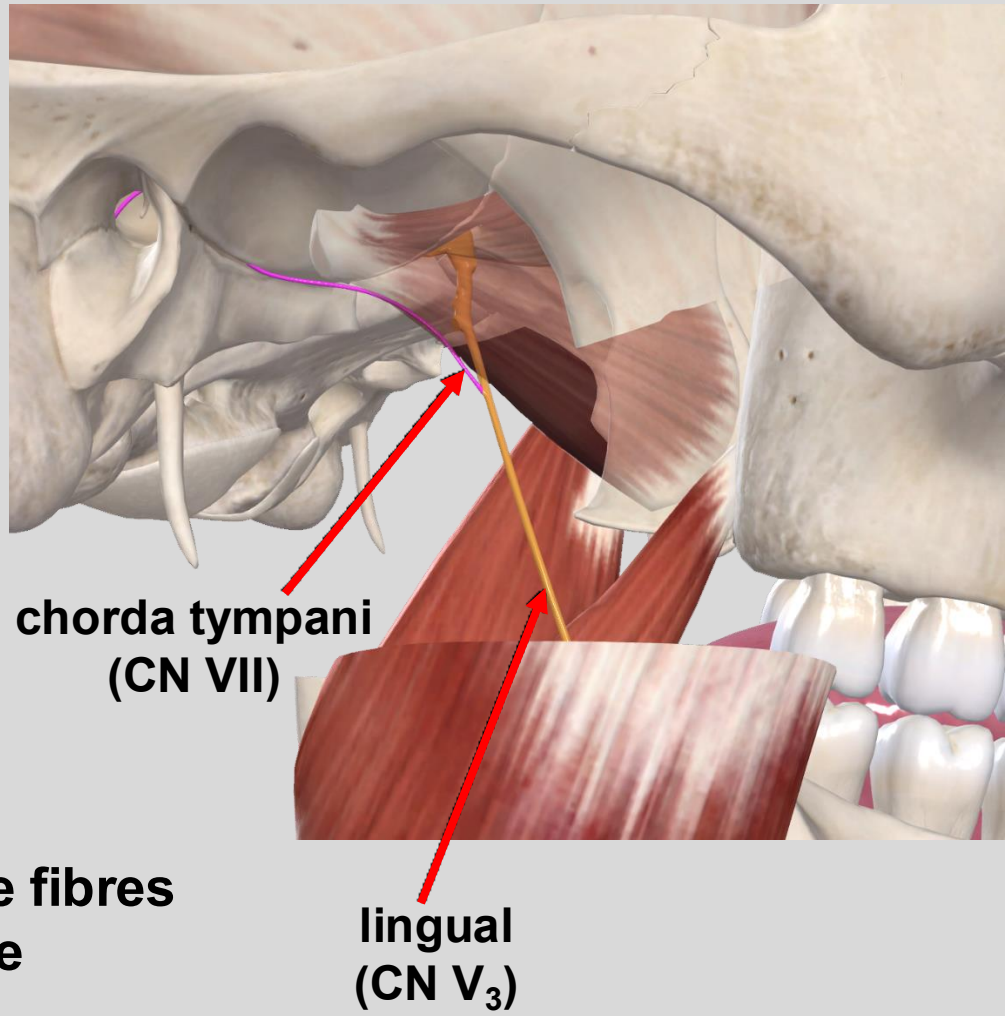
Taste

Chorda tympani

Branch of facial that *exits the skull* through the petrotympanic fissure

"Hitches a ride" with the lingual nerve (CN V_3) to enter the tongue

Though bundled together, the nerve fibres of CN V_3 and CN VII remain separate

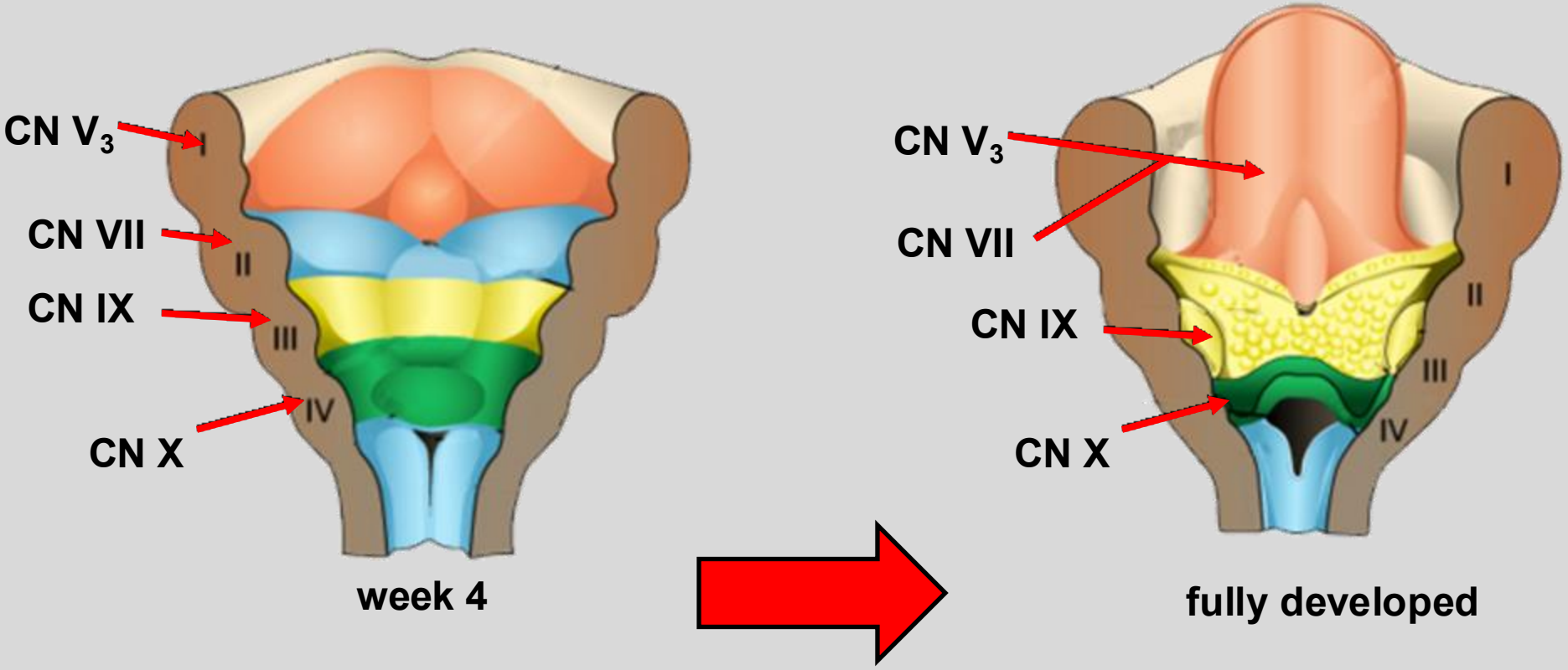


Taste

