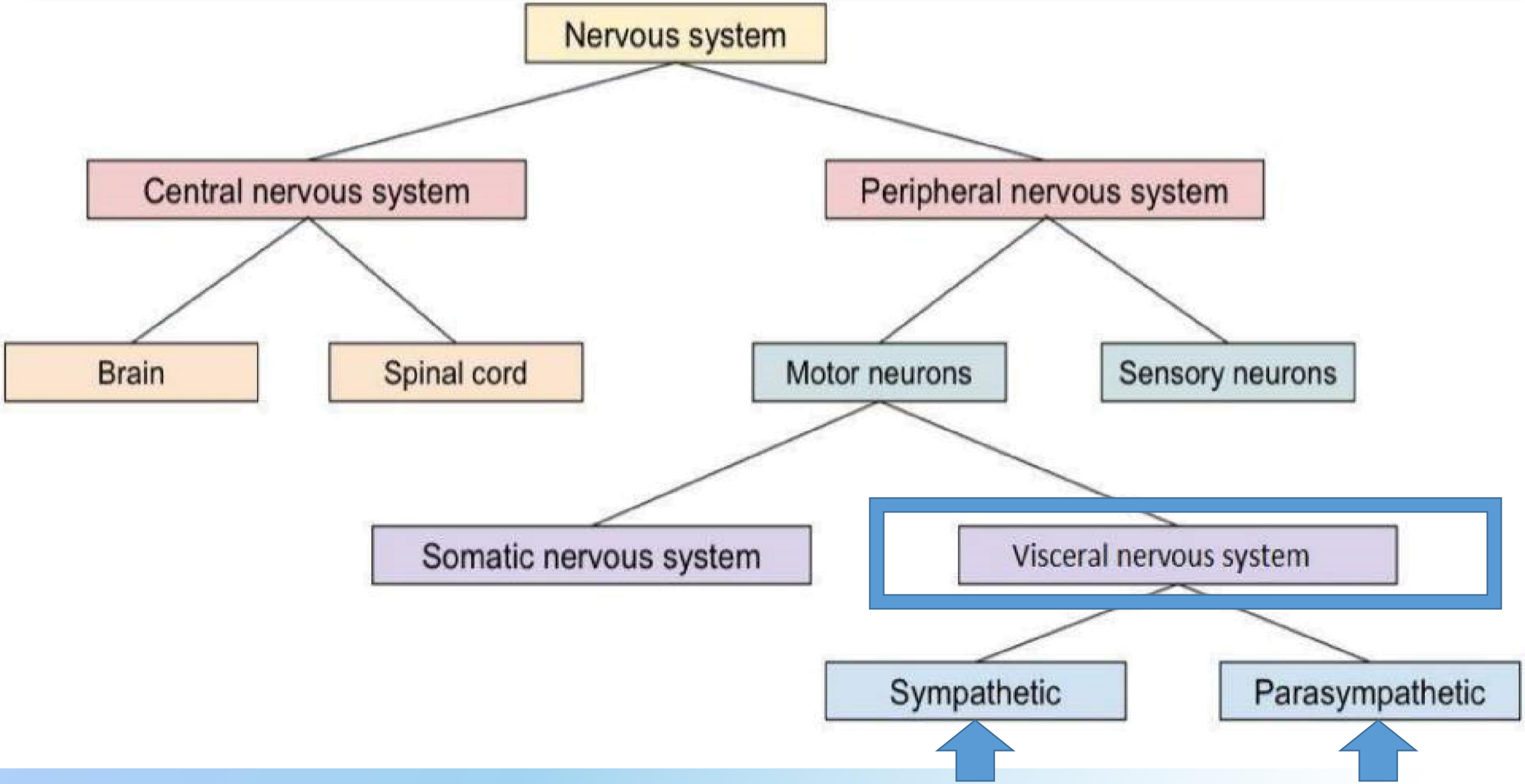
Head and Neck

Peder Holager 6/6 MD



The autonomic nervous system only affects smooth muscle, cardiac muscle and glands

Types of nerve fibers

- GVA, GVE, GSA, GSE
  - Afferent vs Efferent
  - Somatic: “Intentional”
  - Visceral: Autonomic motor fibers, visceral pain
  - GVA always runs with GVE

- (S)pecial fibers of cranial nerves
  - SVA – Taste and smell
  - SSA – Vision, hearing and balance
  - SVE – Motor innervation, pharyngeal arches

Sympathetic vs parasympathetic?

