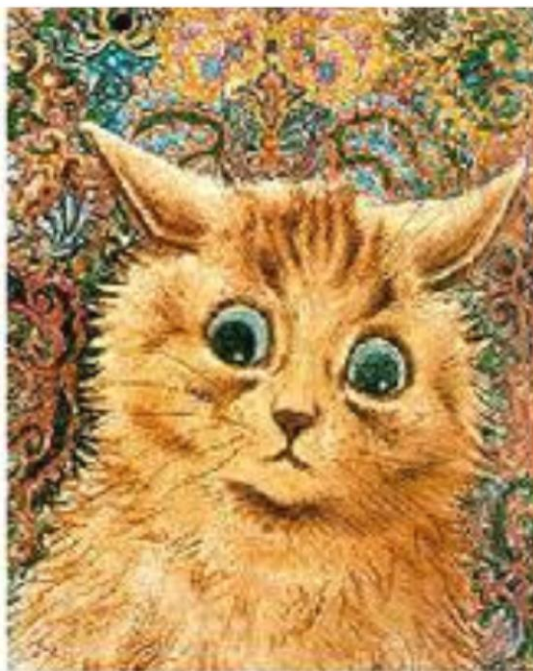
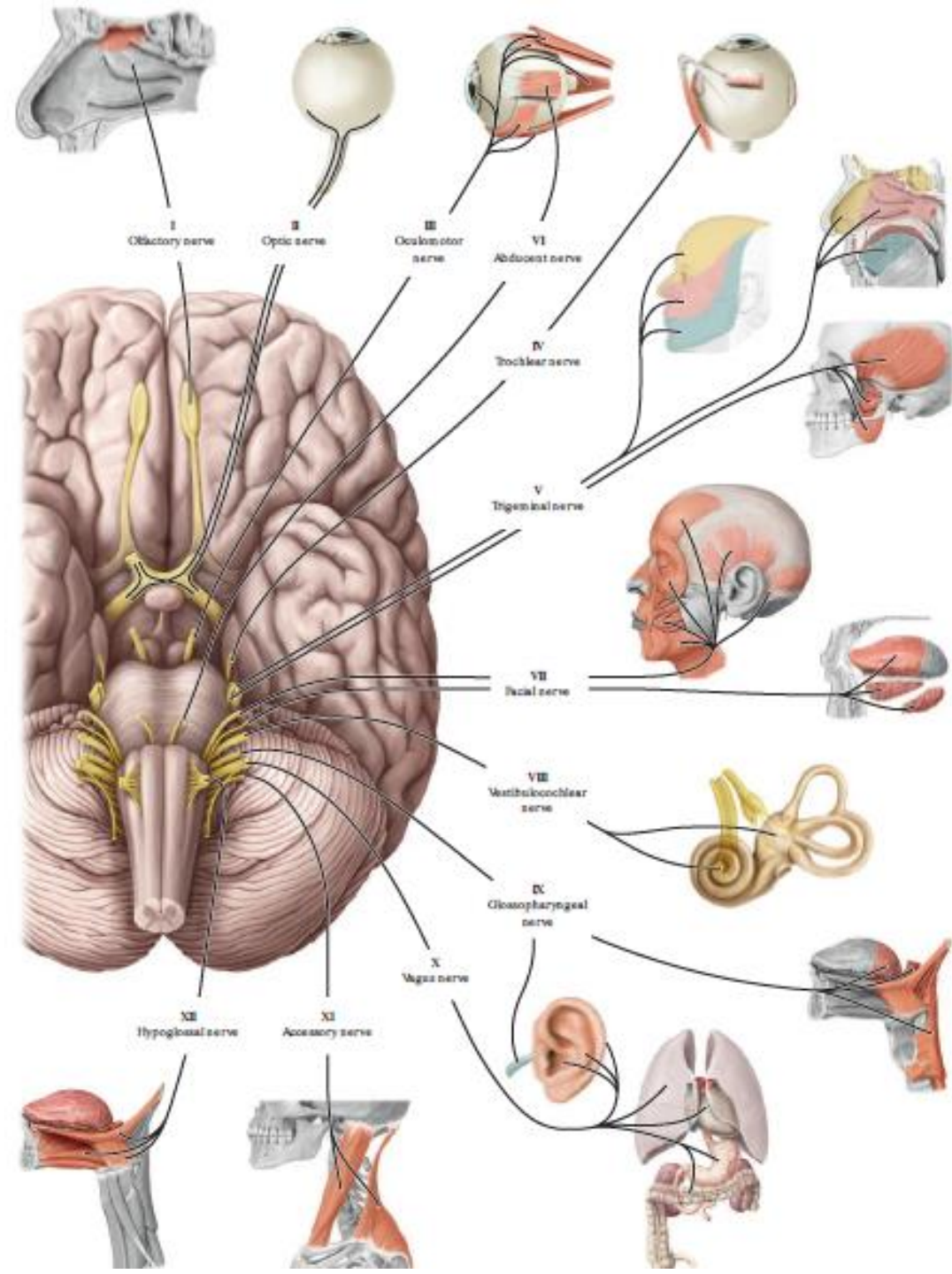


# Nervios Oculomotores

*Nelson D. Villalba M.D. M.Sc.*

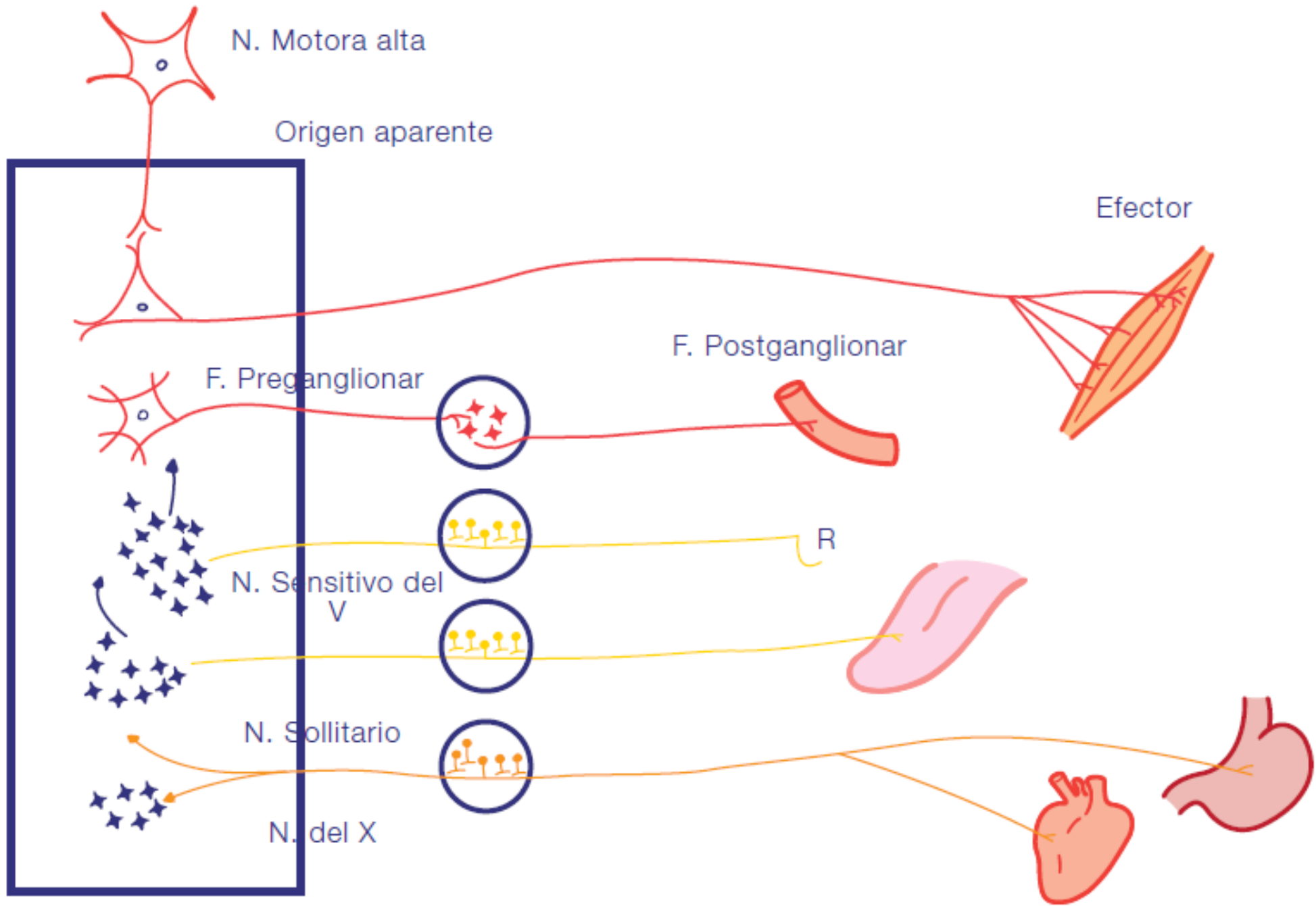




**TABLE 12.1** Cranial Nerve Names and Main Functions

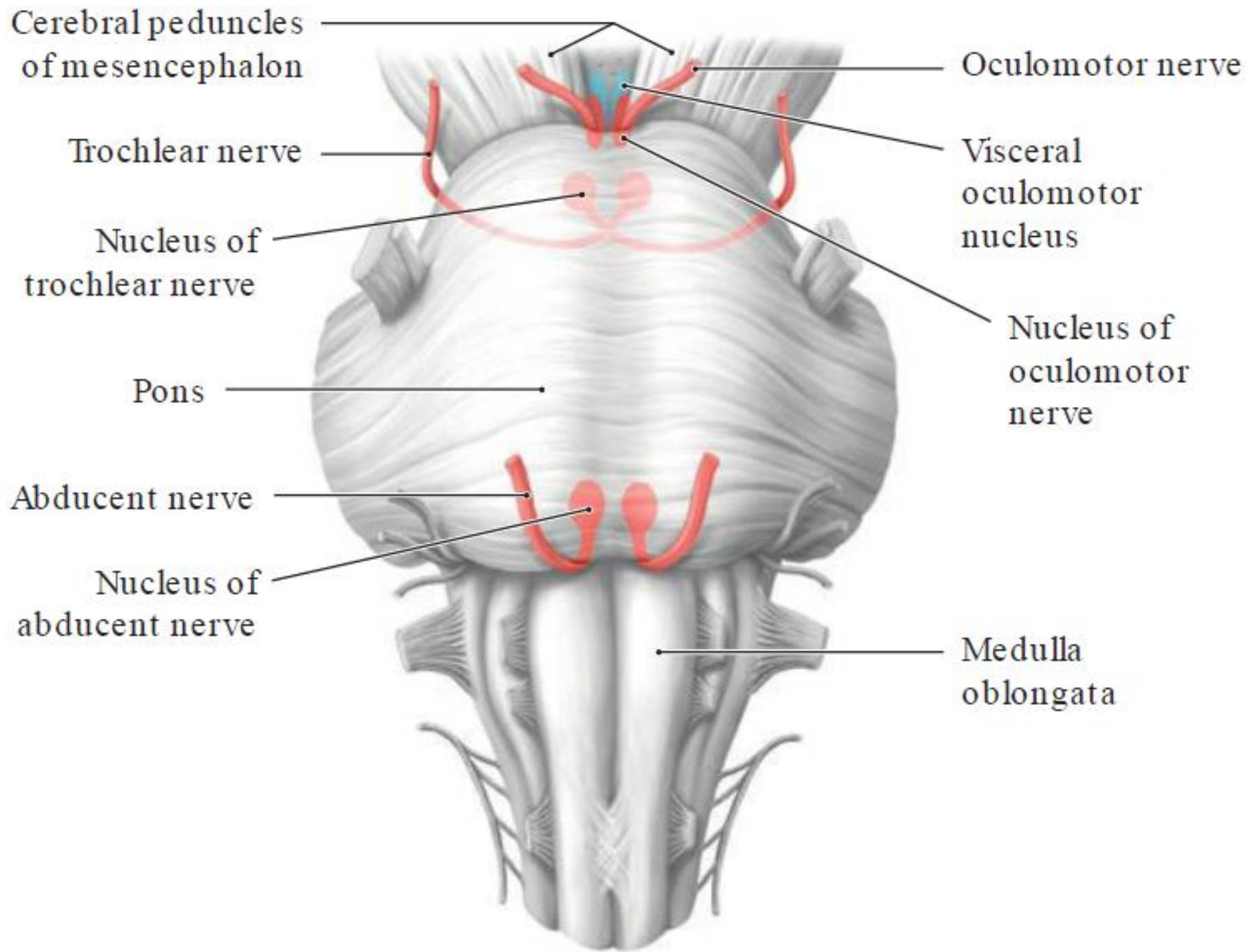
CN	NAME	MAIN FUNCTION(S)
CN I	Olfactory nerve	Olfaction
CN II	Optic nerve	Vision
CN III	Oculomotor nerve	Eye movements; pupil constriction
CN IV	Trochlear nerve	Eye movements
CN V	Trigeminal nerve	Facial sensation; muscles of mastication
CN VI	Abducens nerve	Eye movements
CN VII	Facial nerve	Muscles of facial expression; taste; lacrimation; salivation
CN VIII	Vestibulocochlear nerve	Hearing; equilibrium sense
CN IX	Glossopharyngeal nerve	Pharyngeal muscles; carotid body reflexes; salivation
CN X	Vagus nerve	Parasympathetics to most organs; laryngeal muscles (voice); pharyngeal muscles (swallowing); aortic arch reflexes
CN XI	Spinal accessory nerve	Head turning (trapezius and sternomastoid muscles)
CN XII	Hypoglossal nerve	Tongue movement

