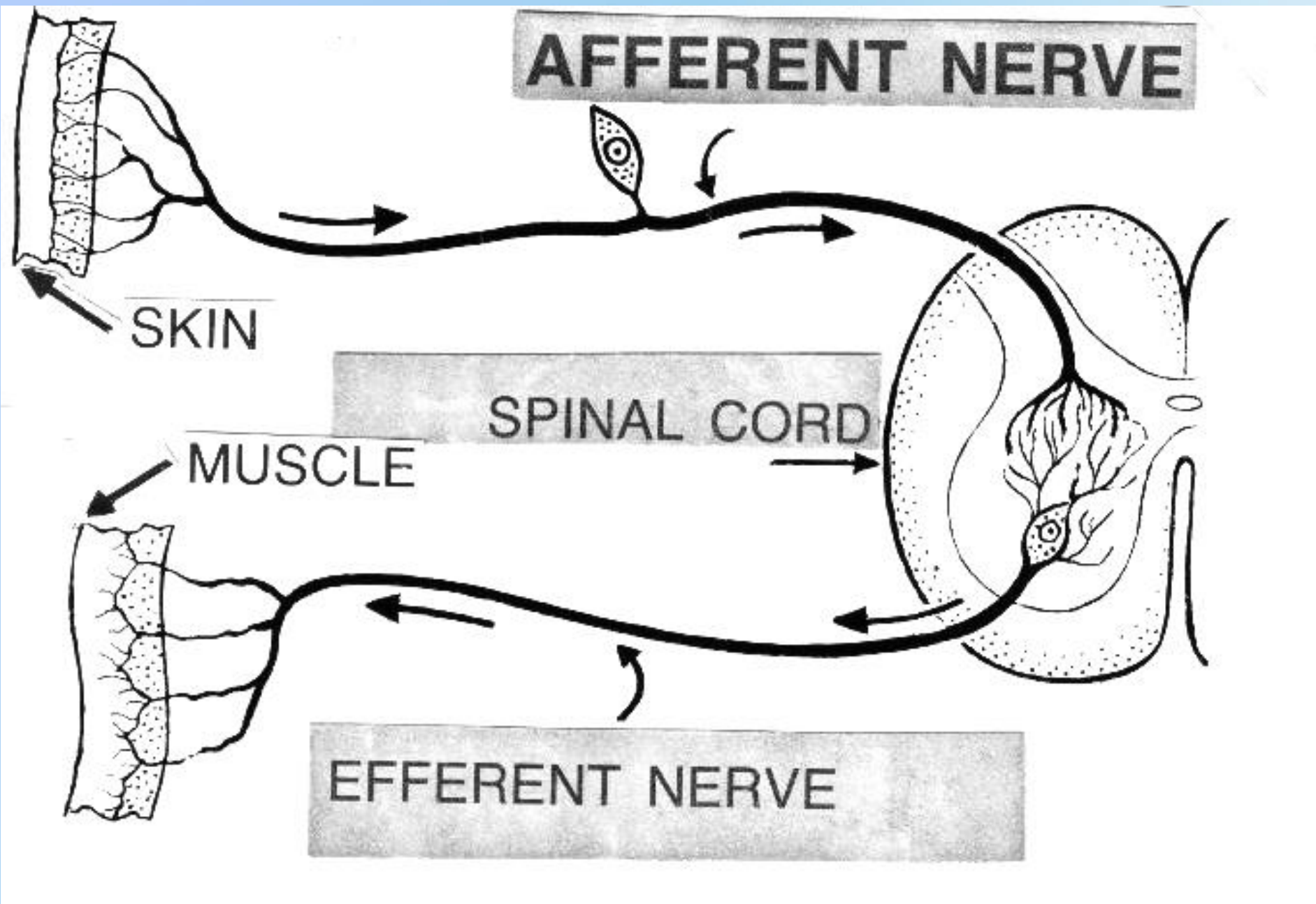


CRANIAL NERVES OF THE ORBIT

CN II
CN III
CN IV & CN VI

TERMS

- Special = carries fibers for senses
 - Smell – CN I
 - Vision – CN II
 - Hearing – CN VIII
 - Balance – CN VIII
 - Taste – CN VII, CN IX, CN X
 - General = not special 😊
 - Visceral = from internal organs + reflexes
 - CN III, IX, X
 - Somatic = skeletal muscle
- **A**fferent = **A**bsorbs information
 - ✓ From target
 - ✓ To brain
 - ✓ Sensory
 - **E**fferent = **E**xits CNS
 - ✓ To target
 - ✓ Motor

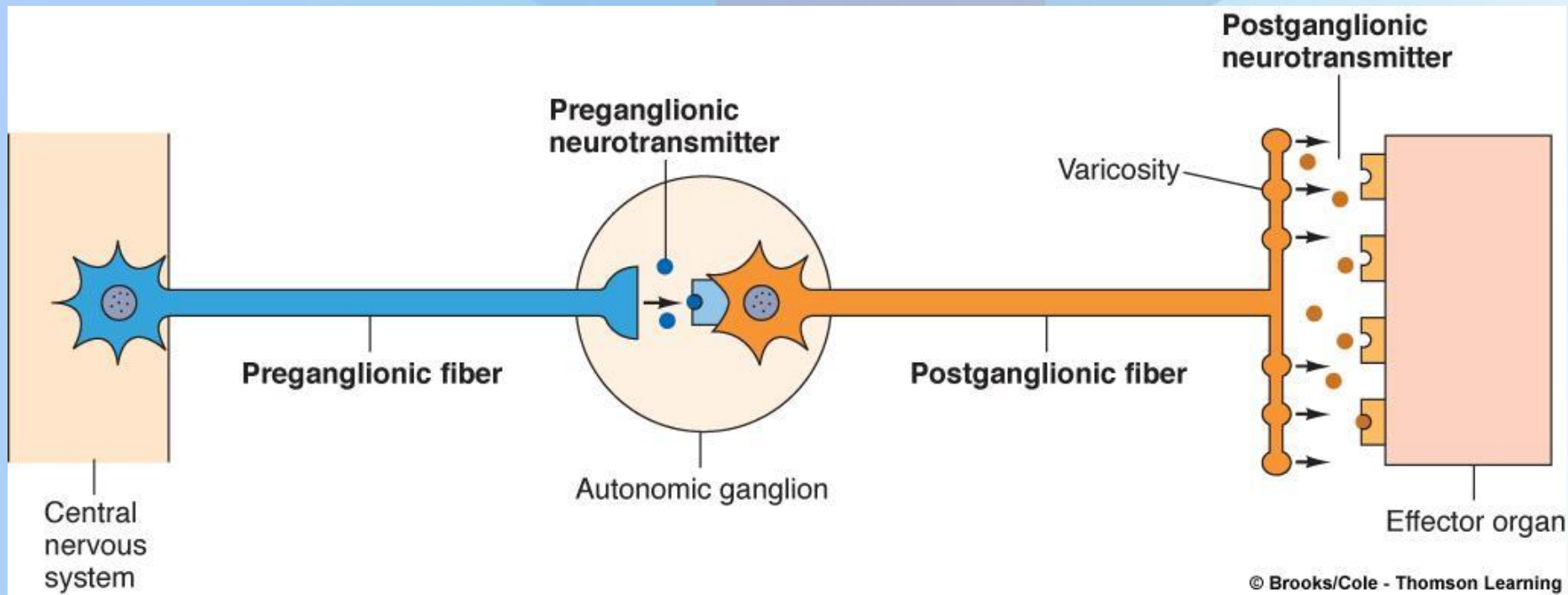


Ganglion:

= Collection of cell bodies outside the brain

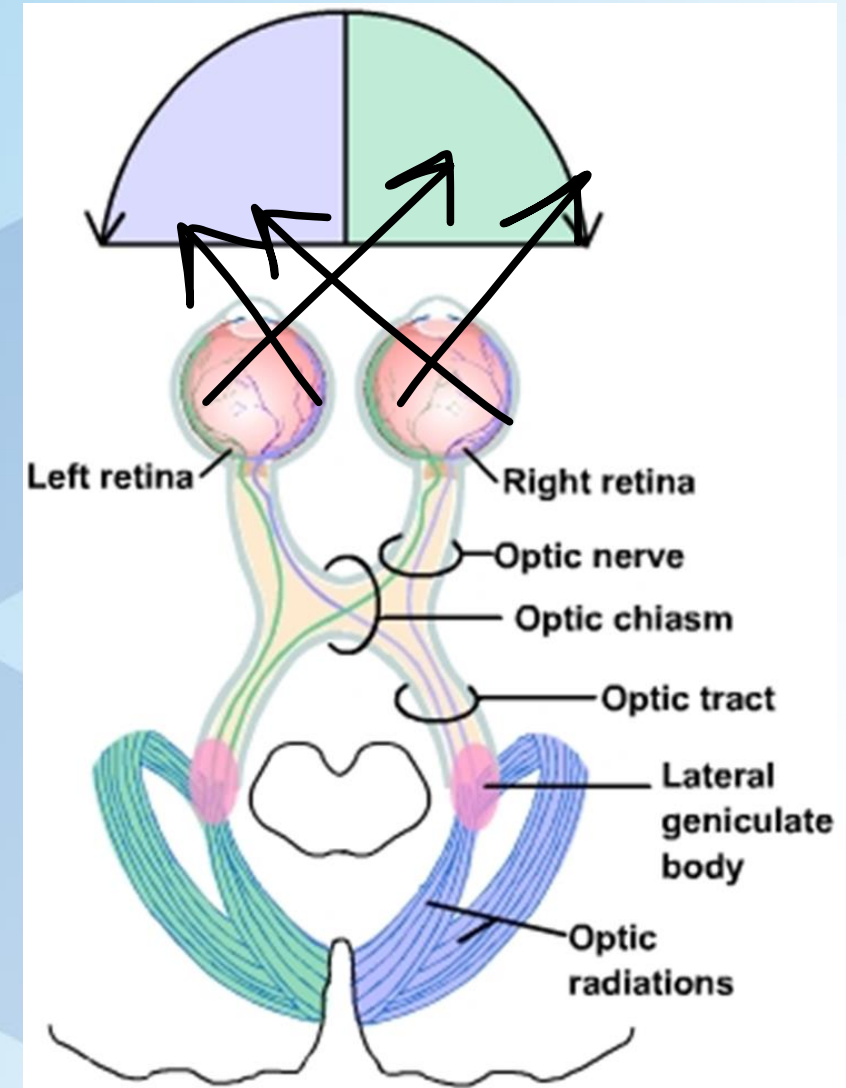
- Grey matter

- Autonomic nervous system
- Synapse



OPTIC NERVE (CN II)

- CNS
- **S**ensory – SSA: Special somatic afferent
- **P**arasymphathetic – SVA: afferent pupillary light reflex
- Retina → Visual cortex (occipital lobe)
- Optic chiasm: crossing of nasal fibers
 - Nasal fibers = contralateral
 - Temporal fibers = ipsilateral
- Nasal fibers = temporal vision
- Temporal fibers = nasal vision



