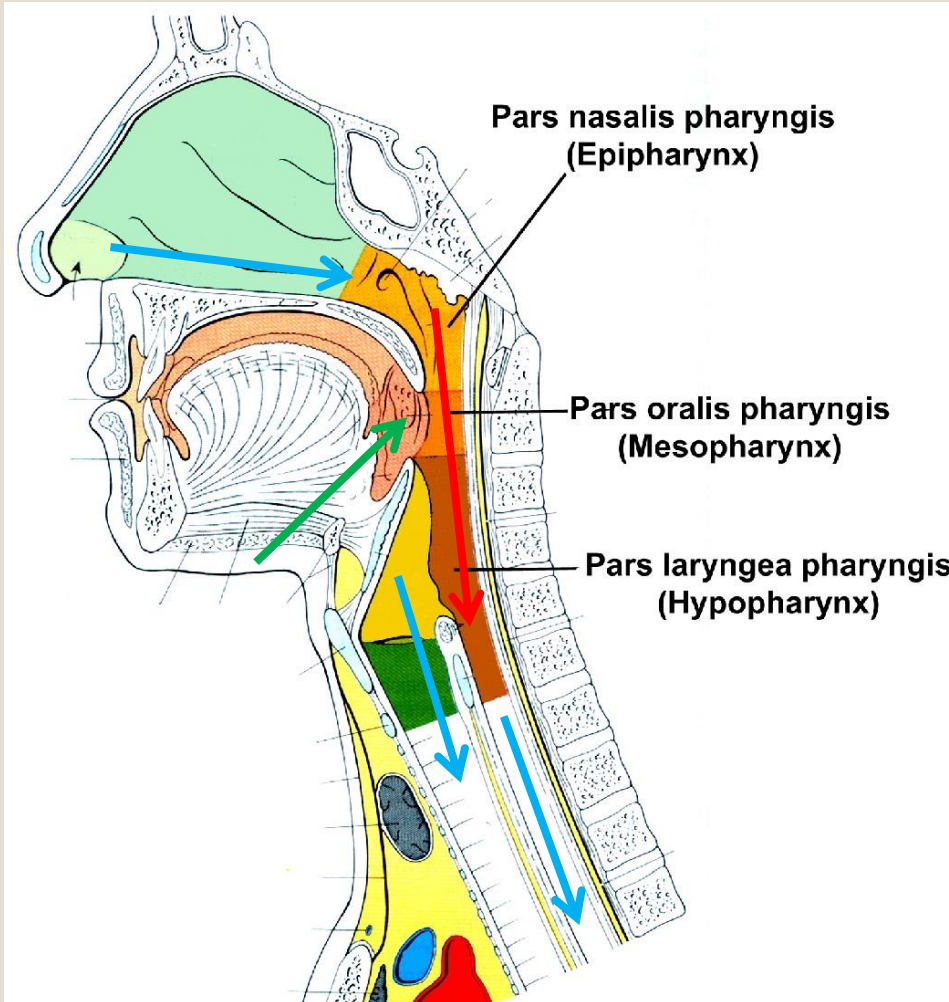


# **The pharynx and the parapharyngeal spaces.**

**János Hanics M.D., Ph.D.**

# Location and connections of the pharynx

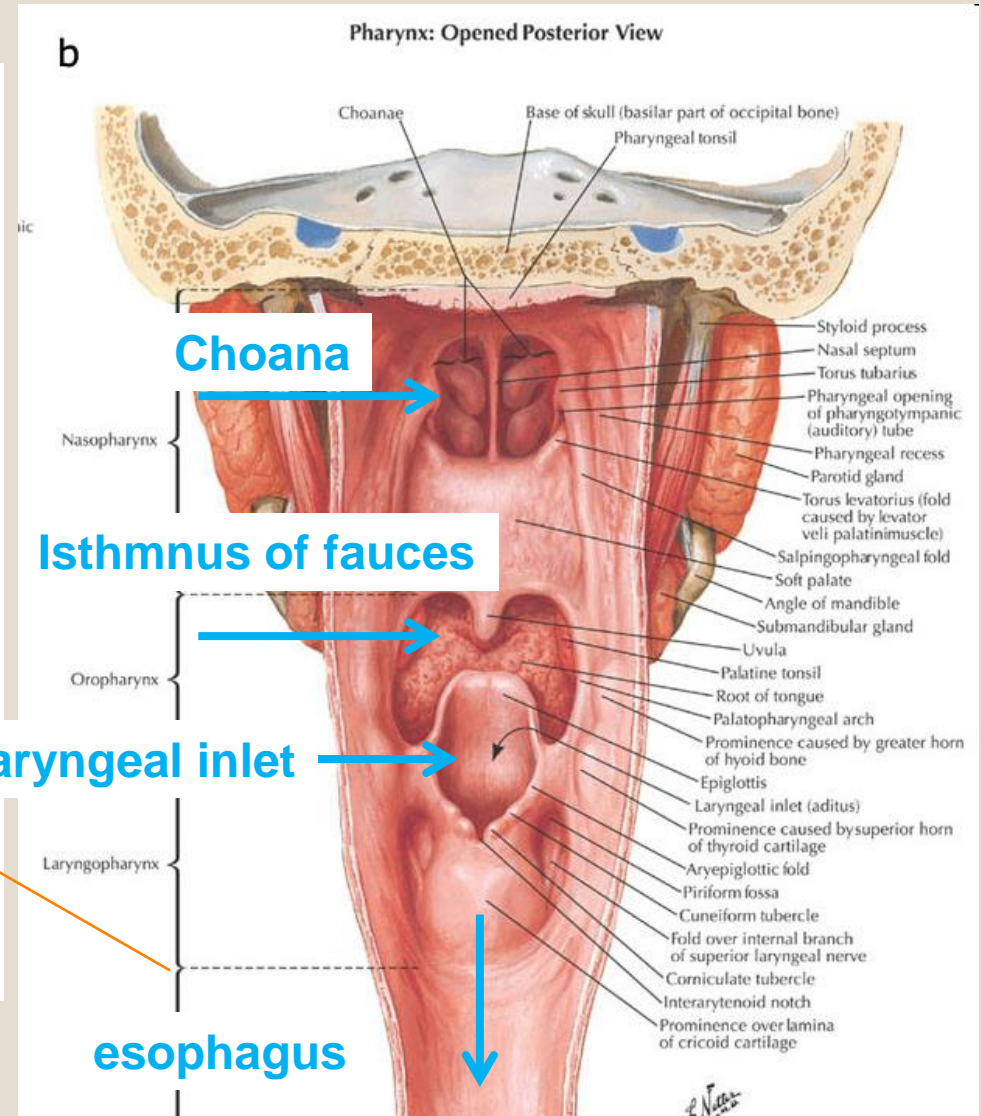
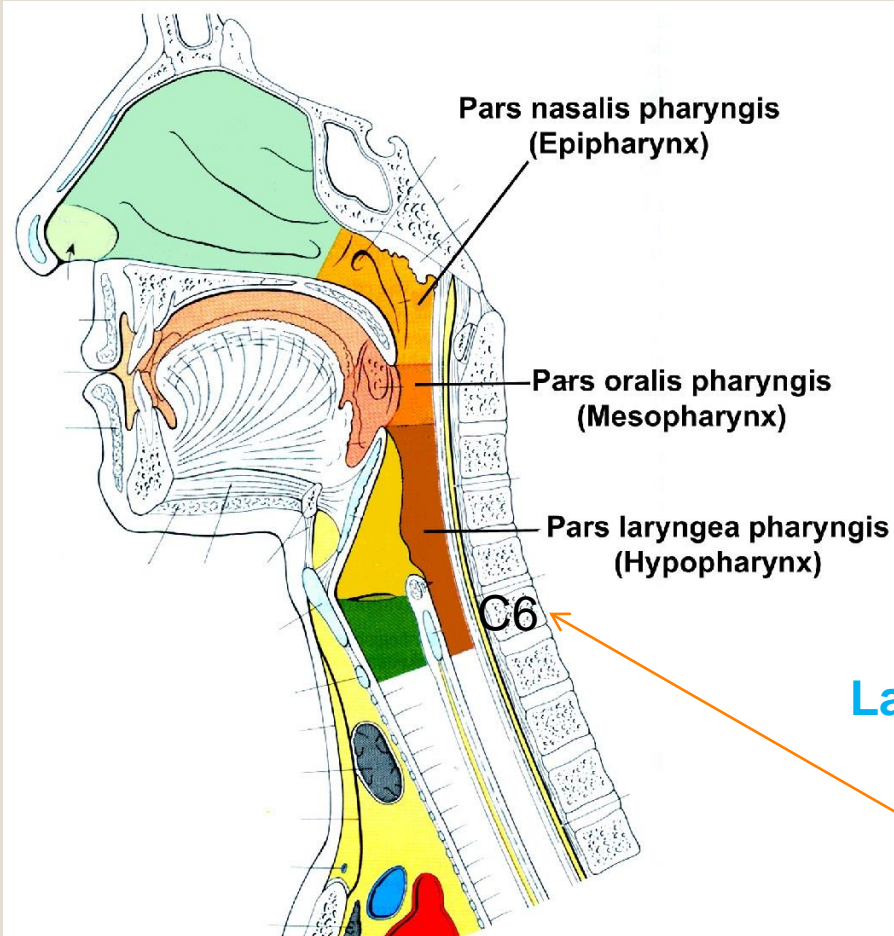


- Oral cavity proper:  
Isthmus of fauces
- Pharynx (cavity)
- Nasal cavity (Choana)  
Larynx (Laryngeal inlet)  
Esophagus (C6)

# Pharynx

3 openings represent the anterior wall of the pharynx and it is continuous with the esophagus

It has 3 levels:

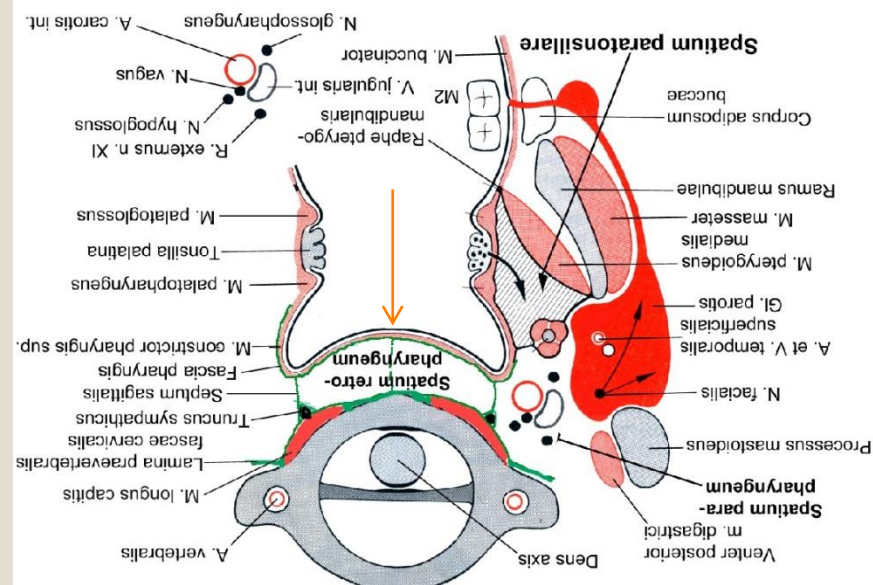
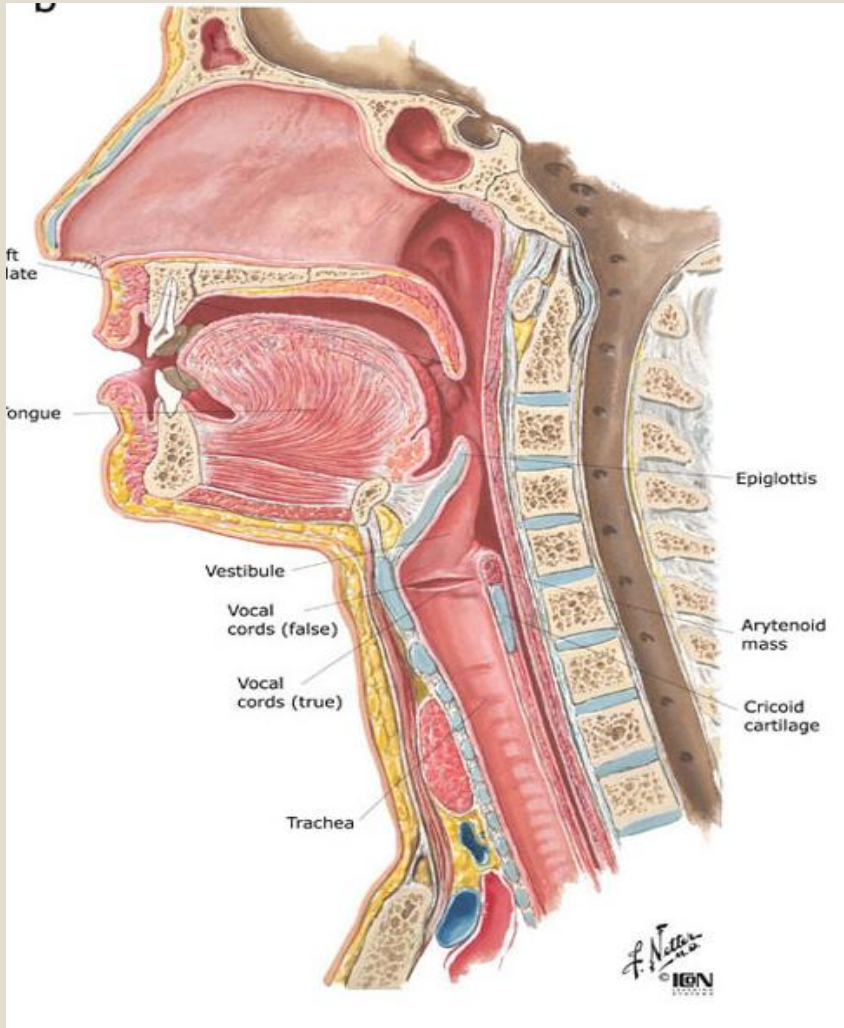
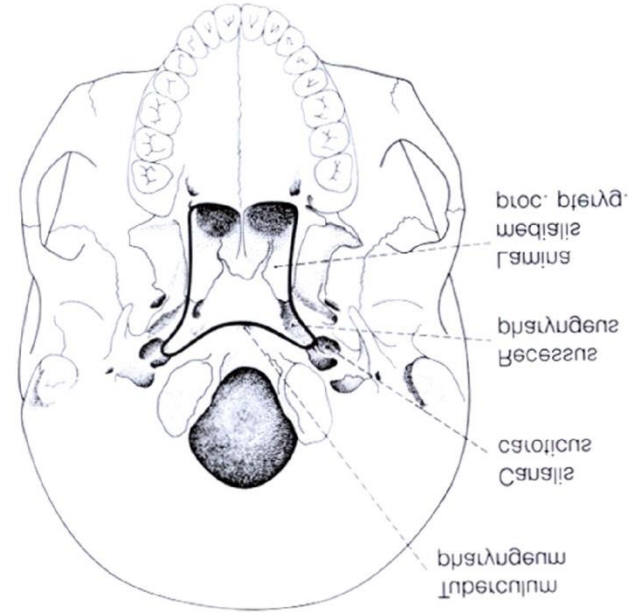