The tongue forms from the first 4 pharyngeal arches

Each pharyngeal arch is associated with its own cranial nerve

Primordial tongue had proto facial nerve fibres that migrated from arch II to arch I and were dragged into the anterior tongue as it developed



Vision

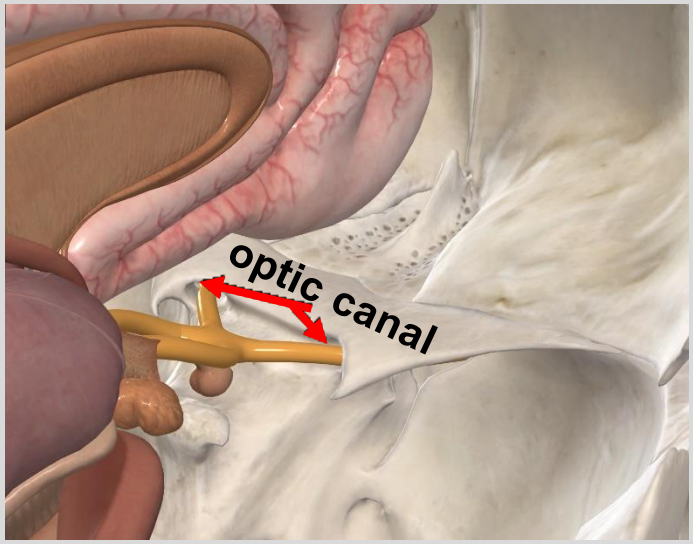
The most important special afferent in our body