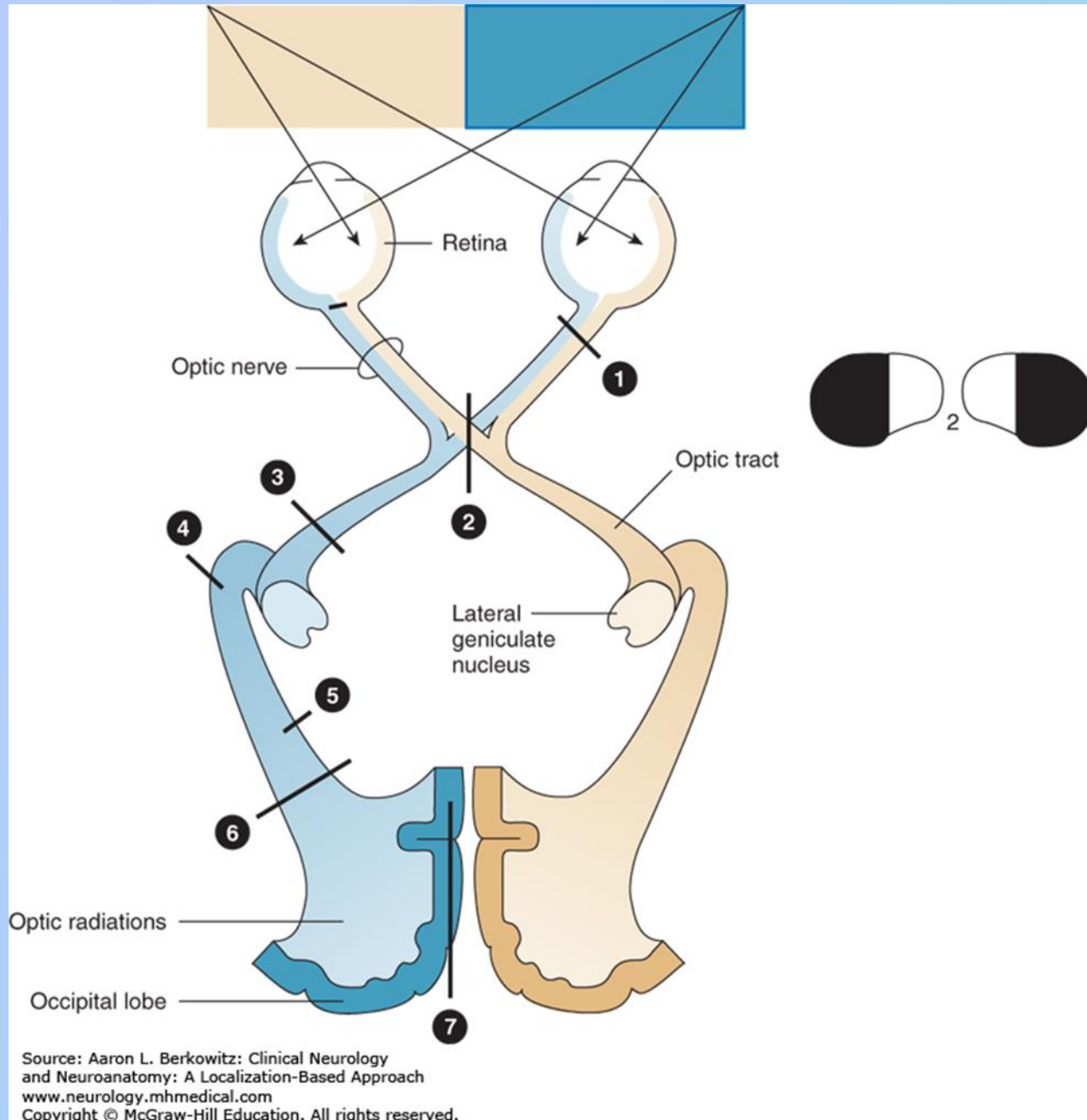
TERMS

- *Anopia* = loss of vision
- *Hemianopia* = loss of vision in half of the visual field
- *Quadranopsia* = loss of vision in one fourth of the visual field (one quadrant)
- *Homonymous hemianopia* = Loss of vision in half of the visual field in both eyes on the same side

OPTIC CHIASM LESION

BITEMPORAL HEMIAOPIA

- Only nasal fibers
- Loss of temporal vision
- MCC is pituitary tumor
- Others: MS

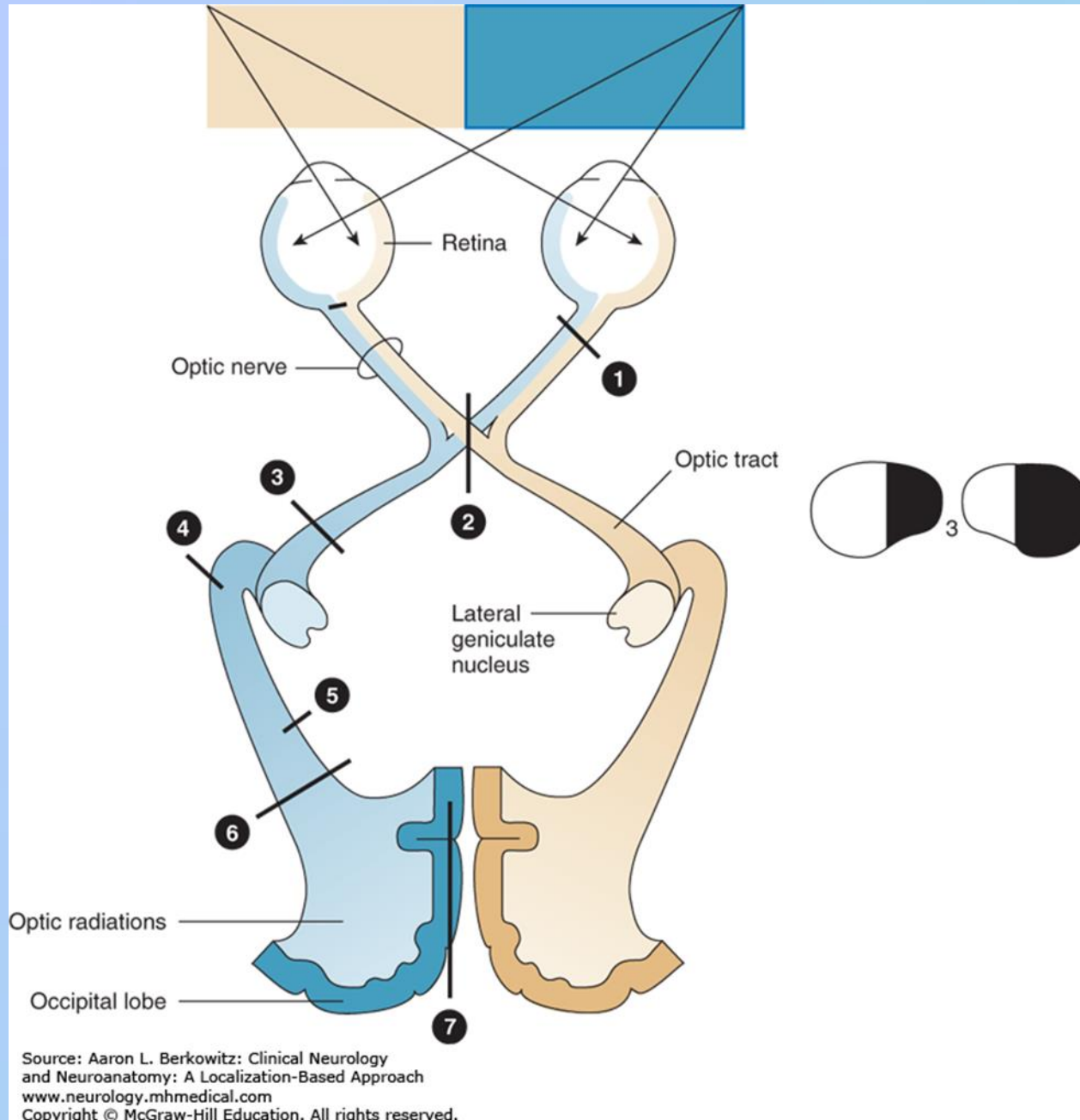


OPTIC TRACT LESION

CONTRALATERAL HOMONYMOUS HEMIANOPIA

- Subcortical lesions

- Stroke
- Tumors
- Infections
- Congenital



Source: Aaron L. Berkowitz: Clinical Neurology and Neuroanatomy: A Localization-Based Approach
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OPTIC RADIATION

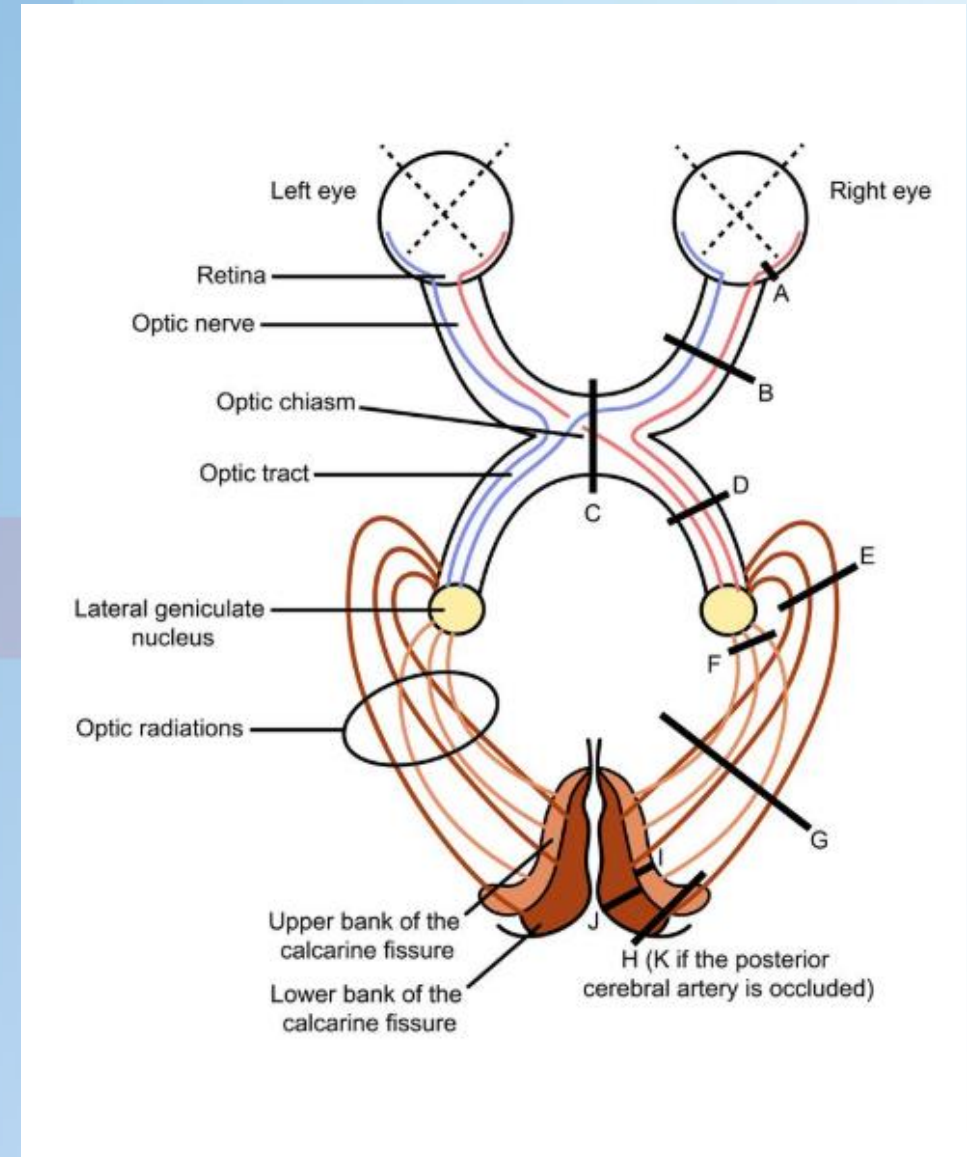
2 pathways

UPPER (F)

- Superior quadrant
- Inferior quadrant visual field
- Baum's loop through parietal lobe

LOWER (E)

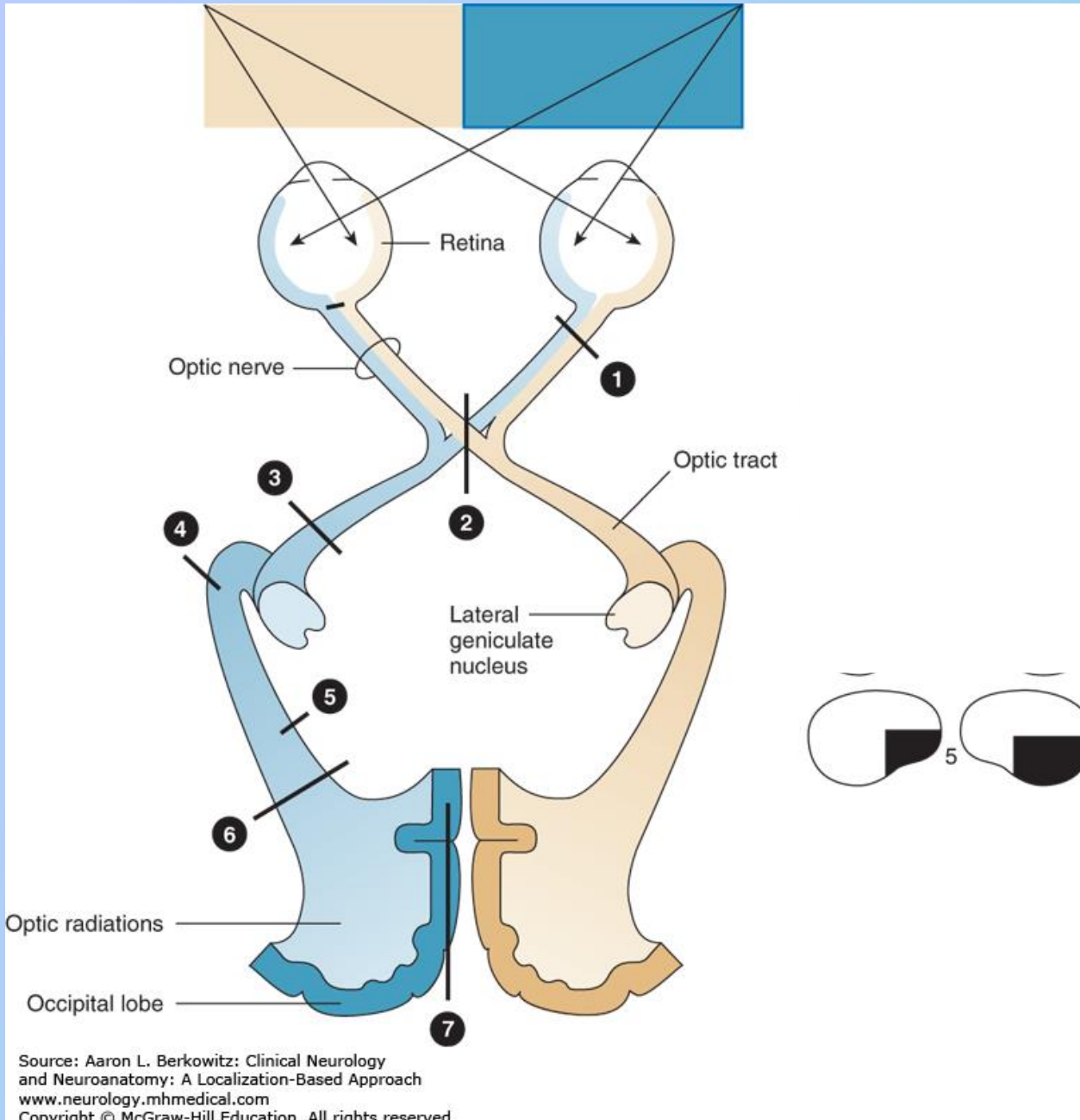
- Inferior quadrant
- Superior quadrant visual field
- Meyer's loop through temporal lobe