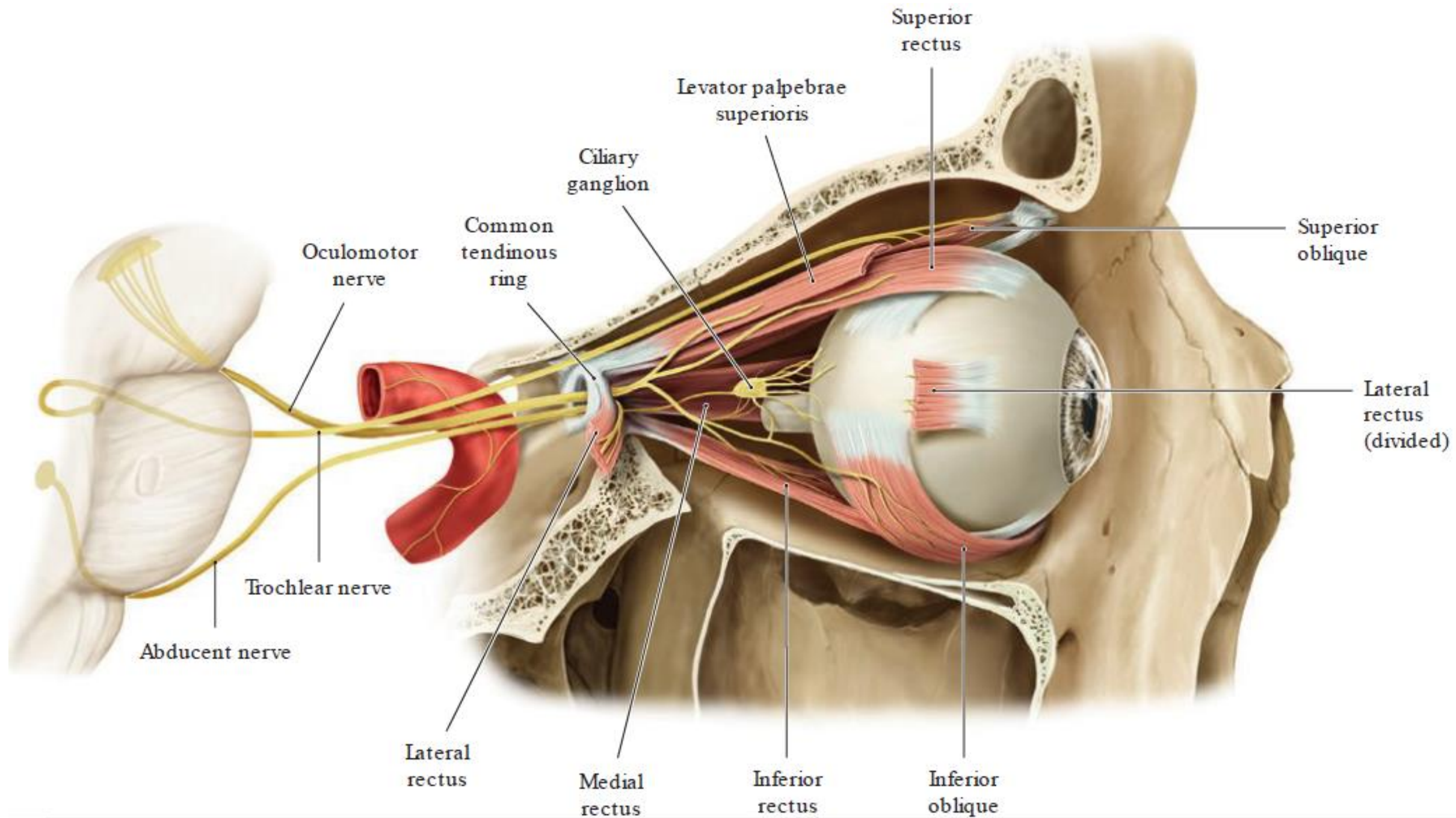
TALLO CEREBRAL



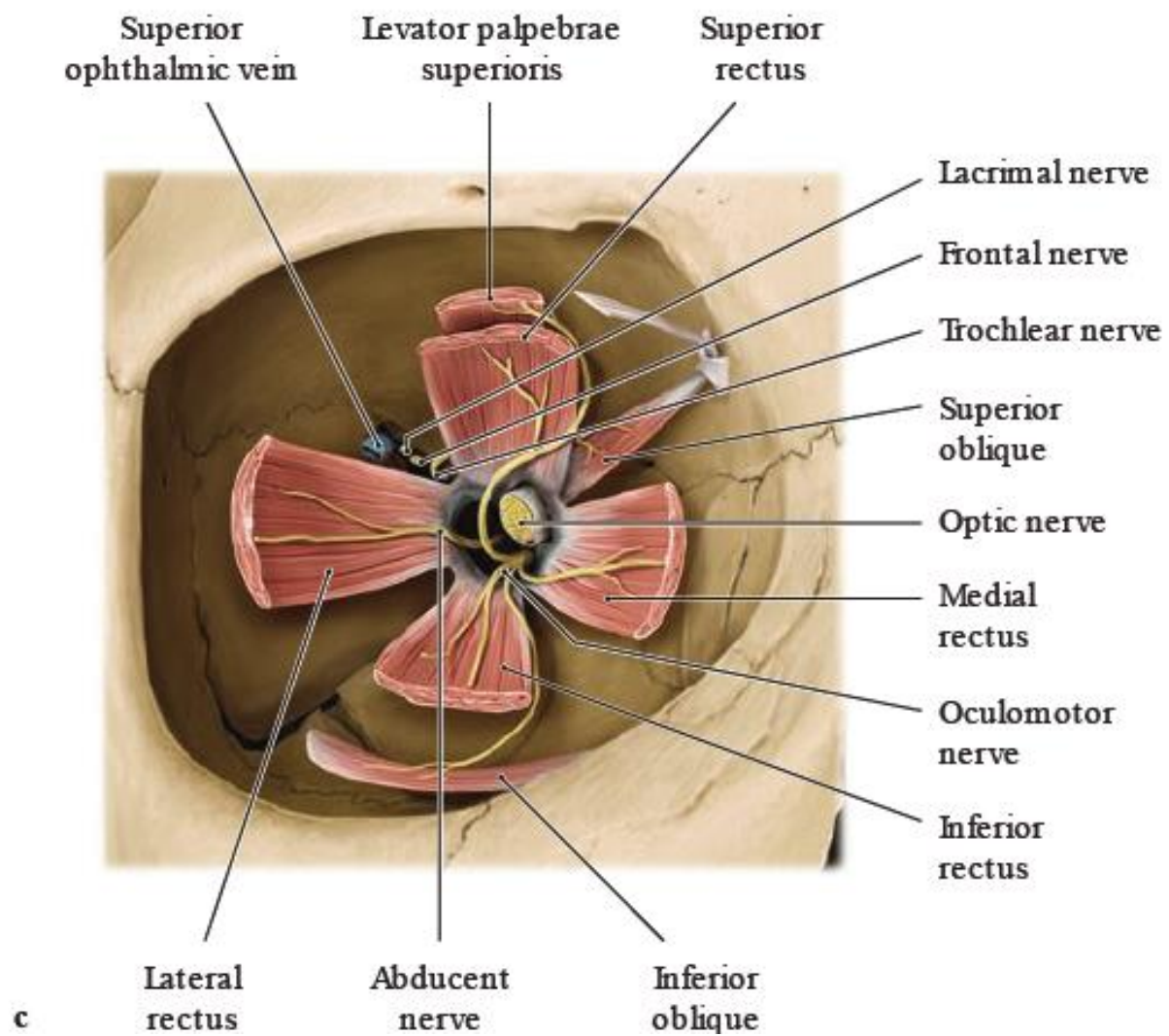
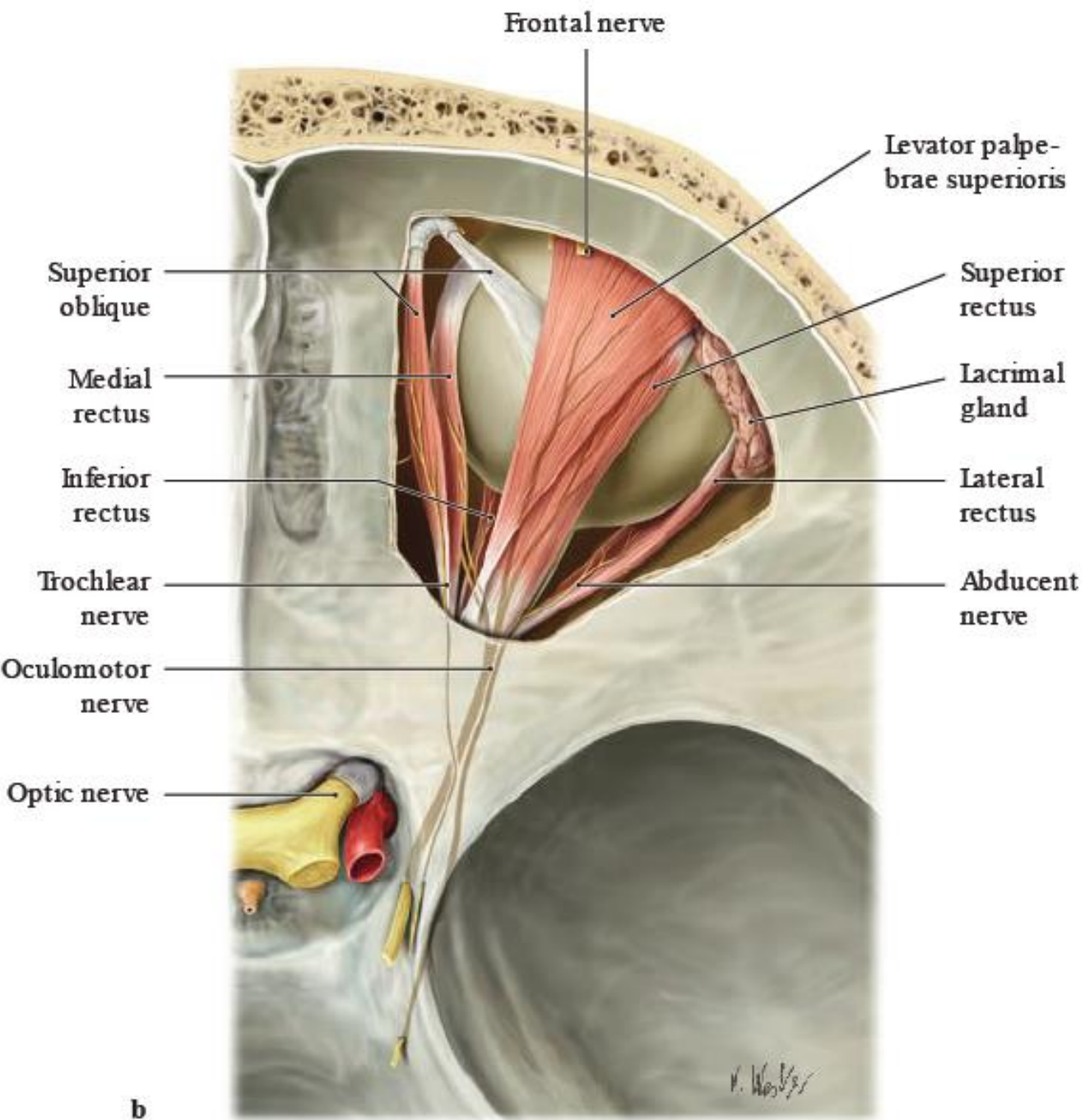
**TABLE 12.3** Classification of Cranial Nerve Nuclei into Motor and Sensory Columns

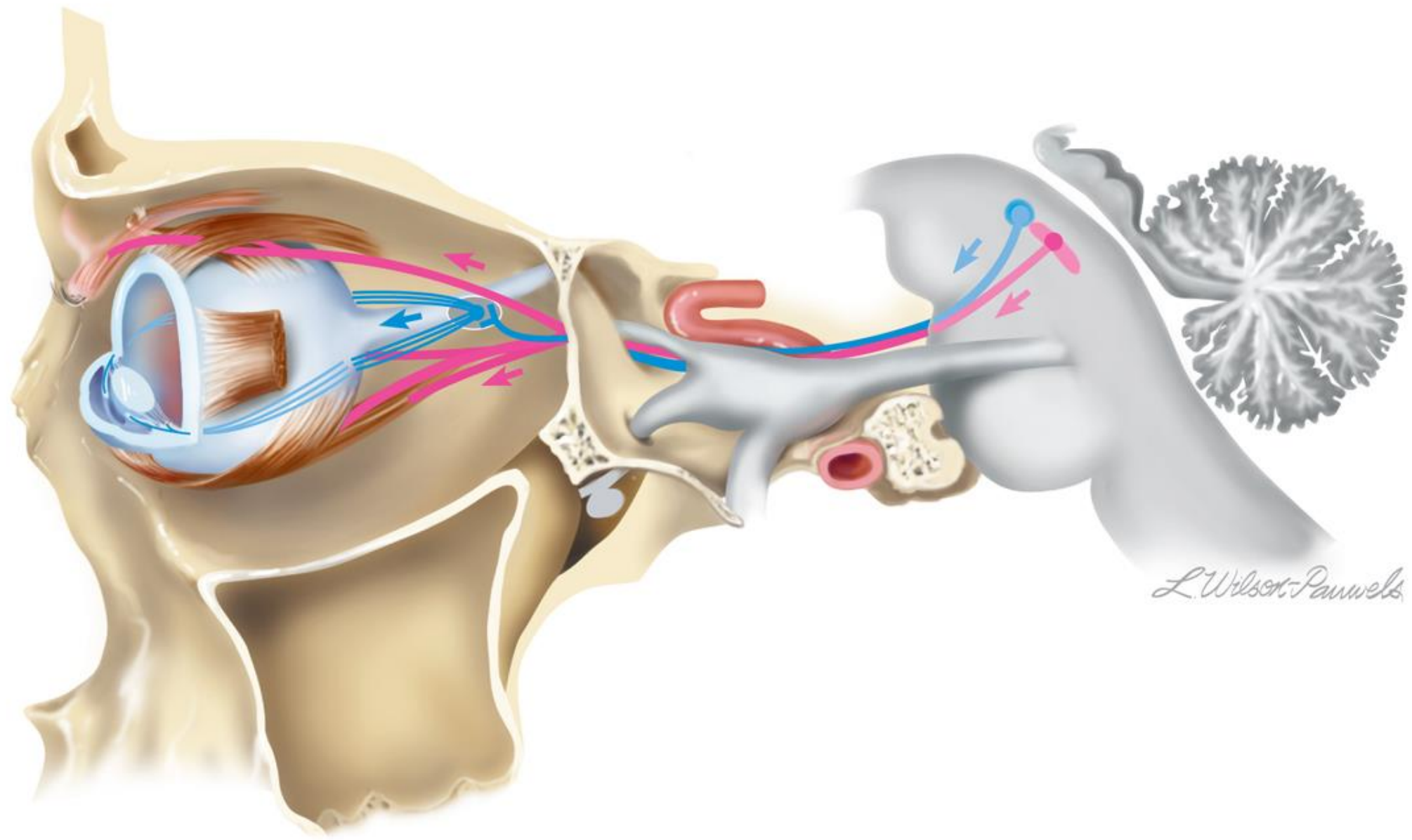
CLASSIFICATION	FUNCTION(S)	BRAINSTEM NUCLEI	CRANIAL NERVE(S)
<b>MOTOR</b>			
Somatic motor (general somatic efferent)	Extraocular muscles, intrinsic tongue muscles	Oculomotor, trochlear, abducens, and hypoglossal	CN III, IV, VI, XII
Branchial motor (special visceral efferent)	Muscles of mastication, facial expression, middle ear, pharynx, larynx, sternomastoid, upper portion of trapezius	Motor nucleus of CN V Facial nucleus Nucleus ambiguus Accessory spinal nucleus	CN V CN VII CN IX, X CN XI
Parasympathetic (general visceral efferent)	Parasympathetic innervation of head and thoracoabdominal viscera above splenic flexure	Edinger–Westphal nucleus Superior salivatory nucleus Inferior salivatory nucleus Dorsal motor nucleus of CN X	CN III CN VII CN IX CN X
<b>SENSORY</b>			
Visceral sensory (special visceral afferent)	Taste	Nucleus solitarius (rostral portion, gustatory nucleus)	CN VII, IX, X
(general visceral afferent)	Inputs for control of cardiorespiratory and digestive function	Nucleus solitarius (caudal portion, cardiorespiratory nucleus)	CN IX, X
General somatic sensory (general somatic afferent)	Touch, pain, temperature, position, and vibration sense for face, sinuses, and meninges	Trigeminal nuclei	CN V, VII, IX, X
Special somatic sensory (special somatic afferent)	Olfaction, vision, hearing, vestibular sensation (olfaction and vision do not have sensory nuclei in the brainstem)	Cochlear nuclei, vestibular nuclei	CN VIII