30–60% of our brain is dedicated to visual processing

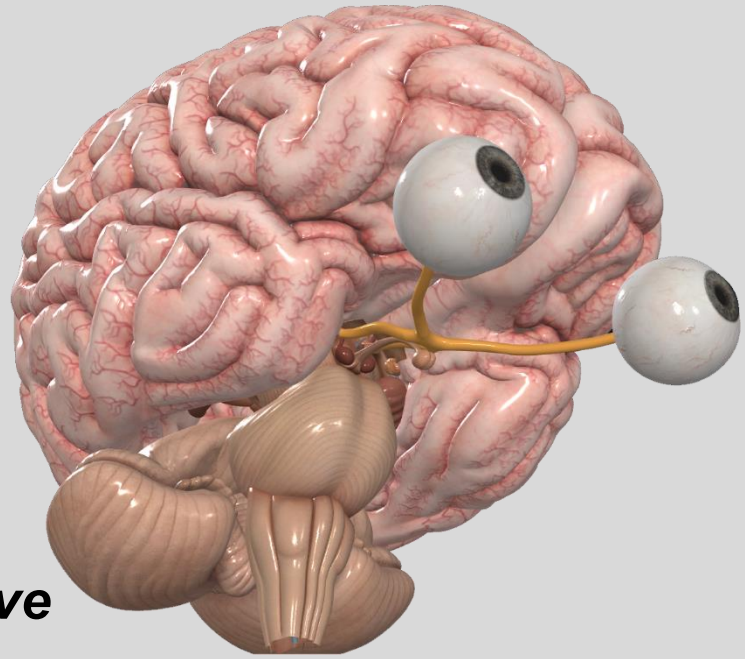
Optic nerve is an anterior extension of the forebrain