1) Production of saliva

2) Constriction of the pupil

3) Increased heartrate

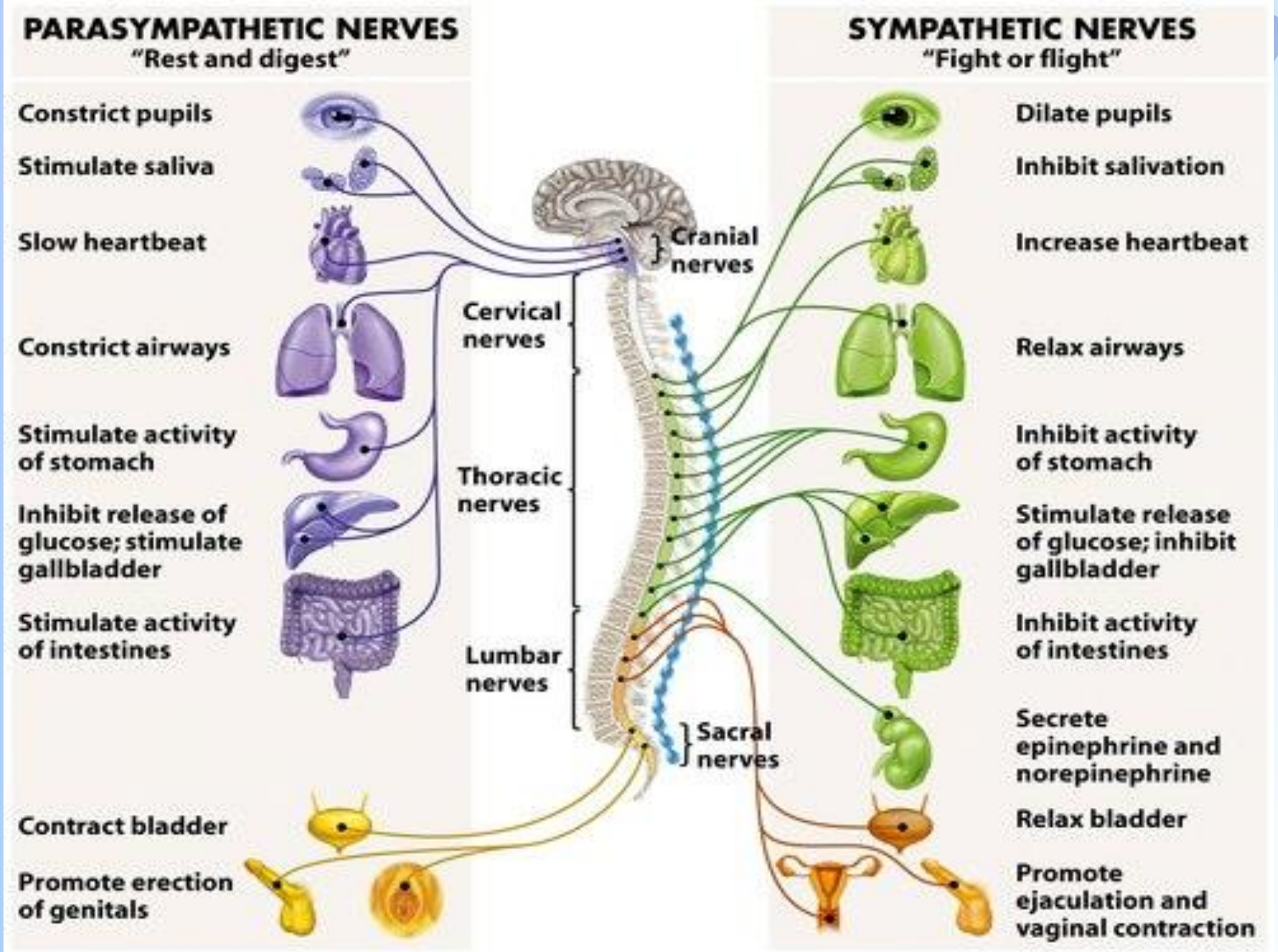
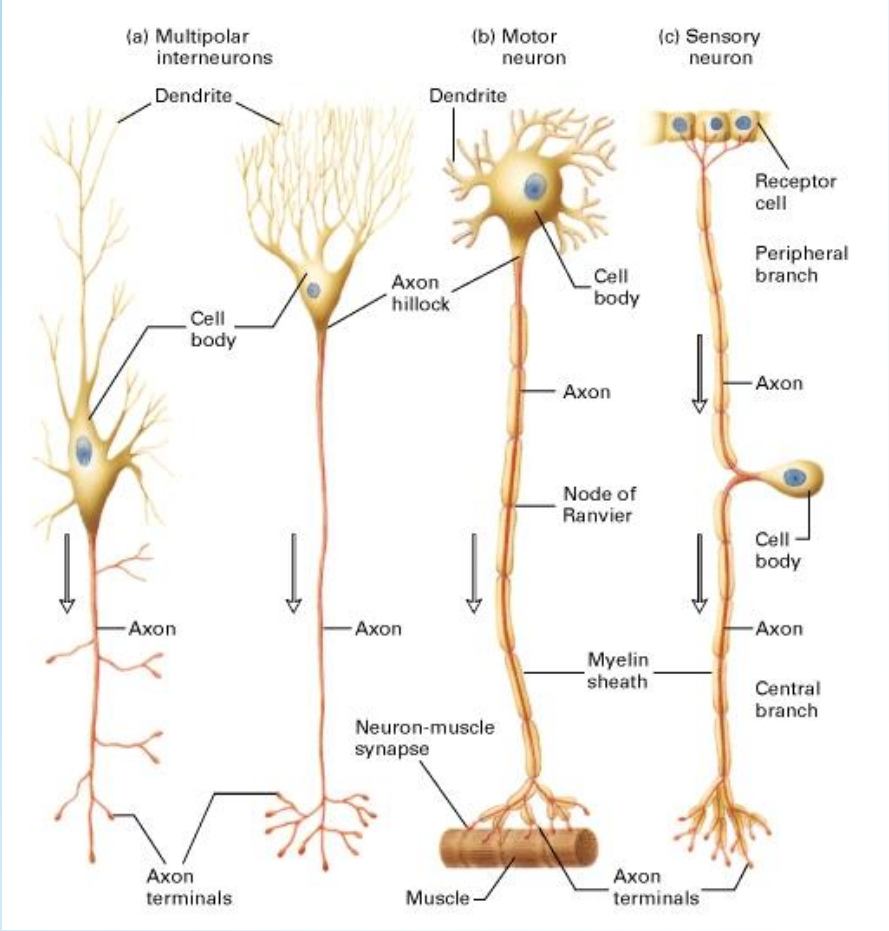
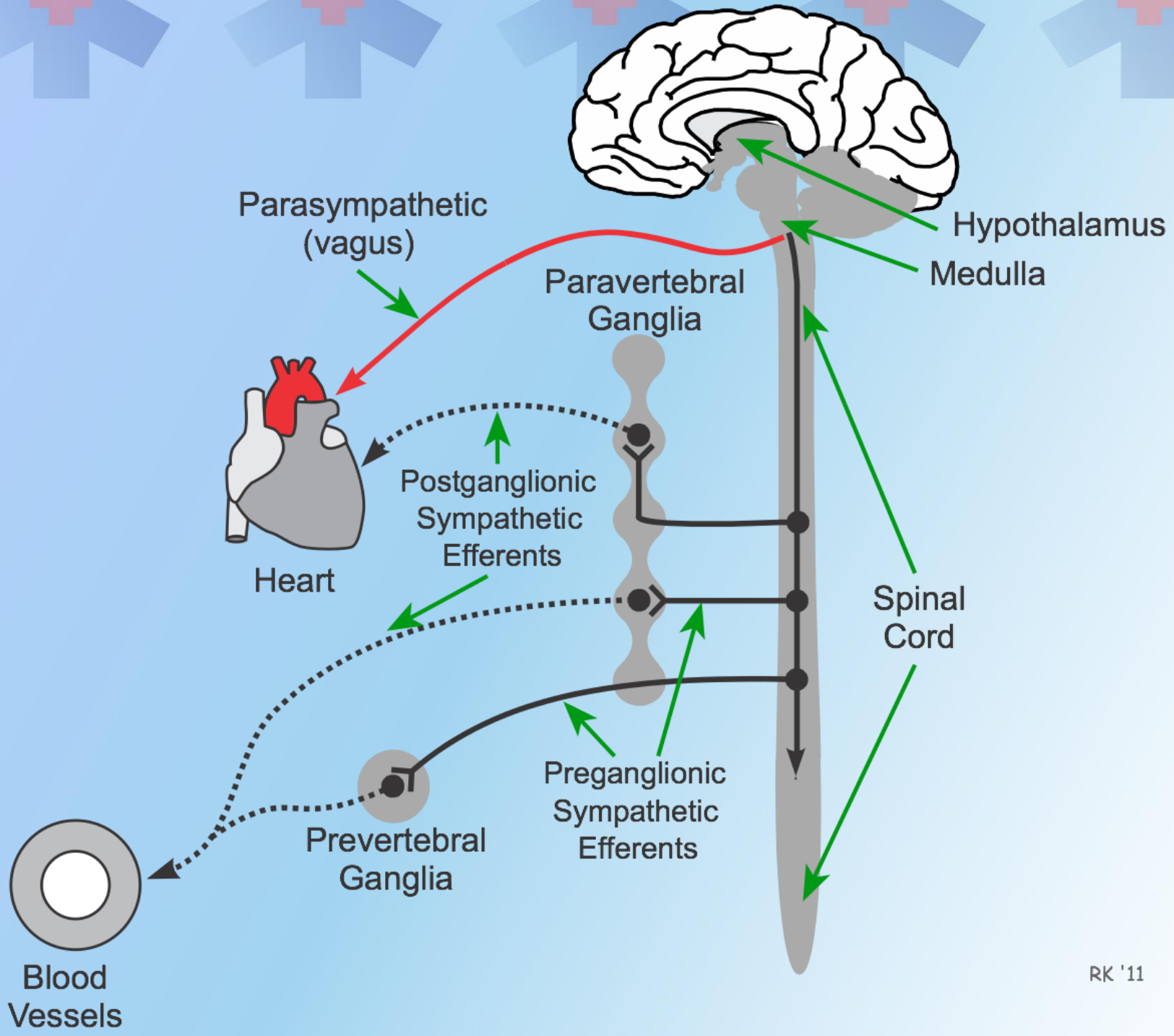


Figure 45-20 Biological Science, 2/e

What is a ganglion?