UPPER RADIATION LESION

CONTRALATERAL LOWER QUADRANTANOPSIA

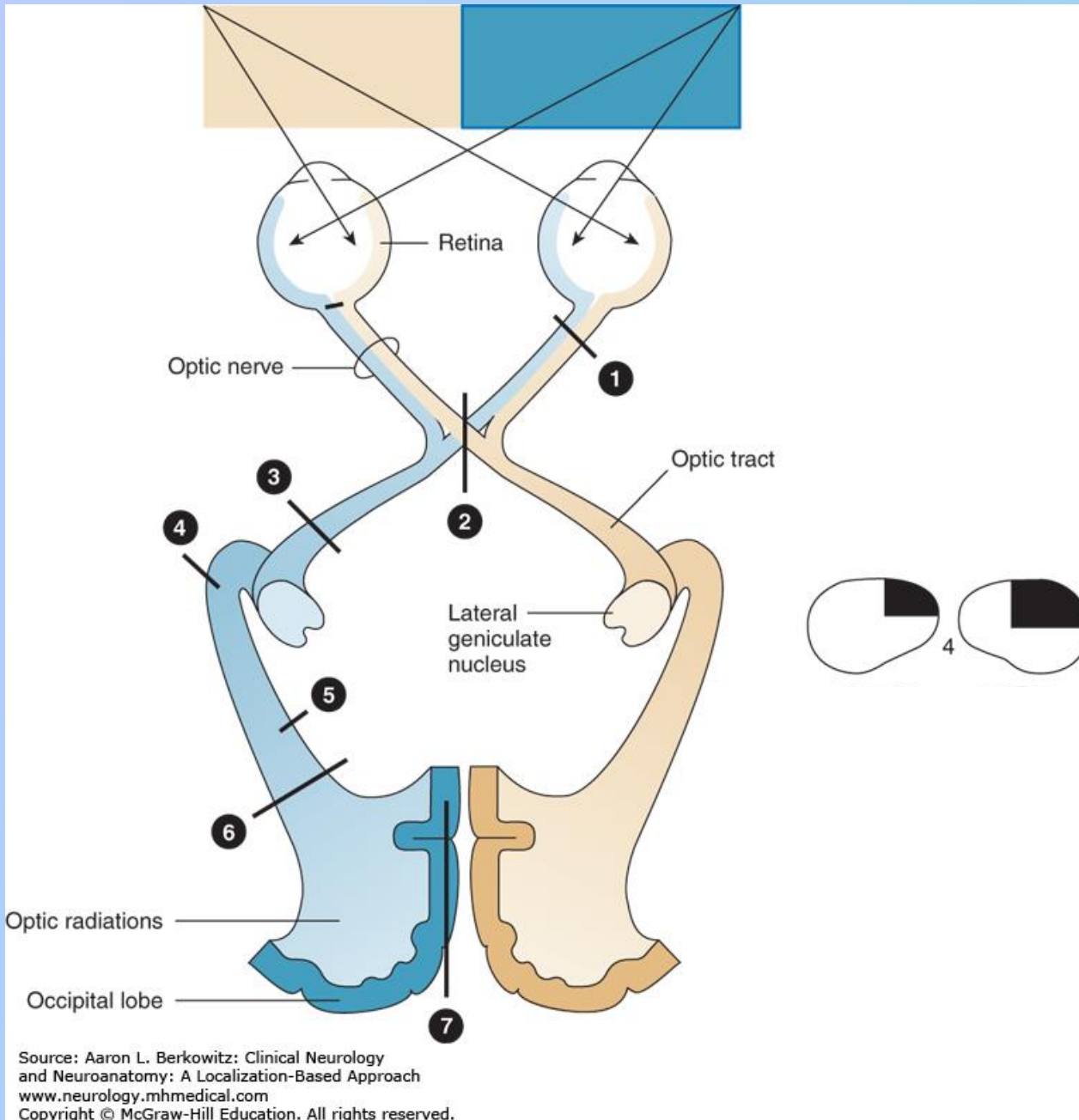
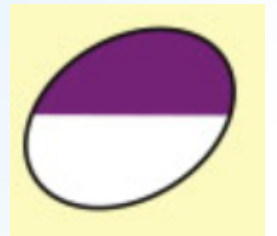
- Loss of lower quadrant visual field opposite to side of lesion
- If bilateral = lower altitudinal hemianopia



LOWER RADIATION LESION

CONTRALATERAL UPPER QUADRANTOPSIA

- Loss of upper quadrant visual field opposite to side of lesion
- If bilateral = upper altitudinal hemianopia

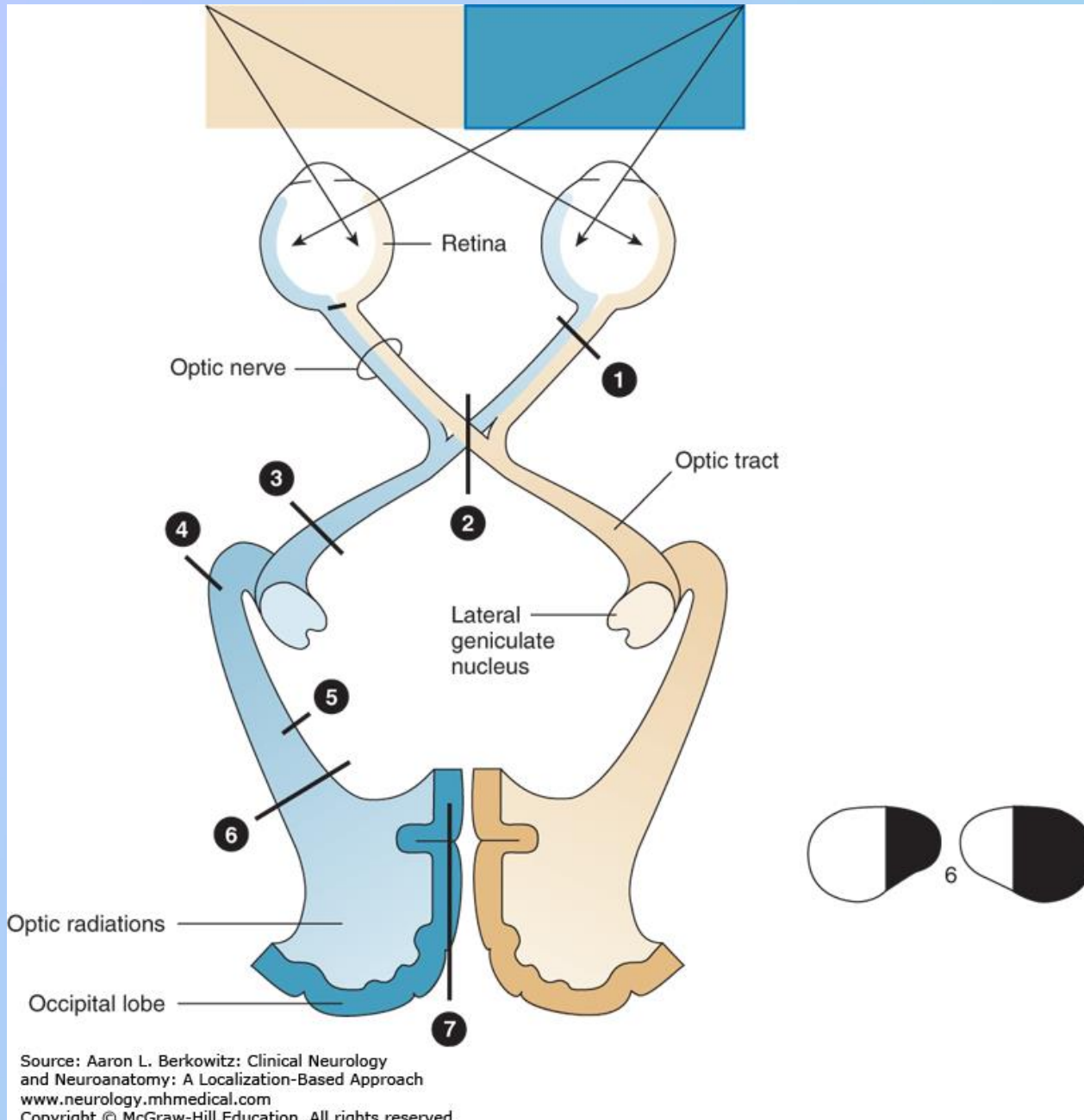


Source: Aaron L. Berkowitz: Clinical Neurology and Neuroanatomy: A Localization-Based Approach
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UPPER AND LOWER RADIATION LESION (6)

CONTRALATERAL HOMONYMOUS HEMIANOPIA

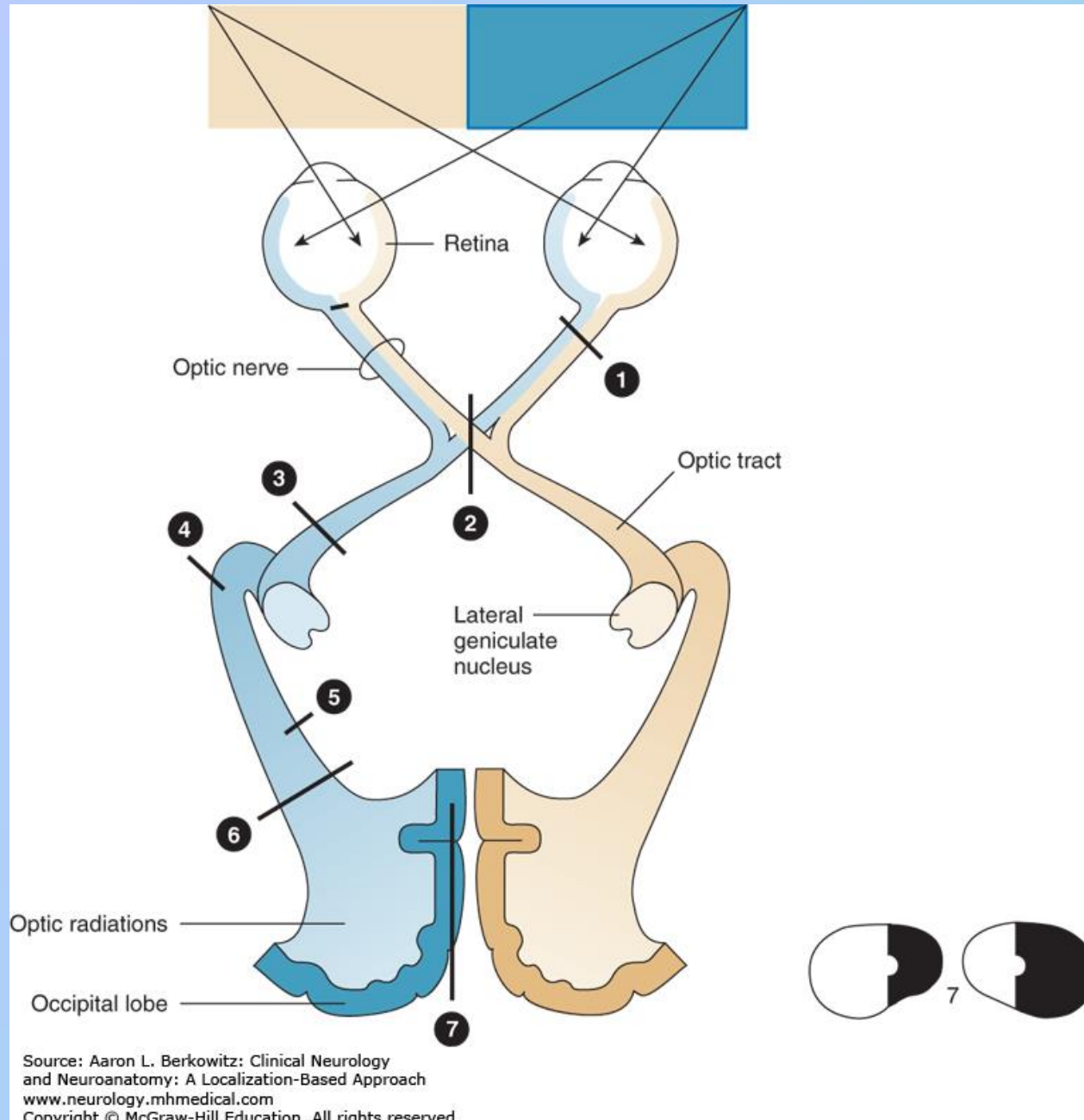
- Loss of all visual fibers on opposite side of the lesion