Optic nerve *exits the endocranium* through the optic canal

The eye is the terminal nerve of the optic nerve



superolateral view

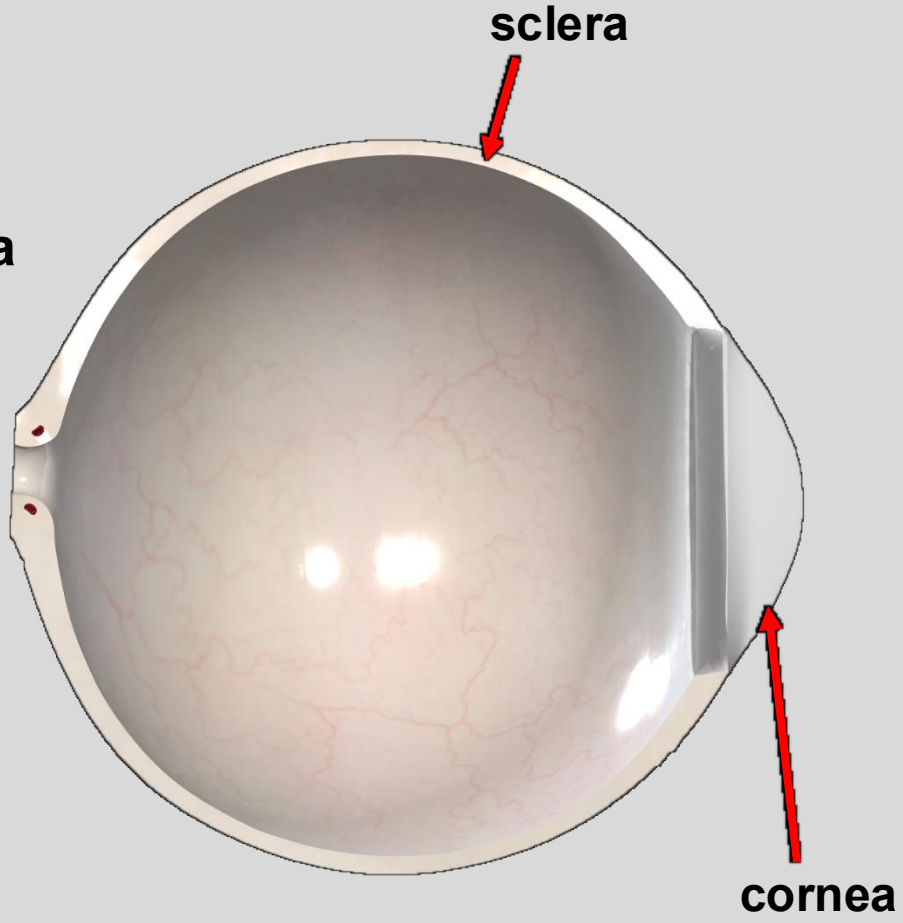


Vision

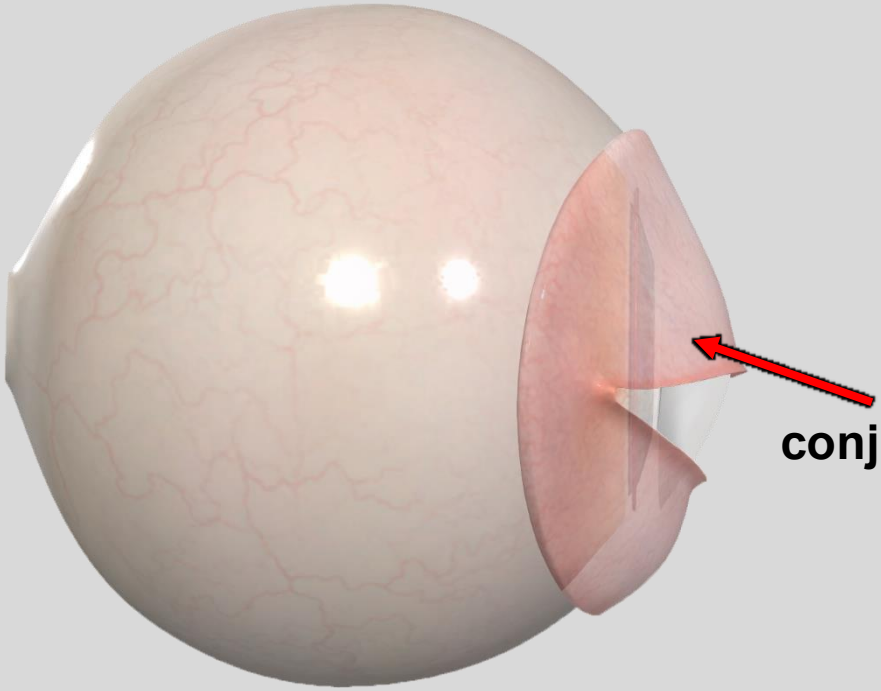
Fibrous Layer

Outer covering is the sclera

Cornea is the clear part of the sclera



Conjunctival Layer



The conjunctival layer supports, protects, and moistens the eye

Vision

Fibrous Layer

Sclera and cornea have the same composition

Collagen fibre orientation determines if light can pass through or not

Sclera blocks out light and protects against physical damage

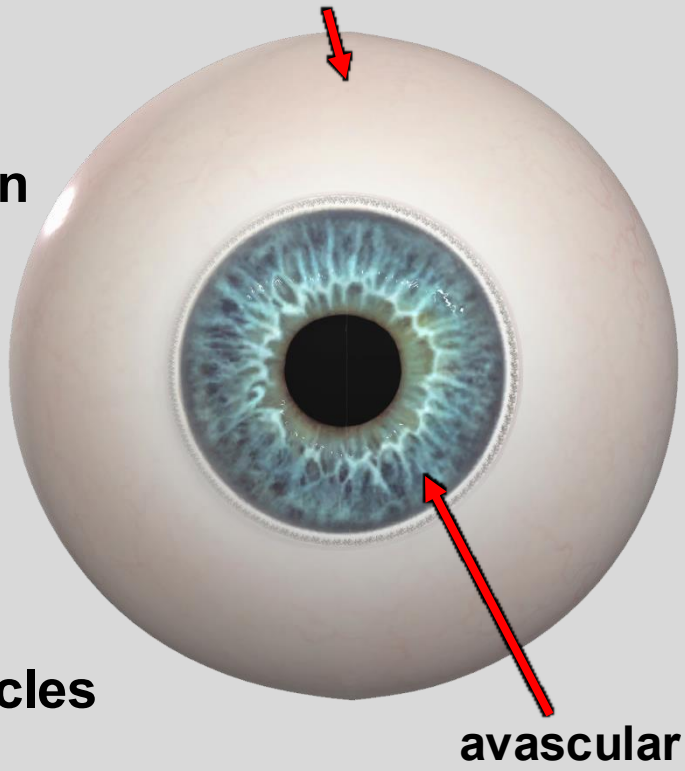
Distal attachment site for all extraocular muscles