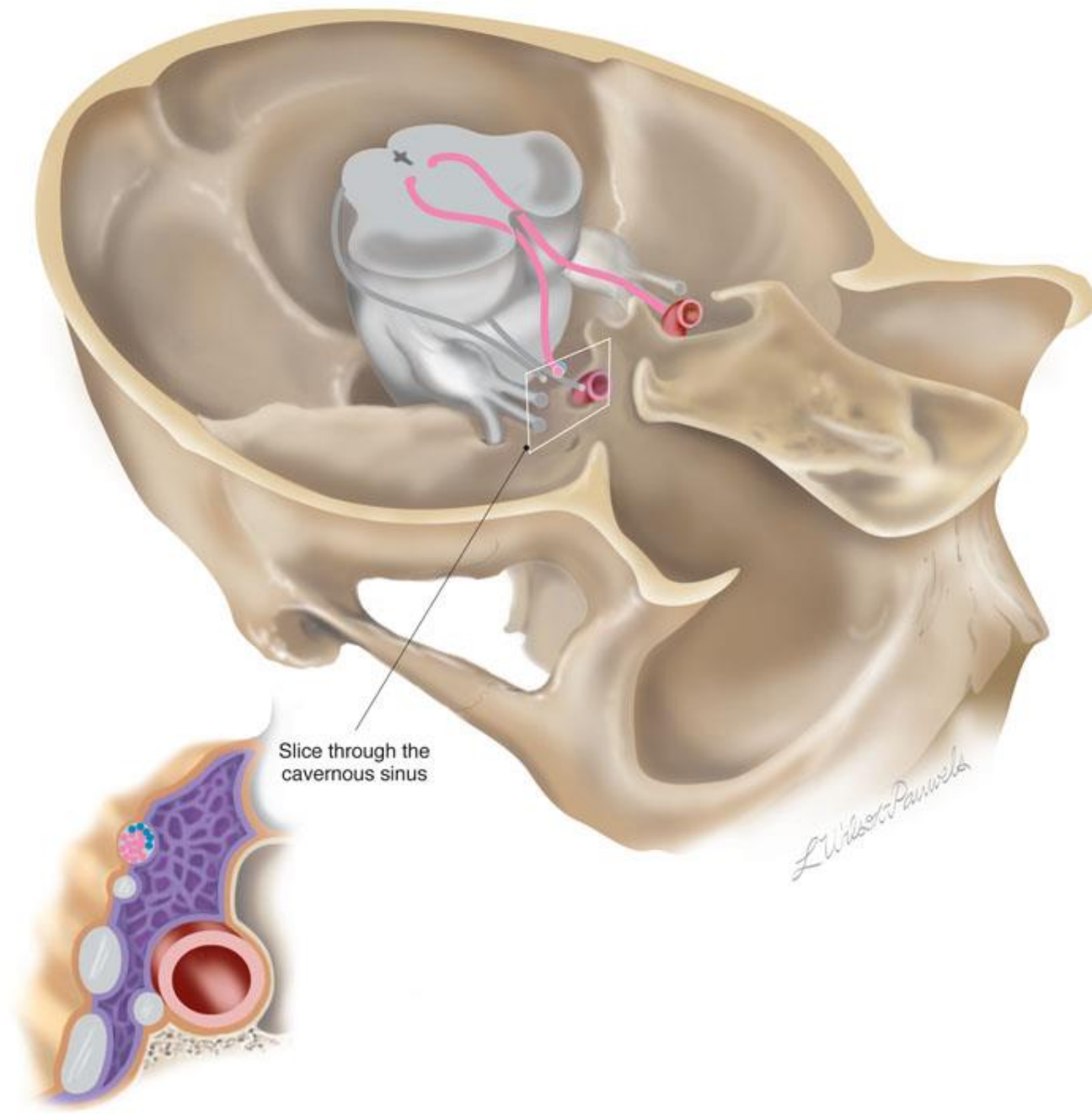


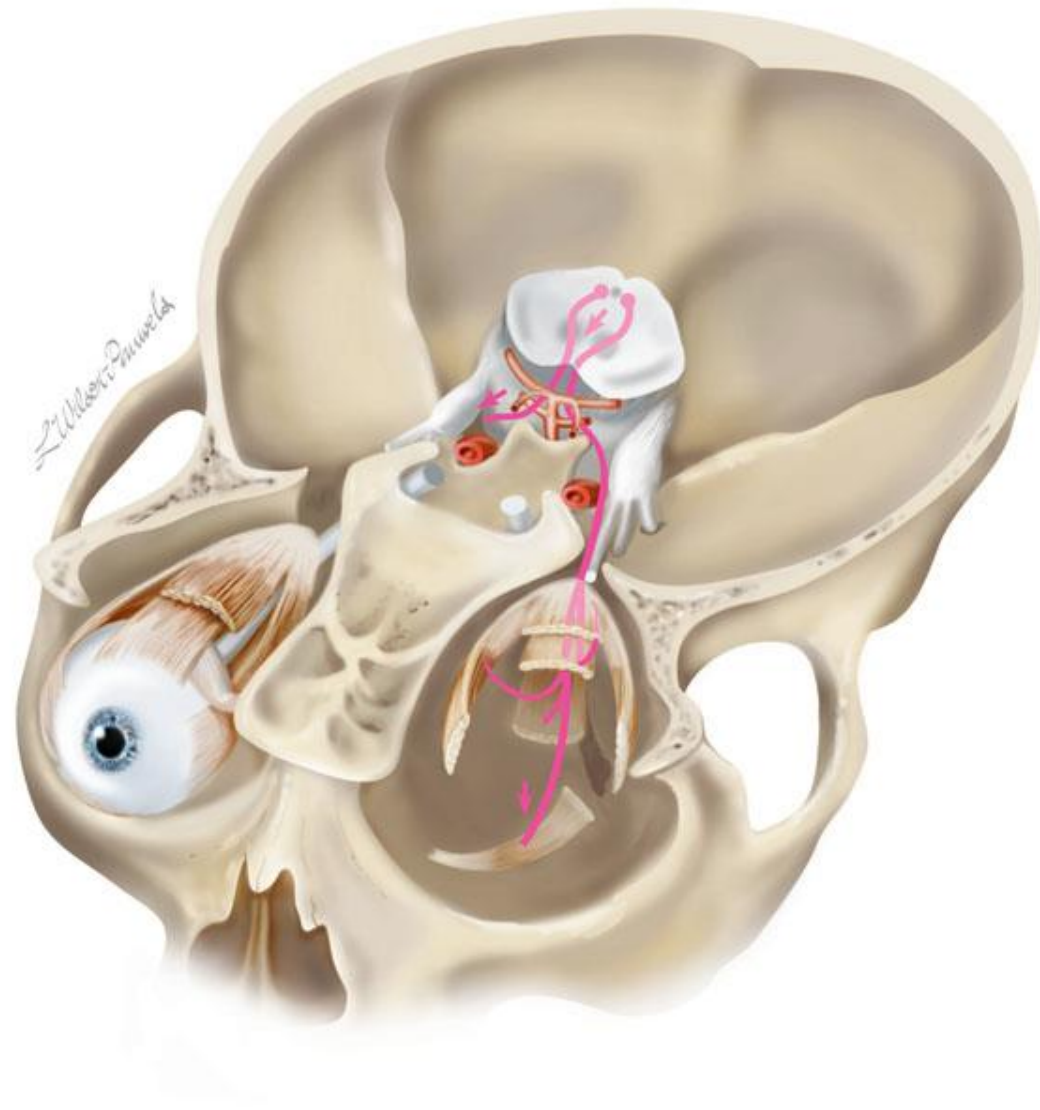




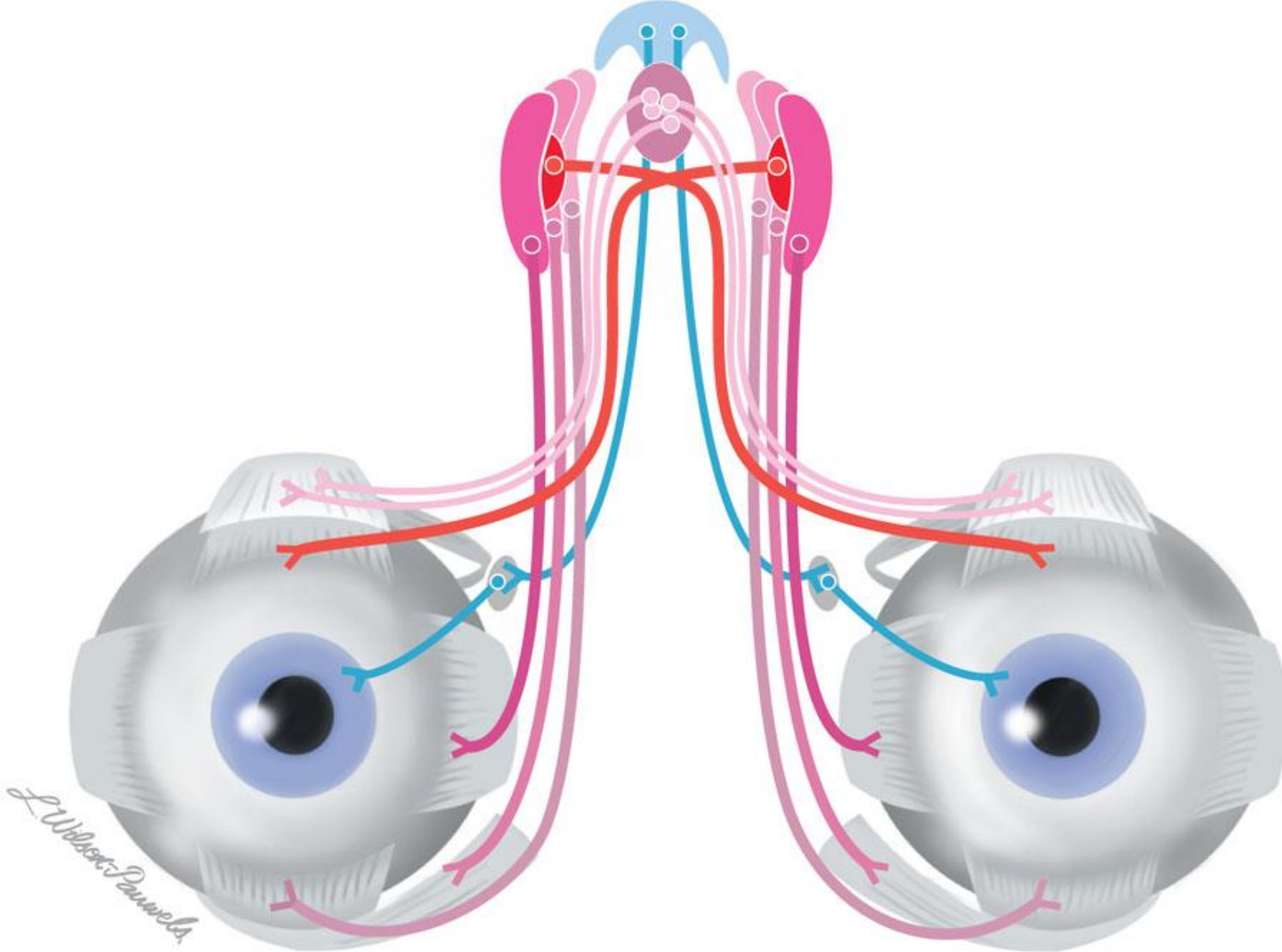








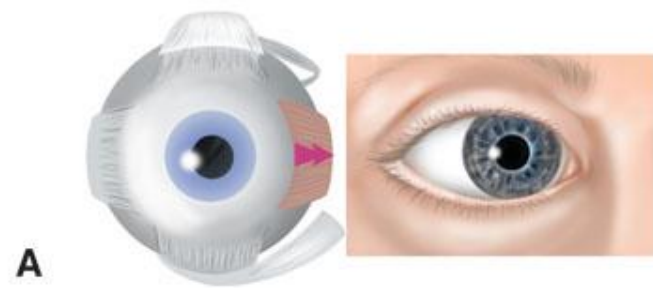
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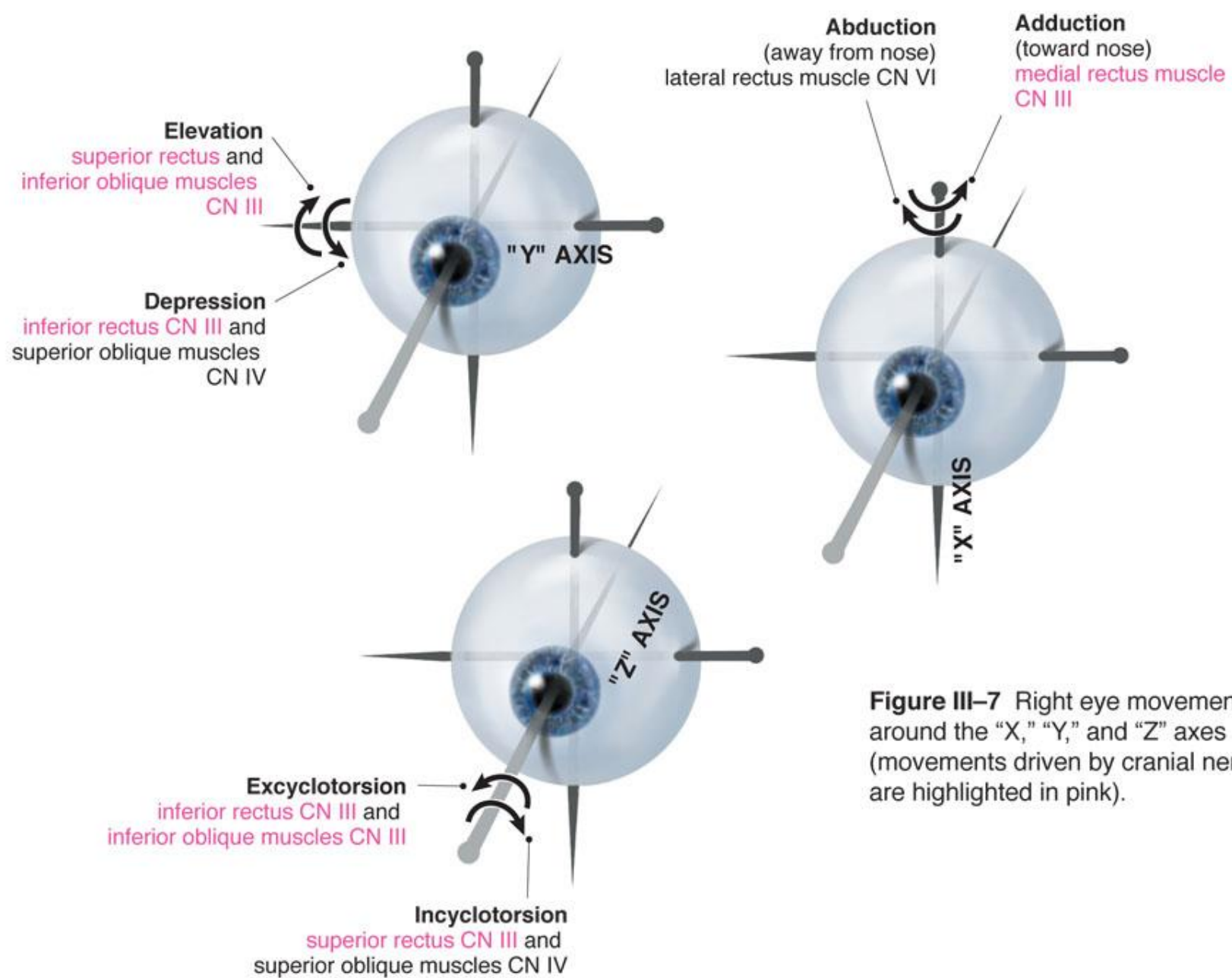
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*L. Wilson-Pauwels*

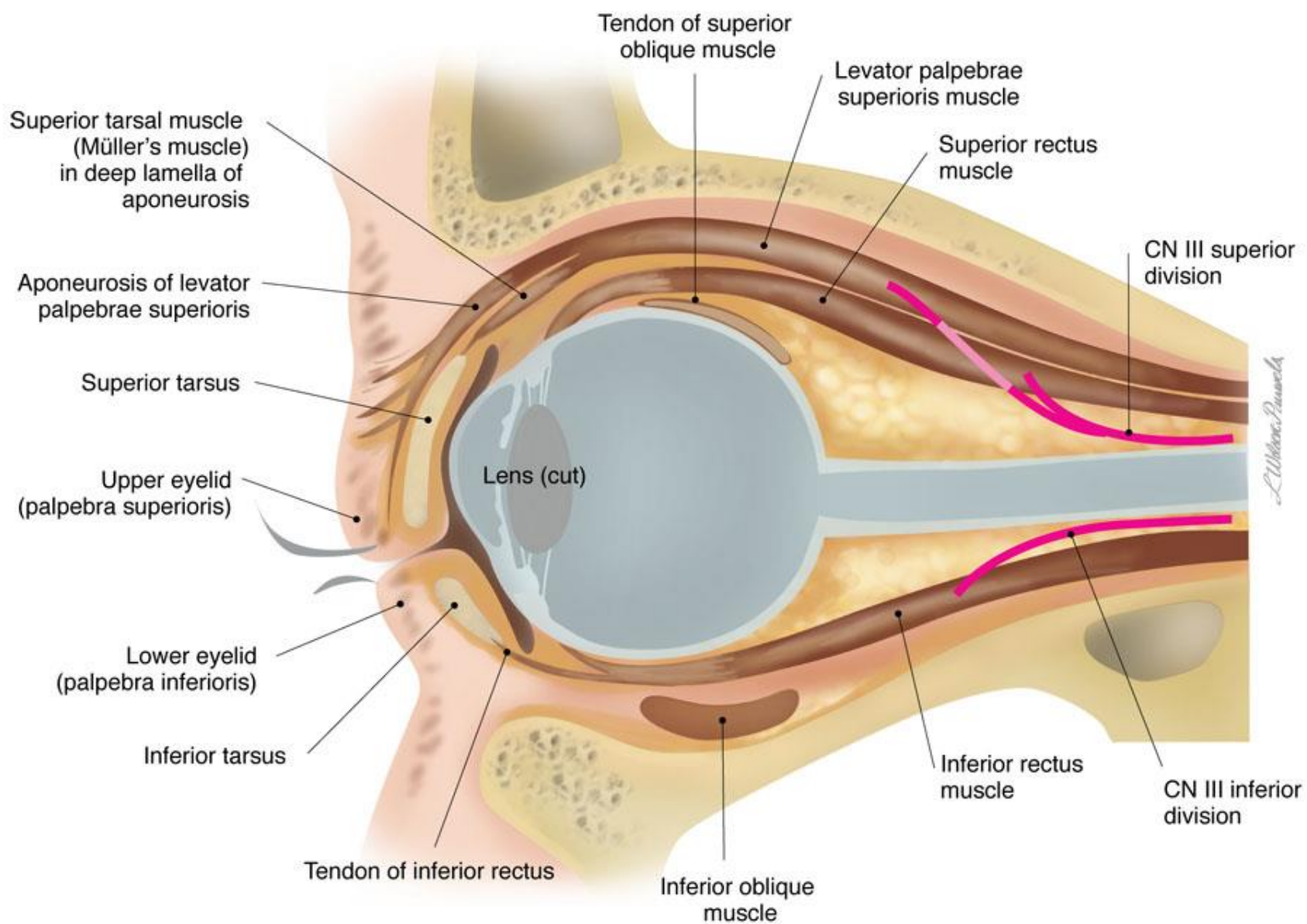


*L. Wilson-Pauwels*

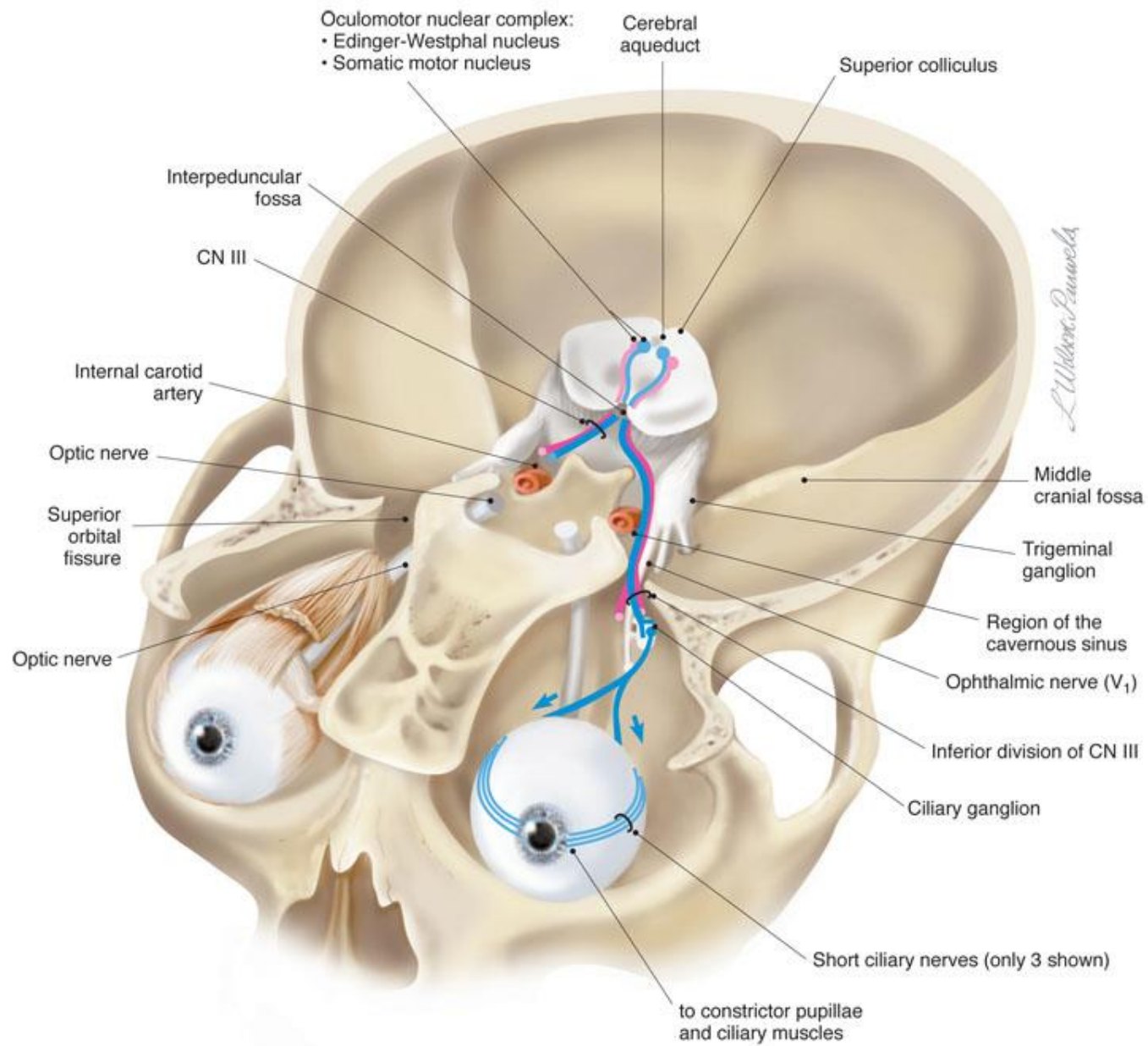


**Figure III-7** Right eye movements around the "X," "Y," and "Z" axes (movements driven by cranial nerve III are highlighted in pink).