# Pharynx - wall

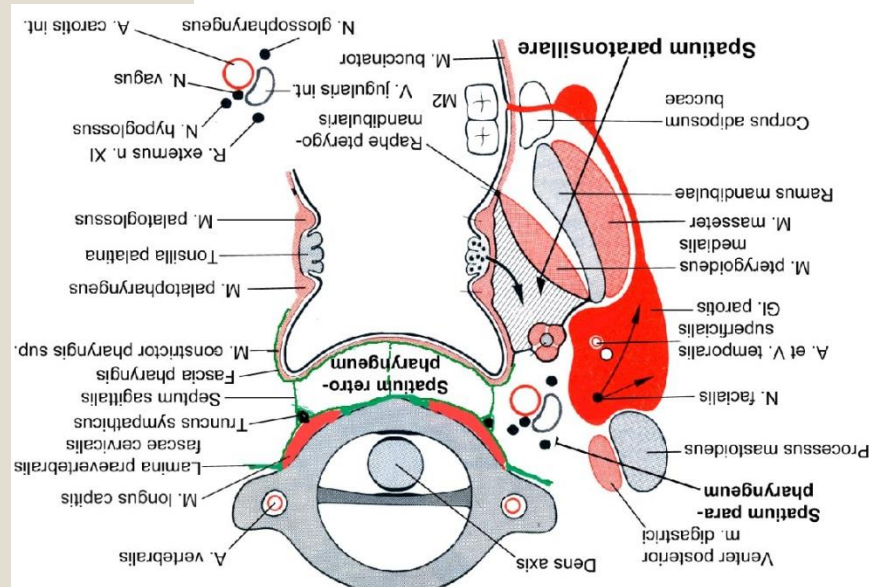
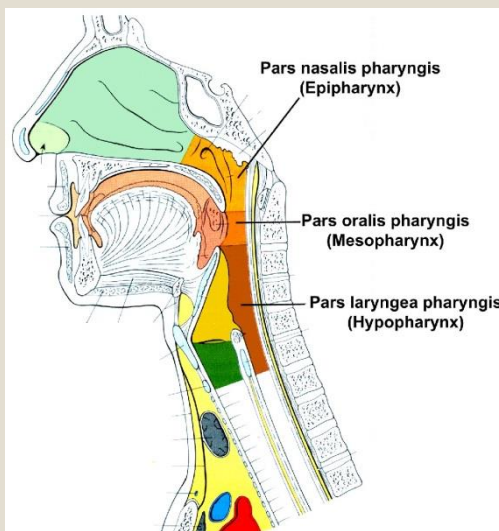
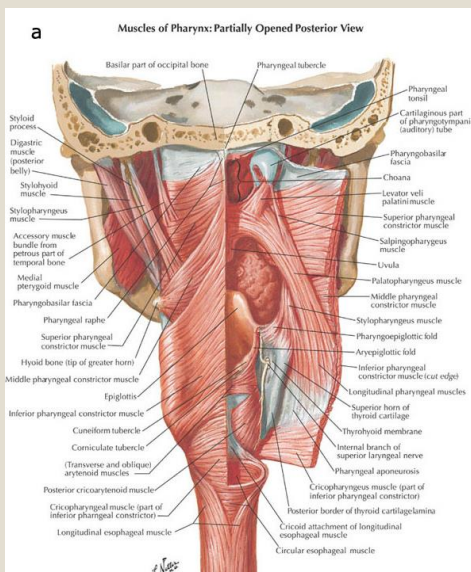
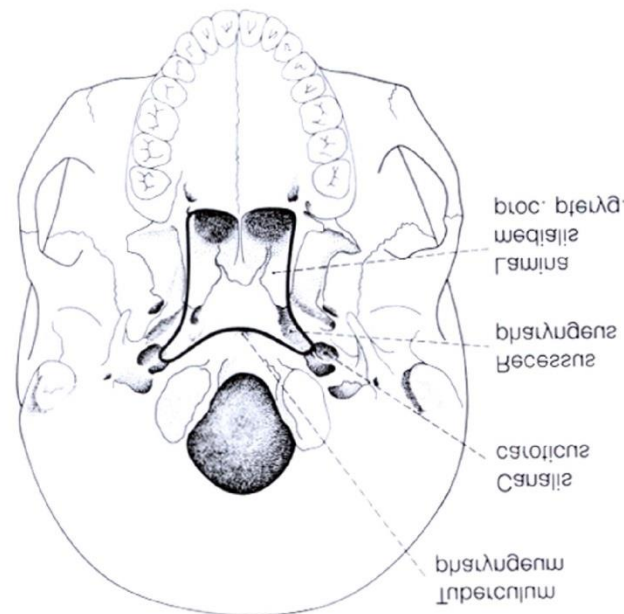
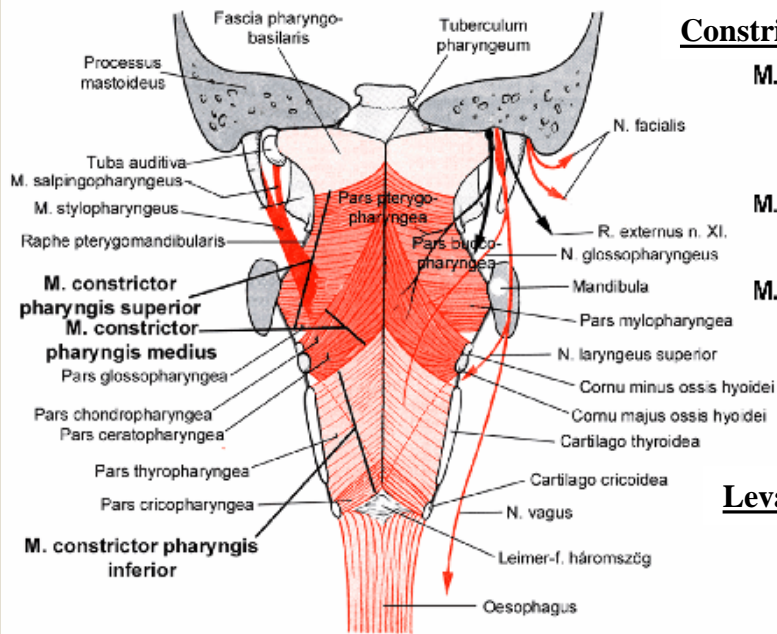
- 1) Tunica mucosa
- 2) Tunica fibrosa
- 3) **Tunica muscularis (striated muscles)**
- 4) Tunica adventitia

Origin is on the base of the skull:



# Tunica muscularis

Origin is on the base of the skull:



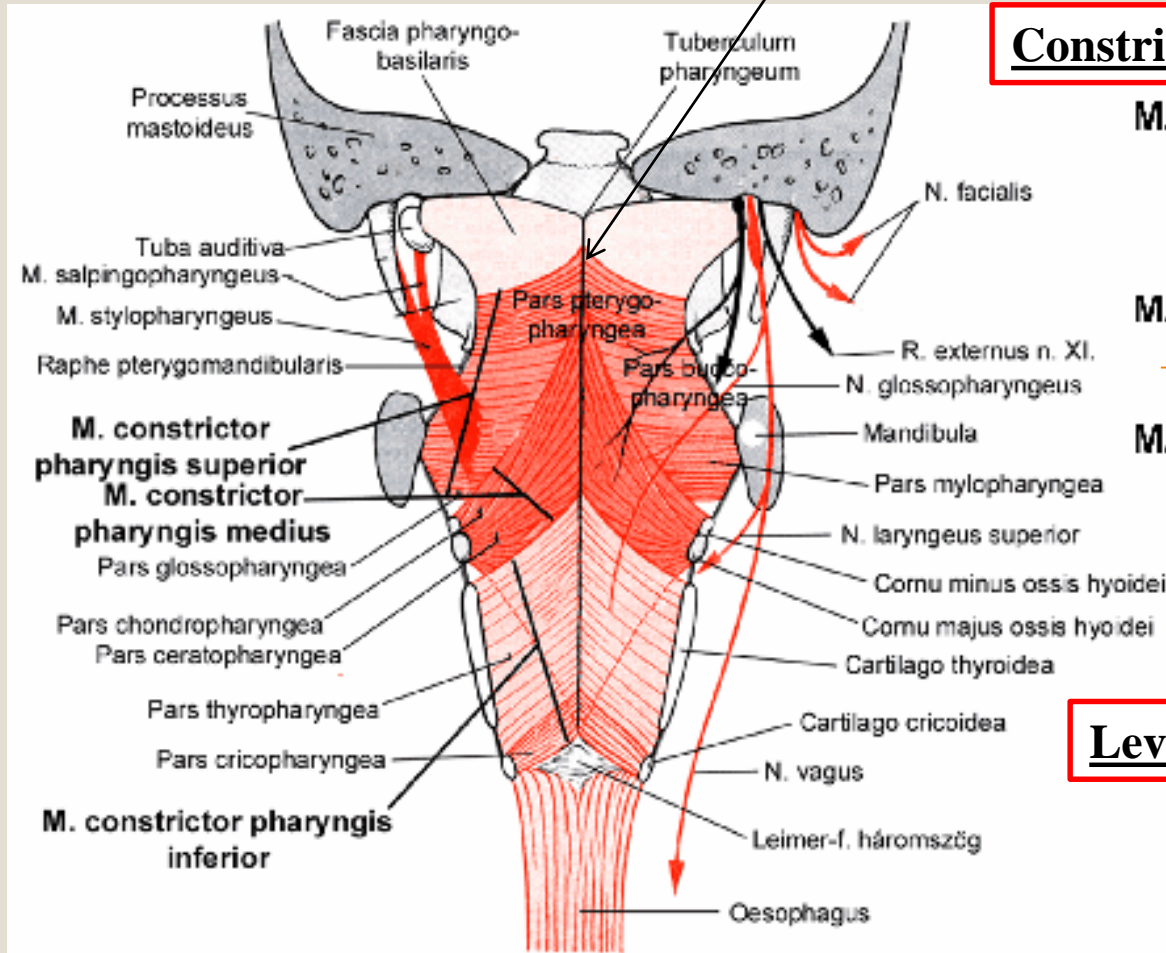


# Muscles of the pharynx

Constrictor muscles of the pharynx  
(3 groups)

Raphe pharyngis

Levator muscles of the pharynx



## Constrictor muscles of the pharynx

**M. constrictor pharyngis superior:**

1. pars pterygopalatina,
2. pars buccopharyngea,
3. pars mylopharyngea,
4. pars glossopharyngea;

n. IX

**M. constrictor pharyngis medius:**

1. pars chondropharyngea,
2. pars ceratopharyngea;

**M. constrictor pharyngis inferior:**

1. pars thyropharyngea,
2. pars cricopharyngea.