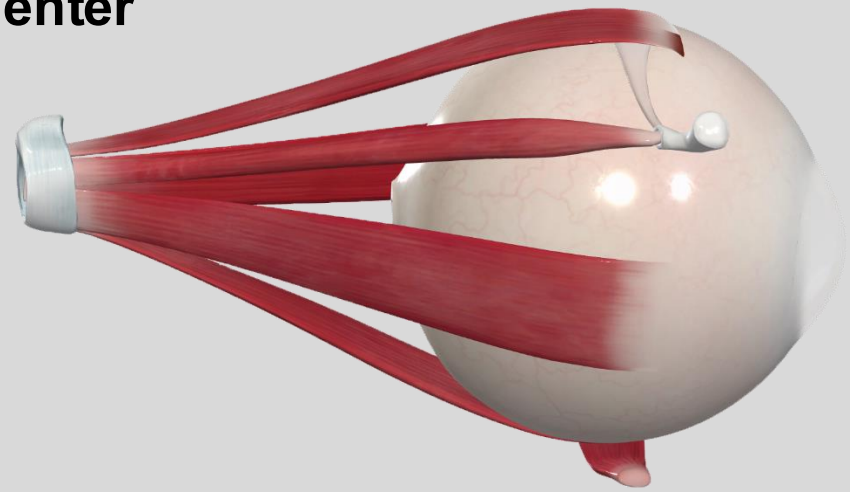
The cornea is the window for light to enter

Cornea blocks most UV light

Cornea is the main light refractor (2/3^{rds} of refraction)