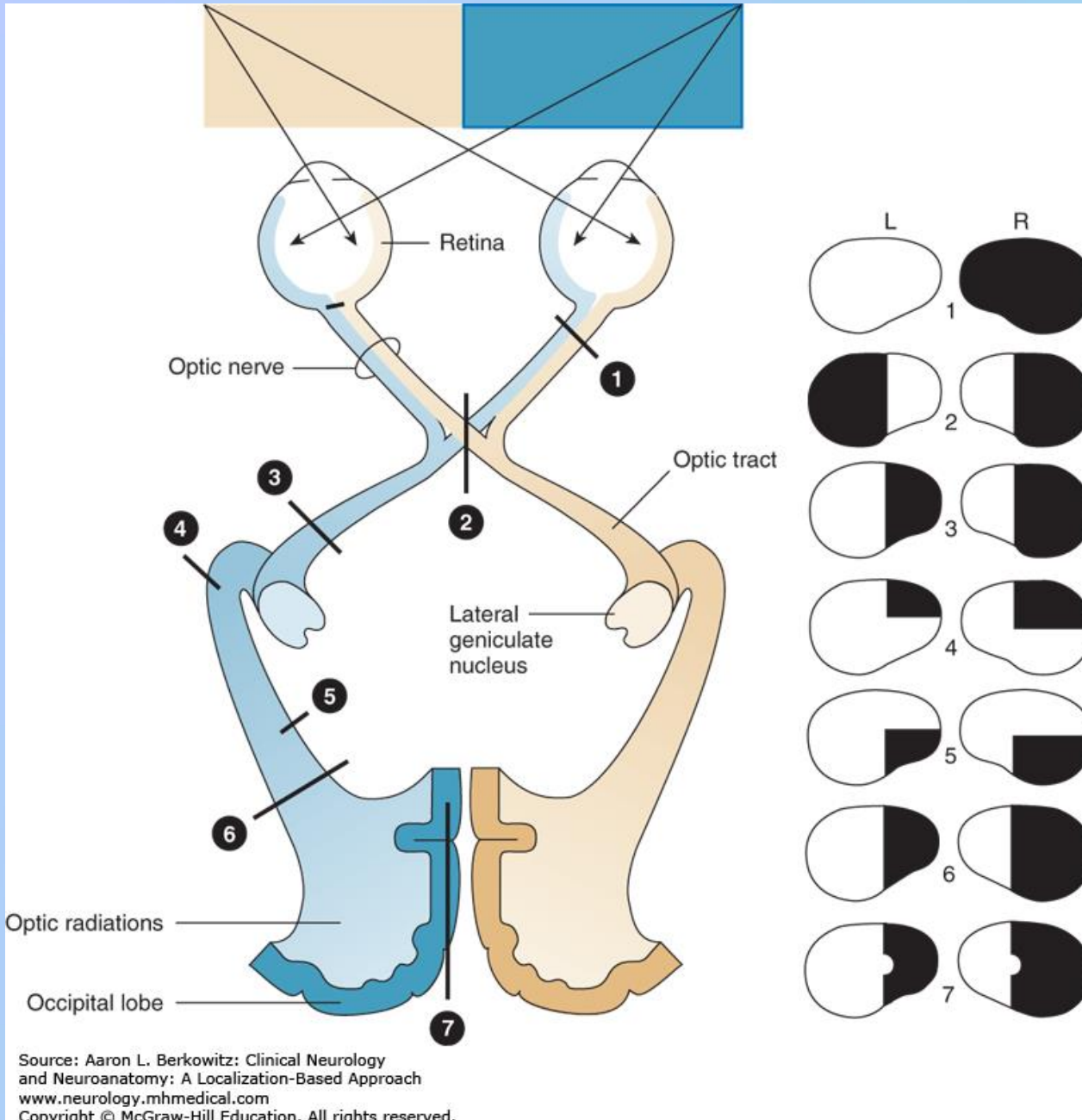


VISUAL CORTEX LESION

CONTRALATERAL HOMONYMOUS HEMIANOPSIA WITH MACULAR SPARING

- Loss of all visual fiber on contralateral side
- Intact pupillary reflex



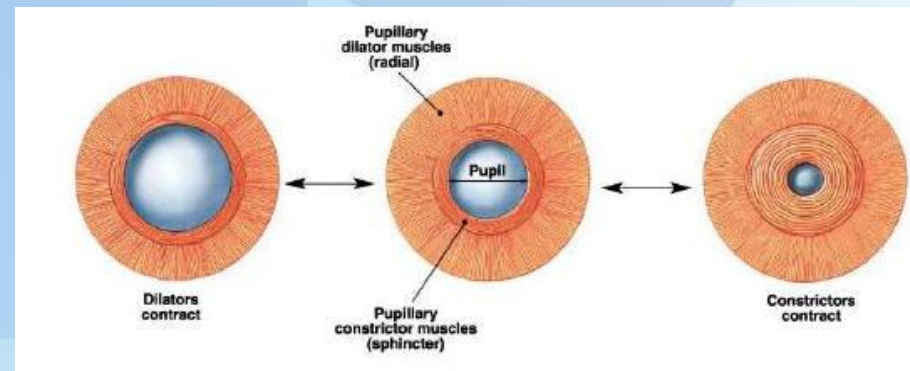
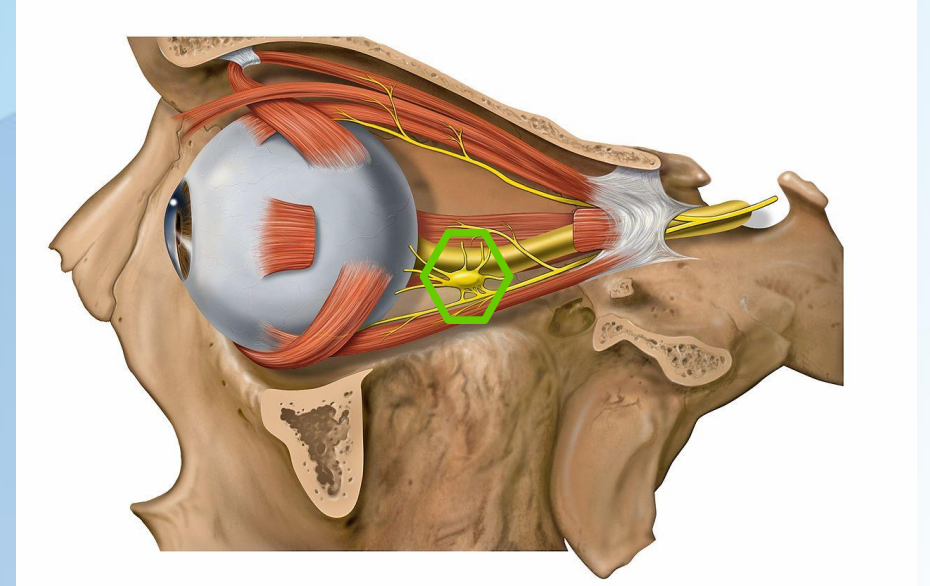


SUMMARY

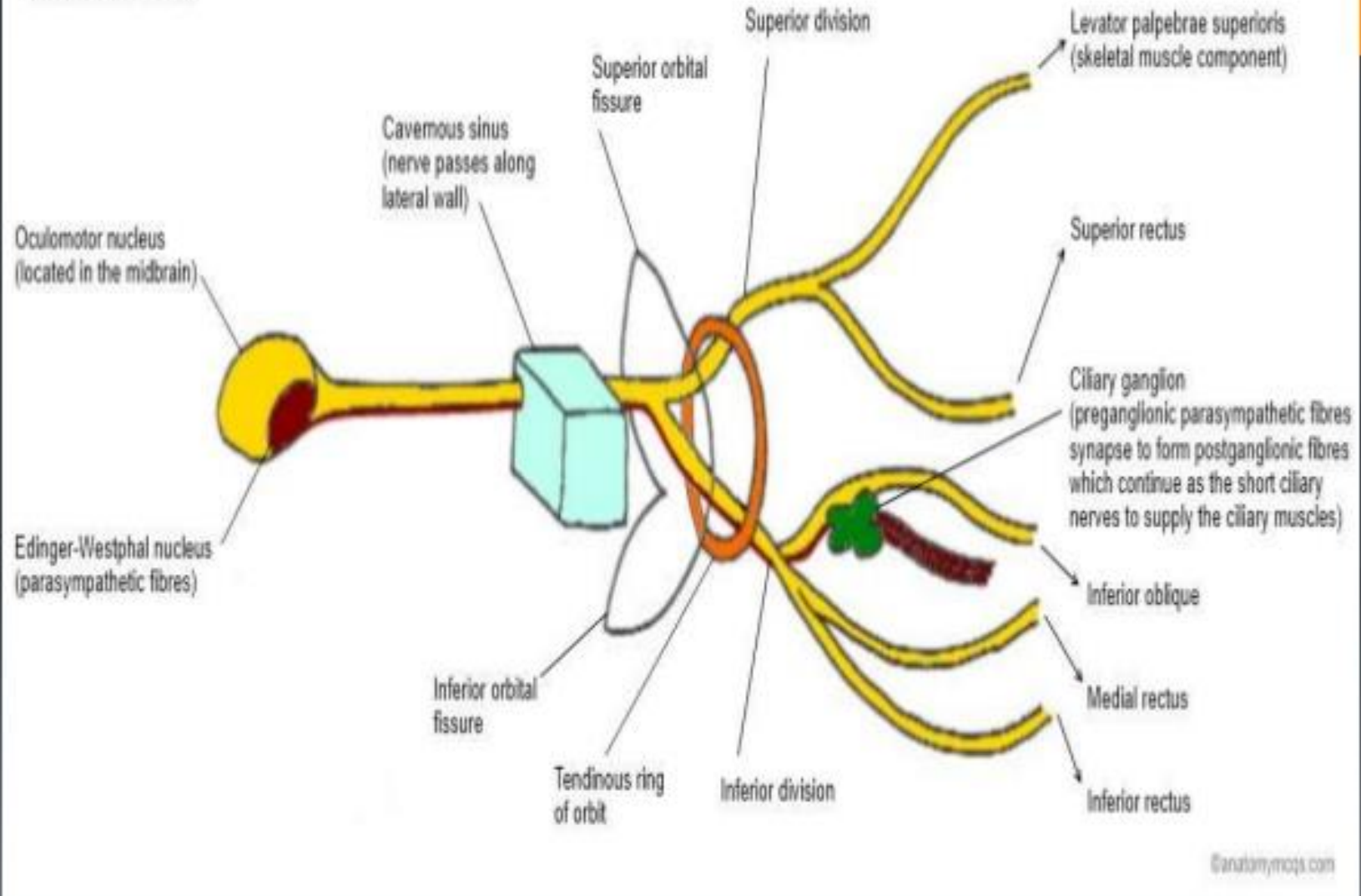
1. Ipsilateral monocular anopia
2. Bitemporal hemianopia
3. Contralateral homonymous hemianopia
4. Contralateral upper quadrantanopsia
5. Contralateral lower quadrantanopsia
6. Contralateral homonymous hemianopia
7. With macular sparing

OCULOMOTOR NERVE (CN III)