n. X

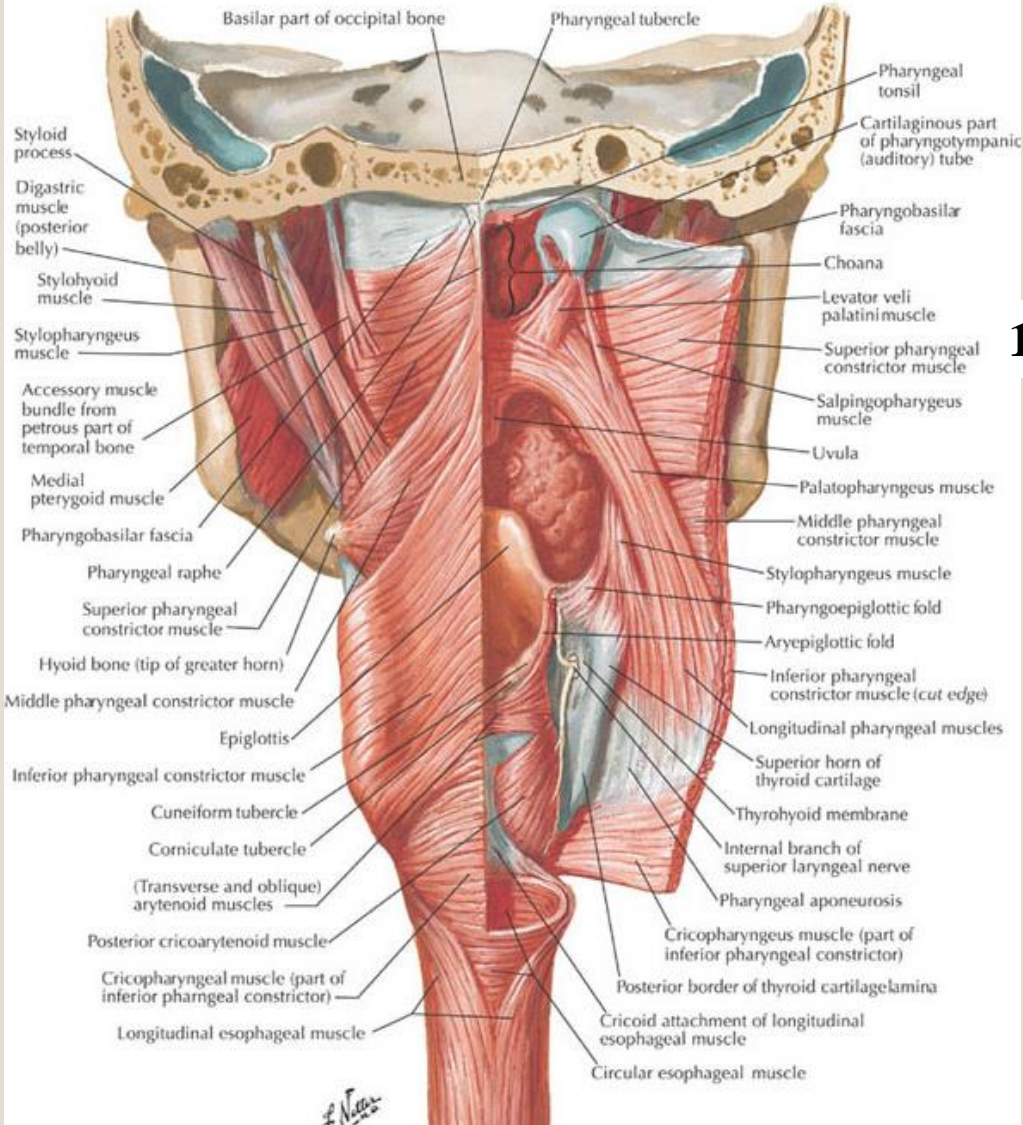
## Levator muscles of the pharynx

1. M. stylopharyngeus,
2. M. salpingopharyngeus,
3. M. palatopharyngeus

# Levator muscles of the pharynx

a

Muscles of Pharynx: Partially Opened Posterior View

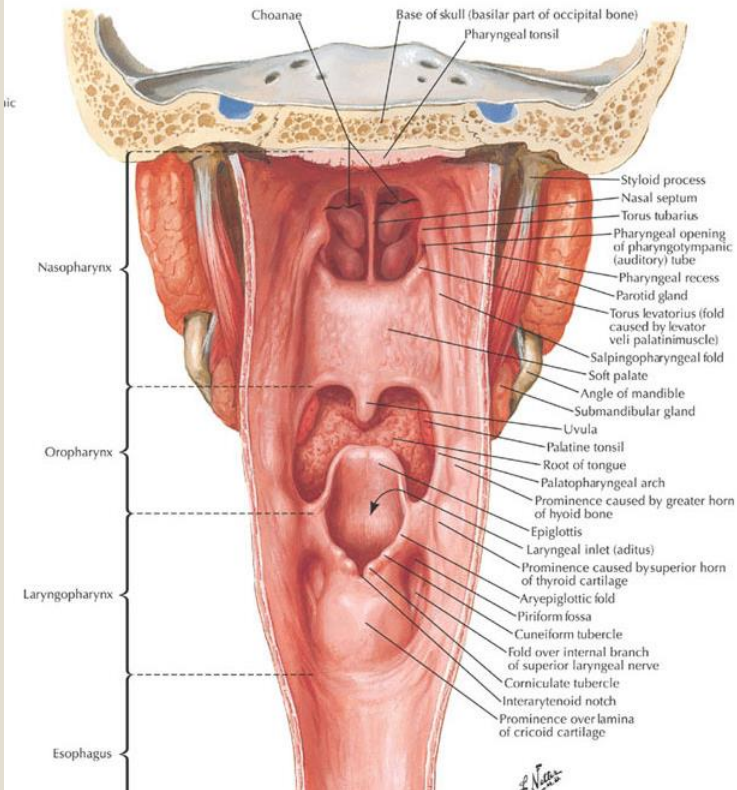


***Stylopharyngeus m.*** – Styloid proc. (temporal bone)

***Salpingopharyngeus m.*** – cartilaginous part of the auditive tube and medial lamina of the pterygoid proc.

***Palatopharyngeus m.*** – soft palate

1 external + 2 internal (fold) ew





# Arteries of the head and neck

## Vertebral aa.

## ICA – intracranial division

## ECA:

**Au – post. auricular a.**

**Oc – occipital a.**

**StyM – stylomastoid a.**

**Te – temporal superfic. a.**

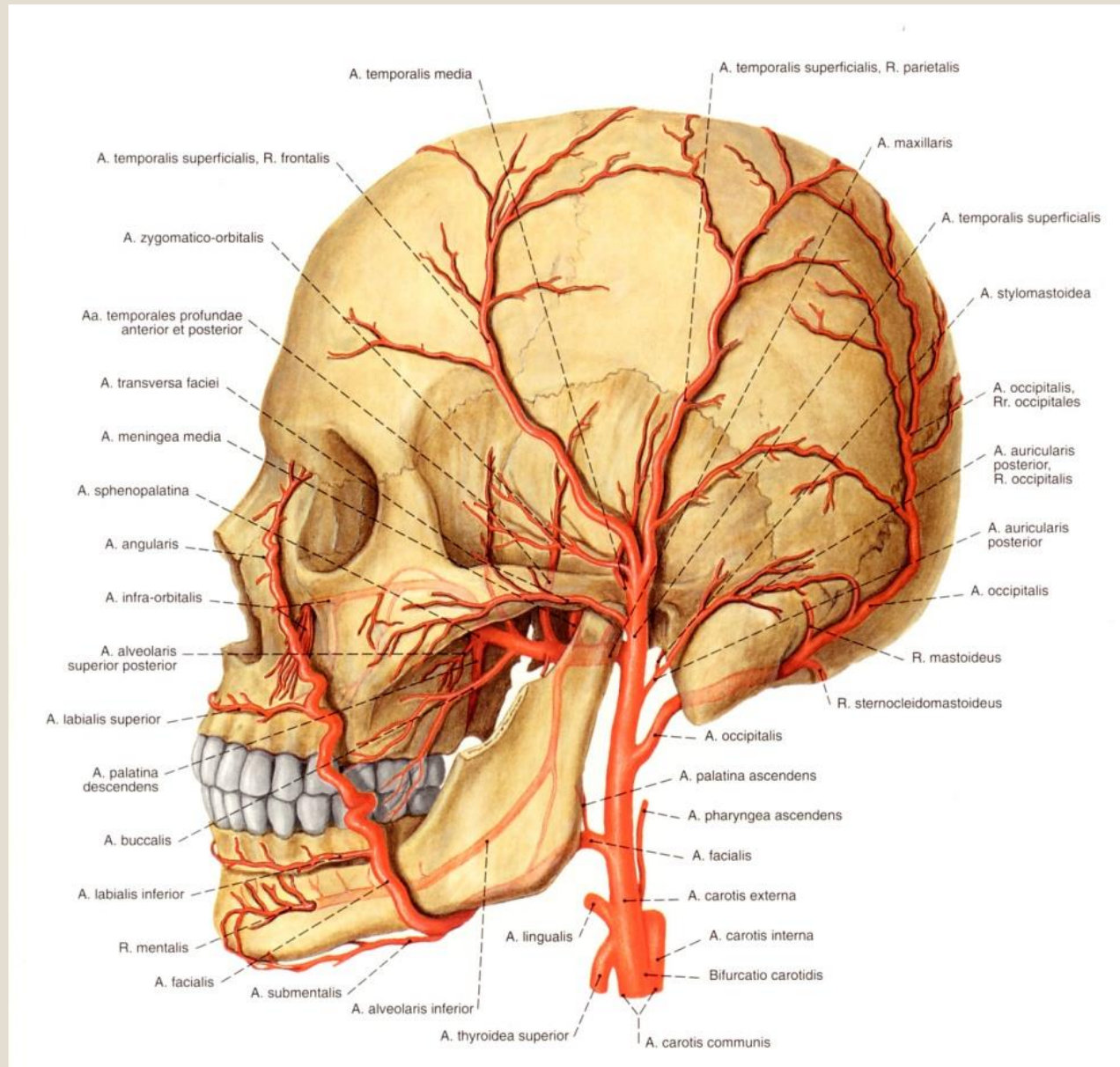
**Ma – maxillary a.**

**Fa – facial a.**

**Pha – asc. pharyngeal a.**

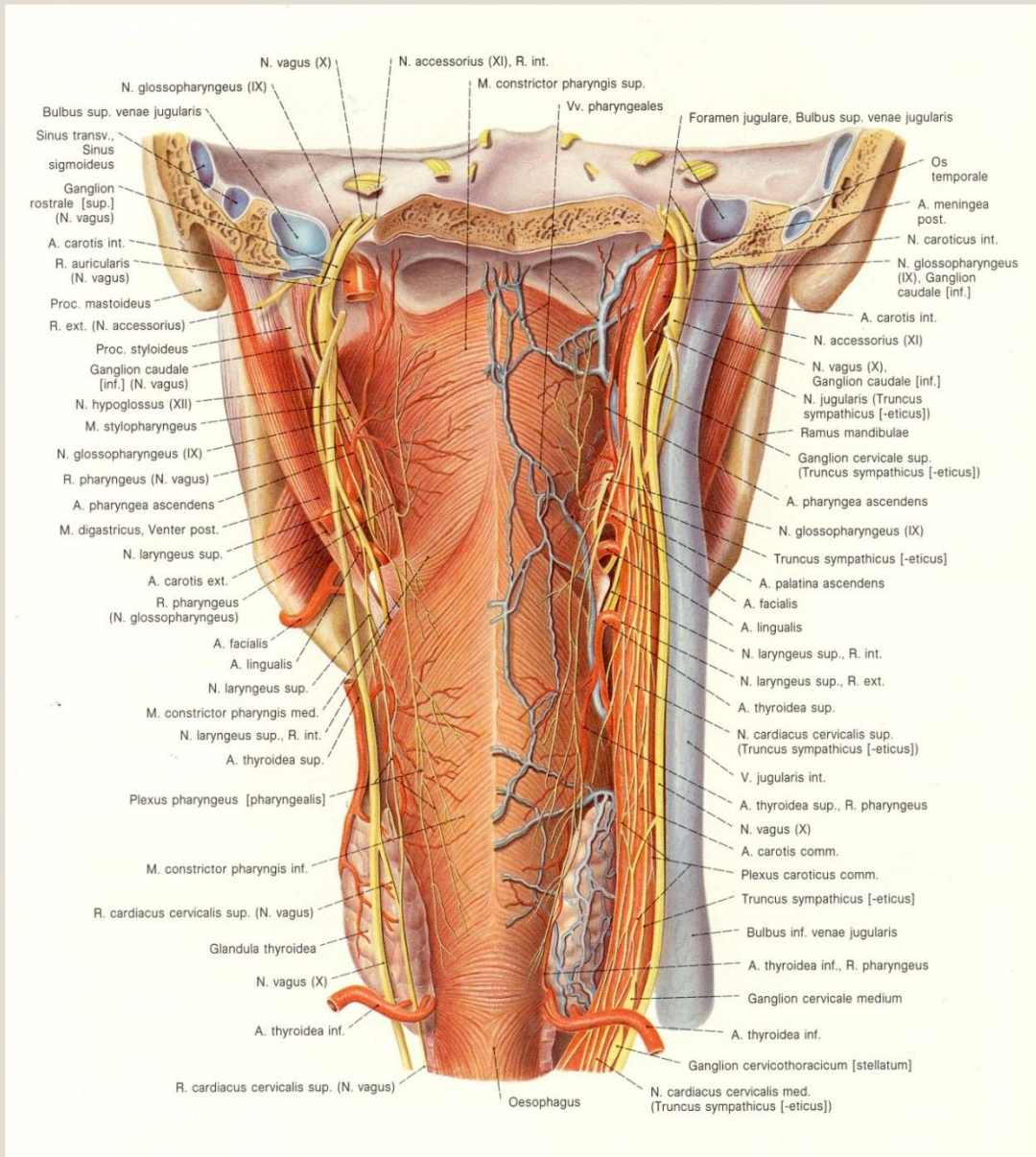
**Ly – lingual a.**

**Thy – sup. thyroid a.**





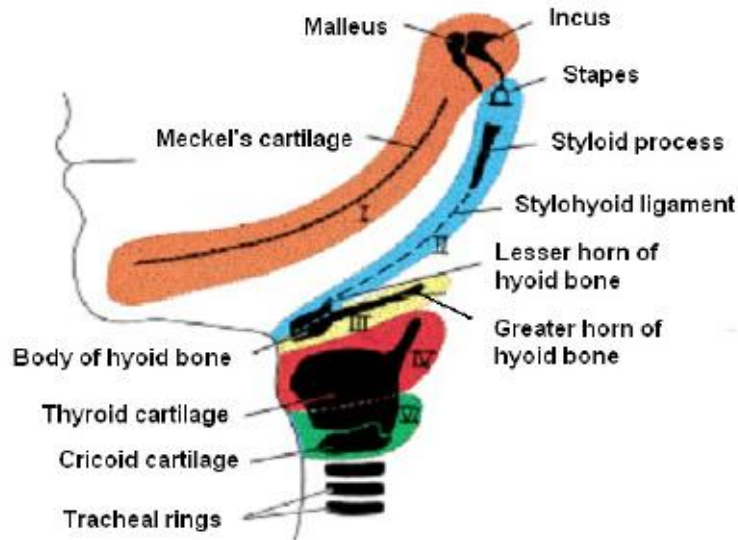
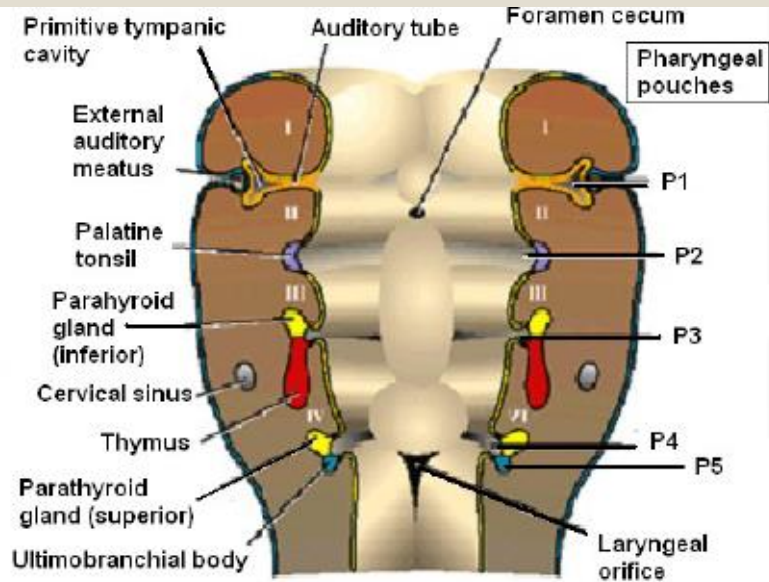
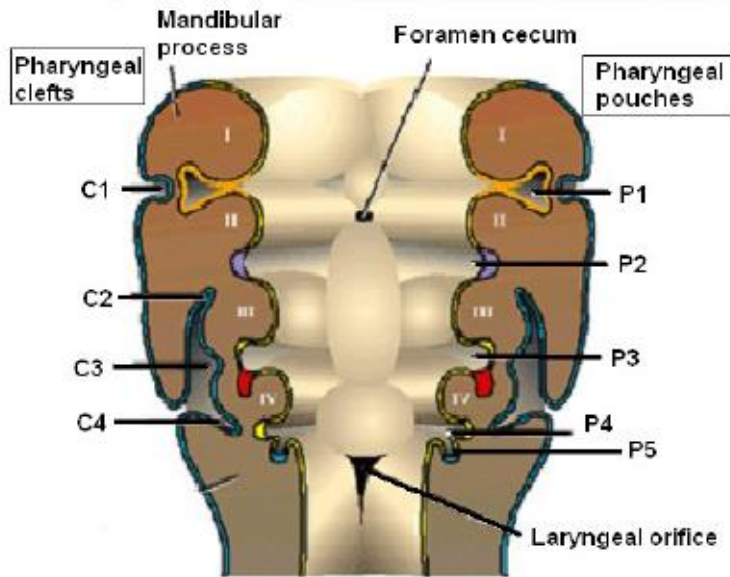
# Blood and nerve supply of the pharynx



**asc. pharyngeal aa.**  
**Pharyngeal branches:**  
**sup. thyroid aa.**  
**inf. thyroid aa.**

**Pharyngeal vv.**

**Pharyngeal plexus:**  
**Glossopharyngeal n. (CN. IX)**  
**Vagus n. (CN. X)**



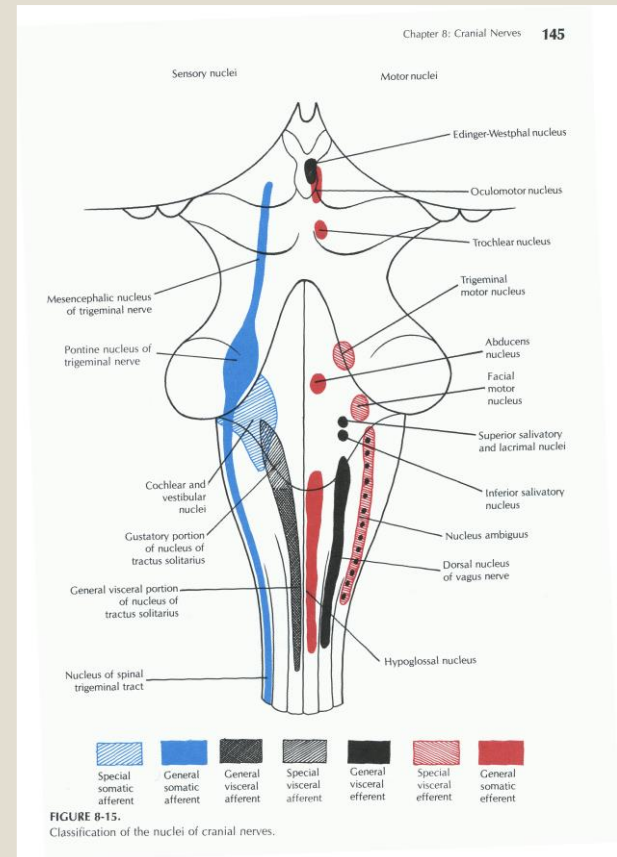
# Branchial apparatus

	Mesenchyme					Ectoderm		Endoderm
	Artery	Cartilage <sup>1</sup>	Bone <sup>1</sup>	Ligament <sup>1</sup>	Muscle <sup>2</sup>	Nerve		
<b>Pharyngeal arch</b>							<b>Clefts</b>	<b>Pouches</b>
<b>I. (mandibular)</b>	(Maxillary artery)	Meckel's (as model for mandible)	Mandible (intramembranous ossification); Malleus; Incus; (*)	Sphenomandibular lig.; Ant. lig. of malleus	<b>Mm. of mastication;</b> Tensor tympani; Tensor veli palatini; Mylohyoid; Digastric ant. belly;	Mandibular nerve (V/3.)		