- Nerve cell bodies **outside** of CNS
- Sensory or autonomic
- In autonomic ganglia the nerve signal synapses, and is either parasympathetic or sympathetics



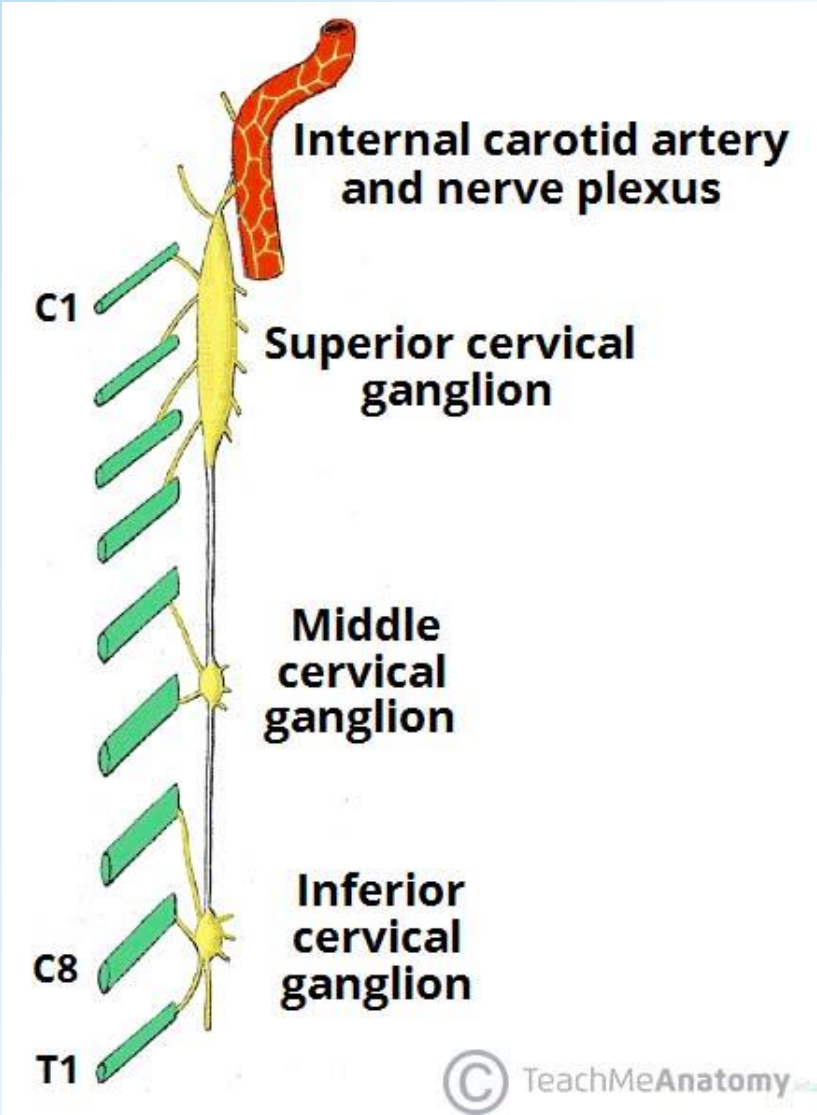


RK '11

studyaid

Superior cervical ganglion

- Where **all** preganglionic sympathetic fibers to the head synapse
- Recieves presynaptic sympathetic fibers from superior thoracic spinal nerves
- Postsynaptic sympathetic fibers go to
  - Cervical spinal nerves via *gray rami communicantes*
  - Thoracic viscera via *Cardiopulmonary splanchnic nerves*
  - Head and neck via *sympathetic peri-arterial nerve plexuses*



Horner syndrome

Cranial nerves with parasympathetic component

- CN III, VII, IX, X → 1973

Parasympathetic ganglia

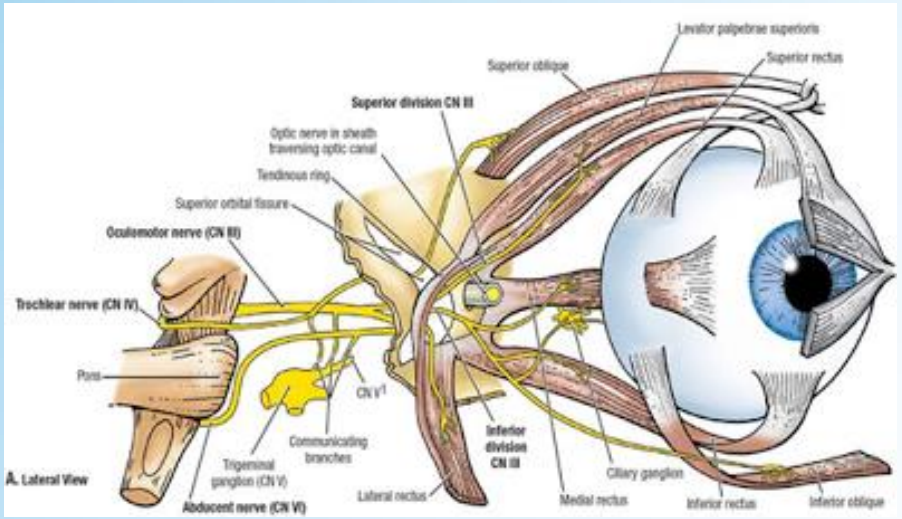
- Lumps of neural tissue
- Cell bodies of parasympathetic nerves
- Preganglionic fibers
  - Sympathetic → Short
  - Parasympathetic → Long

All PS-ganglia have 3 roots

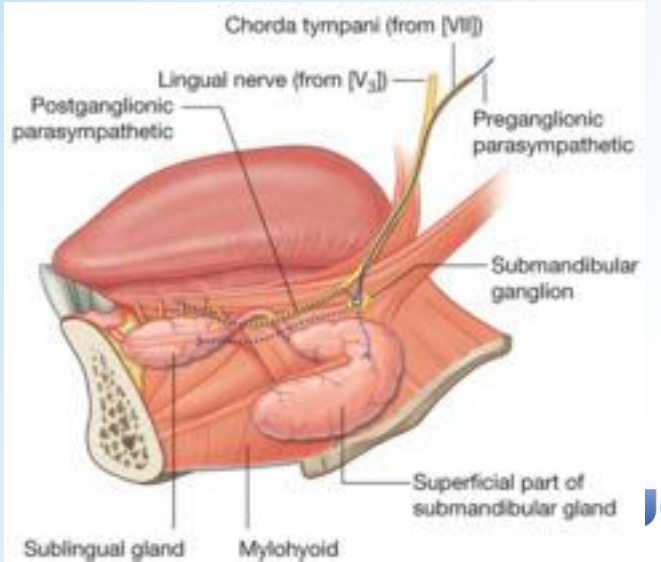
- Motor root/Parasympathetic root
  - Preganglionic parasympathetic
    - GVE(+GVA)
- Sympathetic root
  - Postsynaptic sympathetic nerve
    - GVE(+GVA)
- Sensory root
  - General sensory fibers - GSA

Cranial parasympathetic ganglia(4)

- Cilliary ganglion – CN III
  - Orbit, posterior to the eyeball
  - Constriction and dilation of pupil
  - Edinger westphal nucleus