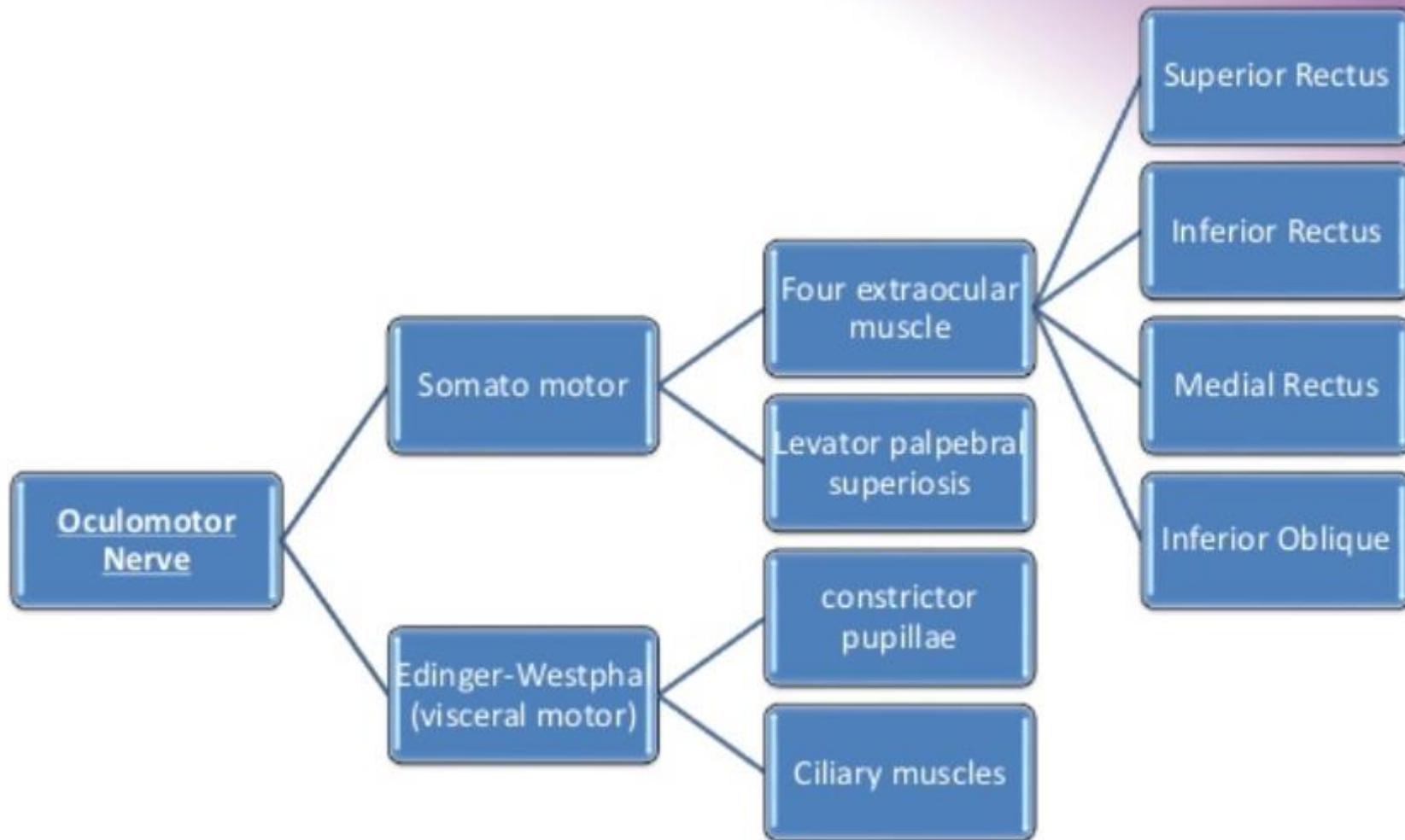
- Superior orbital fissure
- Inside tendinous ring
- Motor – GSE: General somatic efferent
 - Superior rectus muscle
 - Inferior rectus muscle
 - Medial rectus muscle
 - Inferior oblique muscle
 - Superior levator palpebrae (lifts eyelid upper half)
- Parasympathetic – GVE: General visceral efferent (Efferent pupillary light reflex)
 - Ciliary ganglion
 - Pupillary muscles
 - Ciliary muscles (accommodation)



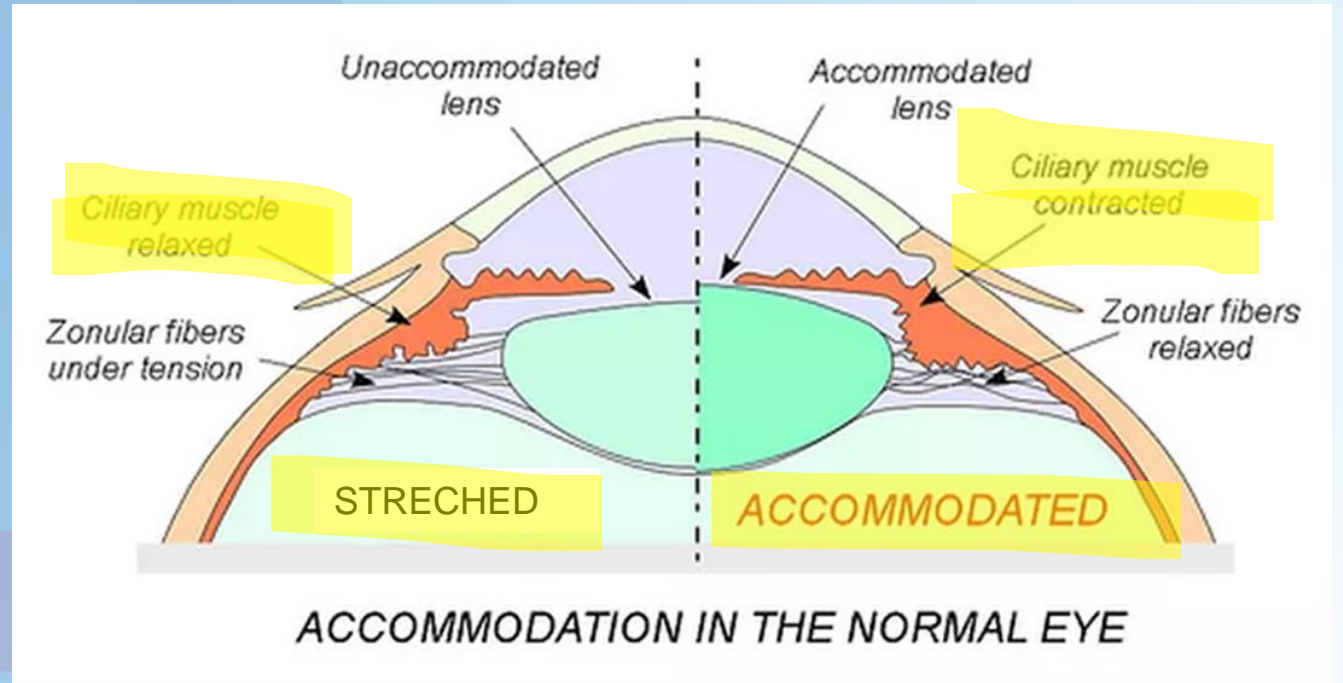
Oculomotor nerve



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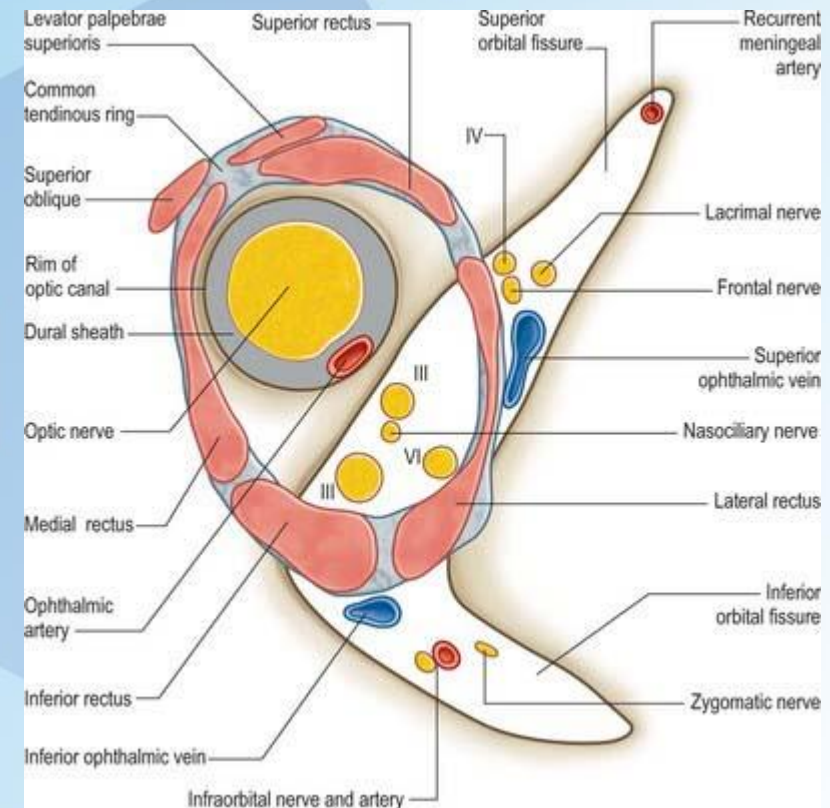
Accommodation

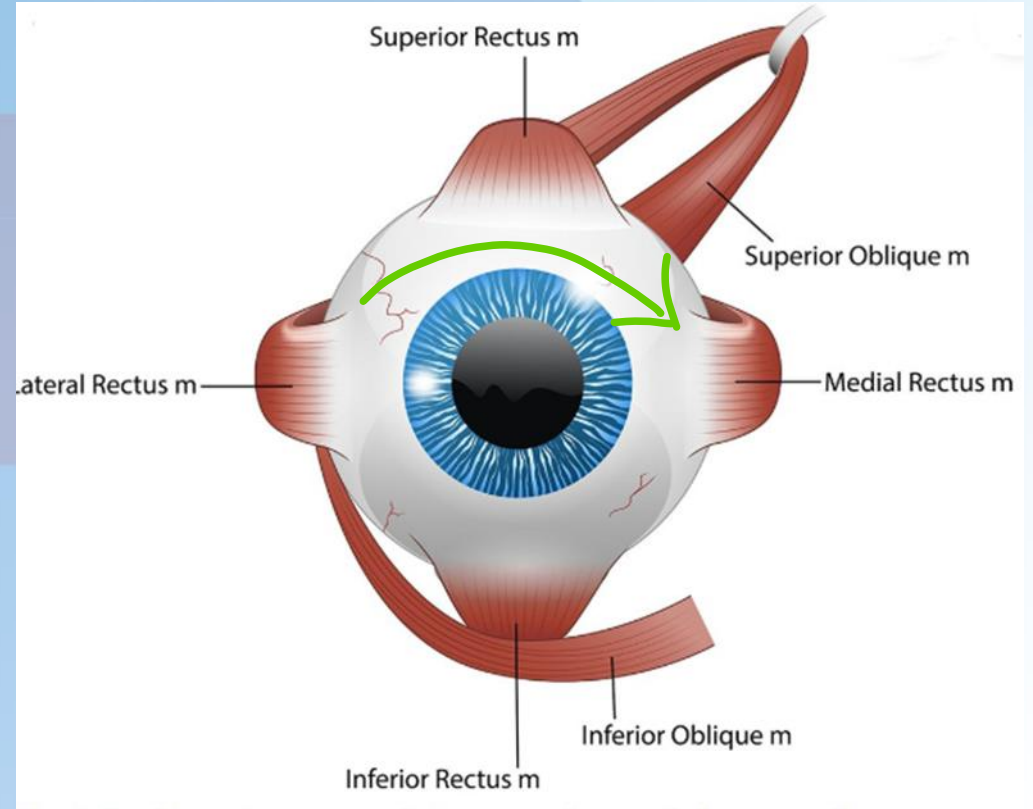
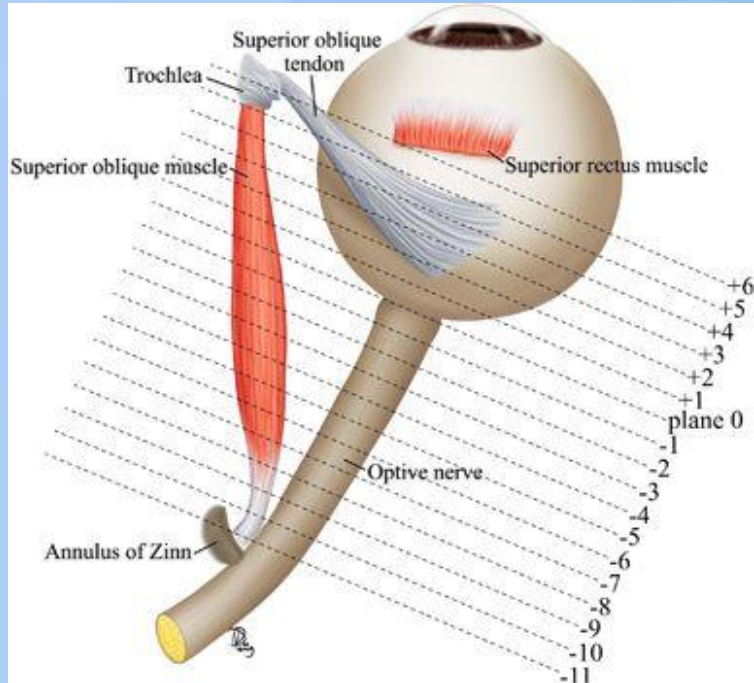