Cornea is highly sensitive to touch





Vision

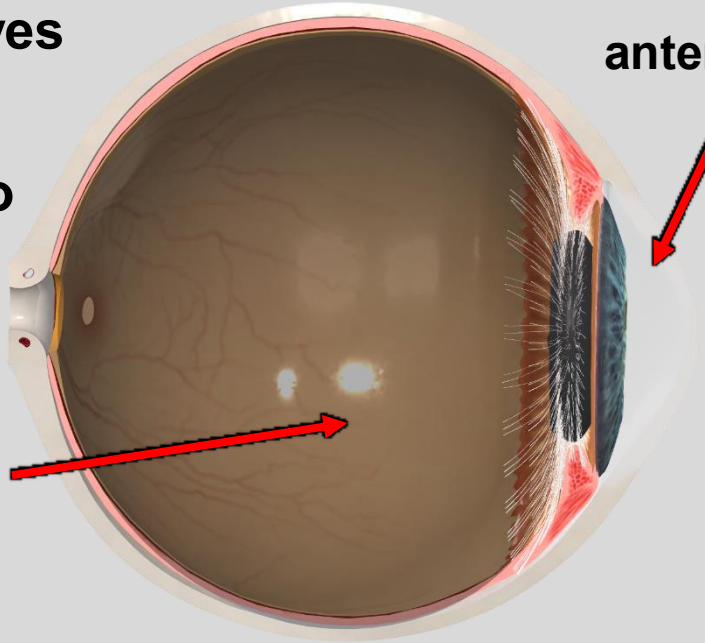
Vascular Layer: Iris

Melanocytes in pigmented layer produce melanin

Trapped melanin granules produce eye colour

More melanin = darker eyes

The iris separates the two compartments of the eye



anterior compartment

<u>aqueous humour</u>

maintains pressure and feeds cornea

posterior compartment

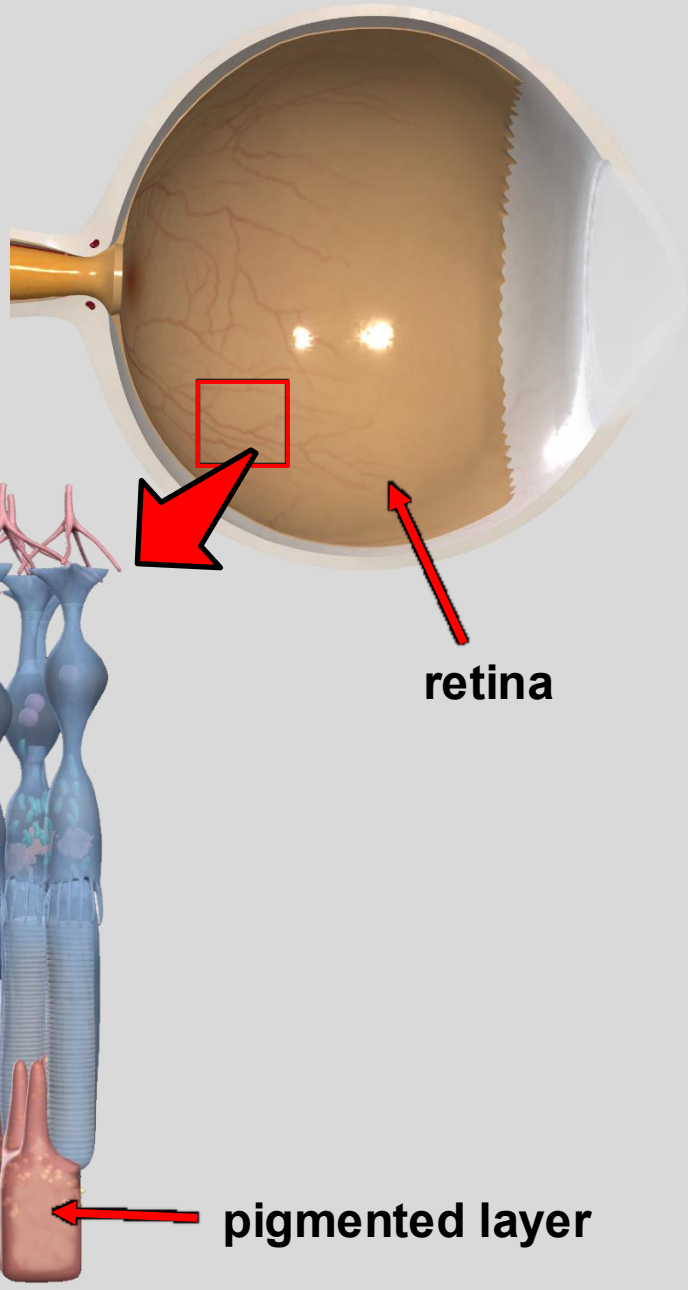
Vision: The Eye

Neural Layer

The retina is the innermost layer of the eye

~150 million different neurons

Consists of two layers



Vision: The Eye

Clinical Correlates

Presbyopia

Lens loses elasticity with age

Stretched lens has trouble "bouncing back" to its original shape

Near-point focusing ability is reduced

Treatment includes corrective lenses or multifocal / presbyLASIK

Vision: The Eye

Clinical Correlates

Cataracts

Protein breakdown exceeds repair rate as we age

Denatured proteins build up in the lens thickening and clouding it

Hypertension, poor nutrition & smoking may increase rates of cataract formation

Cataract in 55-year old male