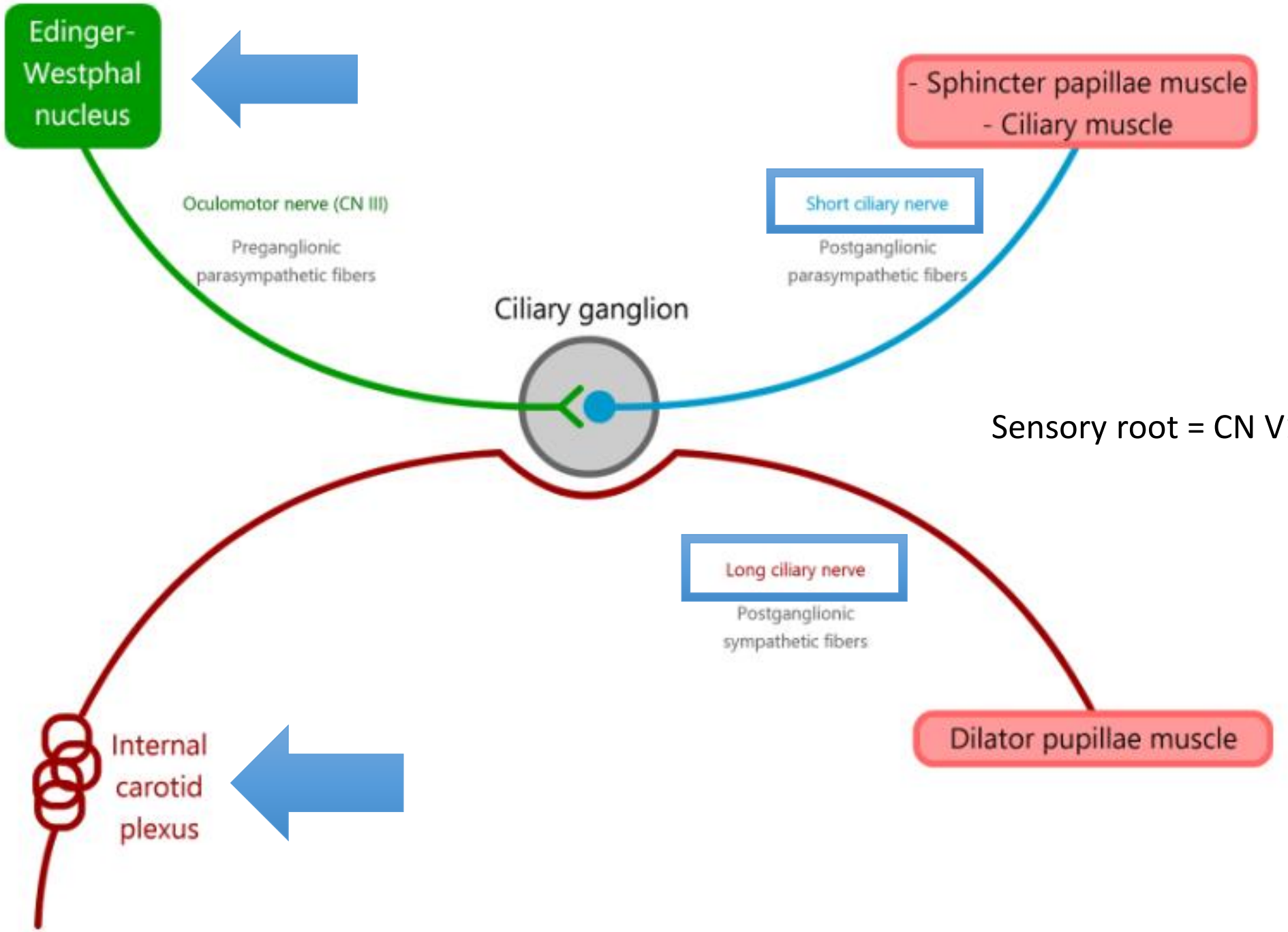
- Submandibular ganglion – CN VII
  - **On** the hyoglossus muscle
  - Salivation submandibular and sublingual glands
  - **Superior** salivatory nucleus



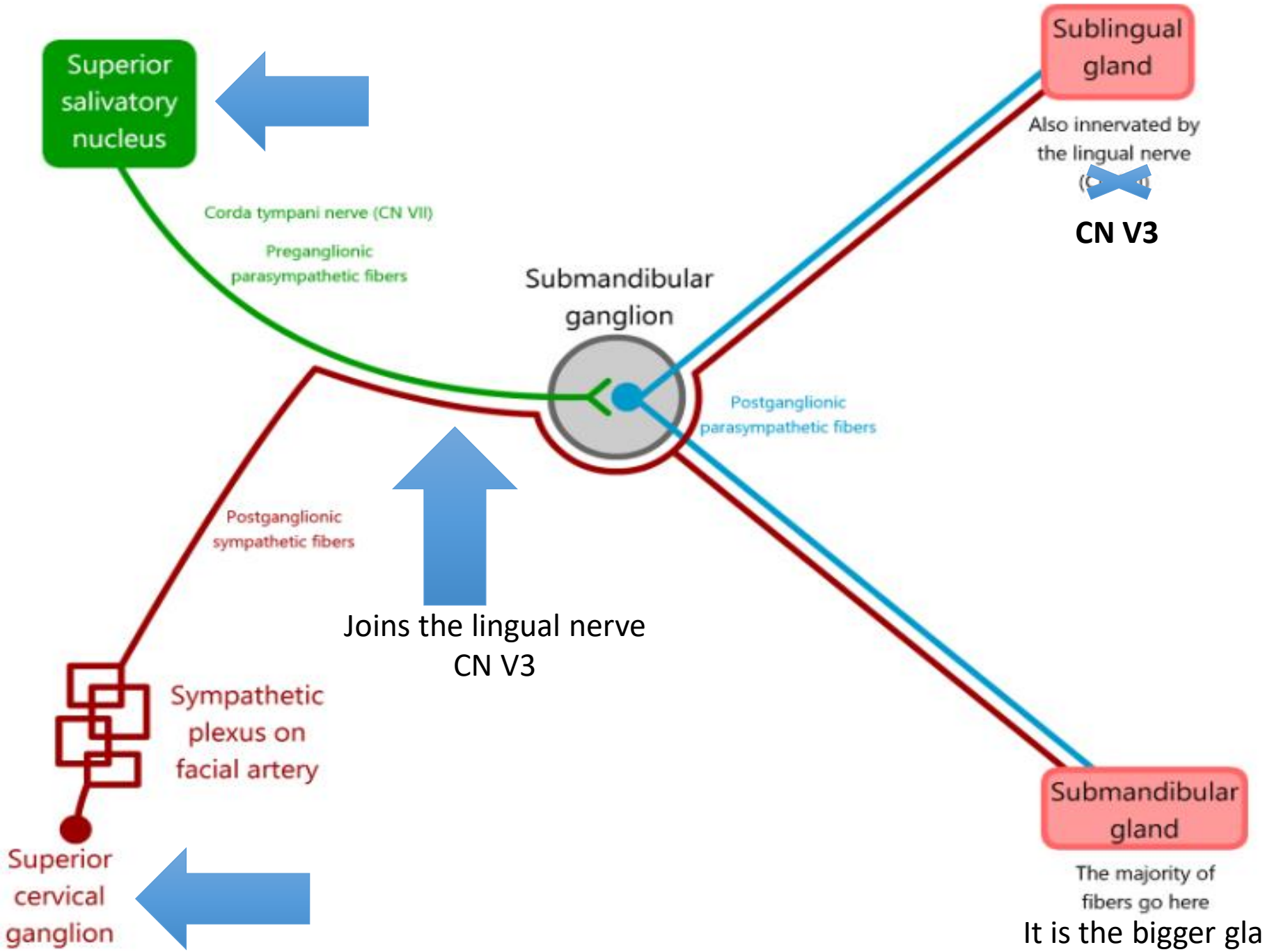
Cranial parasympathetic ganglia(4)