- Ciliary muscles
- CN III
- Constriction of mm = relaxation of zonular fibers = lens is accommodated (thicker)
- Relaxation of ciliary mm = tension of zonular fibers = lens is stretched (unaccommodated)

TROCHLEAR NERVE (CN IV)

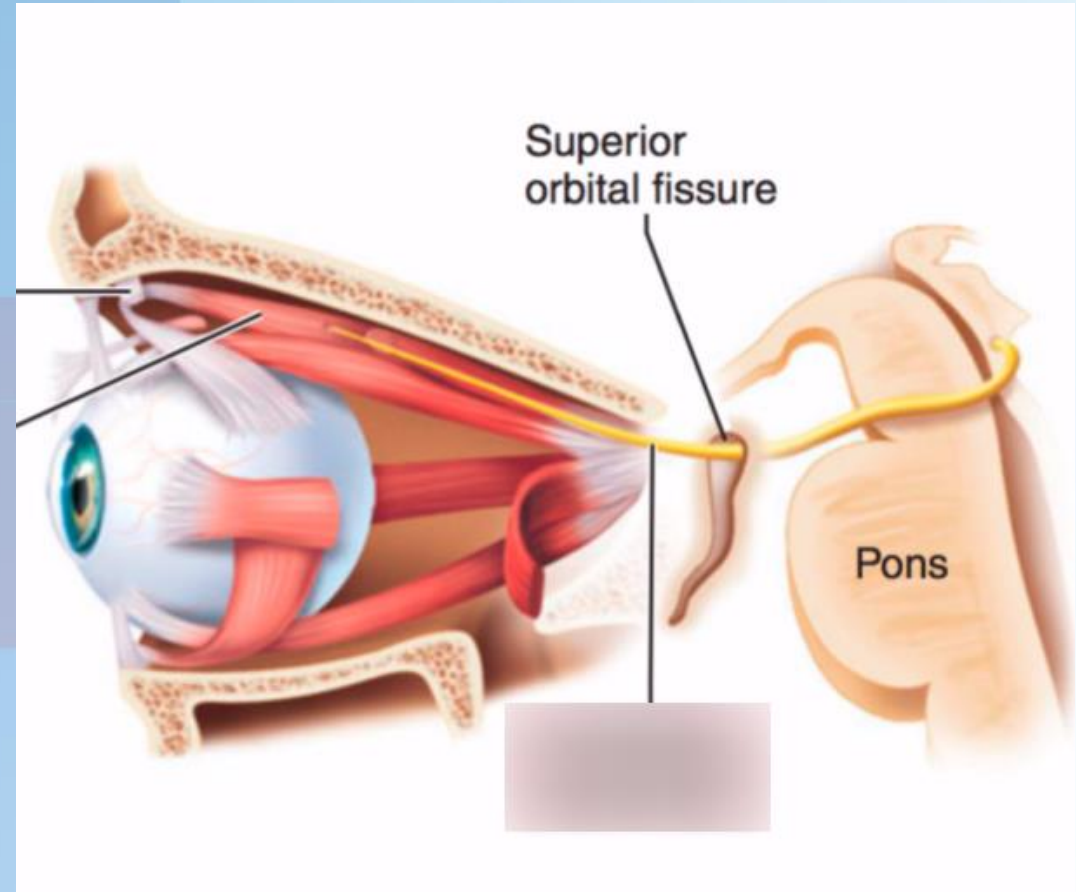
- Superior orbital fissure
- OUTSIDE the tendinous ring
- Motor – GSE
- Superior oblique muscle
 1. Internal rotation
 2. Depression (when looking medially)
 3. Abduction





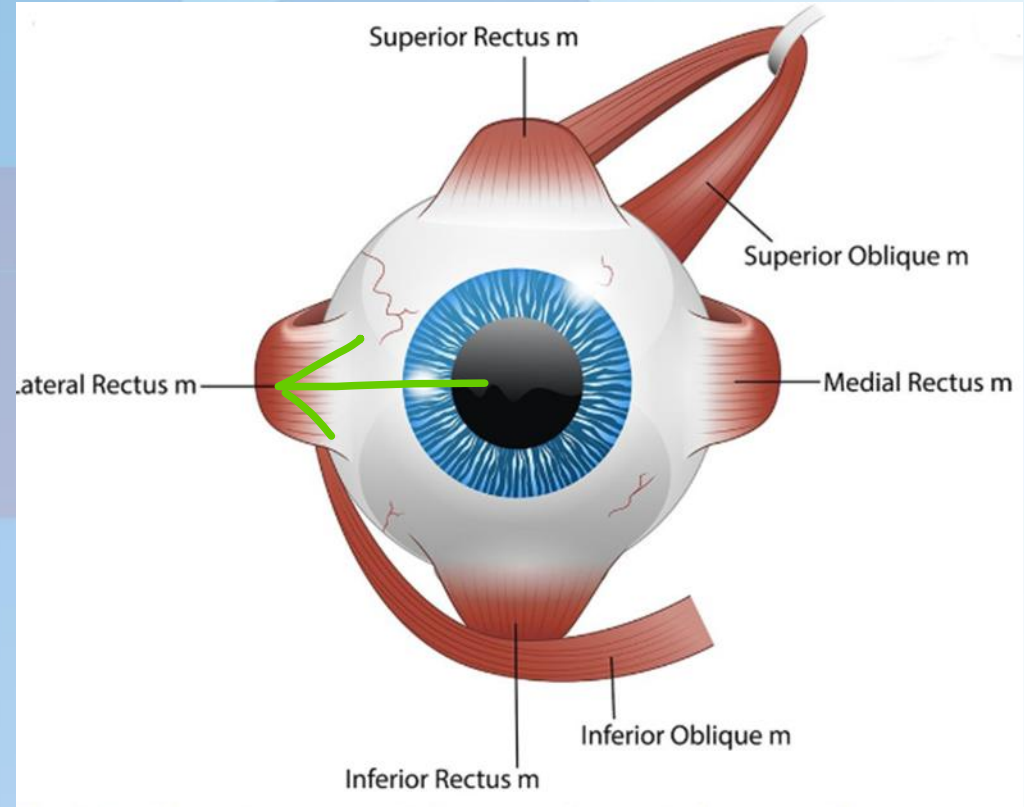
SPECIAL

1. Thinnest CN
2. Longest route
3. Decussates in brain stem
4. Posterior exit



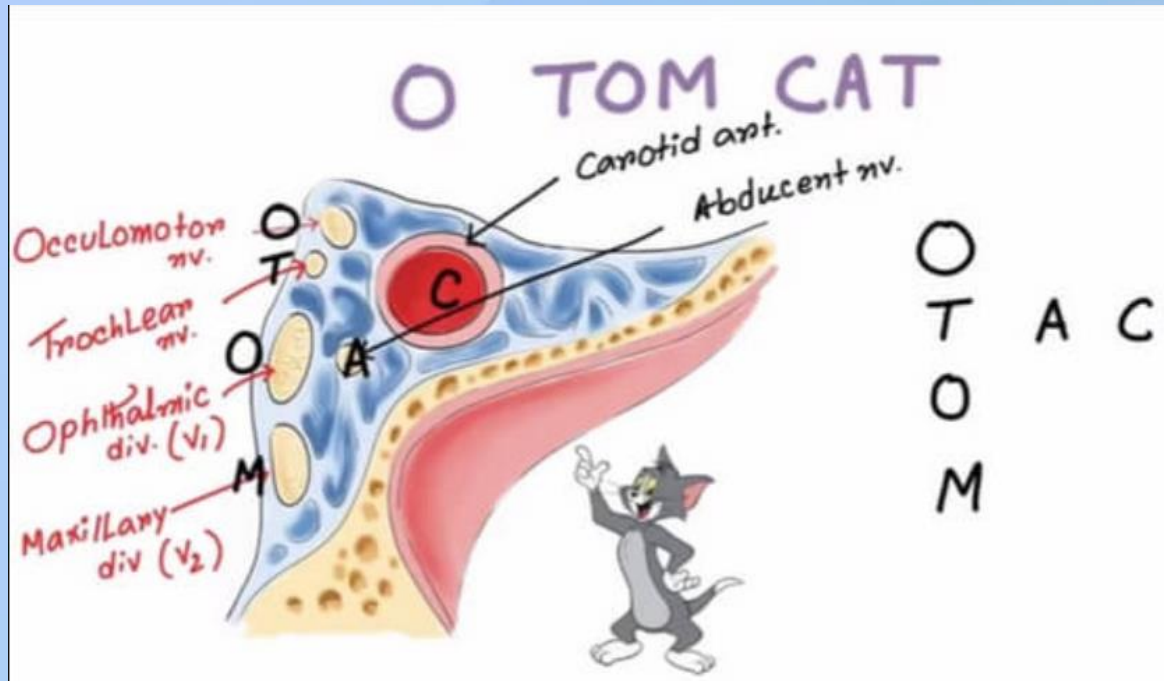
ABDUSSENCE NERVE (CN VI)

- Pontomedullary junction
- Cavernous sinus
- Superior orbital fossa
- Motor – GSE
- Lateral rectus muscle
 - Pulls eyeball laterally