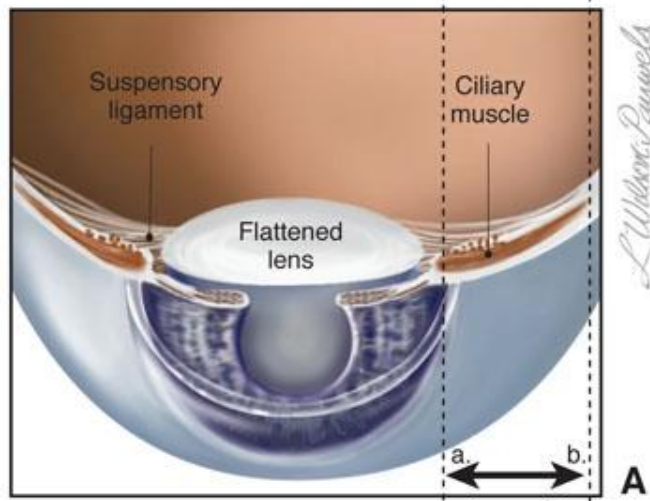




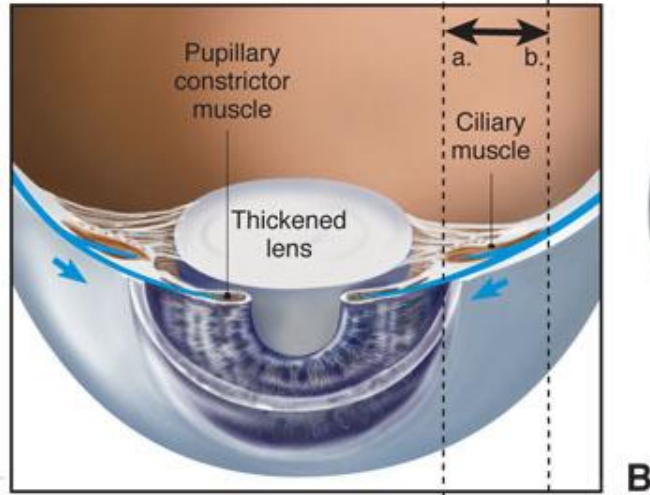
**Figure III-8** Sagittal view of the eye muscles innervated by the oculomotor nerve (CN III) that effect the upper and lower eyelids.



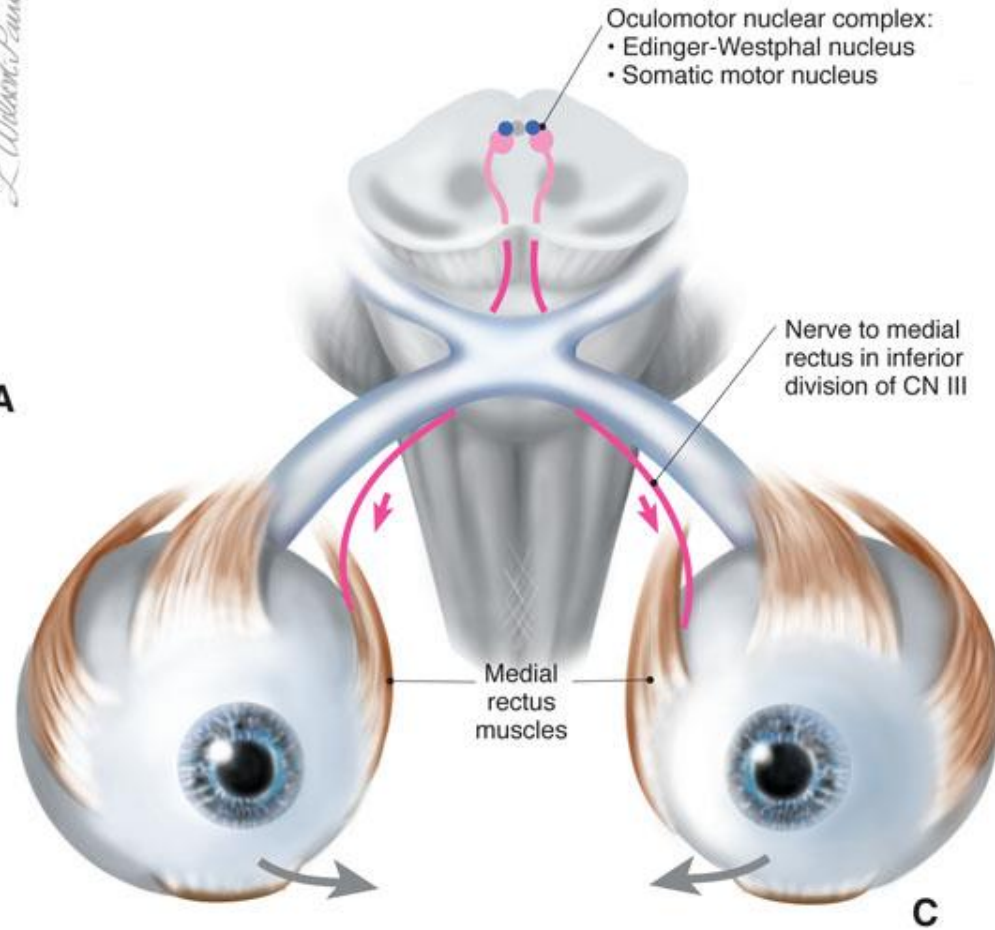
**Figure III-9** The parasympathetic (visceral motor) component of the oculomotor nerve travels with the somatic motor axons that form the inferior division of cranial nerve III .



**A**

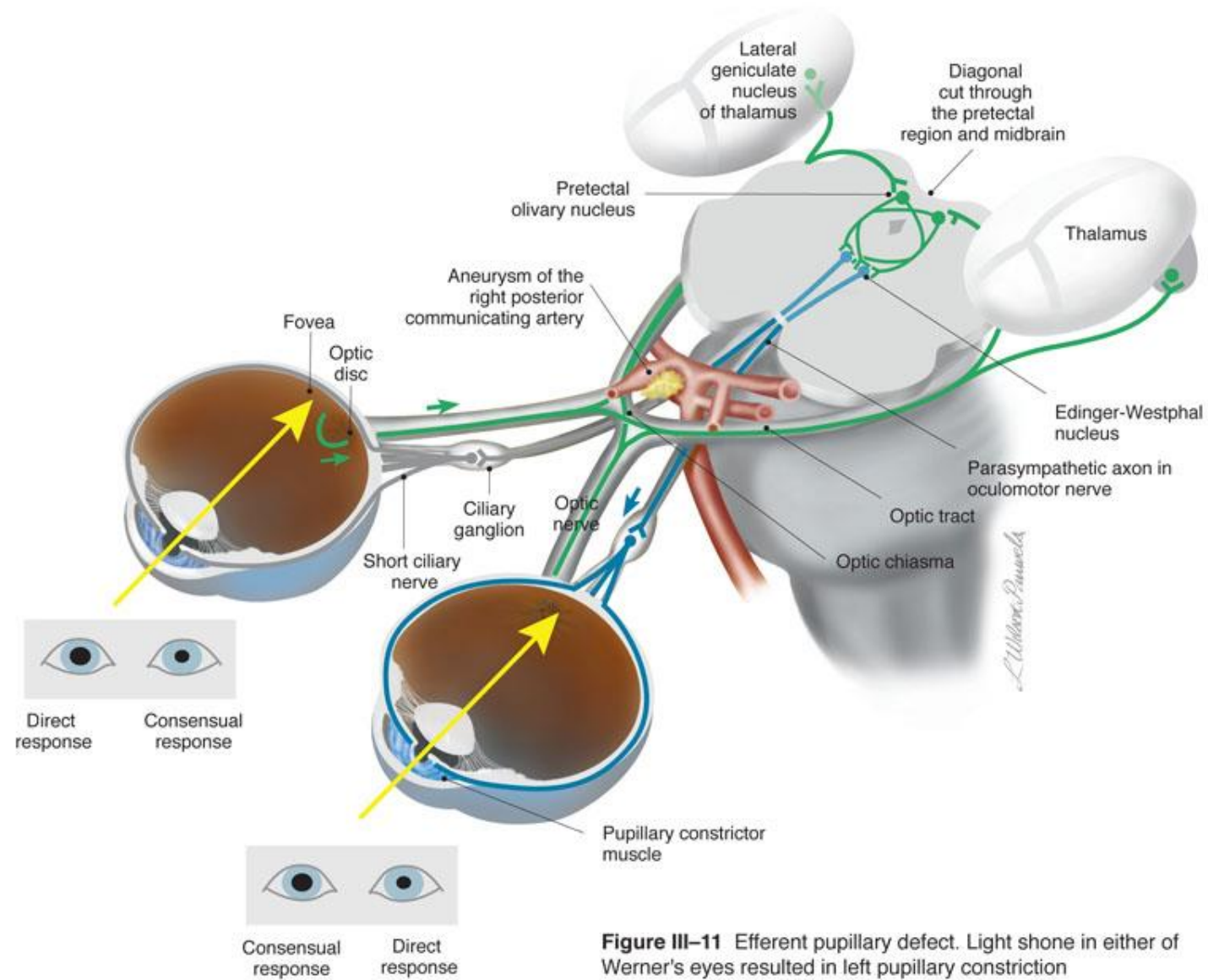


**B**

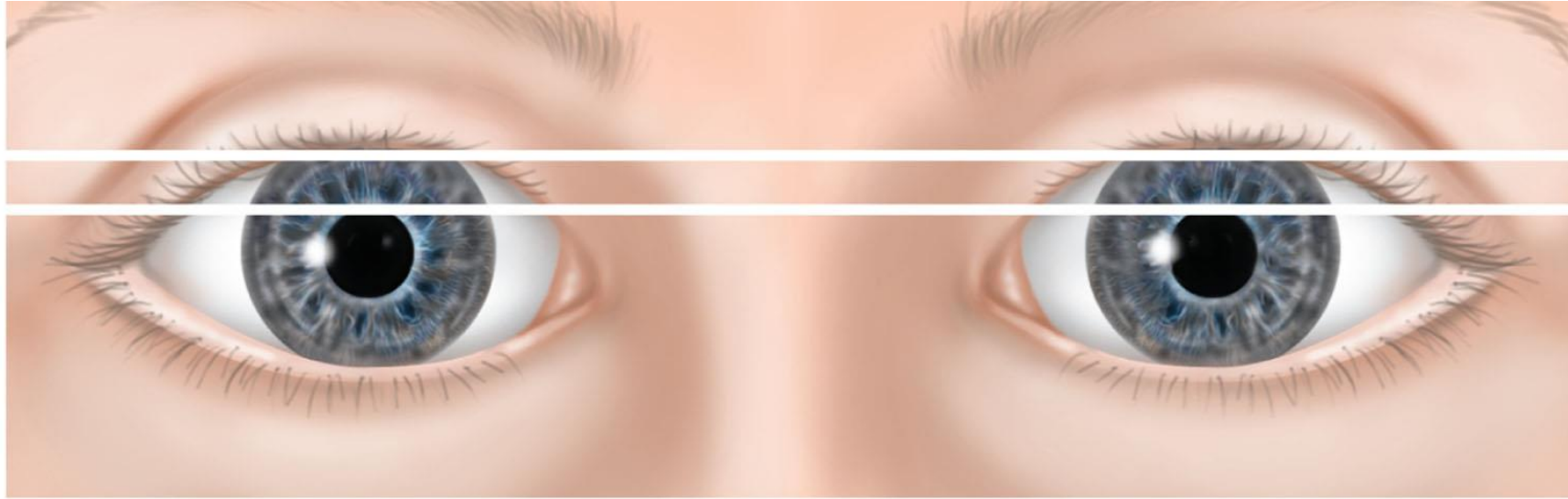


**C**

**Figure III-10** **A**, Eye adjusted for distance vision: large pupil and relaxed ciliary muscle. **B**, In accommodation for near vision, the pupillary constrictor muscles contract resulting in a smaller pupil, and the ciliary muscles contract and the suspensory ligaments relax resulting in a thicker lens. **C**, The medial recti muscles contract causing the eyes to converge.

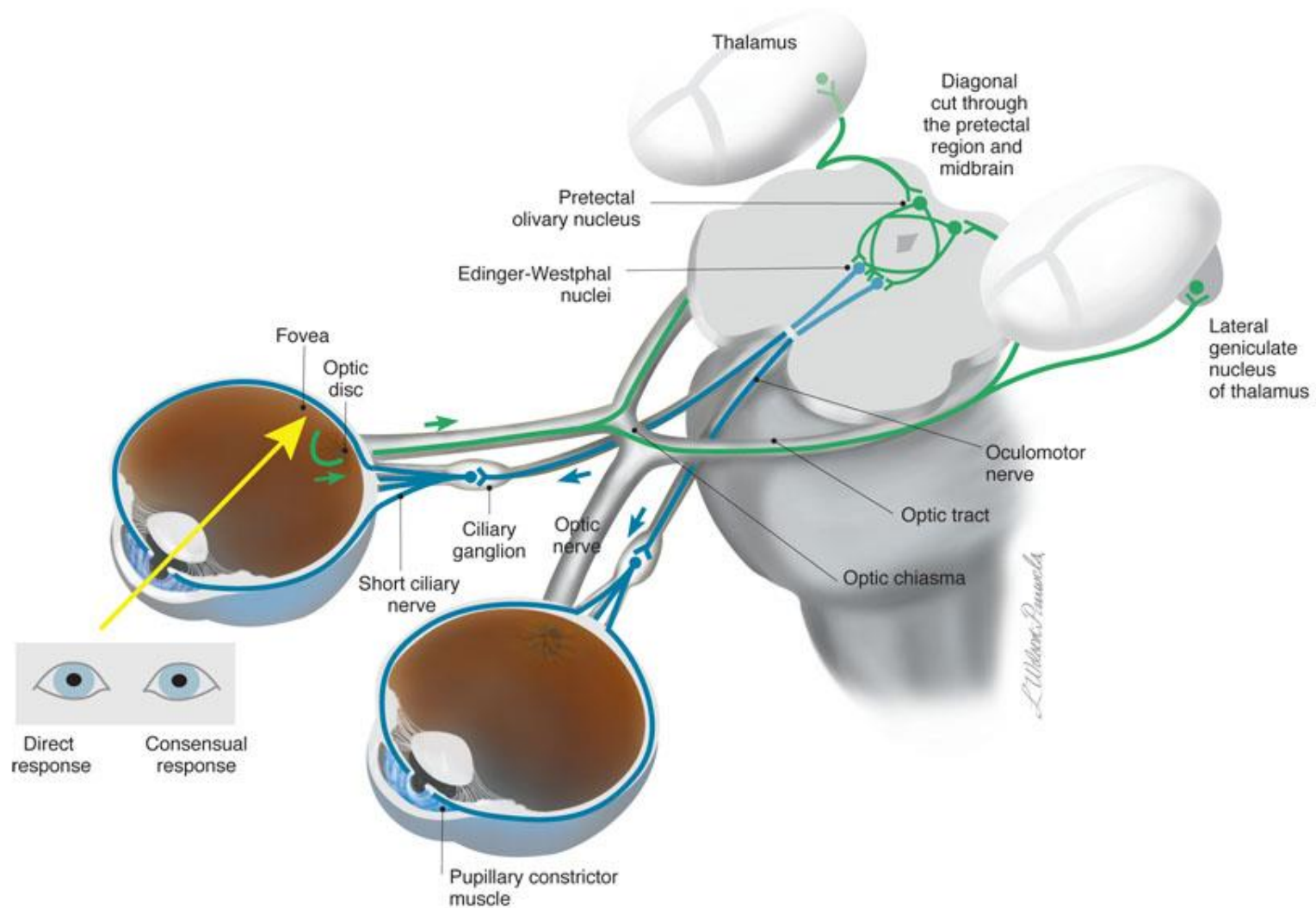


**Figure III-11** Efferent pupillary defect. Light shone in either of Werner's eyes resulted in left pupillary constriction (direct and consensual) but no constriction of the right pupil, due to an aneurysm of the posterior communicating artery.

