigment molecules
 - **cone cells (color - photopic vision)**
 - outer segment tapers to a point



(b)

Back of eye

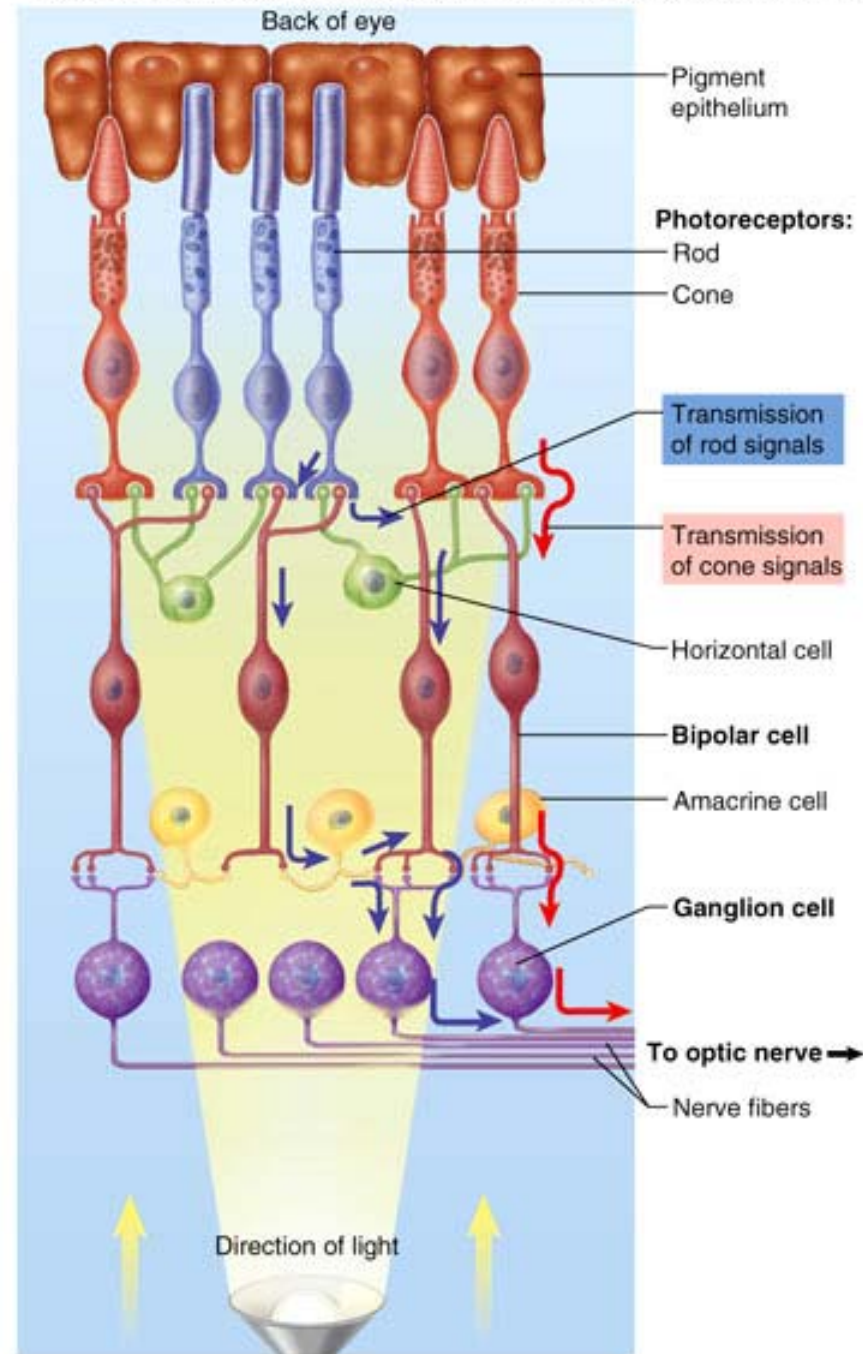
Histology Layers of Retina



Front of eye

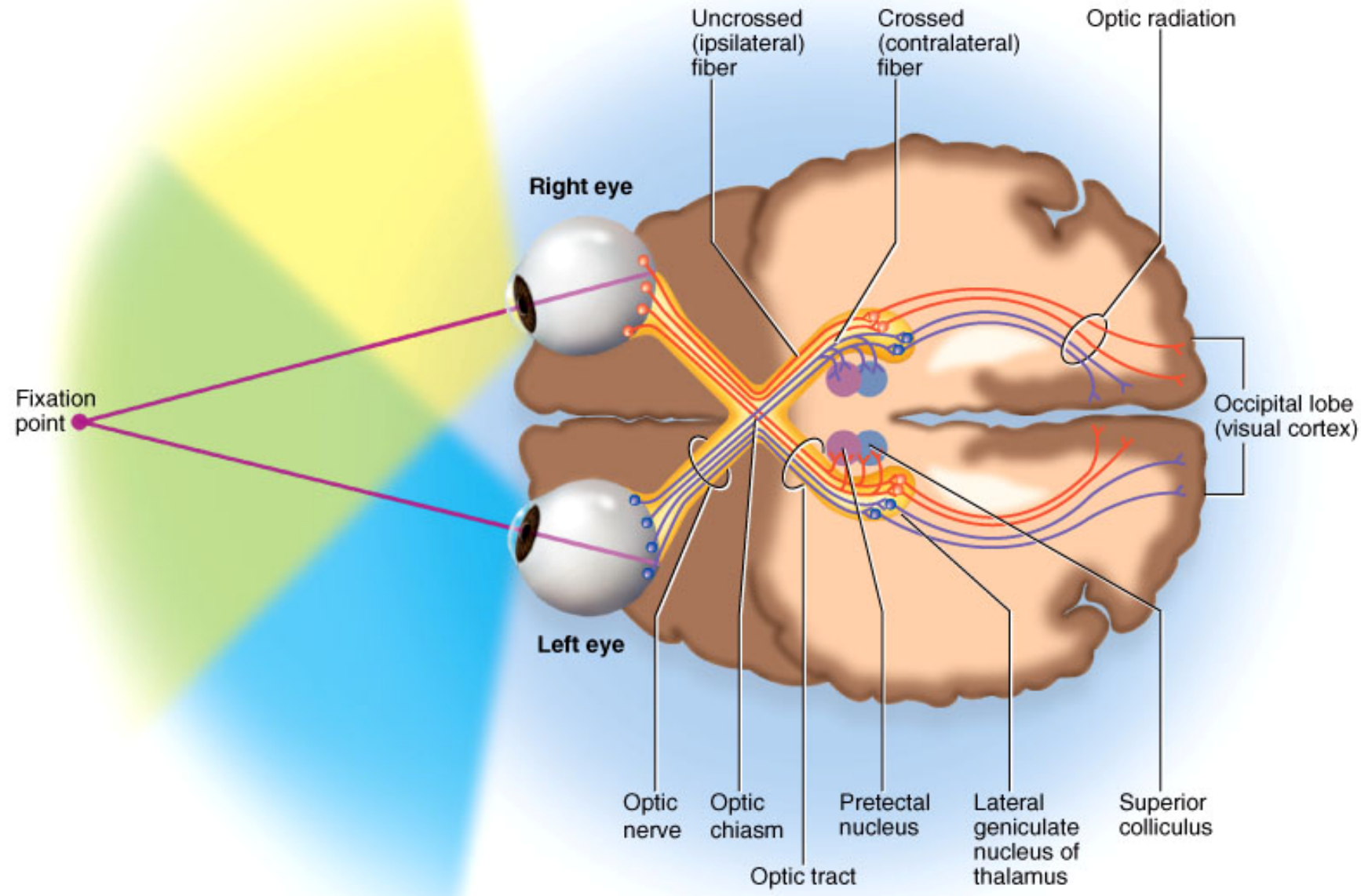
(a)