							<b>C1:</b> External ac. meatus; ext. epithelium of tympanic membrane	<b>P1:</b> Auditory tube; Tympanic cavity; Int. epithelium of tympanic membrane
<b>II. (hyoid)</b>	(Stapedial artery; Hyoid artery)	Reichert's	Stapes; Styloid process; Hyoid (lesser horn and upper part of body)	Stylohyoid lig.	<b>Muscles of facial expression;</b> Stylohyoid; Digastric post. belly; Stapedius; Platysma (from Opercular proc.)	Facial nerve (VII.)		
							<b>C2:</b> (Cervical sinus)	<b>P2:</b> Epithelium of tonsillar fossa
<b>III.</b>	Internal carotid (prox. part)		Hyoid (greater horn and lower part of body)		Pharynx (upper part); Stylopharyngeus	Glossopharyngeal nerve (IX.)		
							<b>C3:</b> (Cervical sinus; Cervical vesicula)	<b>P3:</b> (Thymus) Inferior parathyroid glands
<b>IV.</b>	<i>Left:</i> Arch of aorta; <i>Right:</i> Right subclavian artery (prox. part)	Thyroid cartilage			Pharynx (lower part); Larynx: cricothyroid	Vagus nerve (X.) (Superior laryngeal nerve)		
							<b>C4:</b> (Cervical sinus)	<b>P4:</b> Thymus; Superior parathyroid glands
<b>V. (**)</b>		Thyroid cartilage			Pharynx and larynx muscles (n. XI.: arytenoid)	Vagus nerve (X.) + Accessory nerve (XI.)		
								<b>P5:</b> Ultimobranchial body, C-cells in thyroid gland
<b>VI.</b>	Right: Right pulmonary artery; Left: Left pulmonary artery and ductus art. Botalli	Cricoid cartilage (?)			Larynx muscles ('intrinsic')	Vagus nerve (X.) (Recurrent laryngeal nerve)		

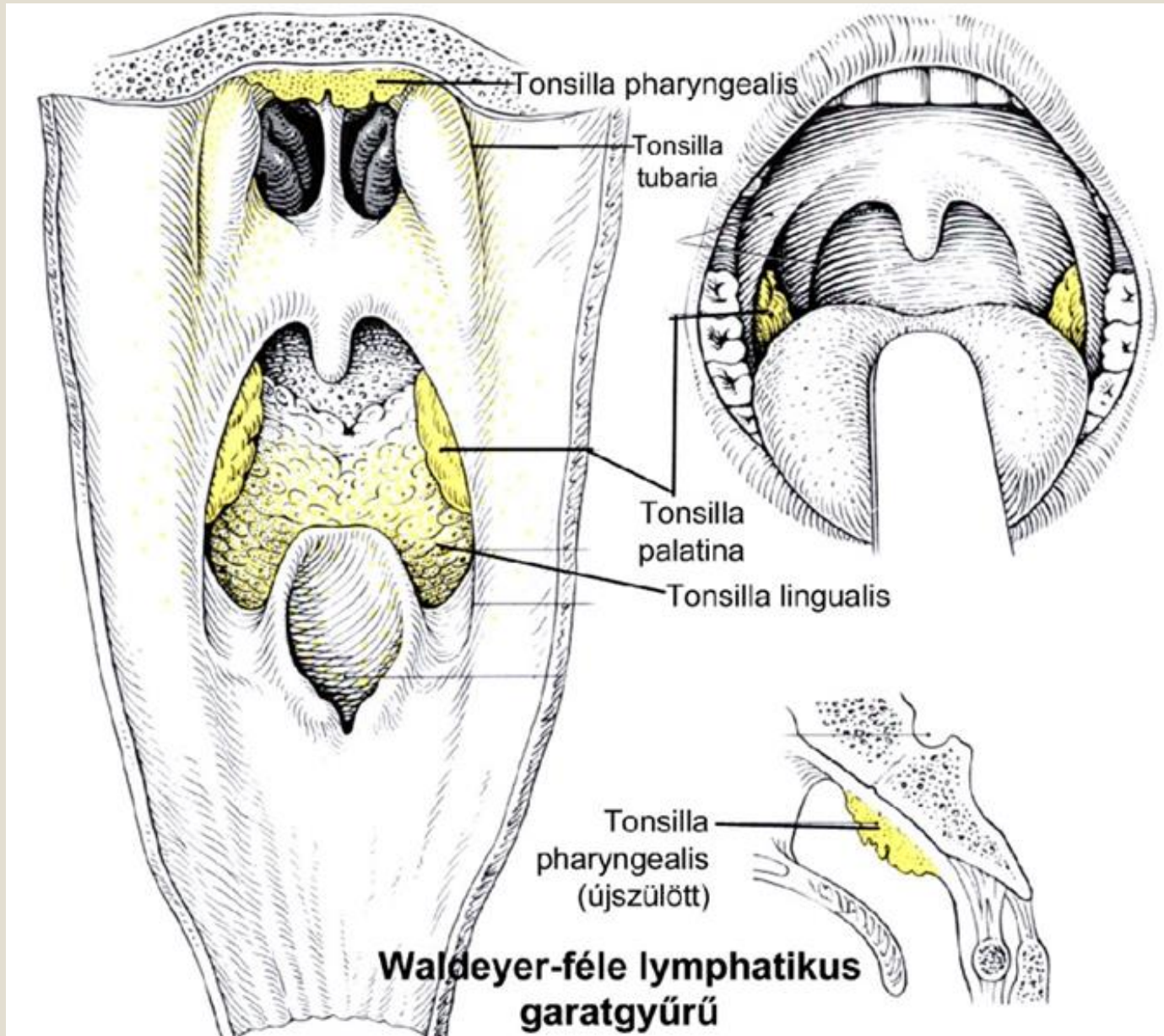
1: derivatives of neural crest (ecto-mesenchyme); 2: derivatives of paraxial mesoderm or somite (mesoderm); (\*) partially forms the maxilla (from the maxillary process of the first pharyngeal arch); (\*\*) Some authors don't give derivatives for fifth pharyngeal arch but mention them at the sixth pharyngeal arch.