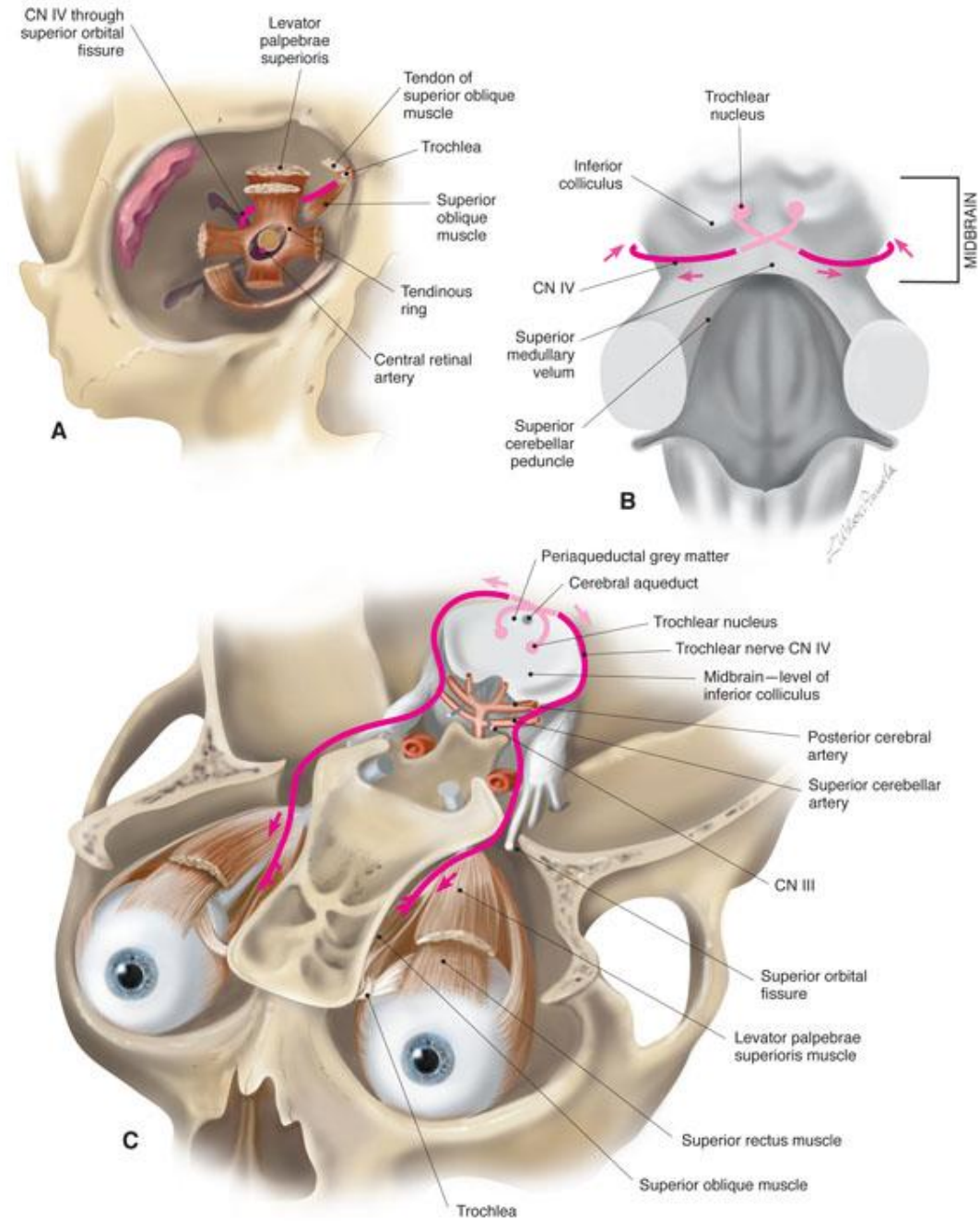


Edge of the upper eyelids  
Top of the pupil

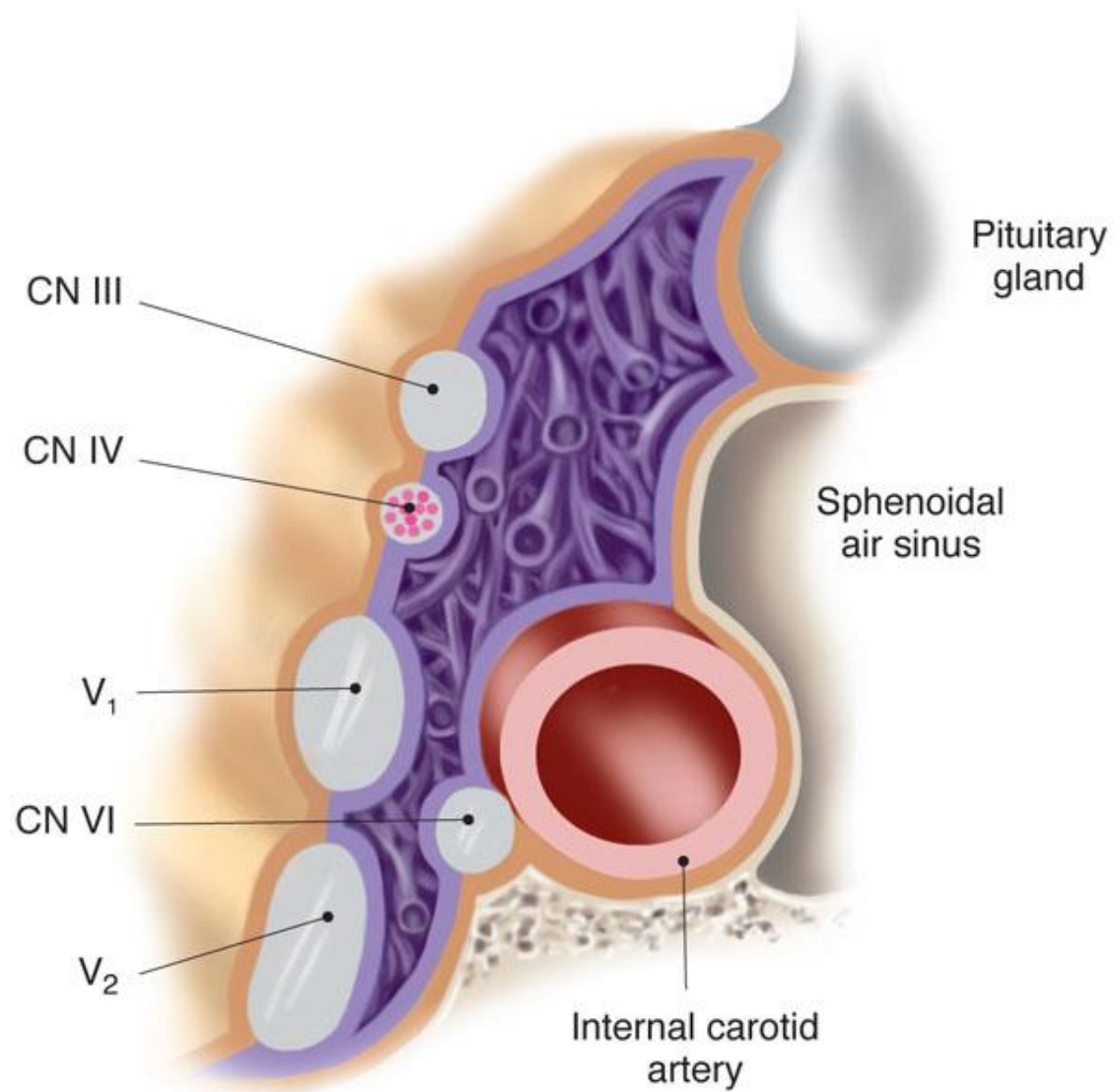
**Figure III–14** Normal eyelid position.



**Figure III-15** Pupillary light reflex. Light shone in the right eye elicits pupillary constriction in the same eye (direct response) and in the opposite eye (consensual response).

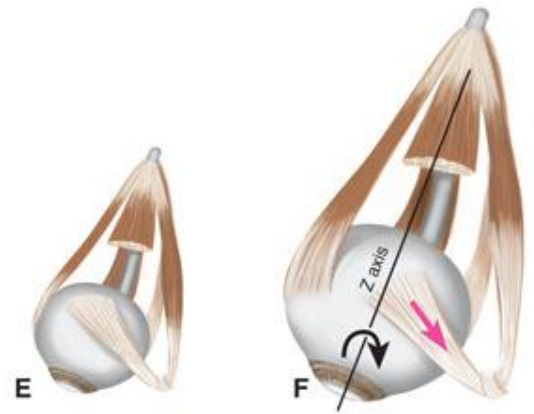
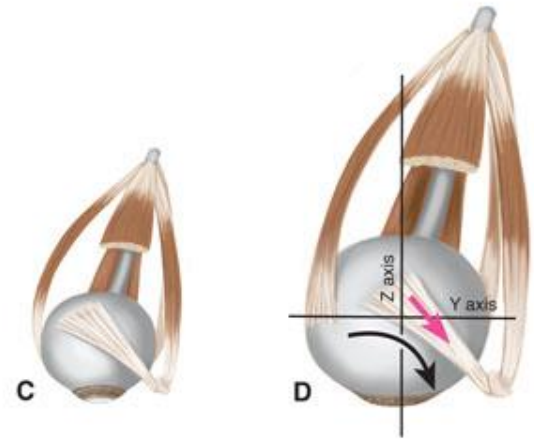
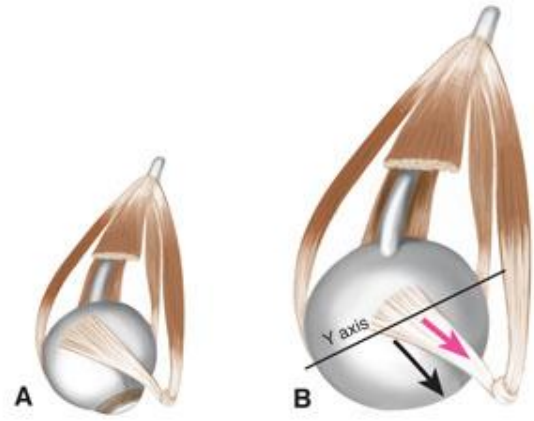


**Figure IV-1** A, Apex of the right orbit illustrating the tendinous ring. B, Dorsal aspect of the brain stem. C, Somatic motor tracts from the trochlear nuclei in the brain stem to the superior oblique muscles.

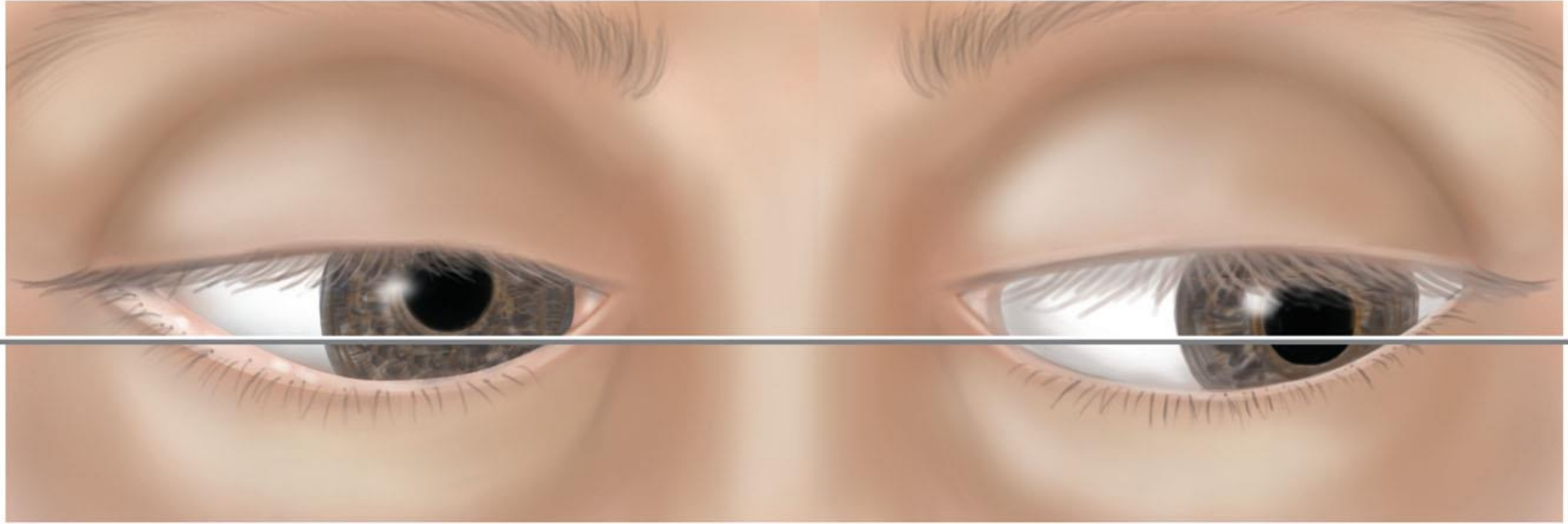


**Figure IV–2** Slice through the right cavernous sinus showing the relationship of CN IV to other structures coursing through the sinus.