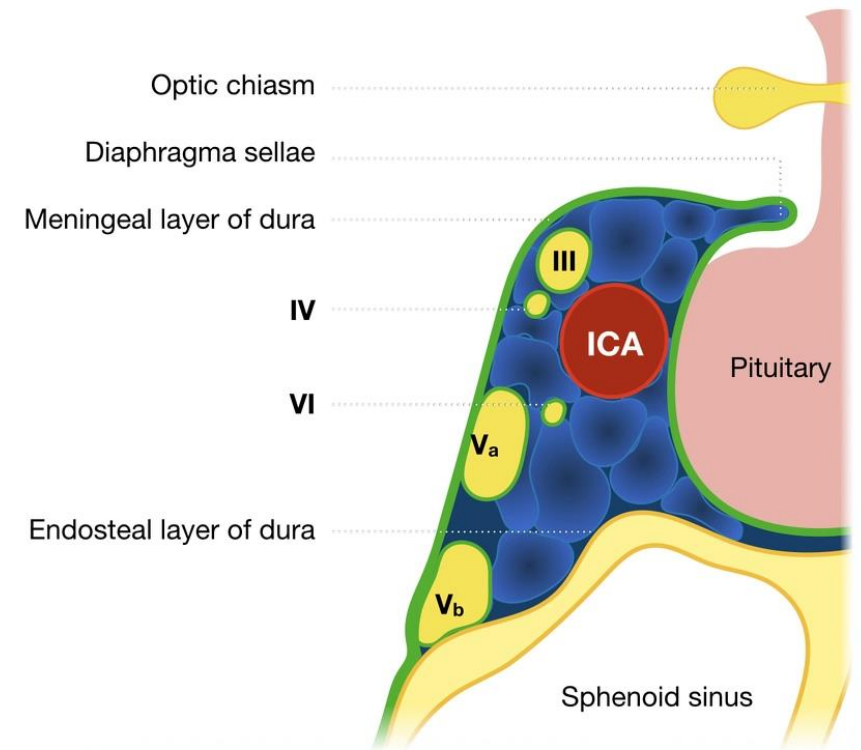


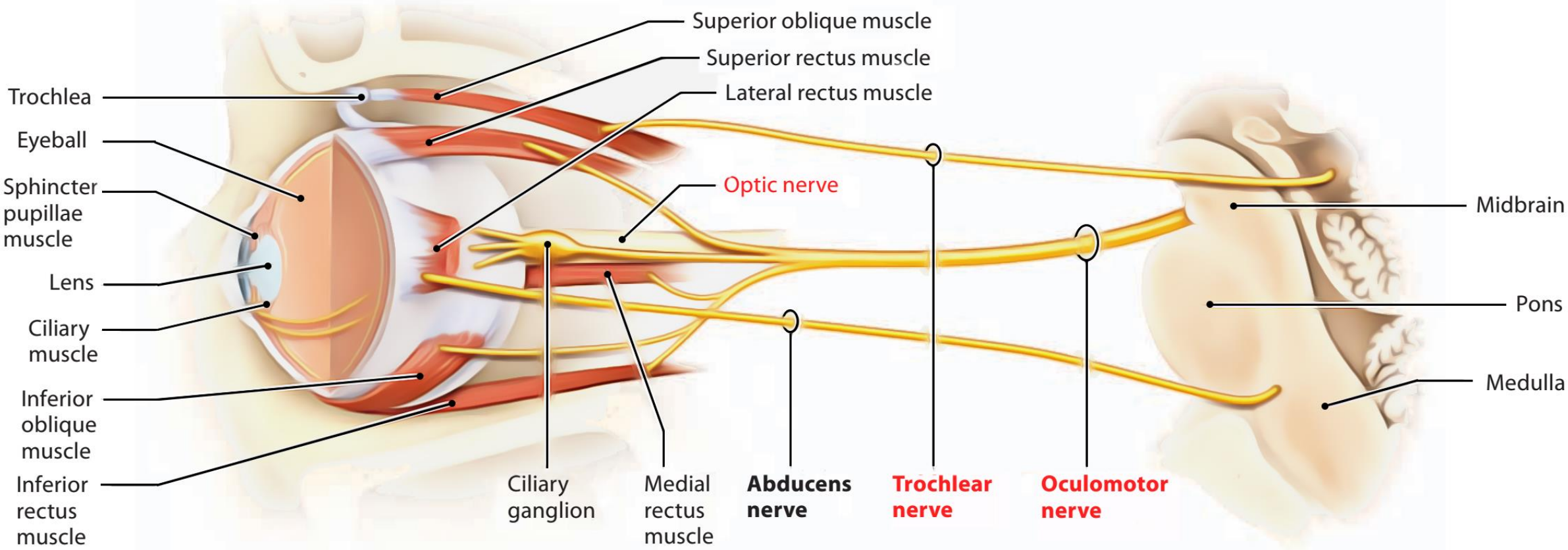
Cavernous sinus

- O TOM CAT



Cavernous sinus





INNERVATION OF THE MUSCLES OF THE EYE

CN III = Oculomotor nerve

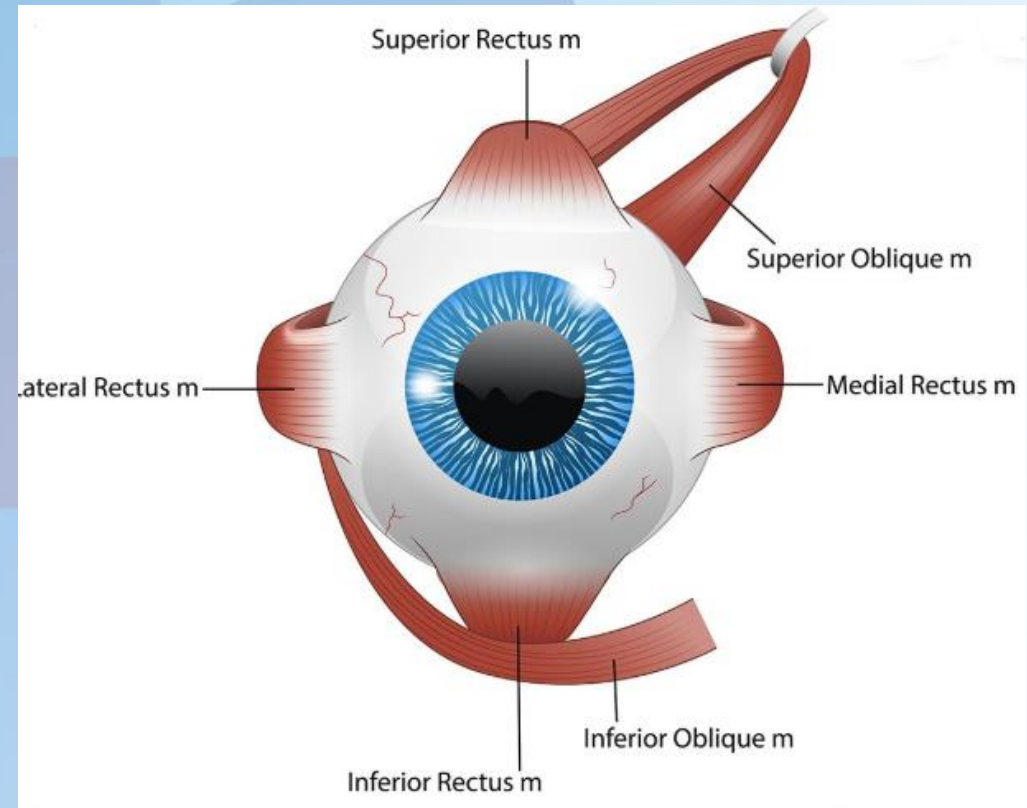
- Superior rectus muscle
- Inferior rectus muscle
- Medial rectus muscle
- Inferior oblique muscle
- Superior levator palpebrae
- Efferent pupillary light reflex

CN IV = Trochlear nerve

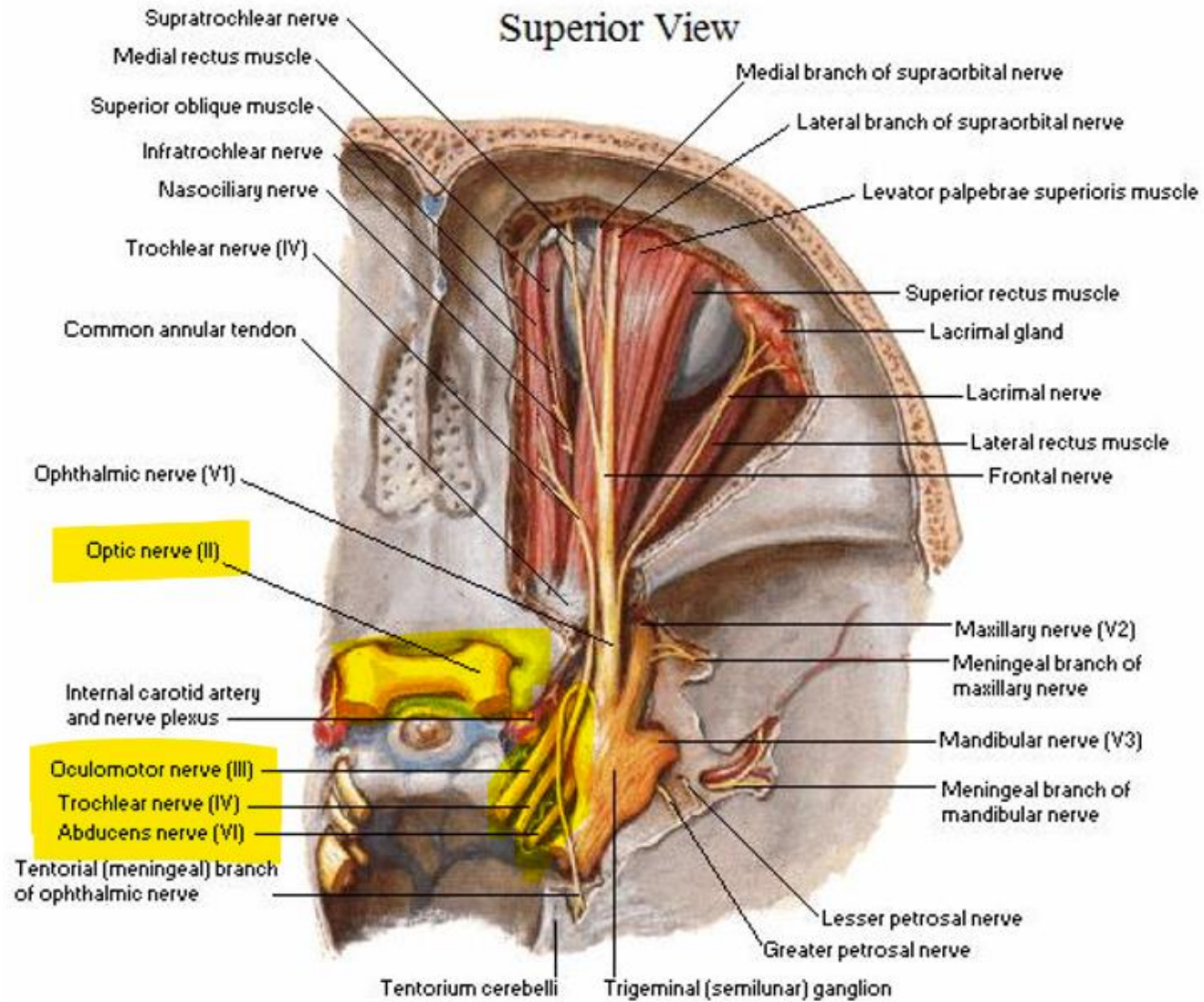
- Superior oblique muscle

CN VI = Abducens nerve

- Lateral rectus muscle

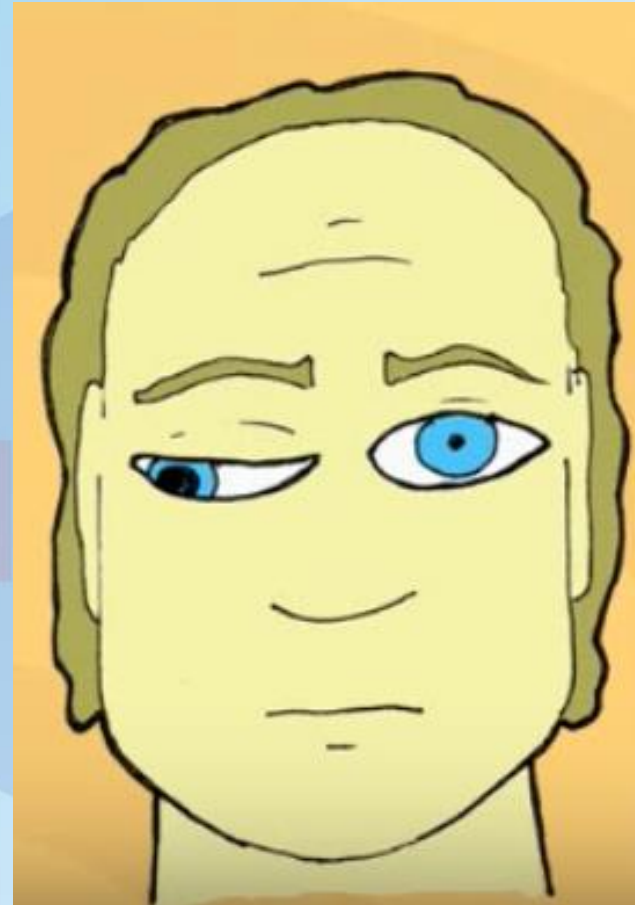


Superior View




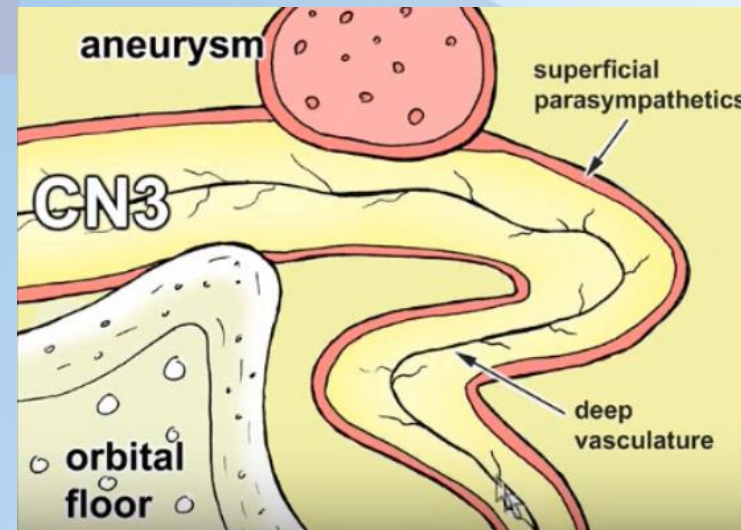
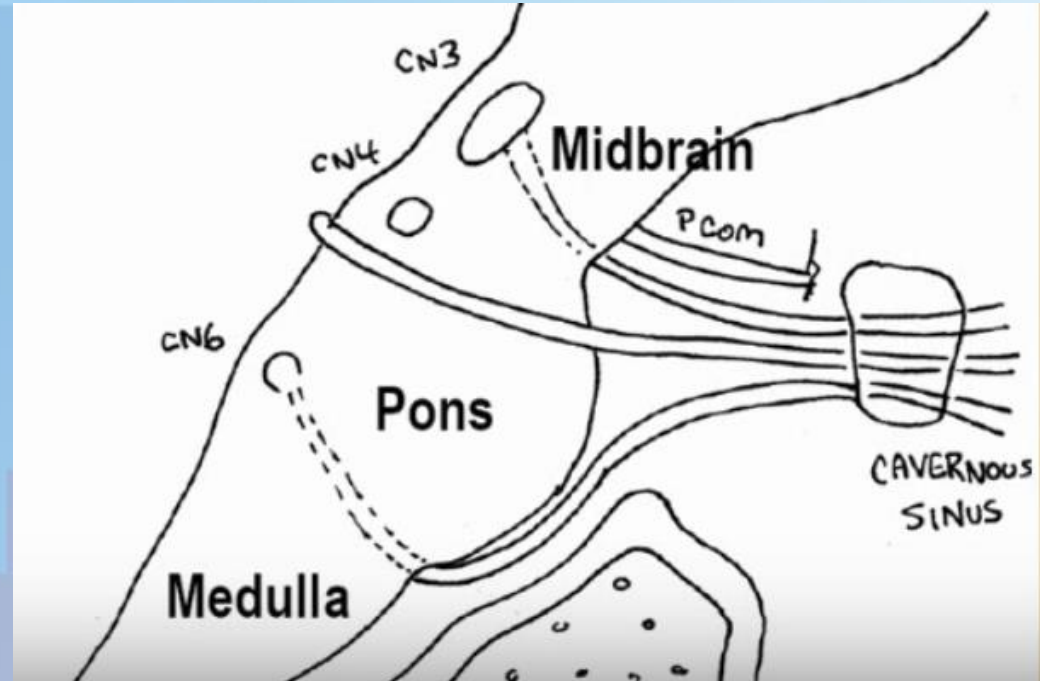
CN III LESION