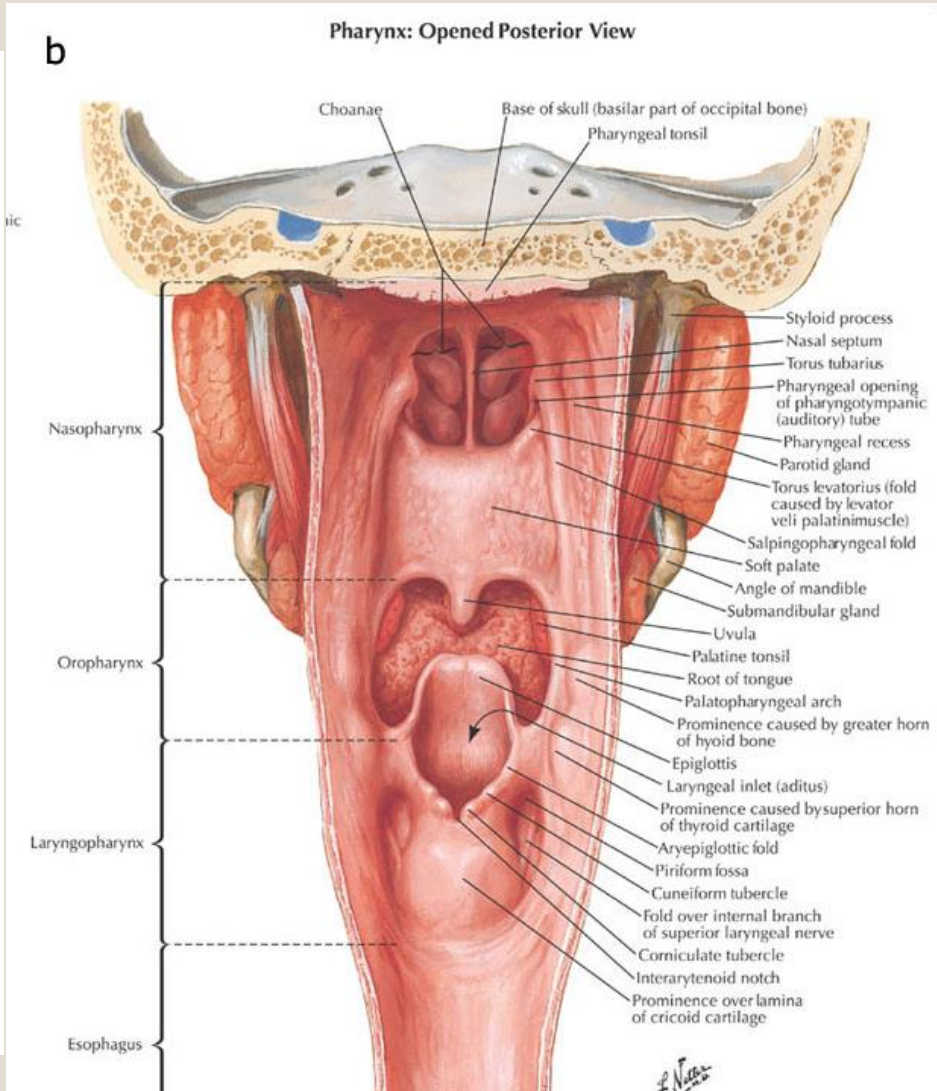
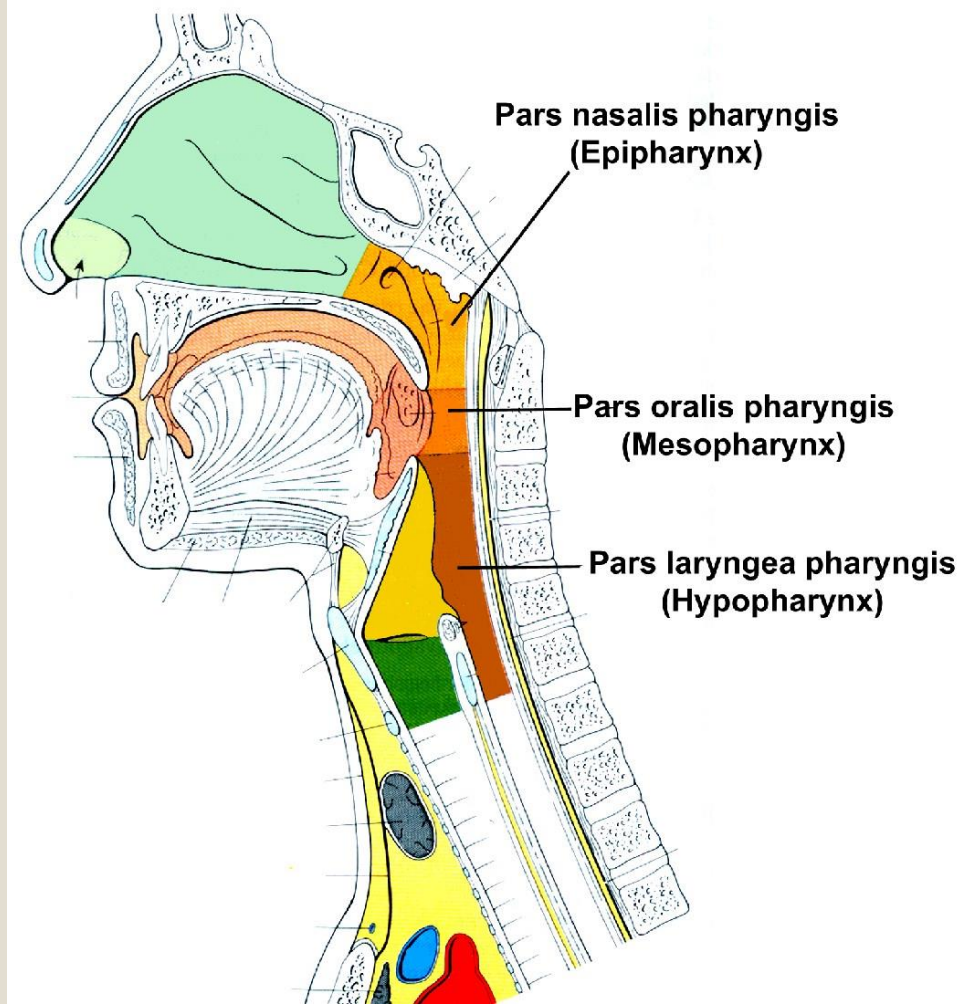
	SM -dorsomedial-	BM (=SVM) -ventrolateral-	GVM (= parasympath.)	GVS (from e.g. baroreceptors, chemoreceptors)	SVS (= taste)	GSS	SSS
III.	Oculomotor nucl.		Accessory oculomotor nucl. (Westphal-Edinger)				
IV.	Trochlear nucl.						
V.		Motor. trigeminal nucl.				<ul style="list-style-type: none"> <li>• <b>Mesencephalic trigeminal nucl.</b> (<i>ganglion cells in the CNS!</i>) Proprioceptive.</li> <li>• <b>Princeps sensory nucl.</b> (pontine nucl.) of trigeminal nerve. Epicritic.</li> <li>• <b>Spinal trigeminal nucl.</b> (receives fibres from CN V.,VII.,,IX.,X.) Protopathic.</li> </ul>	
VI.	Abducent nucl.						
VII.		Facial nucl.	Sup. salivatory nucl.		Solitary tract nucl.	(+)	
VIII.							- Cochlear nuclei (dors. and ventral) - Vestibular nuclei (sup., inf., med., lat.)
IX.		Ambiguous nucl.	Inf. salivatory nucl.	Lat. ala cinerea nucl.	Solitary tract nucl.	(+)	
X.			Medial ala cinerea nucl. (=dorsal vagal nucl.)		Solitary tract nucl.	(+)	
XI.	(C <sub>1-6</sub> motoneurons)						
XII.	Hypoglossal nucl.						
Spinal n.	+		+	+		+	