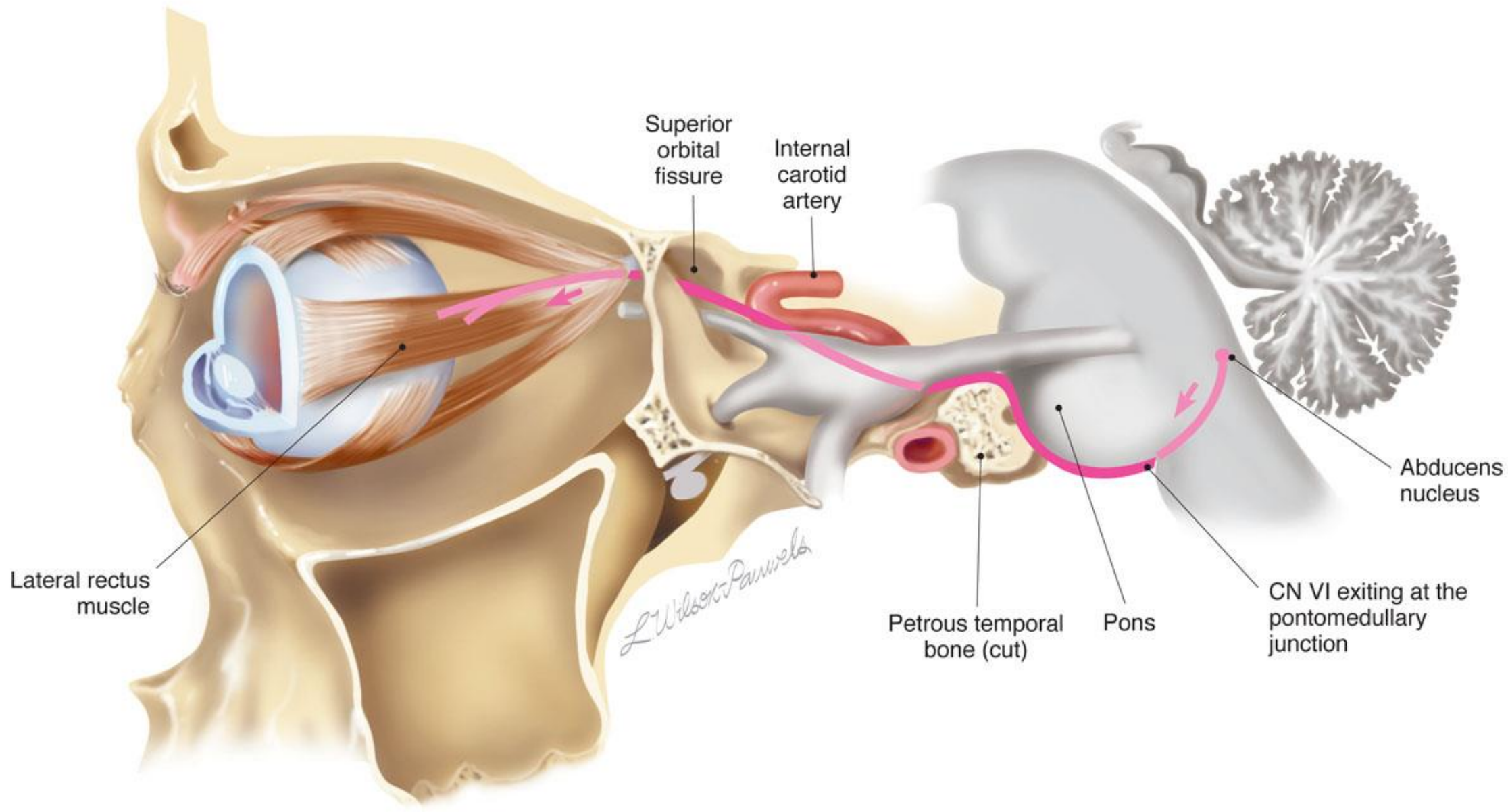


*L. Wilson-Pauwels*

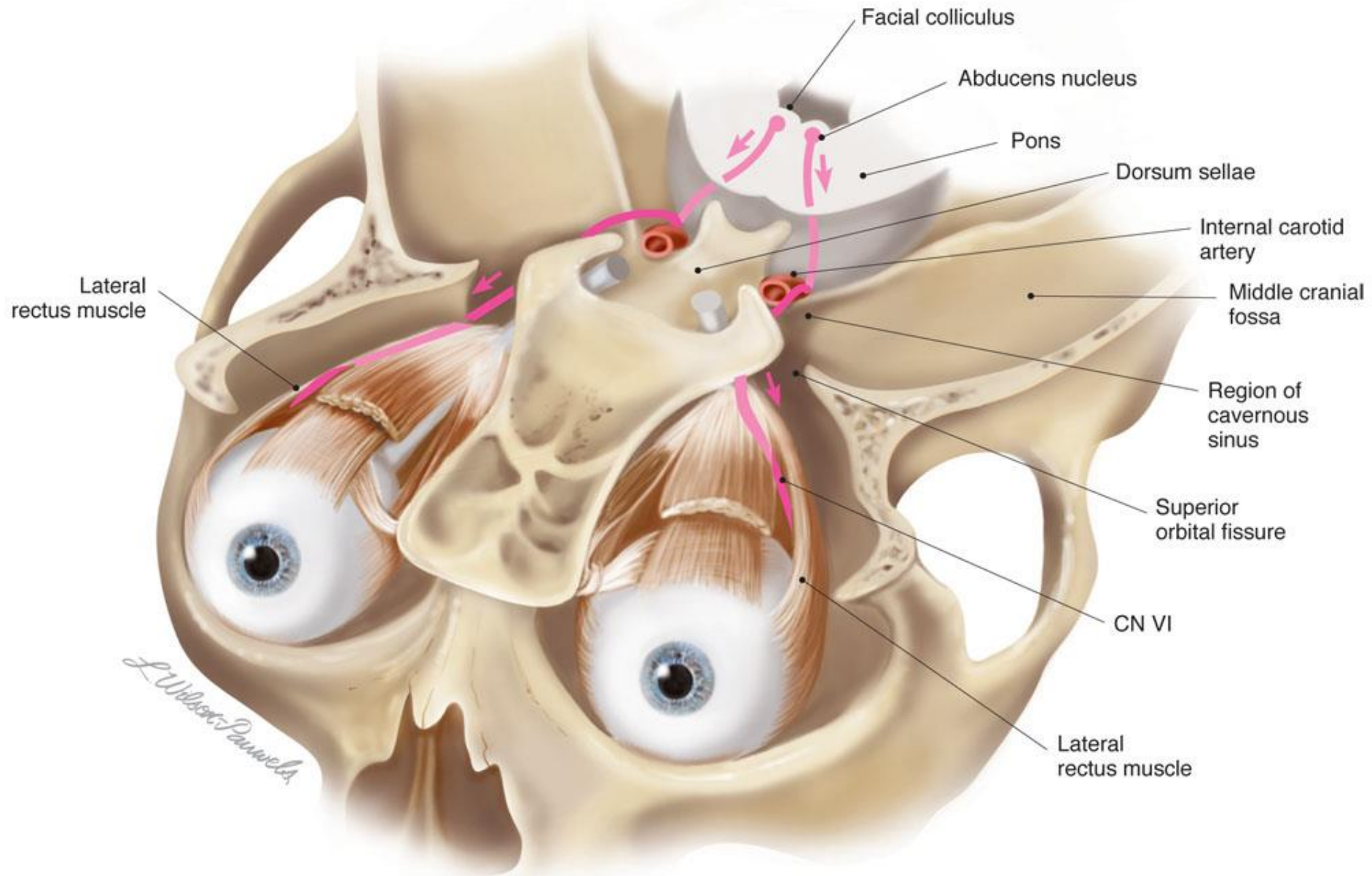


*L Wilson-Pauwels*

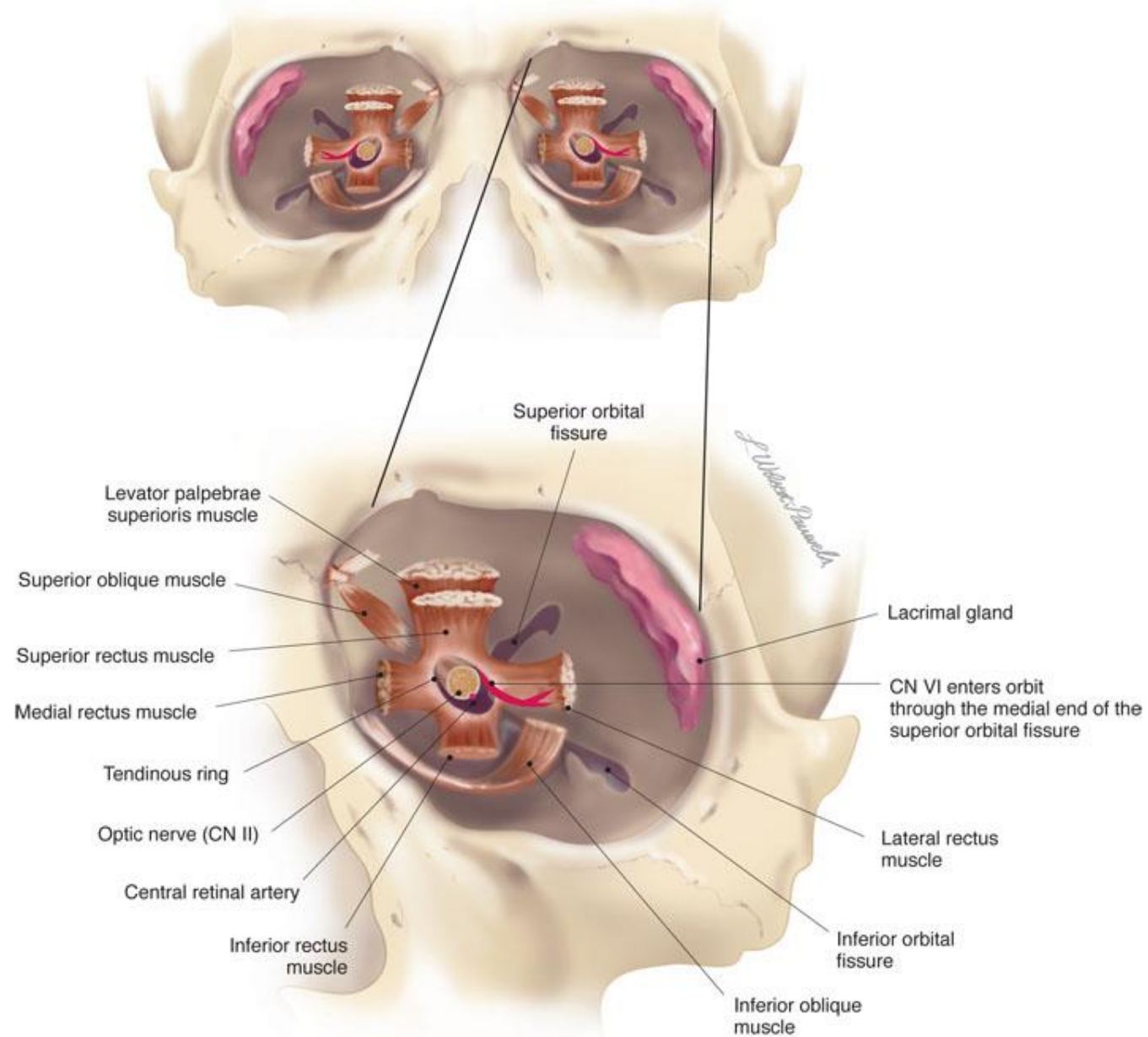
**Figure IV–6** Lakshmi is unable to move her right eye downward when her right eye is adducted.



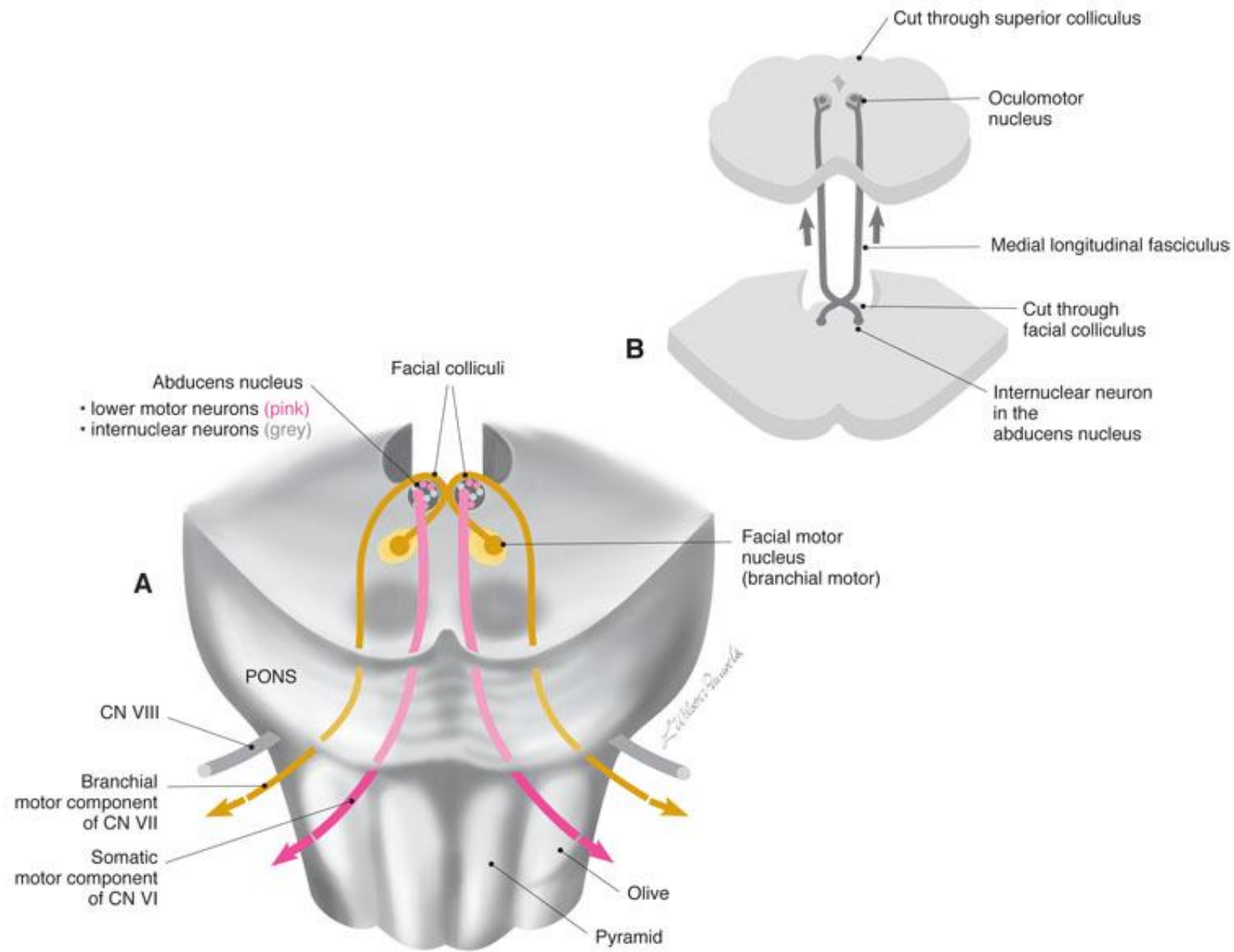
**Figure VI-1** Overview of the abducens nerve.



**Figure VI-2** Route of the abducens nerve (cranial nerve VI) from the pons to the lateral rectus muscle.

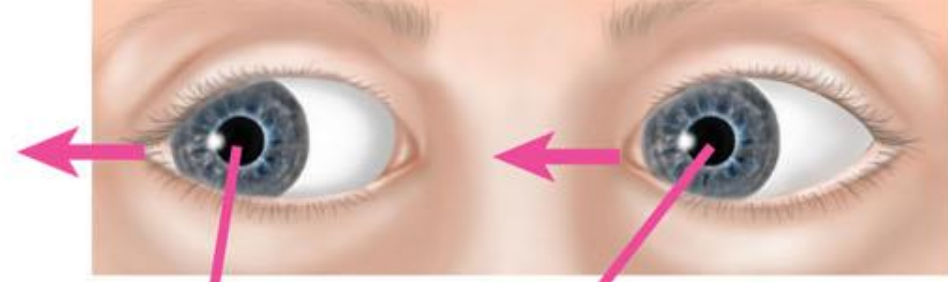
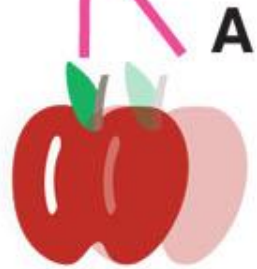
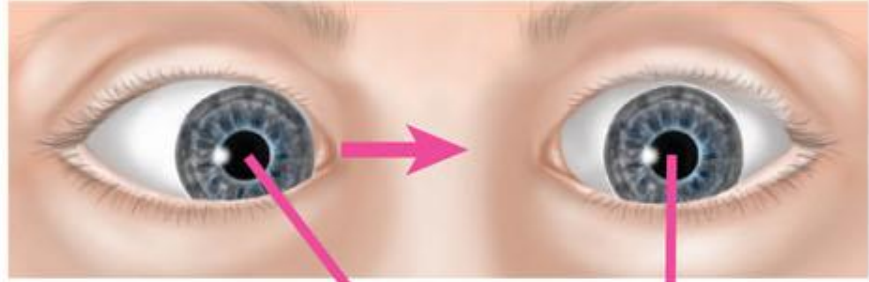


**Figure VI-4** Apex of the right orbit illustrating the tendinous ring and the somatic motor component of cranial nerve VI.



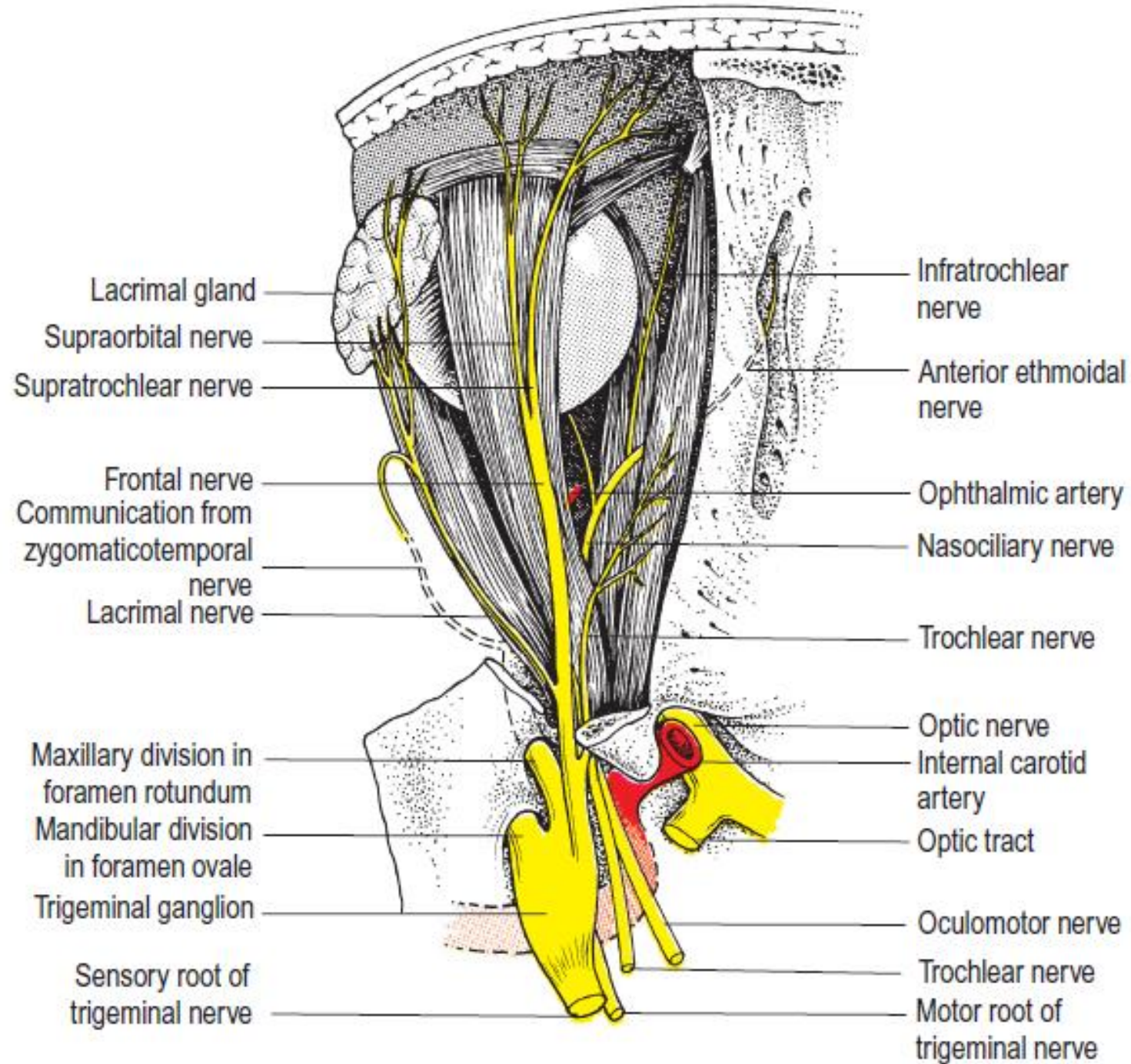
**Figure VI-5** Abducens nuclei in the brain stem.