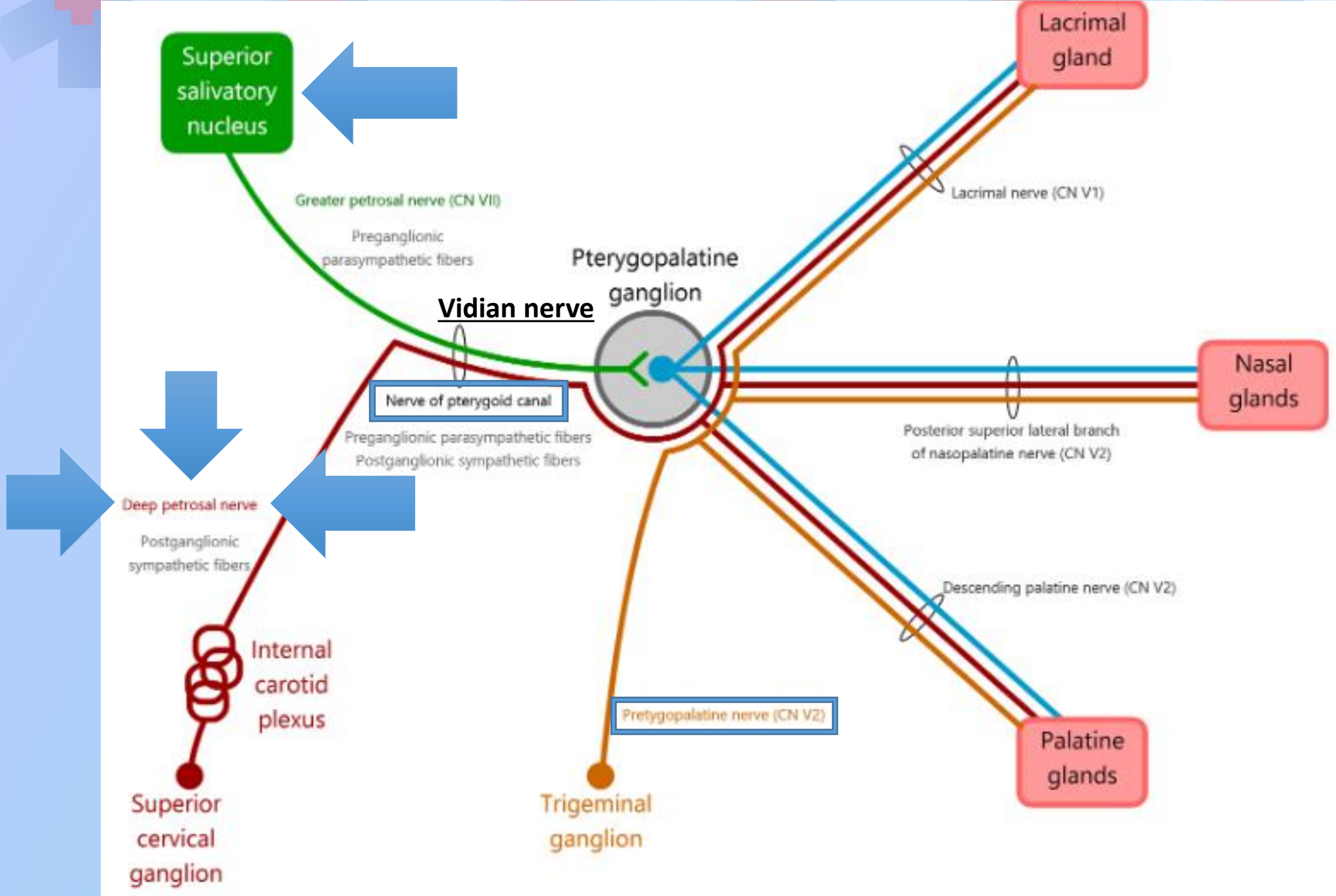
- Otic ganglion – CN IX
  - Inferior to foramen ovale, infratemporal fossa
  - Salivation, **Parotid gland**
  - **Inferior** salivatory nucleus
- Pterygopalatine ganglion – CN VII
  - Pterygopalatine fossa
  - Lacrimal gland, tears
  - **Superior** salivatory nucleus

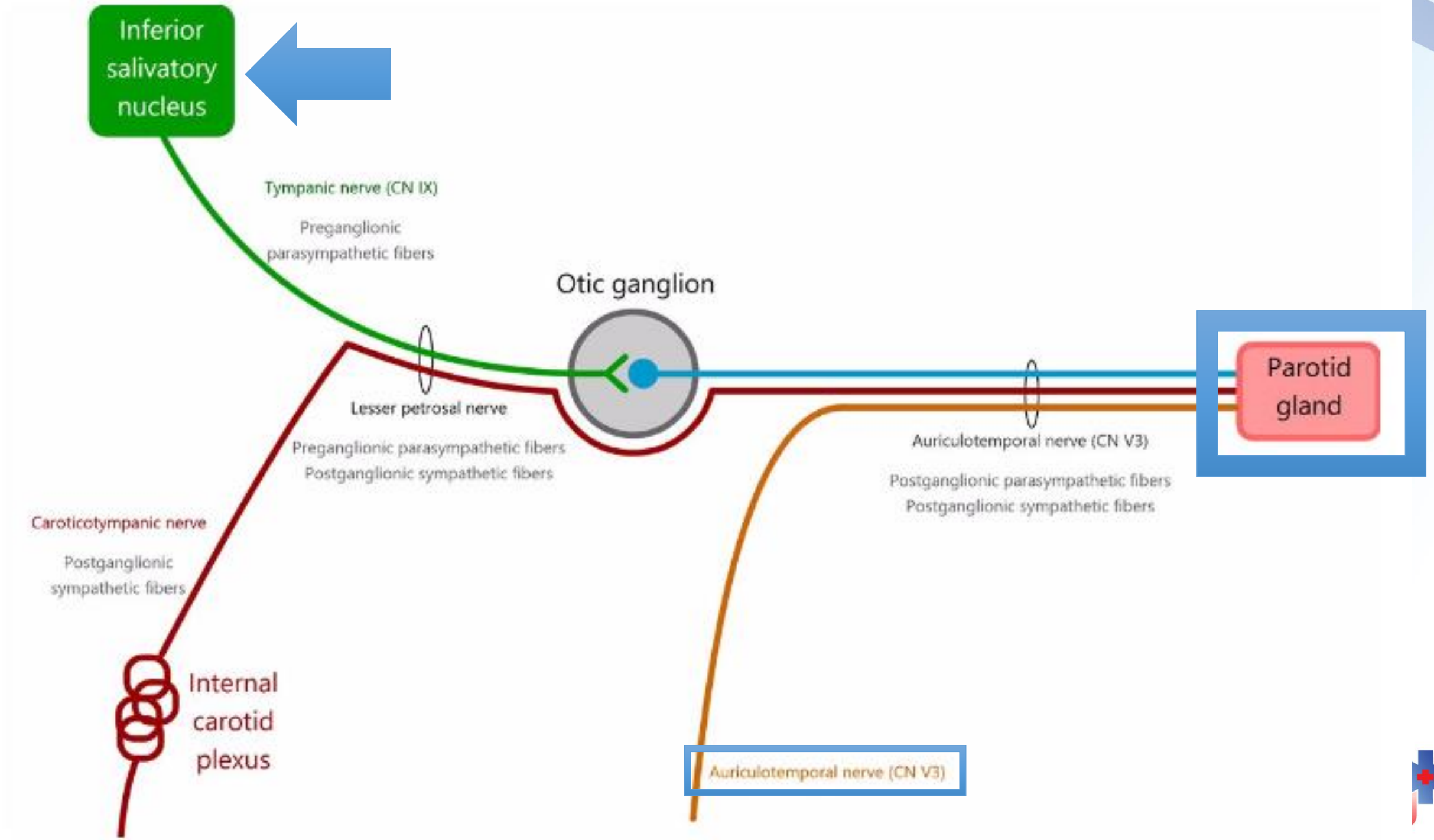
- But what about all the other ganglia in the head?
  - Geniculate ggl, petrous ggl, trigeminal ggl, scarpas ggl



Sensory root = CN V1


Superior salivatory nucleus
Corda tympani nerve (CN VII)
Preganglionic parasympathetic fibers
Submandibular ganglion
Sublingual gland
Also innervated by the lingual nerve
CN V3
Postganglionic parasympathetic fibers
Postganglionic sympathetic fibers
Joins the lingual nerve
CN V3
Sympathetic plexus on facial artery
Superior cervical ganglion
Submandibular gland
The majority of fibers go here
It is the bigger gland