# Cavity of the pharynx – Lymphatic ring of Waldeyer

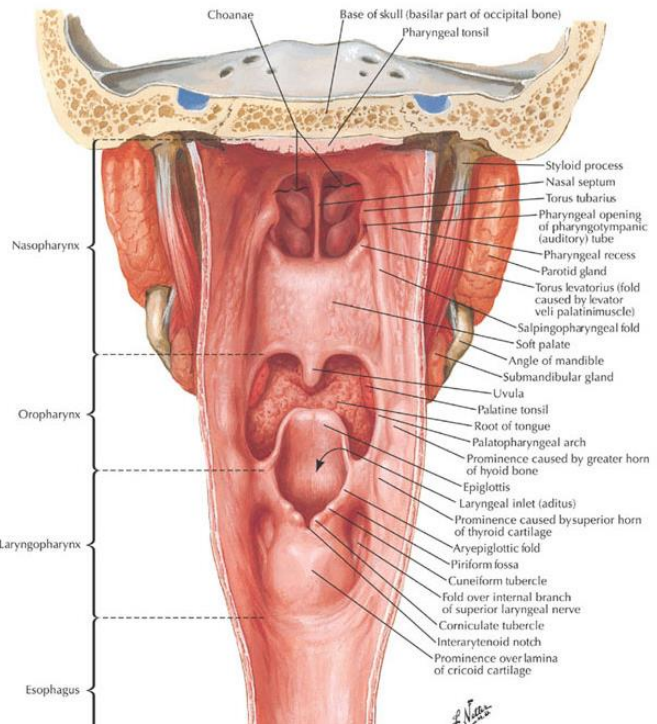


# Cavity of the pharynx

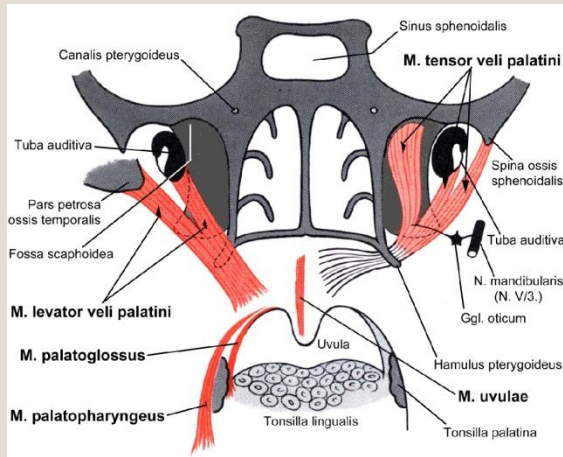




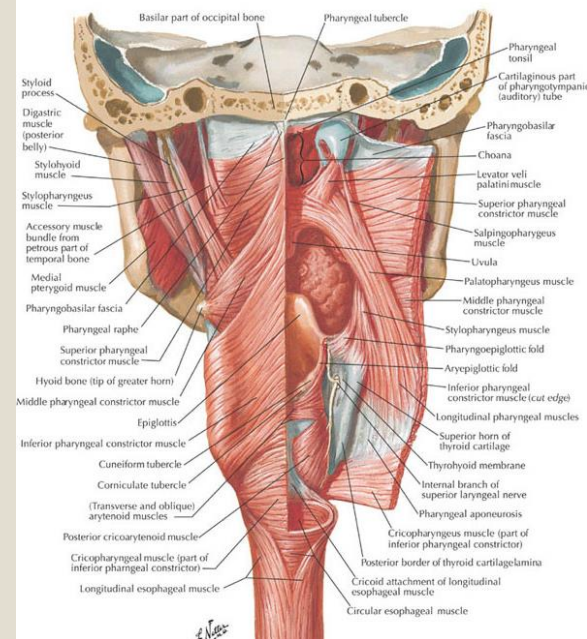
**b** Pharynx: Opened Posterior View



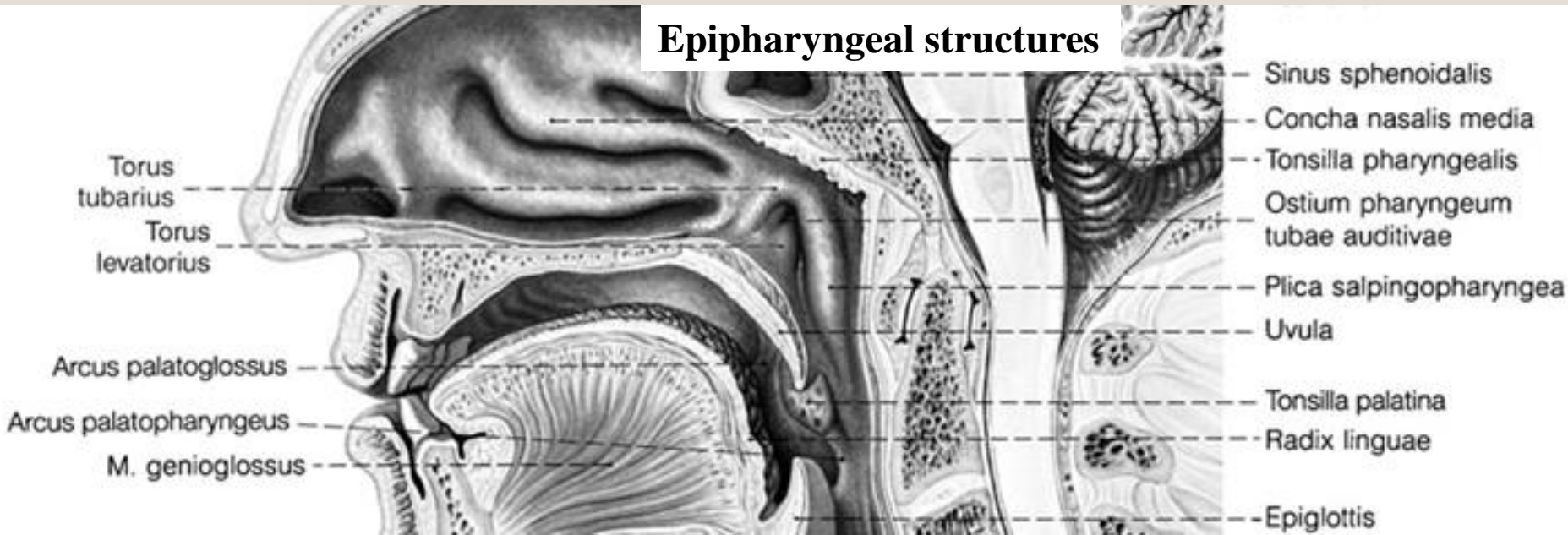
# Cavity of the pharynx - epipharynx



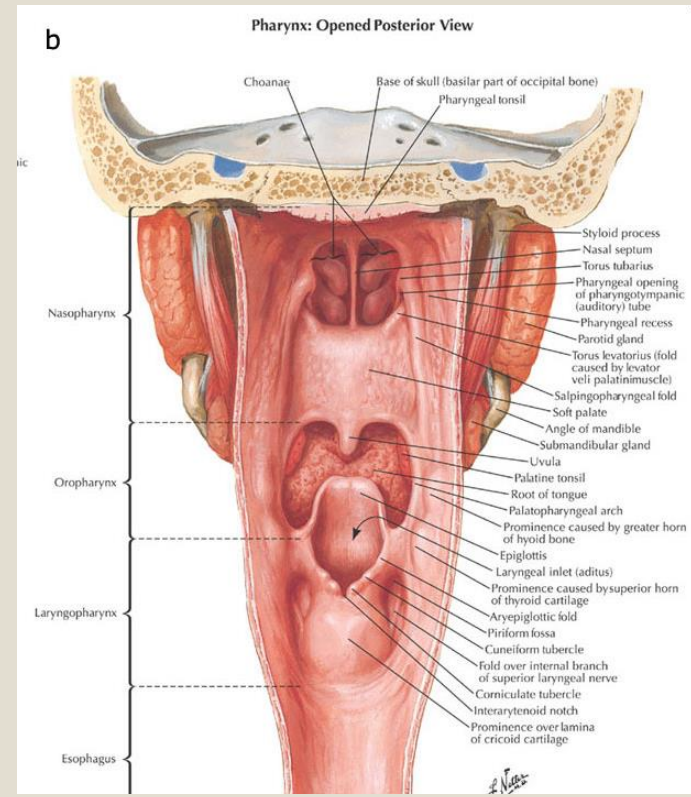
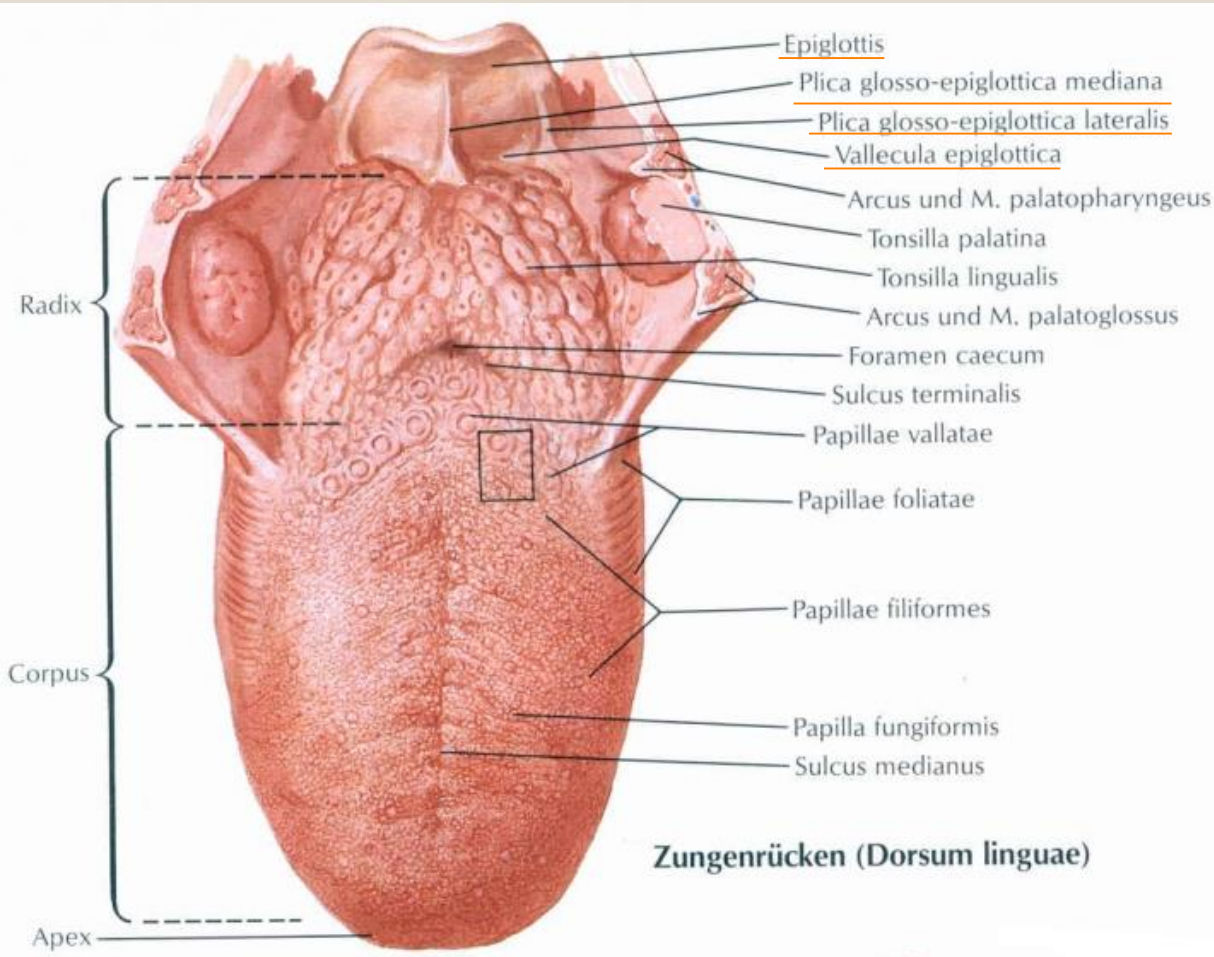
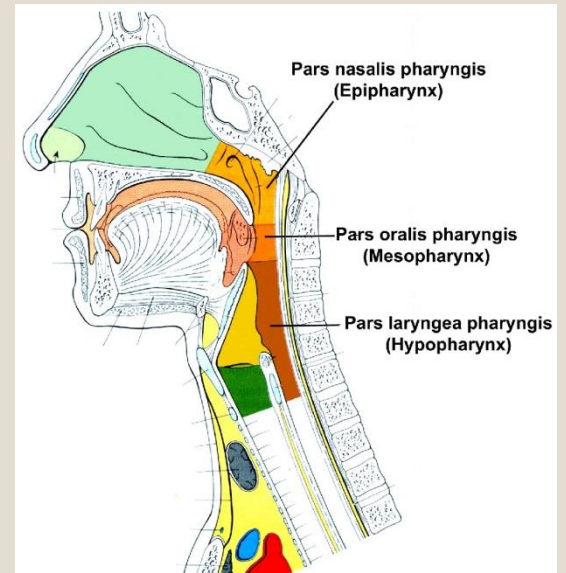
**a** Muscles of Pharynx: Partially Opened Posterior View



## Epipharyngeal structures

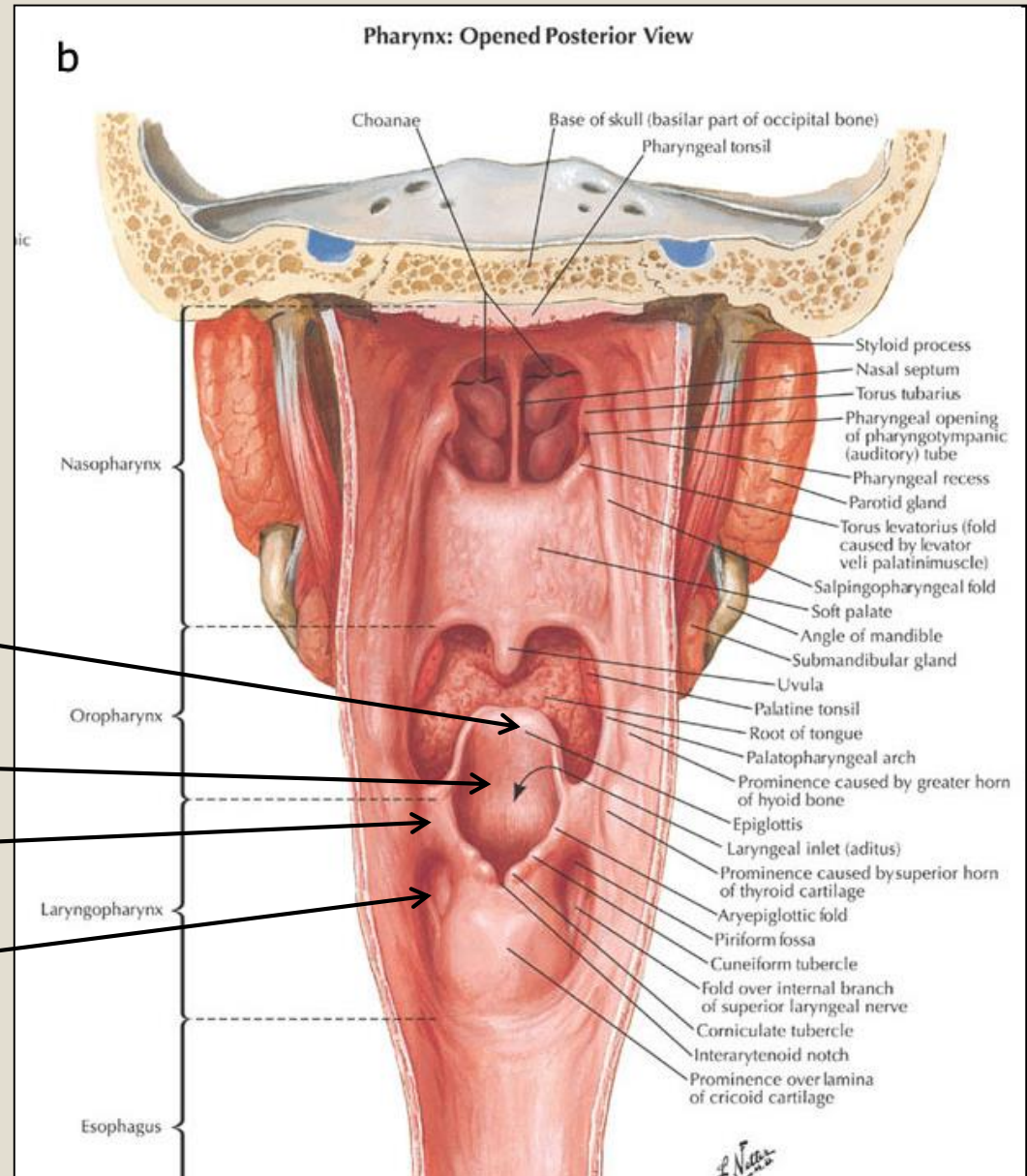
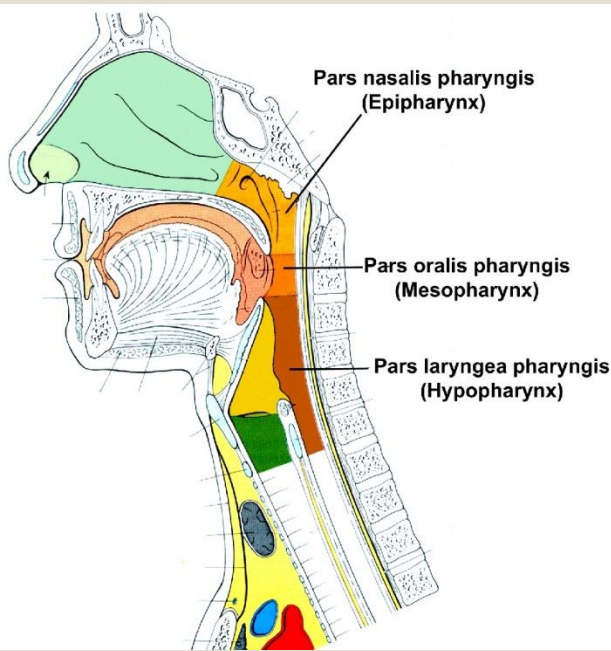