- A.** Branchial motor axons from the facial nucleus loop over the abducens nucleus thereby creating an elevation (bump) in the floor of the fourth ventricle, called the facial colliculus. Because of this close anatomic association, lesions of the facial colliculus affect both cranial nerve VI and cranial nerve VII.
- B.** Insert illustrates the internuclear neurons ascending and crossing over to the contralateral oculomotor nucleus.



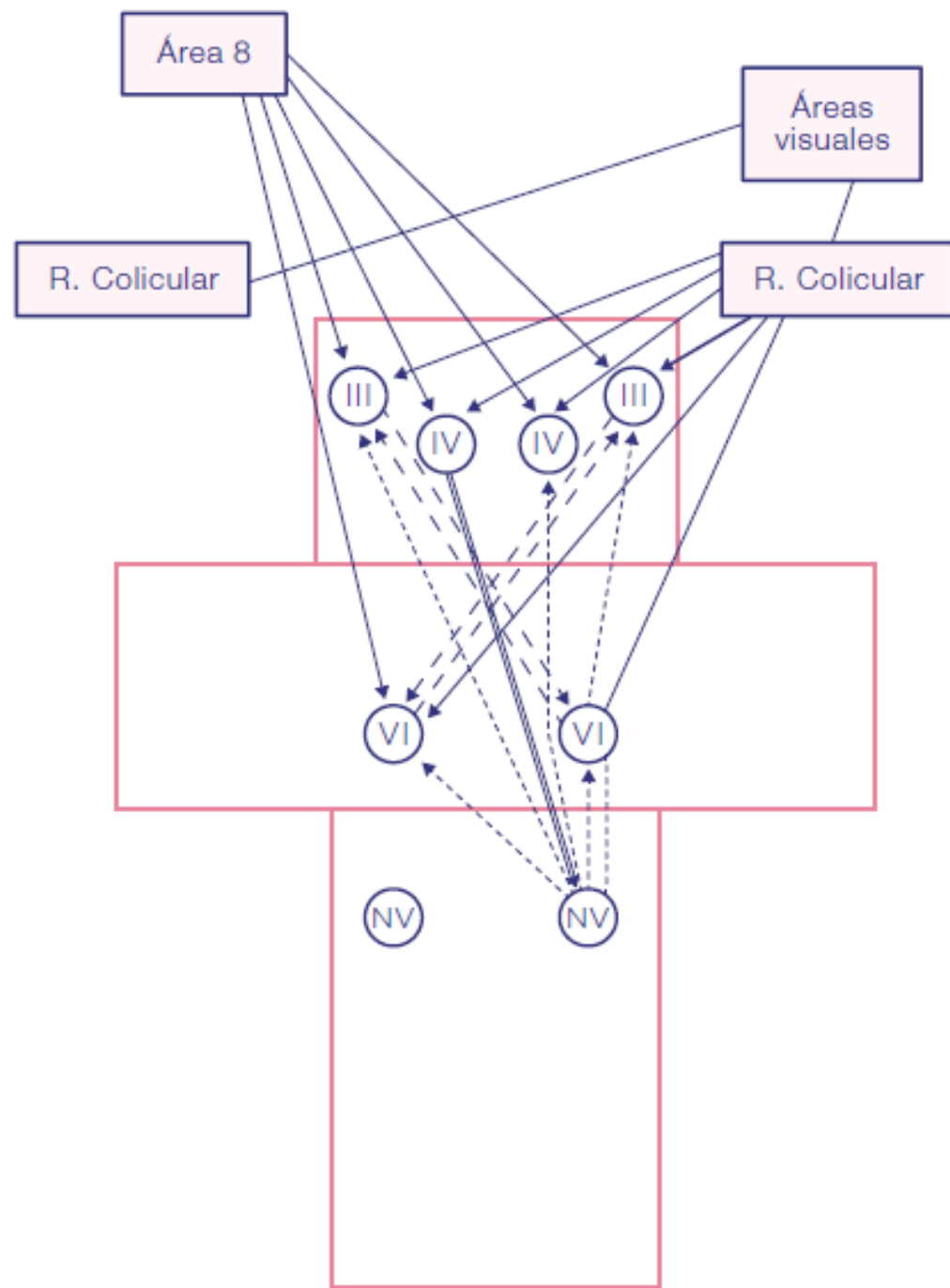
*L. Wilson-Pauwels*

**Figure VI-6** A. On attempted left lateral gaze, Grace was unable to abduct her left eye due to paralysis of her left lateral rectus muscle; therefore, she experienced double vision. B. When looking to the right, Grace was able to direct both eyes toward the same object.









Edinger-Westphal nucleus  
(Preganglionic parasympathetic neurons)

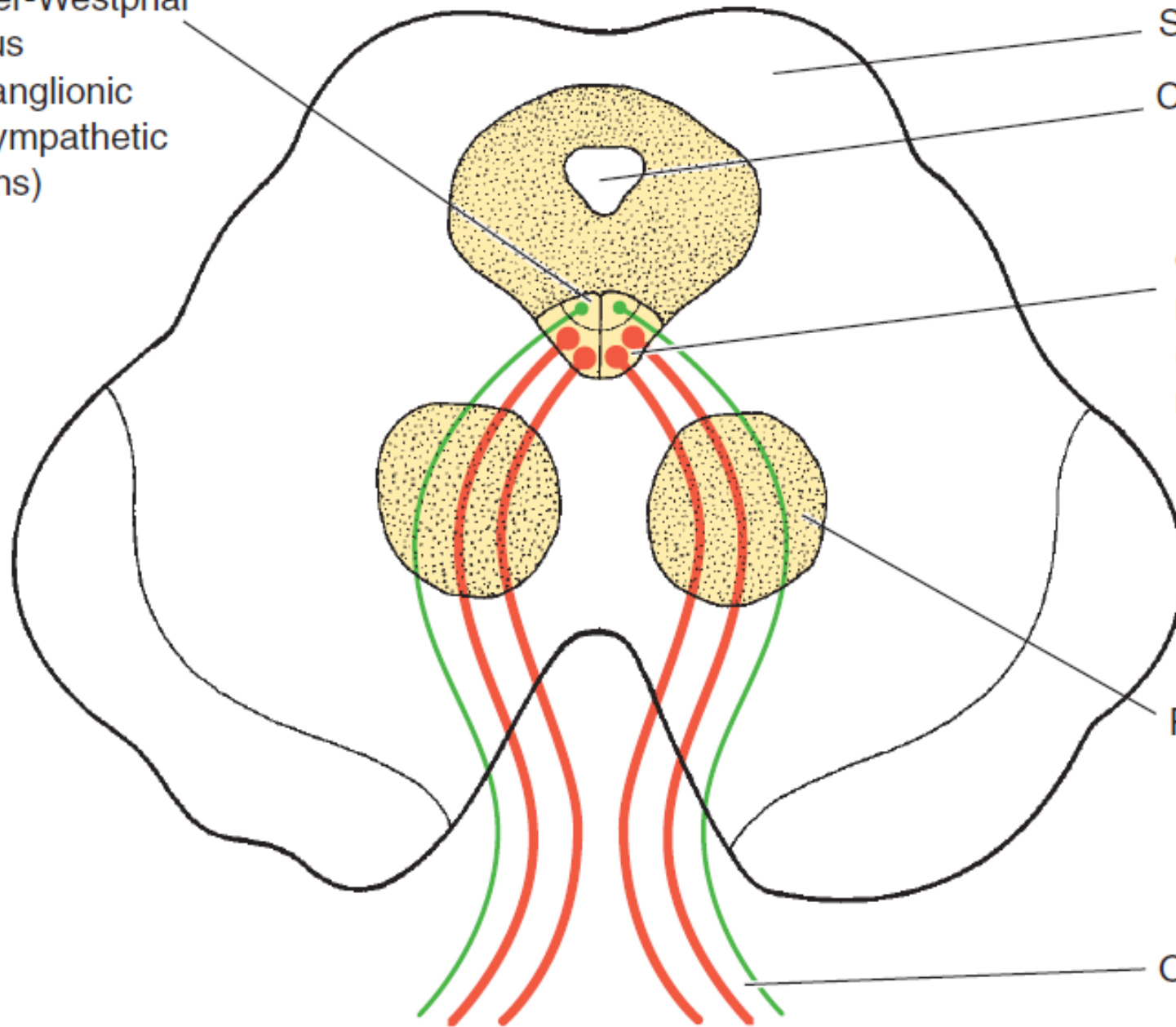
Superior colliculus

Cerebral aqueduct

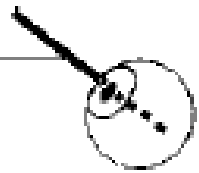
Oculomotor nucleus  
(Somatic motor neurons)