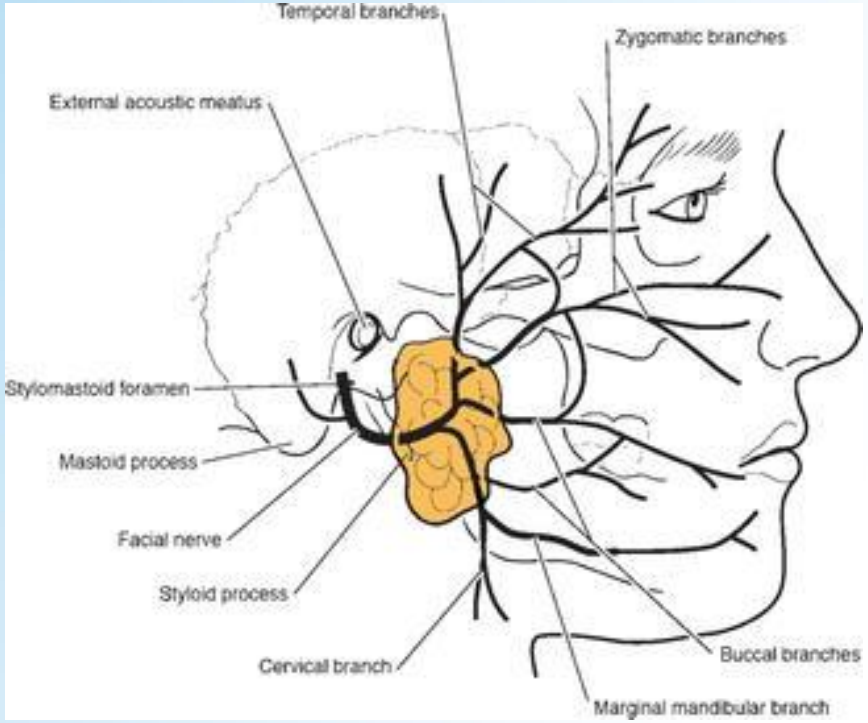

Superior salivatory nucleus
Greater petrosal nerve (CN VII)
Preganglionic parasympathetic fibers
Vidian nerve
Pterygopalatine ganglion
Lacrimal gland
Lacrimal nerve (CN V1)
Nasal glands
Nerve of pterygoid canal
Preganglionic parasympathetic fibers
Postganglionic sympathetic fibers
Posterior superior lateral branch of nasopalatine nerve (CN V2)
Deep petrosal nerve
Postganglionic sympathetic fibers
Descending palatine nerve (CN V2)
Internal carotid plexus
Pretygopalatine nerve (CN V2)
Palatine glands
Superior cervical ganglion
Trigeminal ganglion


Inferior salivatory nucleus
Tympanic nerve (CN IX)
Preganglionic parasympathetic fibers
Otic ganglion
Lesser petrosal nerve
Preganglionic parasympathetic fibers
Postganglionic sympathetic fibers
Auriculotemporal nerve (CN V3)
Postganglionic parasympathetic fibers
Postganglionic sympathetic fibers
Parotid gland
Caroticotympanic nerve
Postganglionic sympathetic fibers
Internal carotid plexus
Auriculotemporal nerve (CN V3)

	Cilliary ggl.	Pterygopalatine ggl.	Submandibular ggl.	Otic ggl.
Sensory root	Ophtalmic division of trigeminal - CN V1	Pterygopalatine nerve - Maxillary trigeminal – CN V2	Lingual nerve - Mandibular trigeminal – CN V3	Auriculotemporal nerve – Mandibular trigeminal – CN V3
Parasympathetic root	Oculomotor nerve – CN III – Edinger Westphal nucleus	Facial nerve – CN VII – Greater petrosal nerve – Sup. salivatory nucleus	Facial nerve – CN VII – Chorda tympani – Sup. salivatory nucleus	Glossopharyngeal – CN IX – Inf. salivatory nucleus
Sympathetic root	Internal carotid plexus – Sup. Cervical ggl.	Deep petrosal nerve – Sup. Cervical ggl.	Facial artery plexus – Sup. Cervical ggl.	Caricotympanic nerve – Sup. Cervical ggl.

Facial nerve plexus/parotid plexus

- Embedded within the tissue of parotid gland
- Does **not** innervate it!
- Great auricular nerve – sensory
- Glossopharyngeal nerve(CN IX) - Secretomotor