# Cavity of the pharynx - mesopharynx





# Cavity of the pharynx - hypopharynx



**Epiglottis**

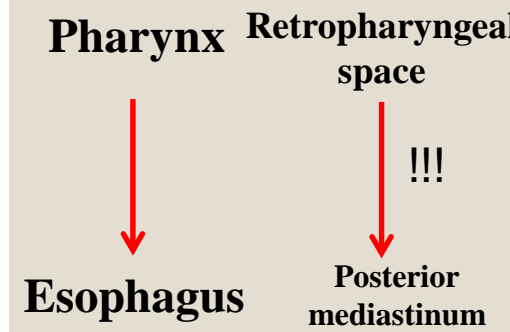
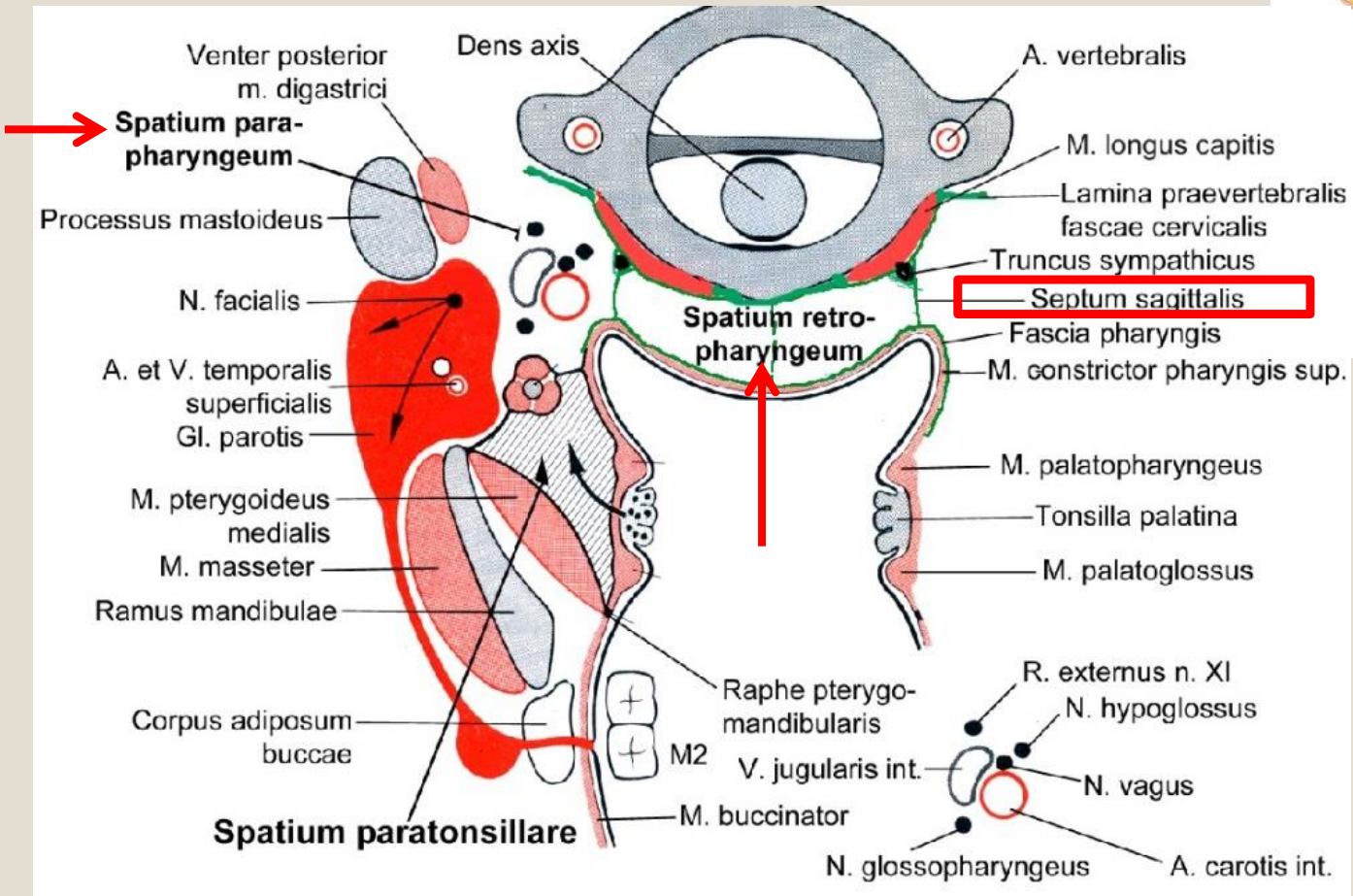
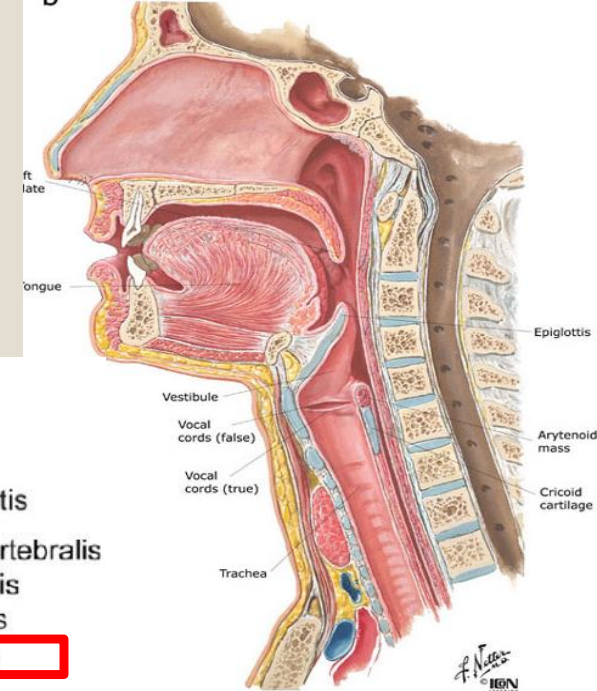
**Aditus laryngis**