Down and Turner's syndrome may increase chance of cataracts

68% of U.S. pop over 80, have / had cataracts

Requires surgical intervention

Partial / total lens replacement

Healthy lens next to two lenses with various degrees of cataracts

Vision: The Eye

Clinical Correlates

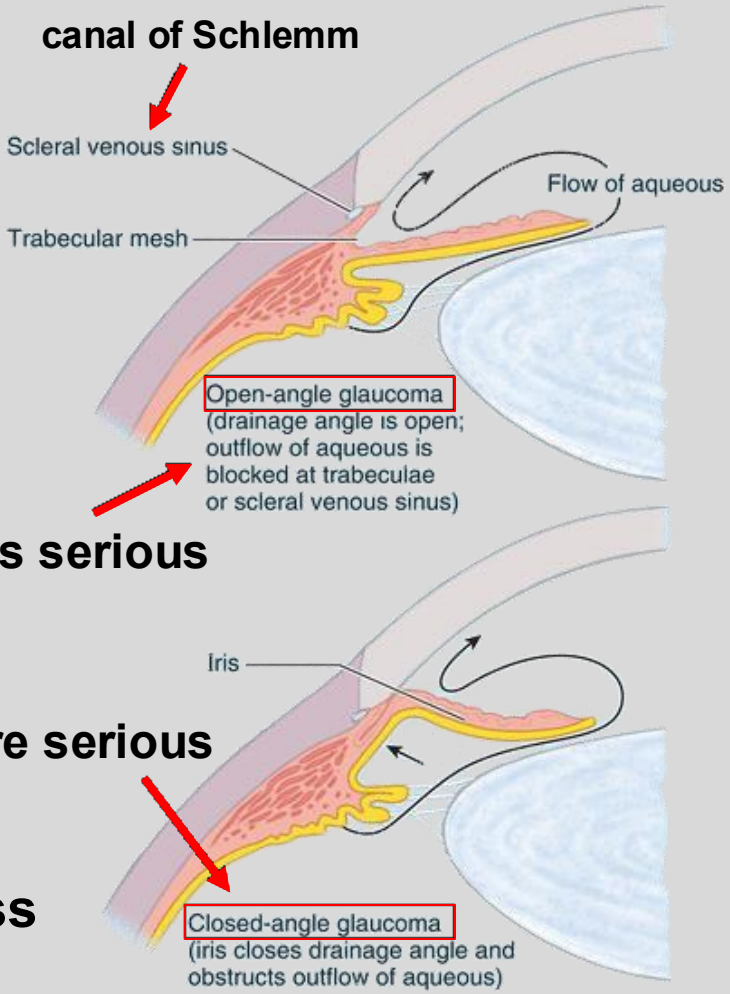
Glaucoma

Aqueous humour is continuously produced by the ciliary body

The humour is continuously drained through the scleral venous sinus (canal of Schlemm)

Blockage of this flow causes stagnation and cloudiness

Left untreated, glaucoma will cause blindness due to optic nerve compression



Vision: The Eye

Clinical Correlates

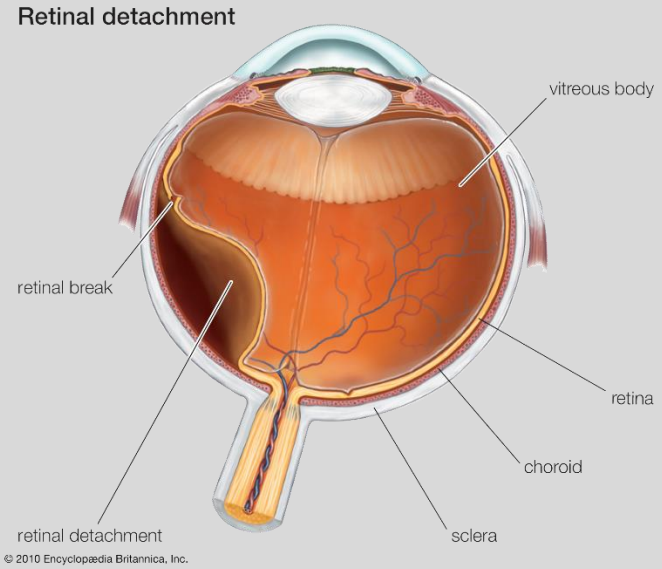
Retinal detachment

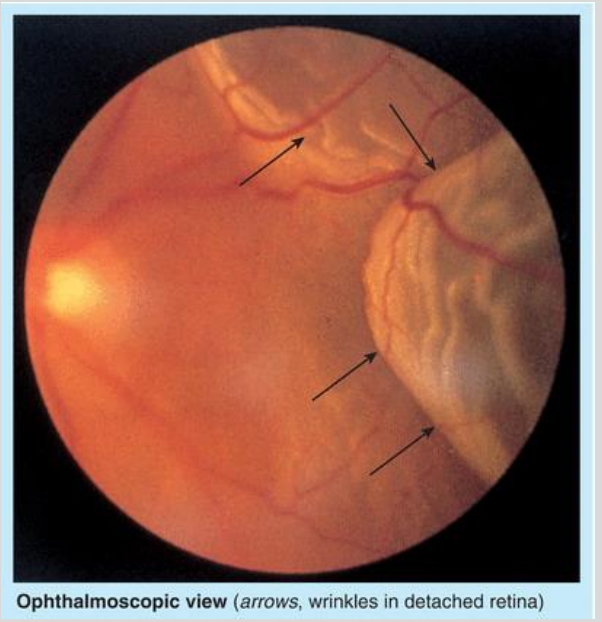
Neural layer of retina requires ocular pressure to maintain attachment to choroid

Injuries that reduce intraocular pressure put the retina at risk of detachment

Patients complain of flashes and specs of light

Retinal detachments are immediate medical emergencies





Ophthalmoscopic view (*arrows*, wrinkles in detached retina)