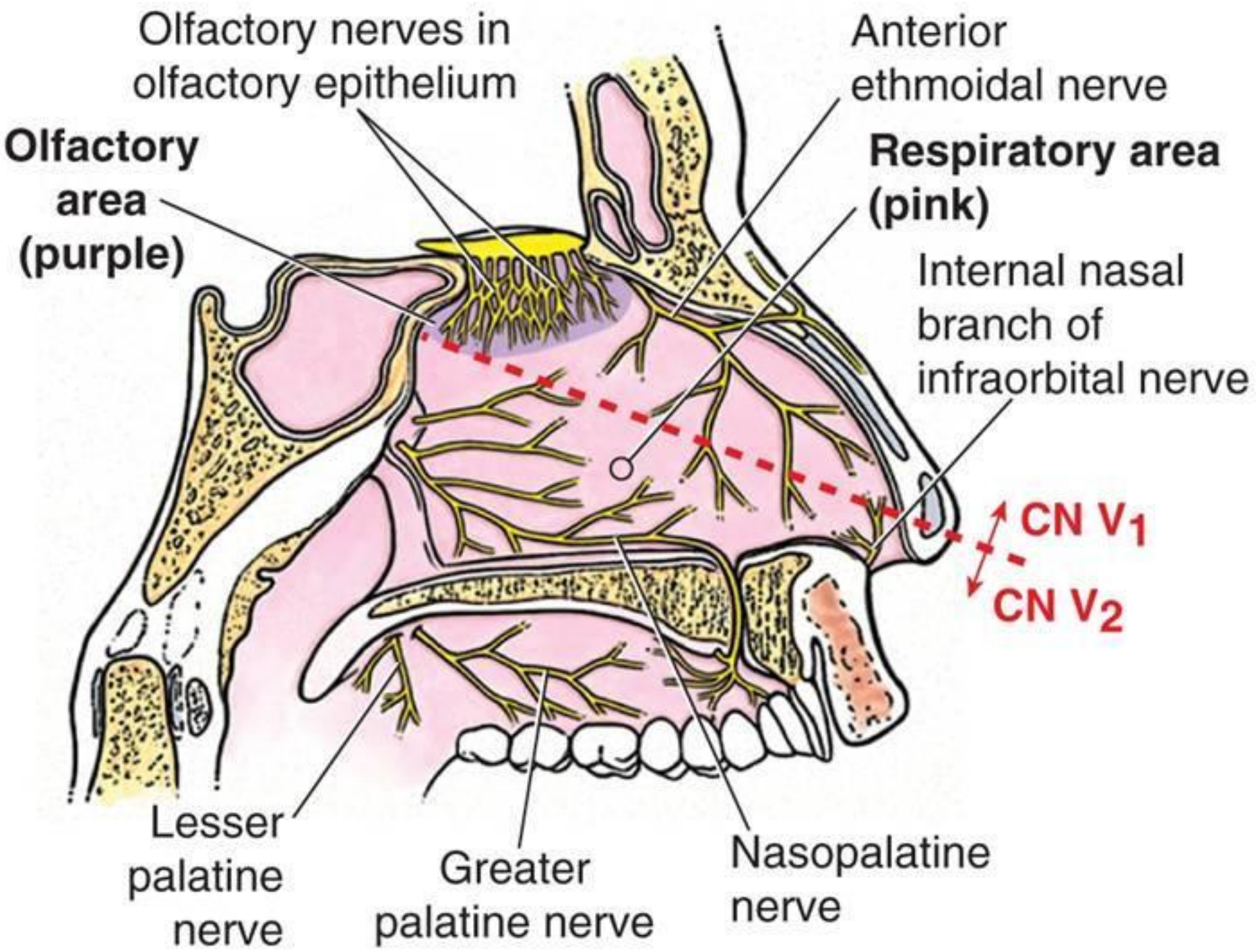
Posterior ethmoid
arterie

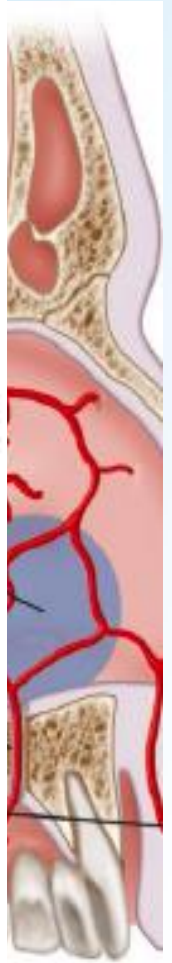
Anterior ethmoid
arterie

Sphenopalatin
arter

Lateral nas
branches
facial arter

Greater palatin
arter



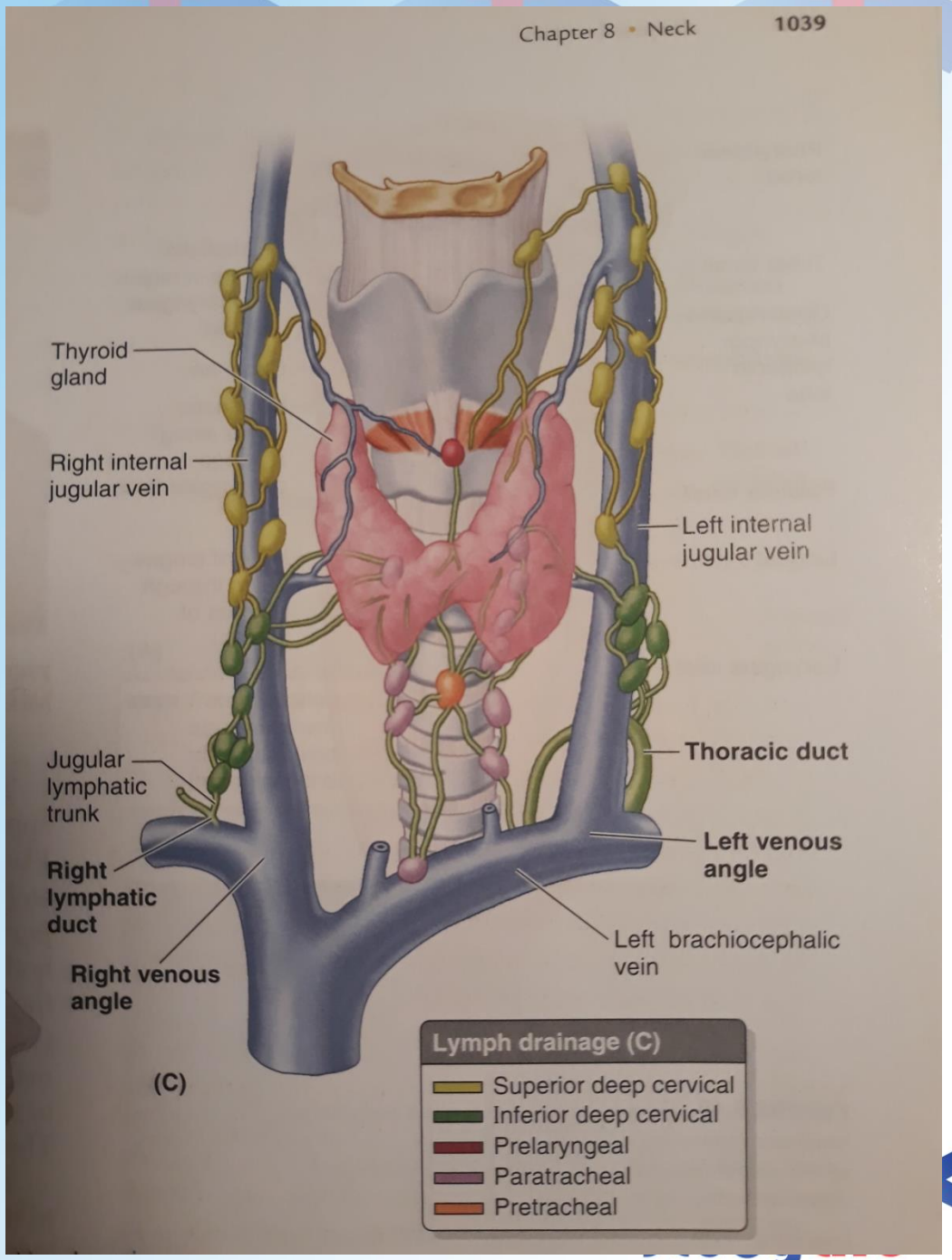


Paranasal sinuses

- Frontal sinuses → Frontonasal duct → *ethmoidal infundibulum* → opens into the *semilunar hiatus* of the **middle nasal meatus**
- Ethmoidal cells
  - Anterior ethmoidal cells →*ethmoidal infundibulum* →**middle nasal meatus**
  - Middle ethmoidal cells → Directly to **middle nasal meatus**
  - Posterior ethmoidal cells → Directly to **superior** nasal meatus
- Sphenoidal sinuses(divided by a septum) → Sphenoethmoidal recess
- Maxillary sinuses → Maxillary ostium → **semilunar hiatus** → middle nasal meatus
- Nasolacrimal duct → Nasolacrimal canal → **Inferior nasal meatus**

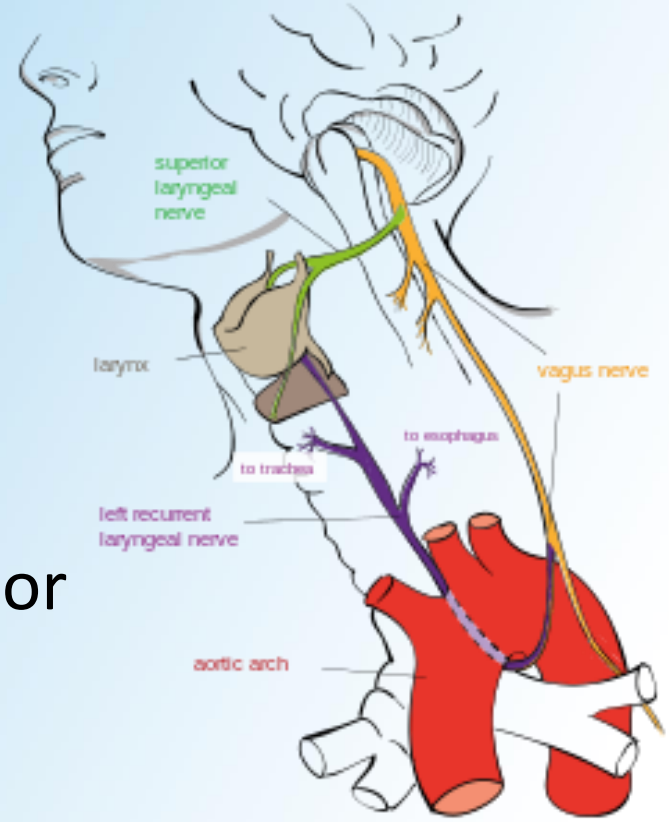
Lymphatic drainage

- Thoracic duct enters left venous angle
- Right lymphatic duct enter right venous angle
- Supraclavicular lymph nodes
- Virchow's nodes