Schematic Layers of the Retina



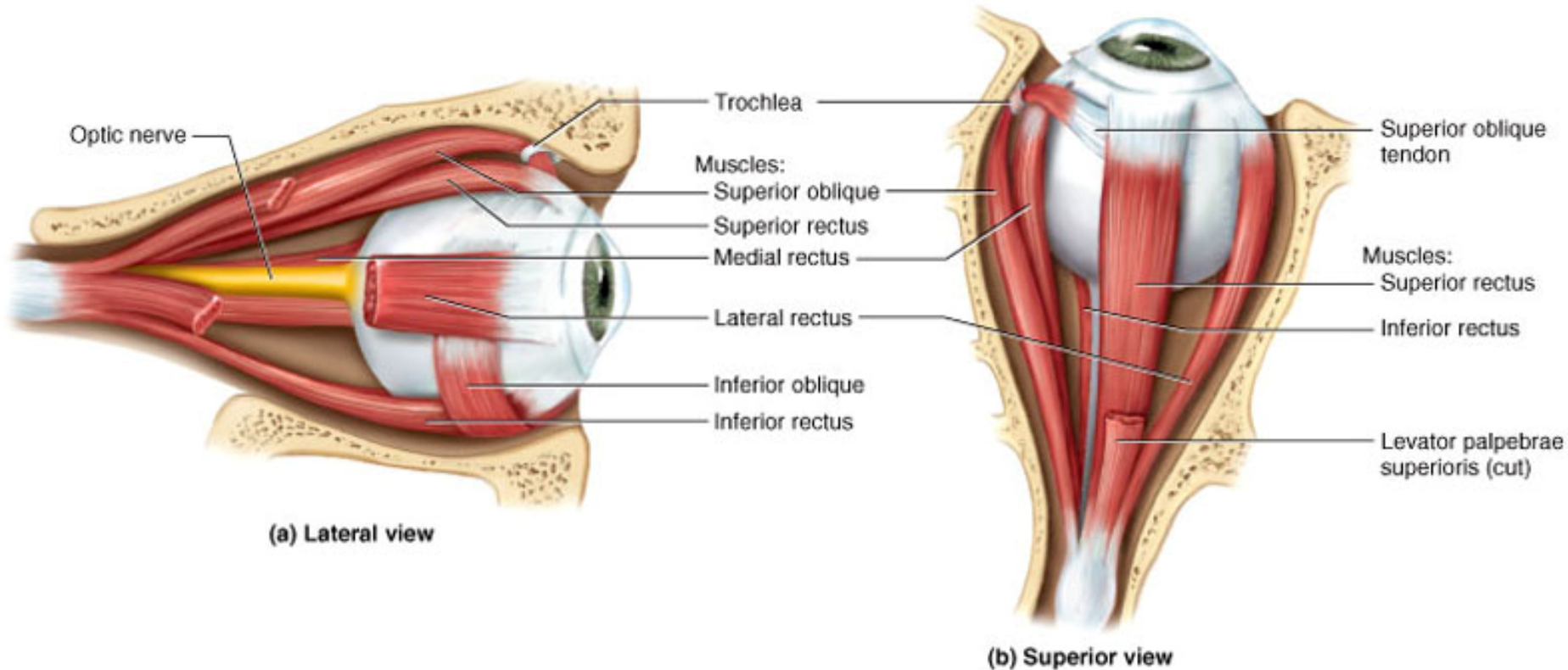
(b)

Visual Projection Pathway



Extrinsic Eyes Muscles

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- **6 muscles inserting on eyeball**
 - 4 rectus, superior and inferior oblique muscles
- **Innervated by cranial nerves III, IV and VI**

Innervation of Extrinsic Eye Muscles

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