Hearing

Clinical Correlates

Hearing Loss

Can be congenital or acquired

<u>Conductive hearing loss</u>

Affects the *middle ear*

Result of damage to:

- Tympanum — perforation / tear
- Ear ossicles — scarring from prolonged inflammation

People speak softly thinking they are loud

Can be treated surgically or with a hearing aid

Hearing

Clinical Correlates

Tinnitus

Affects 15–20 % of U.S. population

Age-related loss of "hair" cells along cochlea

Loss is often at higher frequencies

Ringing sensation whenever brain "checks" those frequencies

Symptom of some other causes such as:

excessive noise (construction sites, concerts)

side-effect of some drugs

Ringing is constant and often without a stimulus

Hearing

Clinical Correlates

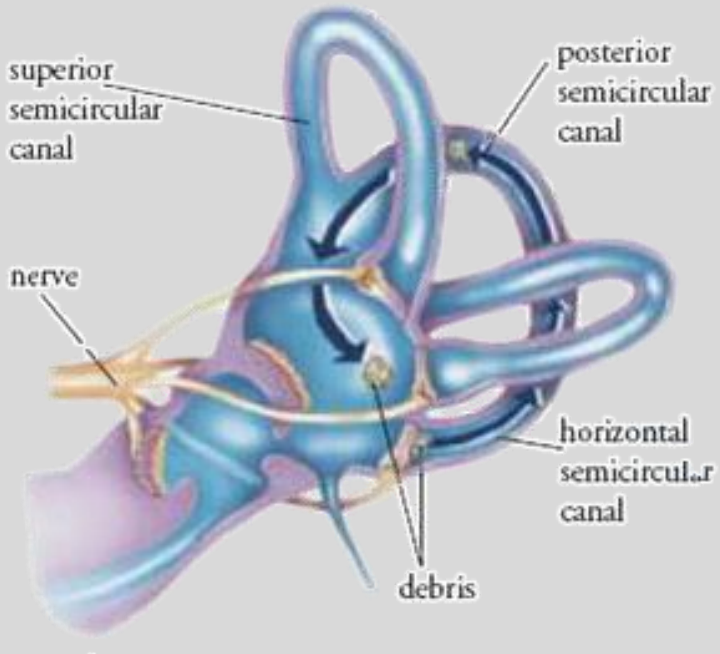
Benign Paroxysmal Position Vertigo (BPPV)

Occurs when otoliths break free from utricle

Free-floating otoliths enter SCC producing conflicting signals to the brain about head orientation

BPPV has multiple causes

- blunt trauma to head
- age-related weakening of tissue
- idiopathic (most common)



Hearing

Clinical Correlates

Benign Paroxysmal Position Vertigo (BPPV)

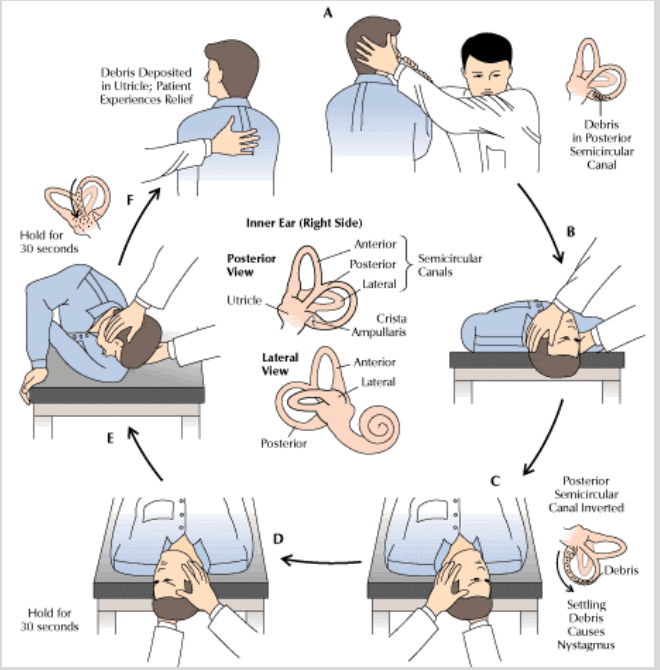
Patients experience intense, debilitating vertigo

Vertigo lasts anywhere from minutes to months

BPPV usually resolves on its own via otolith resorption

Canalith repositioning (Epley Maneuver)

Surgery



Epley maneuver