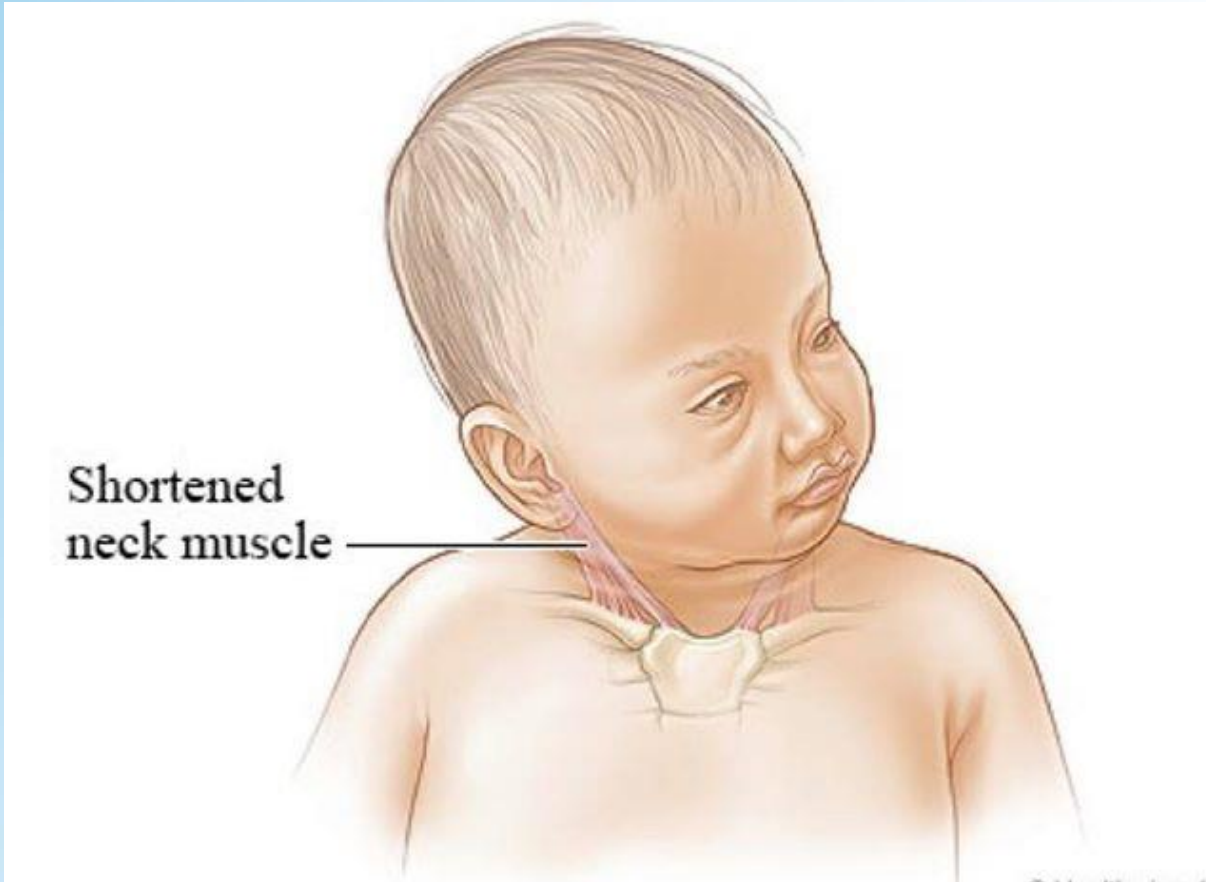
Recurrent laryngeal nerve

- Branch of Vagus nerve
  - Moves in opposite direction
- Innervates all intrinsic muscles of the larynx
- Typically produces symptoms when affected by tumor



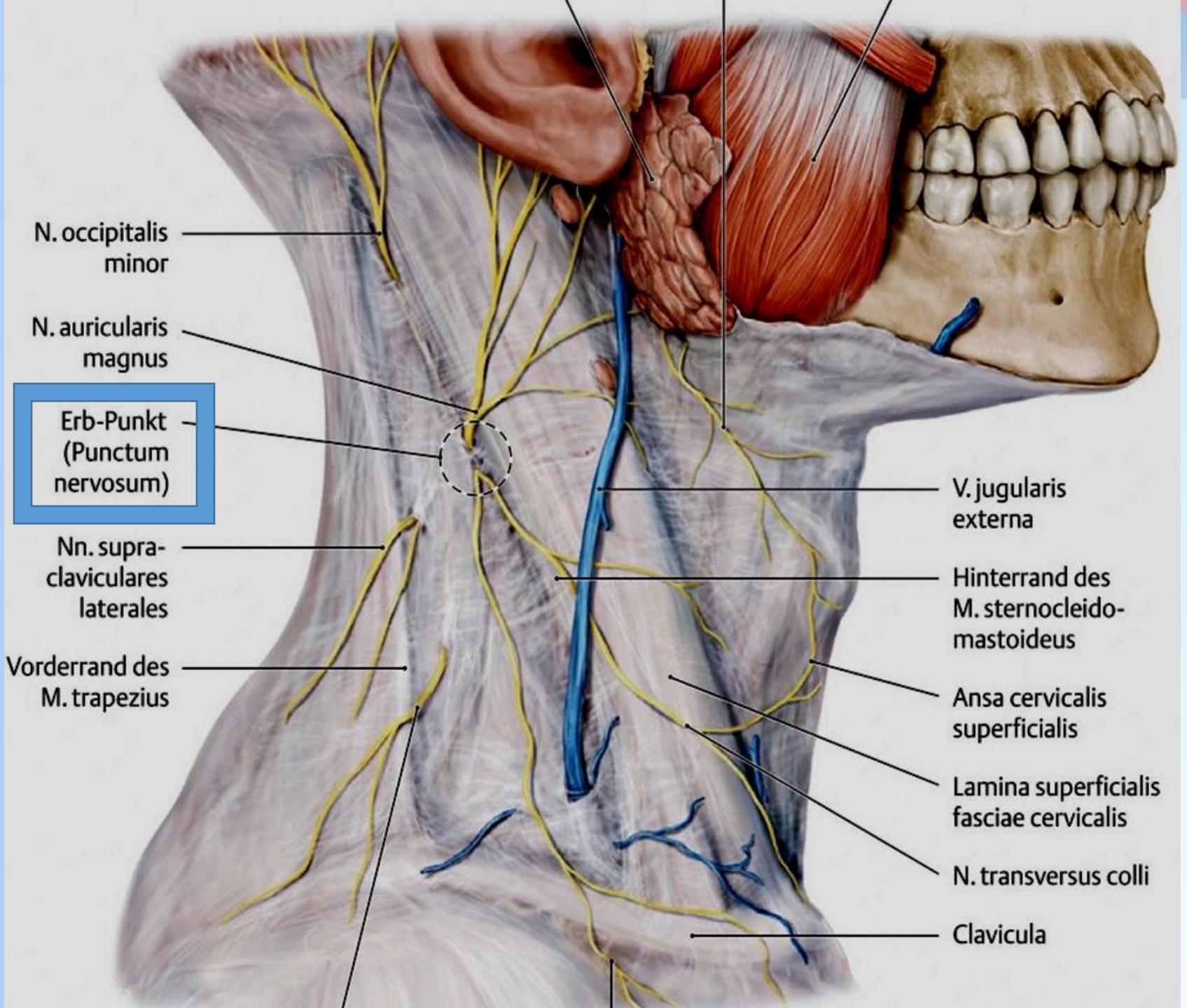
Torticollis

- Congenital
- Affects the sternocleidomastoid
- Caused by fibrous tissue formation
- Face is twisted away from affected side
- Often caused by trauma during birth



Cervical Plexus

- Anterior rami of C1-C4
- Cutaneous branches(4)
- Muscular branches
  - Ansa Cervicalis(C1-C3)
  - Phrenic nerve(C3, C4, C5 keeps the diaphragm alive)


N. occipitalis minor
N. auricularis magnus
Erb-Punkt (Punctum nervosum)
Nn. supra-claviculares laterales
Vorderrand des M. trapezius
V. jugularis externa
Hinterrand des M. sternocleido-mastoideus
Ansa cervicalis superficialis
Lamina superficialis fasciae cervicalis
N. transversus colli
Clavicula

Good luck on your exam!!