- Dilated, fixed pupil
- Decreased visual acuity (loss of accommodation)
- Ptosis (sup levator palpebrae)
- Eyeball = down and out
- External strabismus



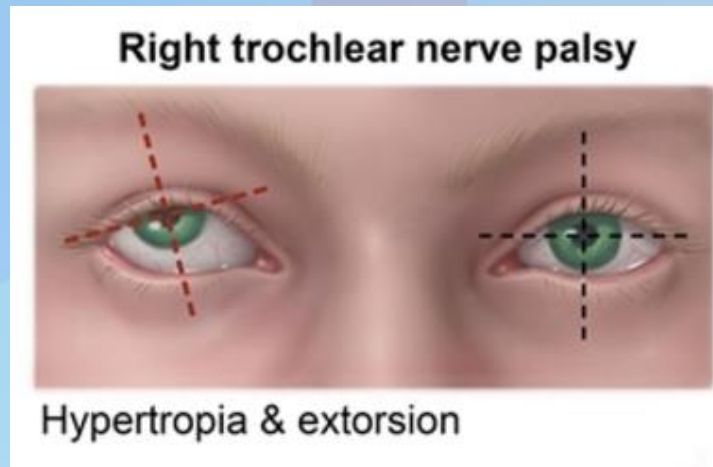
Causes

- MCC:
 - Vasculitic
 - Tumors
 - Aneurysm
- Vasculitic = deep
 - E.g diabetes/HTN
 - May spare the parasympathetic fibers
- Pupillary involvement is bad 



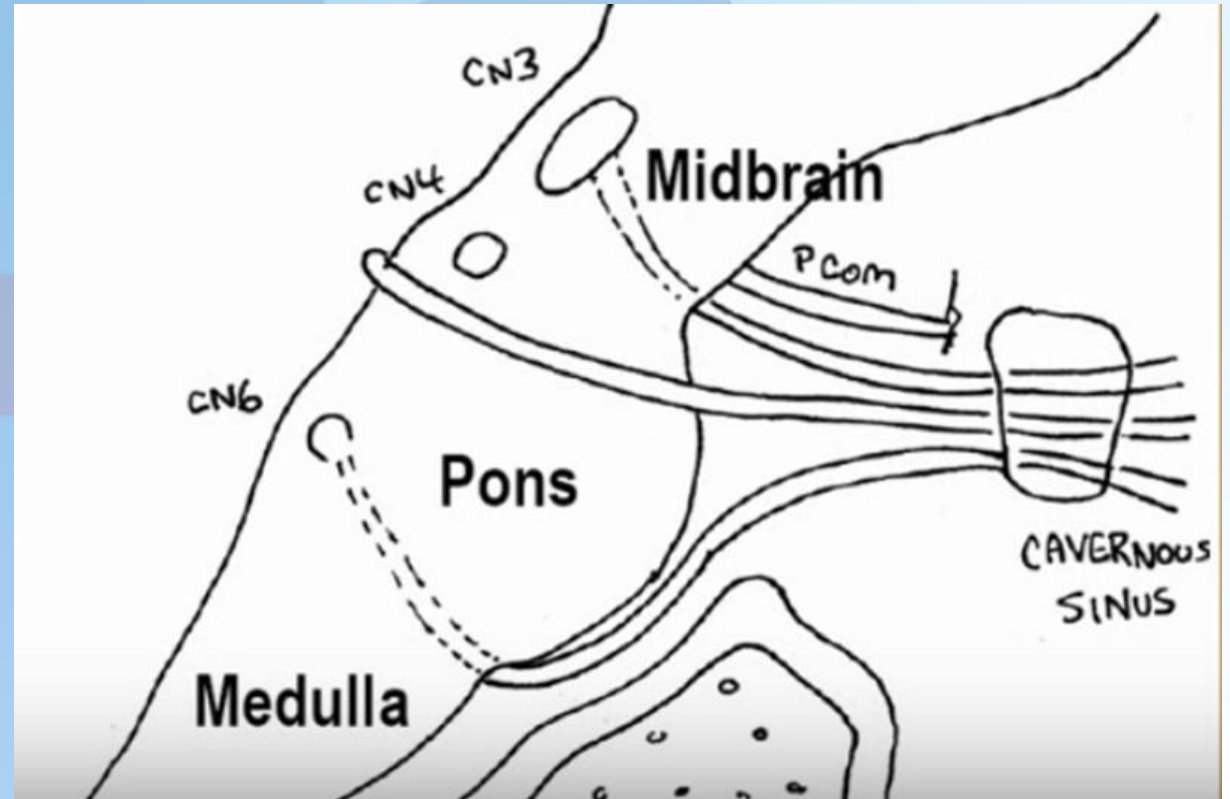
CN IV LESION

- Eyeball = up and out
- Head tilt (contralateral side)
- Diplopia
- Presents with
 - Neck pain
 - difficulty reading
- Normal pupil



Cont. CN IV lesion

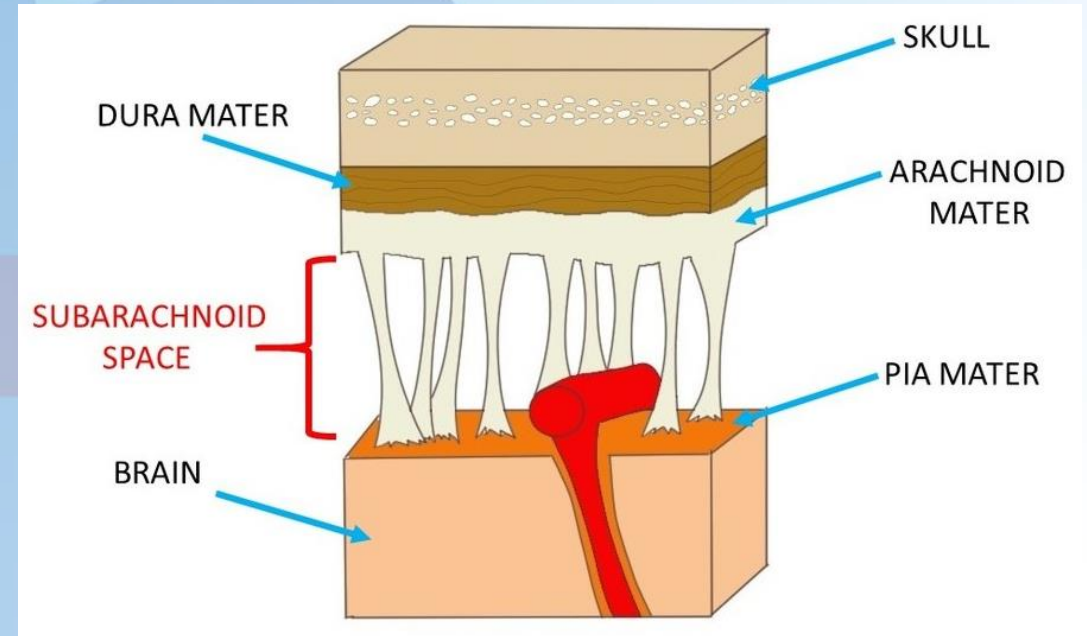
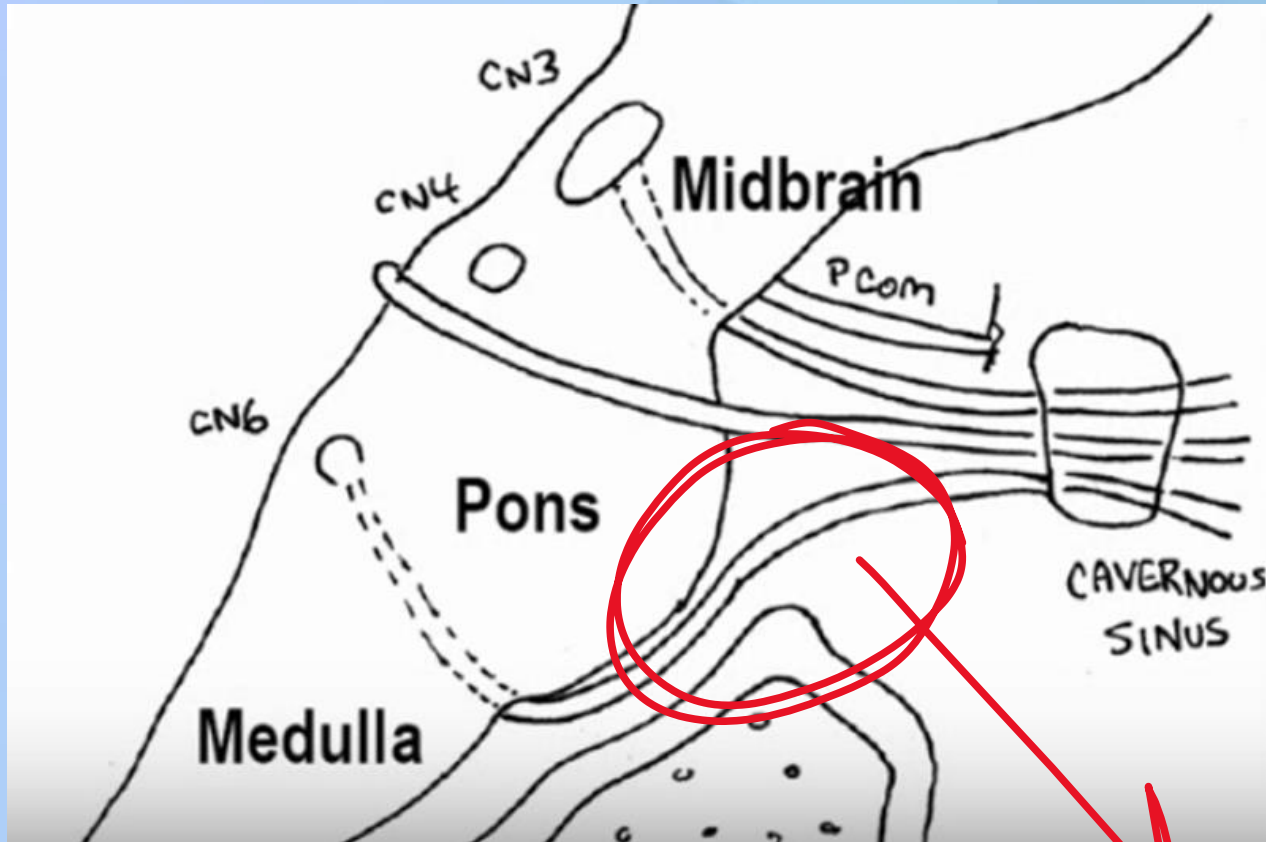
- MCC:
 - Vasculitic
 - Tumor
 - Trauma
 - Congenital trauma
- Long and thin nerve



CN VI LESION

- Normal pupil
- Eyeball = medially (cross-eyed)
 - Internal strabismus
- Diplopia (double vision)
- MCC:
 - Vasculitic
 - Tumor
 - ↑ ICP





The nerve bends sharply = makes it sensitive to increased intracranial pressure (ICP)