Red nucleus

Oculomotor nerve

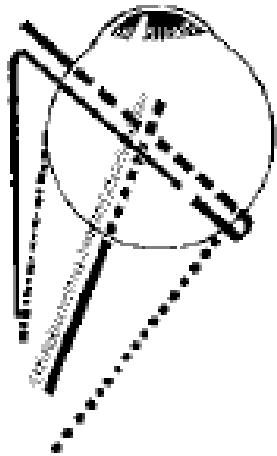


Inferior oblique:  
elevates  
adducted eyeball



Superior rectus:  
elevates  
adducted eyeball

Medial rectus:  
adducts  
eyeball

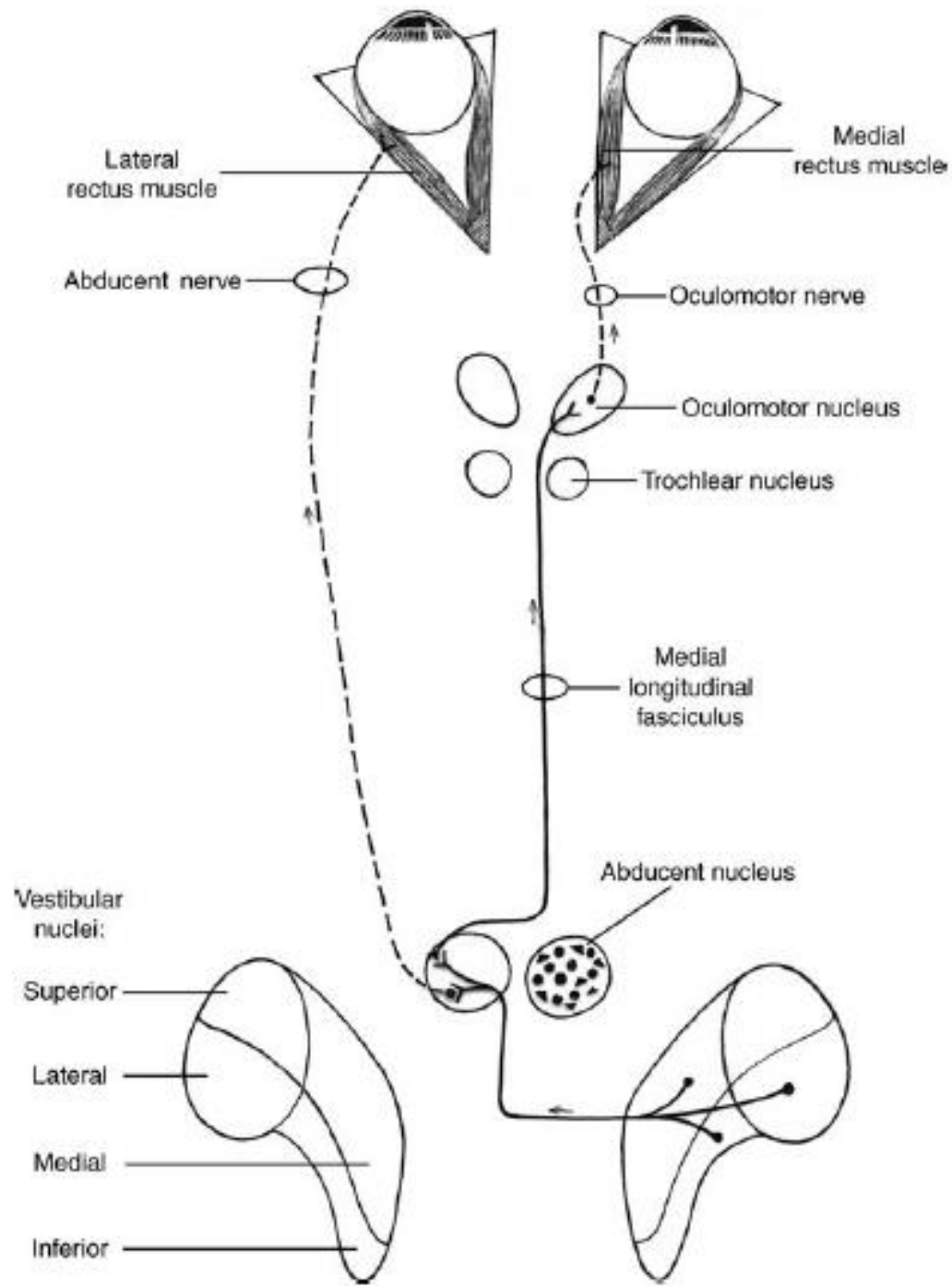


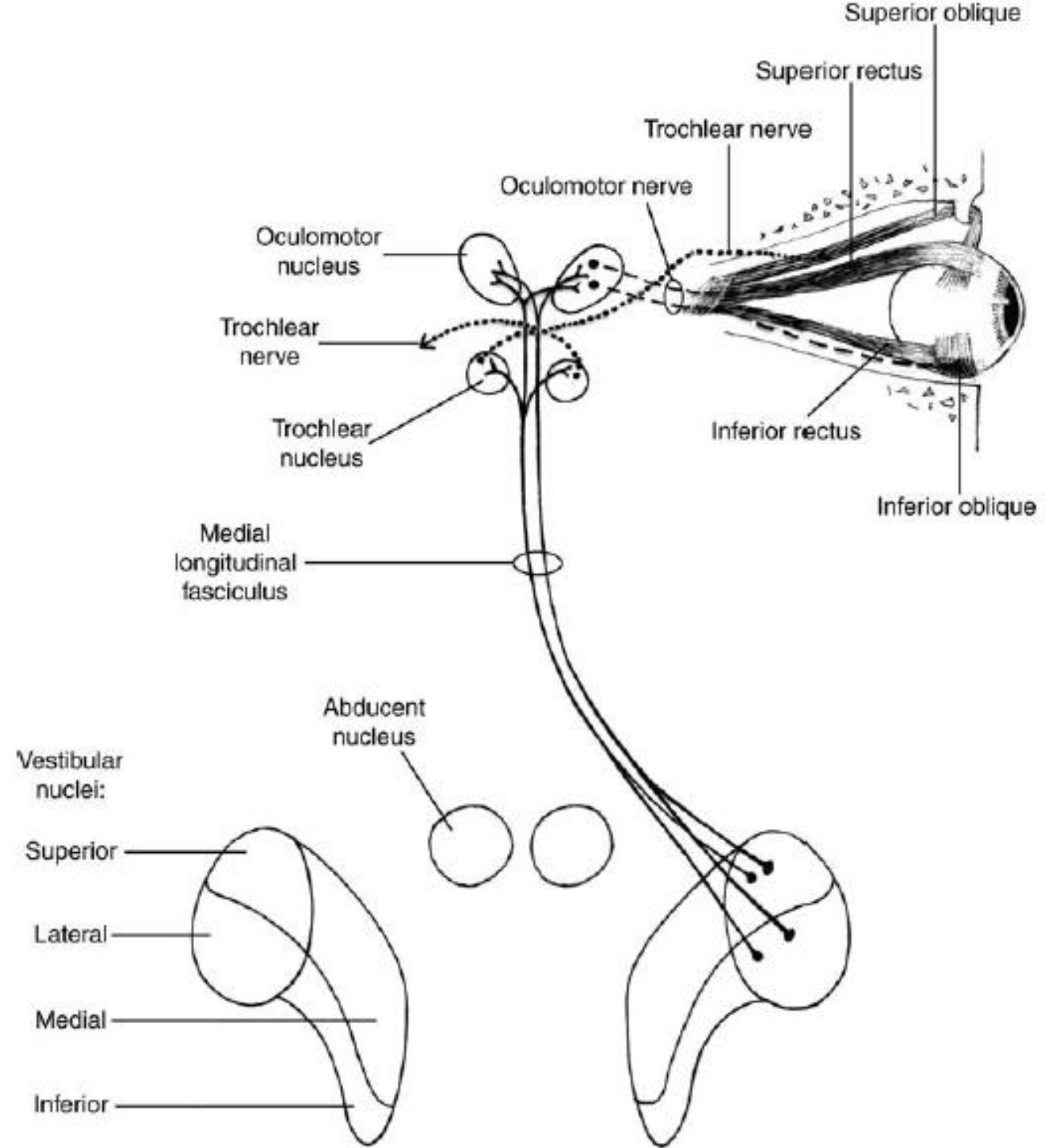
Lateral rectus:  
adducts  
eyeball

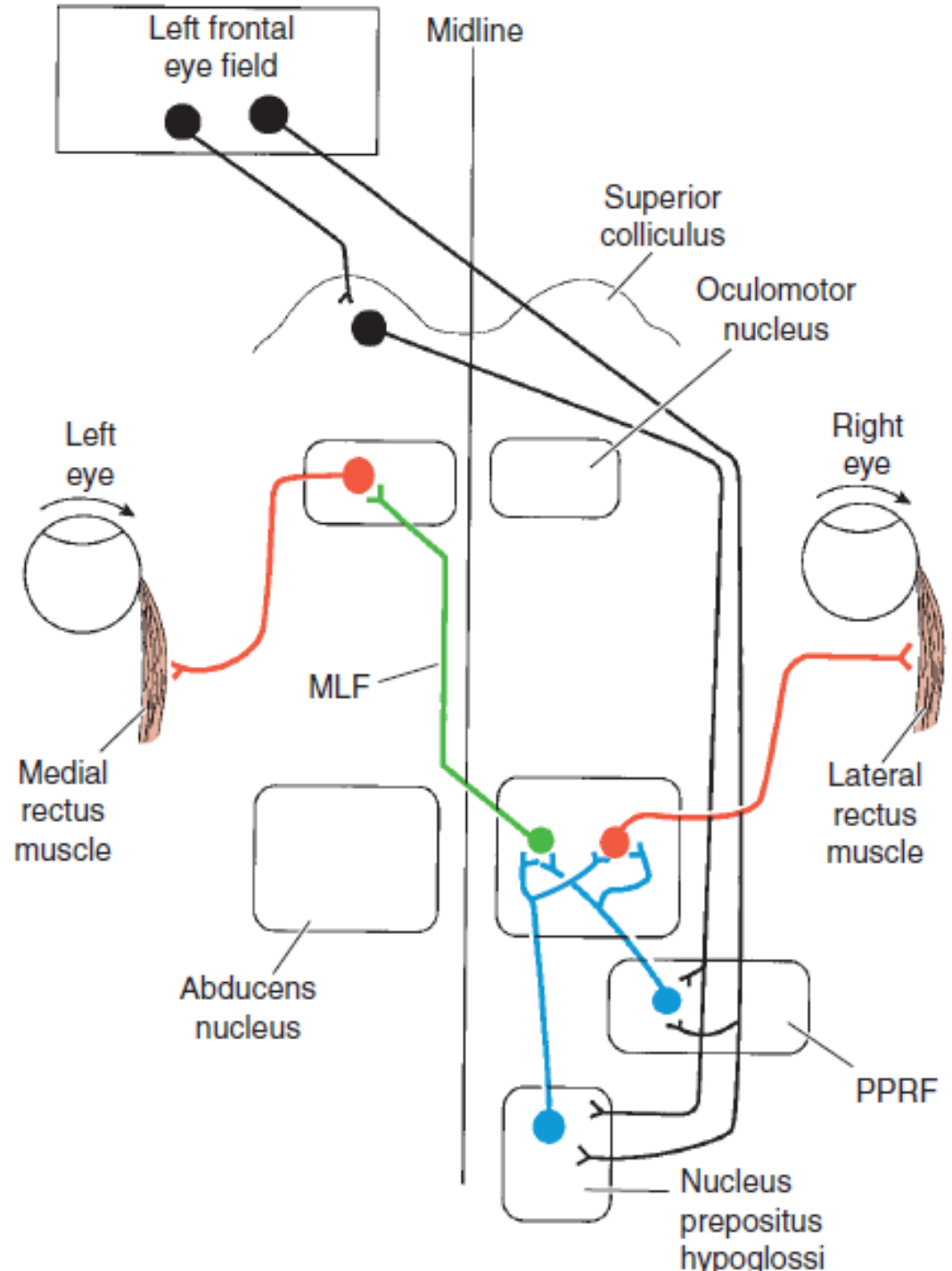
Superior oblique:  
depresses  
adducted eyeball

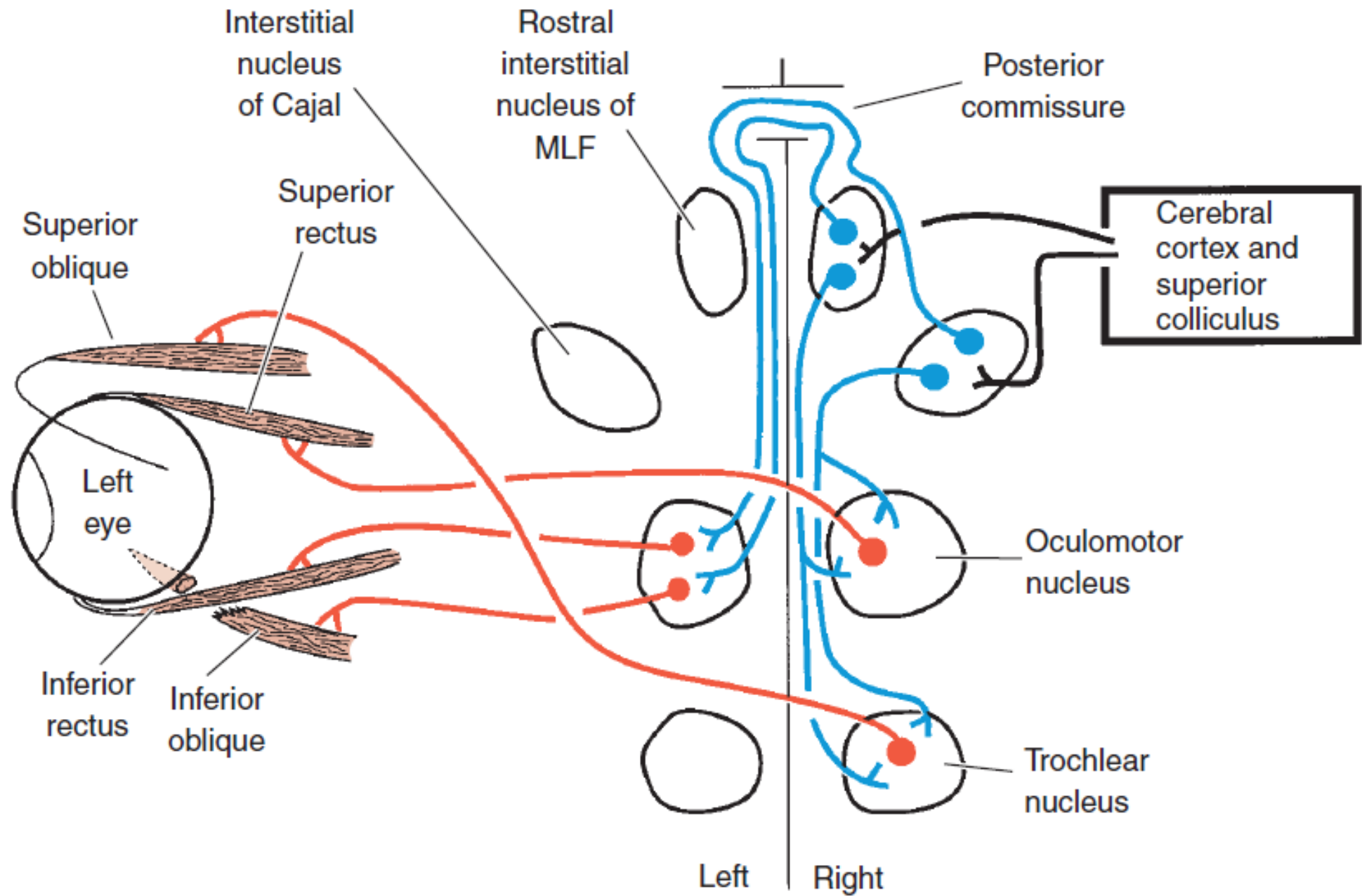


Inferior rectus:  
depresses  
adducted eyeball

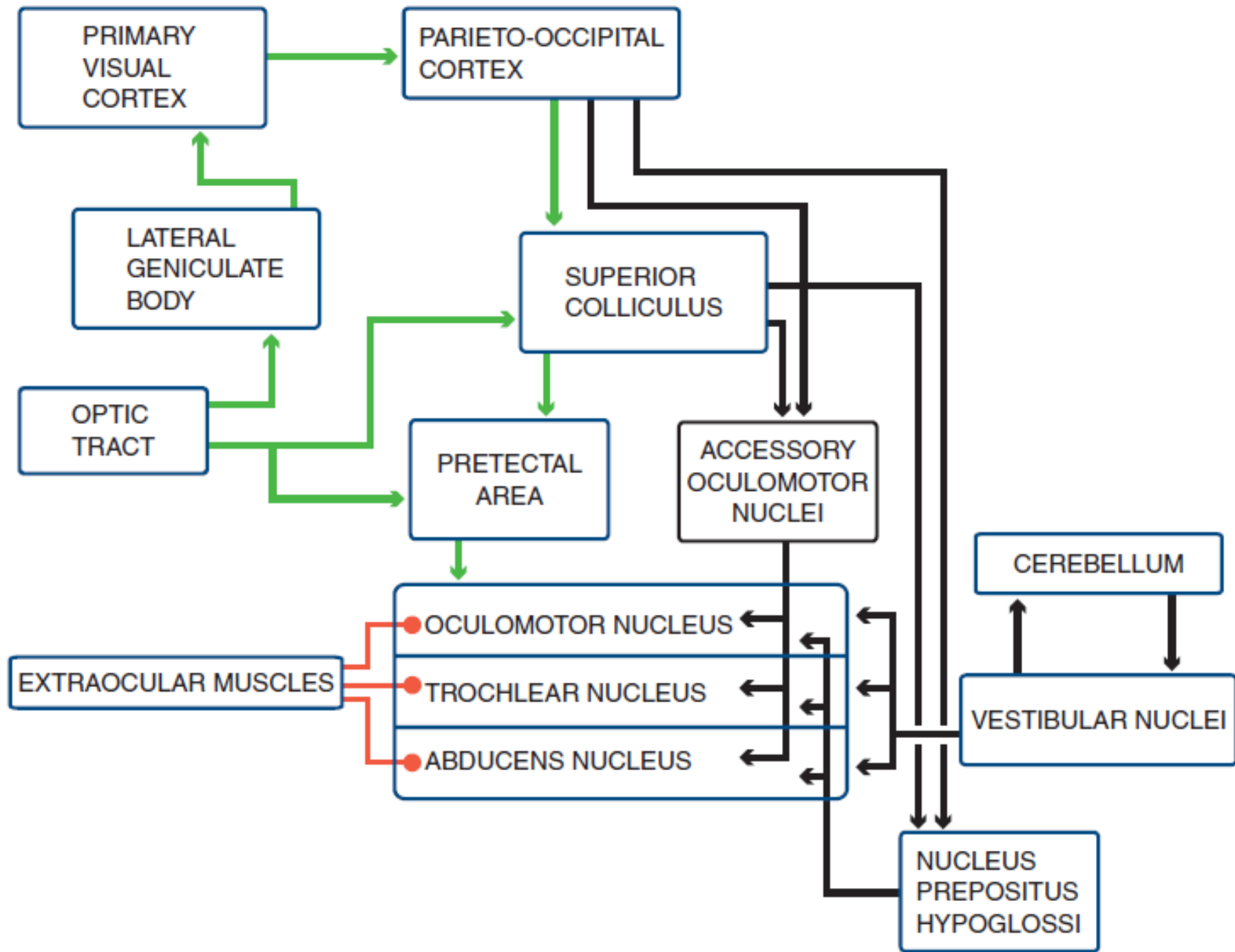


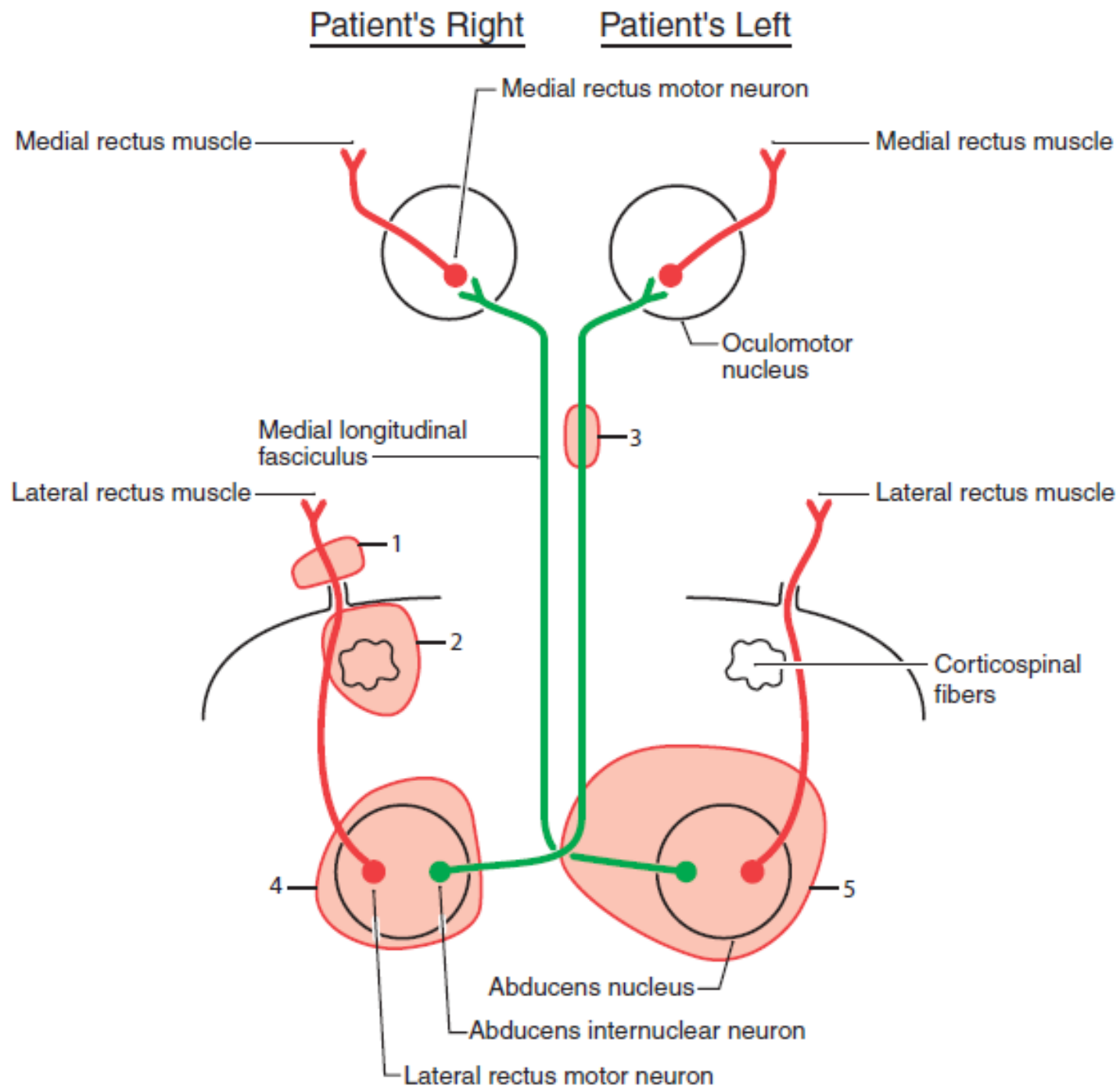




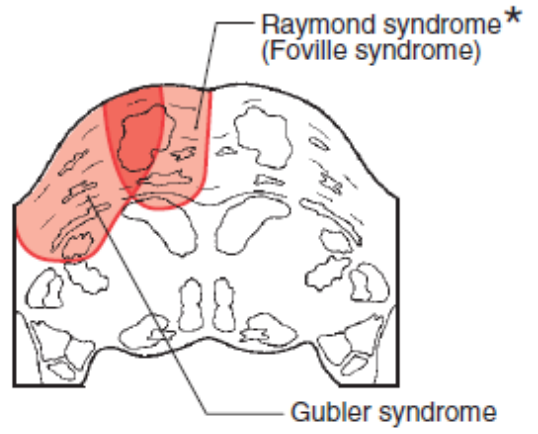








**Pons**



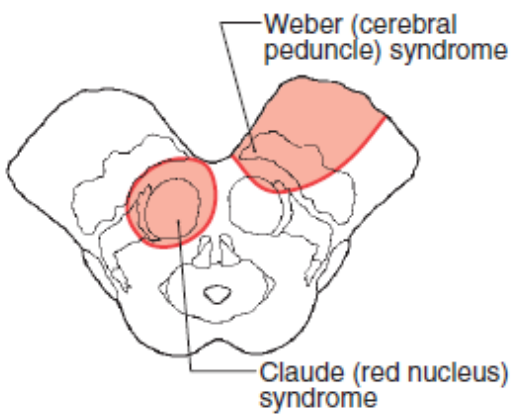
Corticospinal fibers  
 Abducens fibers in pons  
 Corticospinal fibers  
 Facial nucleus or fibers (Anterolateral system)  
 (Trigeminal nerve)

Contralateral hemiplegia  
 Ipsilateral abducens palsy, diplopia  
 Contralateral hemiplegia  
 Ipsilateral paralysis of facial muscles  
 (Contralateral loss of pain and thermal sensation on UE, trunk, and LE)  
 (Ipsilateral paralysis of masticatory muscles, ipsilateral loss of pain and thermal sensation on face)

Corticospinal fibers  
 Trigeminal nerve

Contralateral hemiplegia  
 Ipsilateral paralysis of masticatory muscles, ipsilateral loss of pain and thermal sensation on face

**Midbrain**



Corticospinal fibers  
 Oculomotor fibers  
 Corticonuclear fibers

Contralateral hemiplegia  
 Ipsilateral oculomotor paralysis, diplopia, dilated pupil  
 Contralateral weakness of facial muscles on lower face; deviation of tongue to contralateral side on protrusion; ipsilateral trapezius + sternocleidomastoid weakness

Oculomotor nerve  
 Cerebellothalamic fibers

Ipsilateral oculomotor palsy, diplopia, dilated pupil  
 Contralateral ataxia, tremor, + red nucleus hyperkinesias

# Heart and Brain

THE  
AWKWARD YETI