**Aryepiglottic fold**

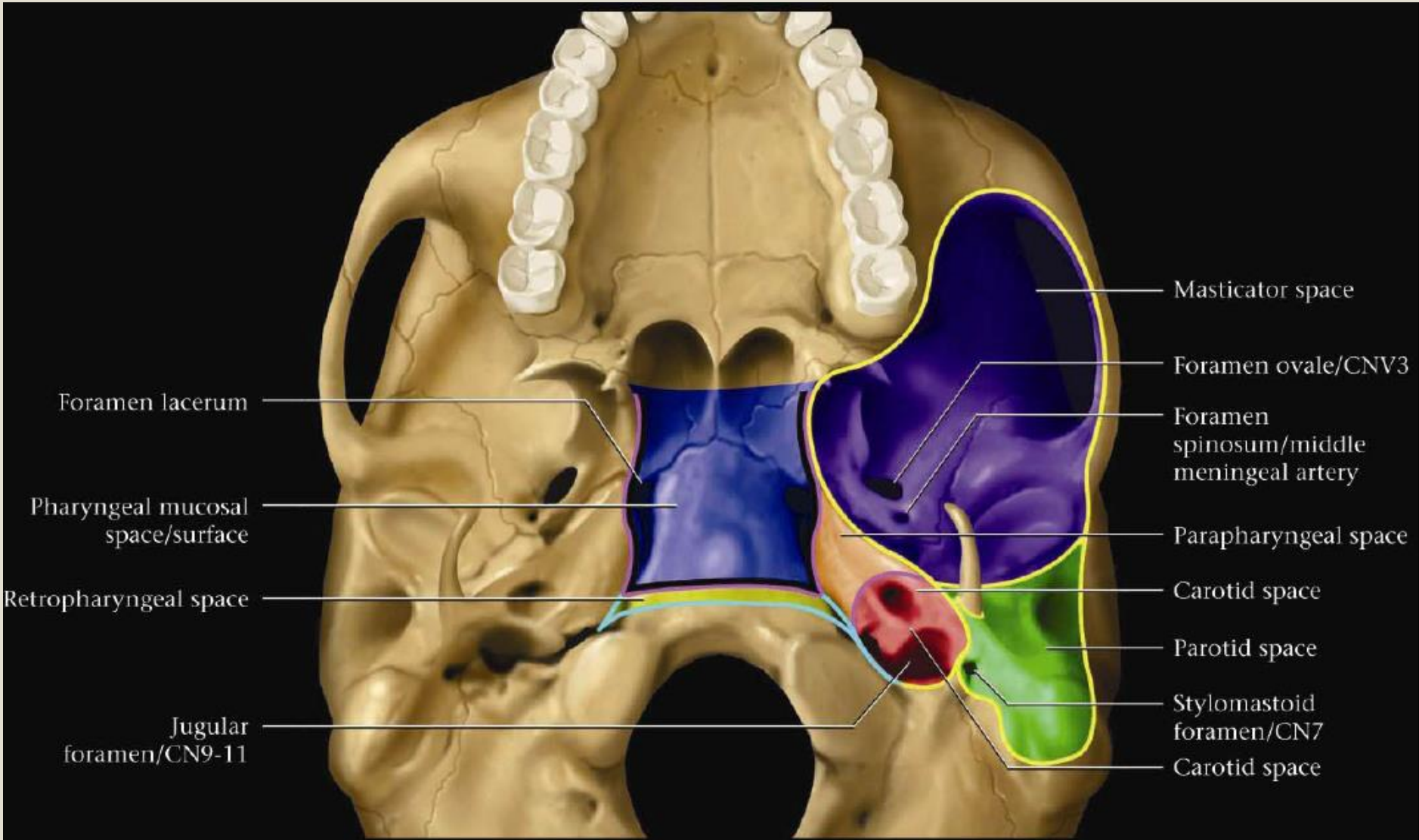
**Piriform recess**



# → Pharyngeal spaces (spatium)



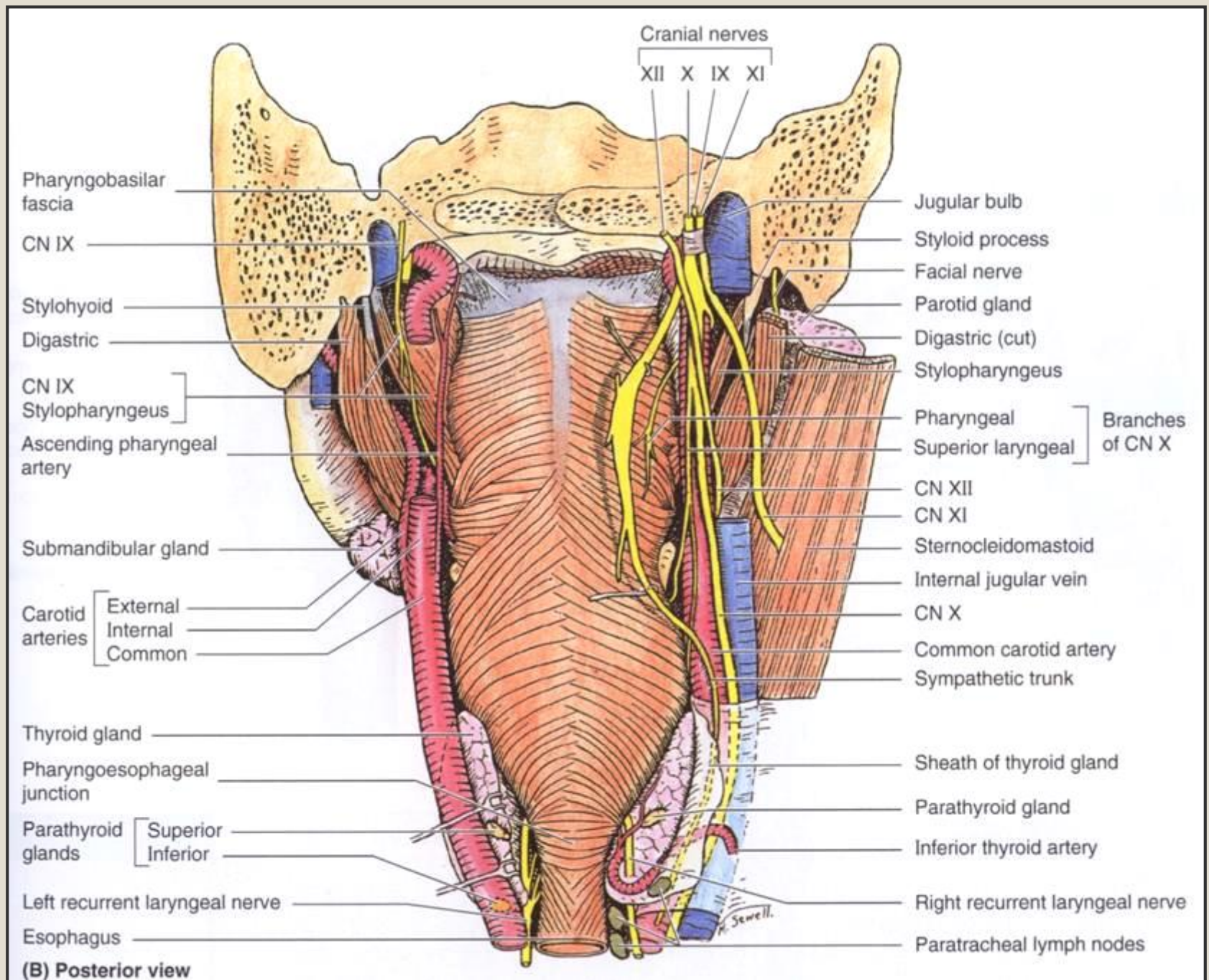
# Spaces

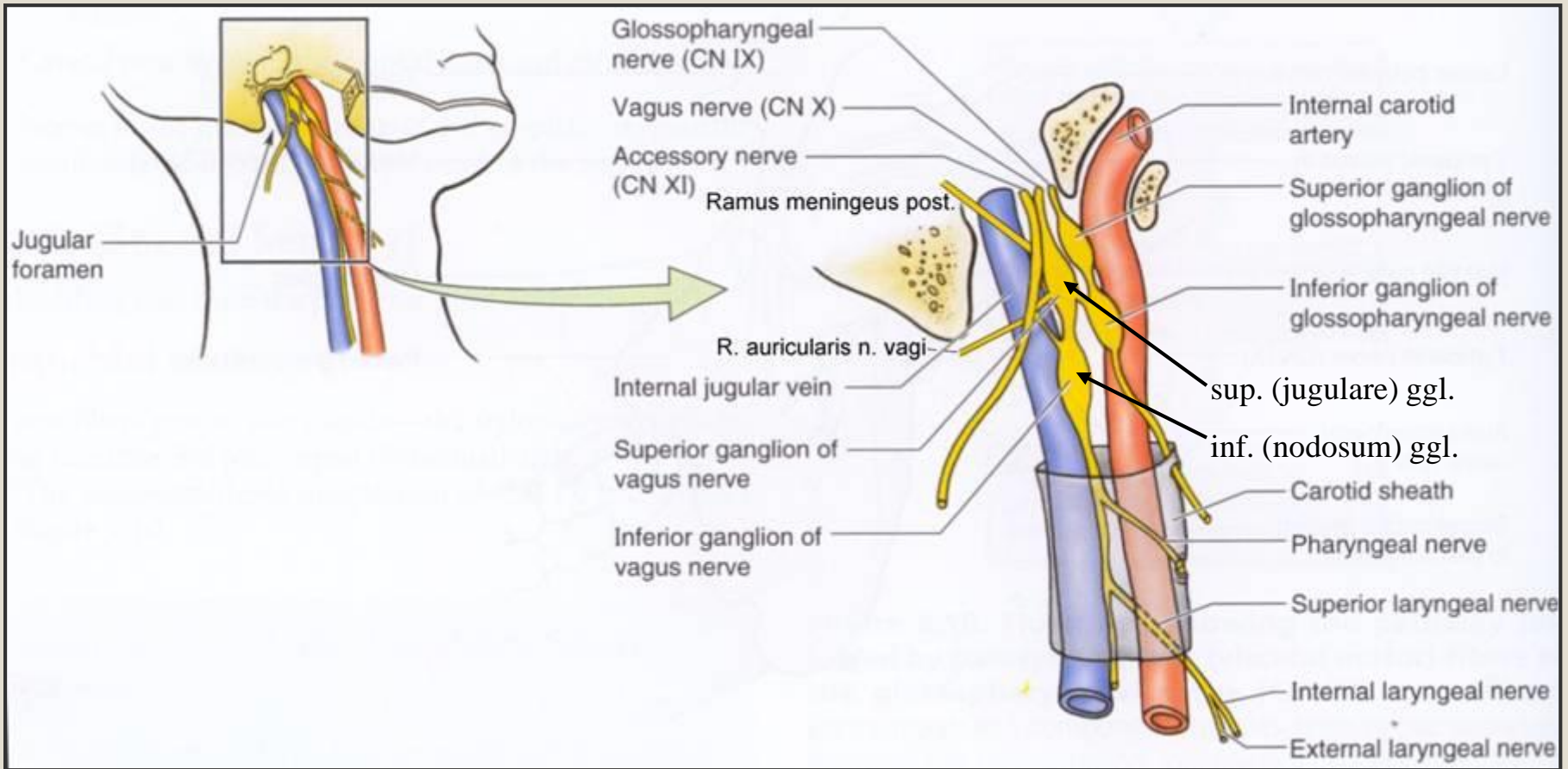


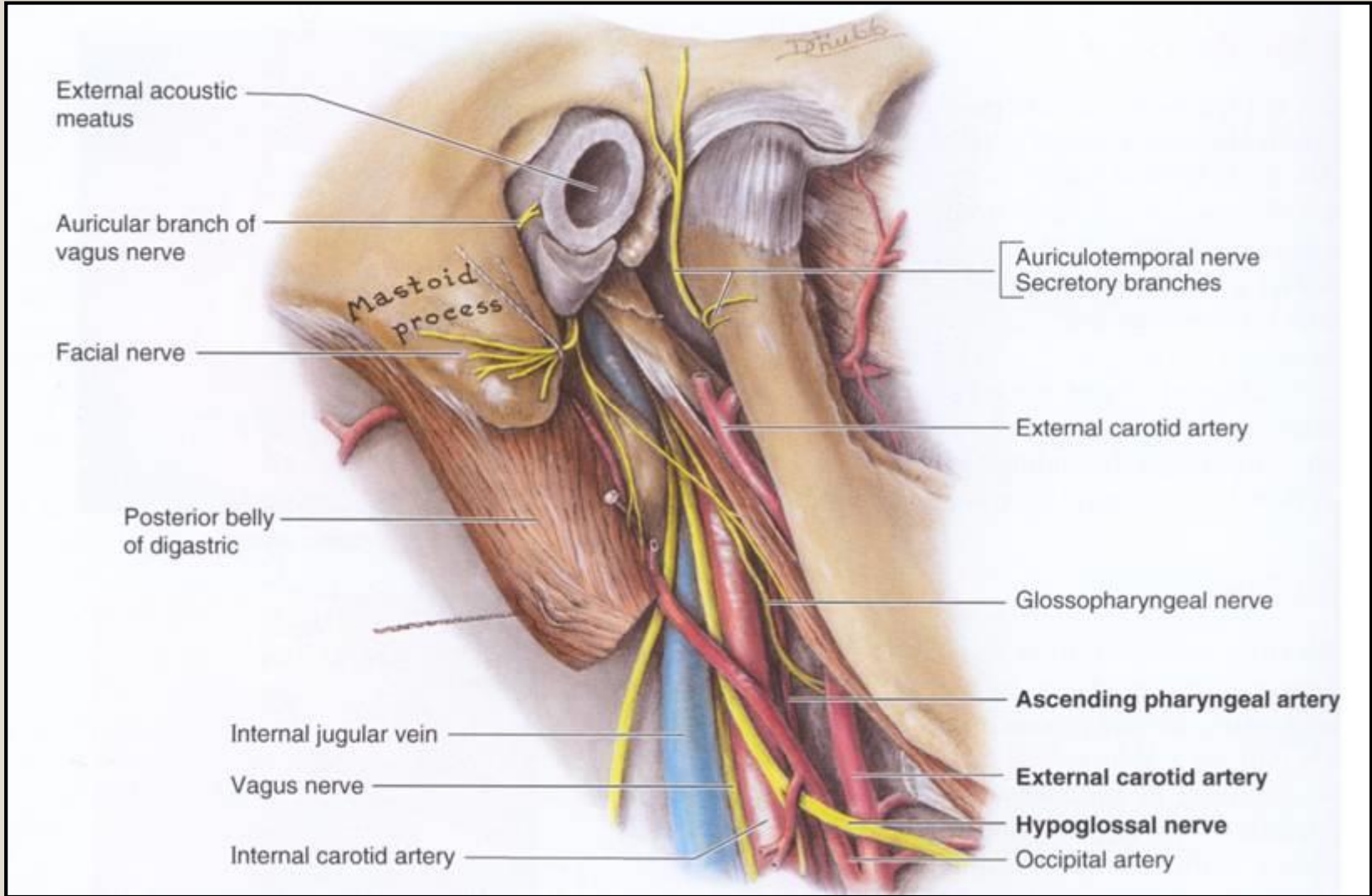




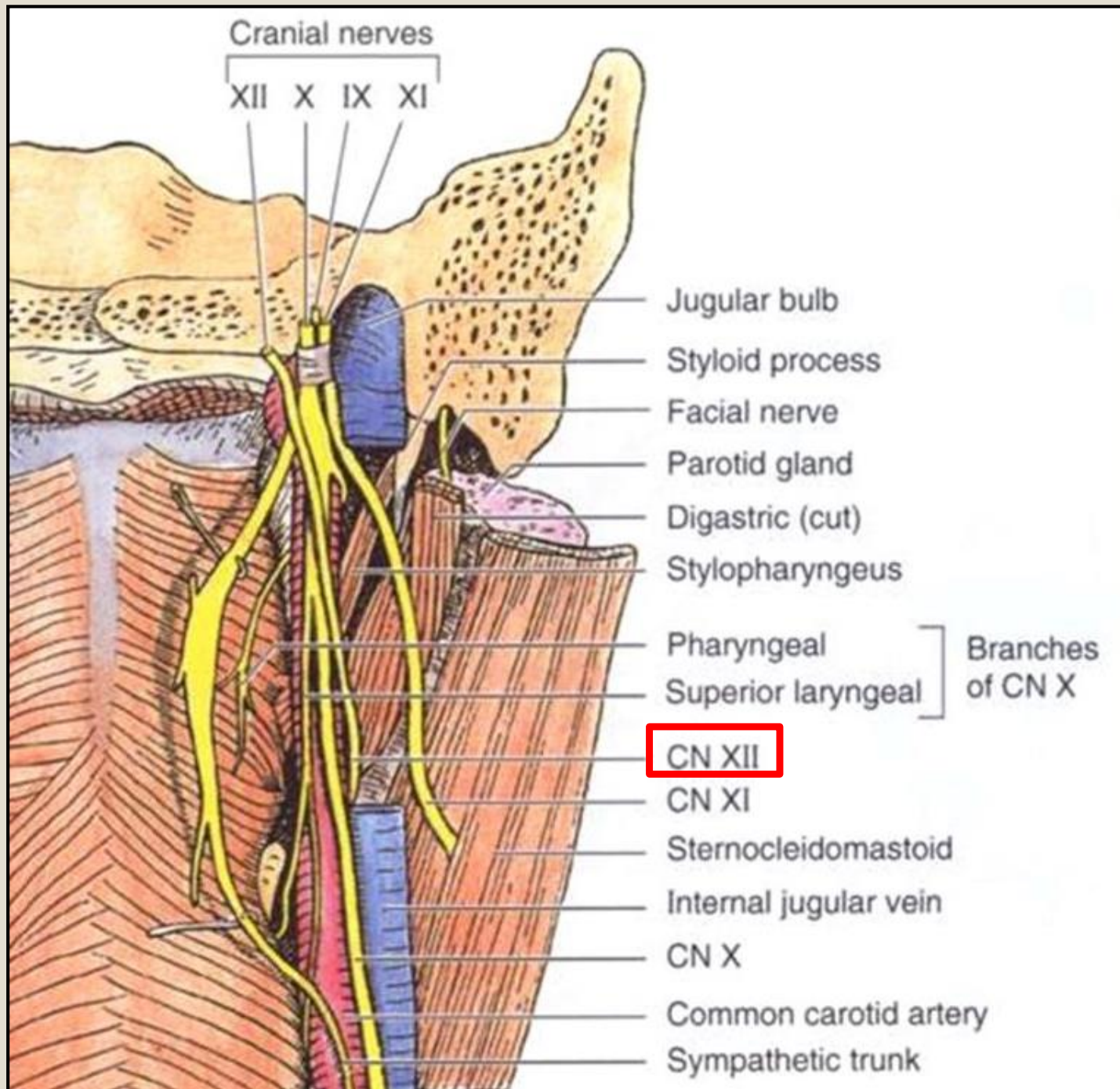




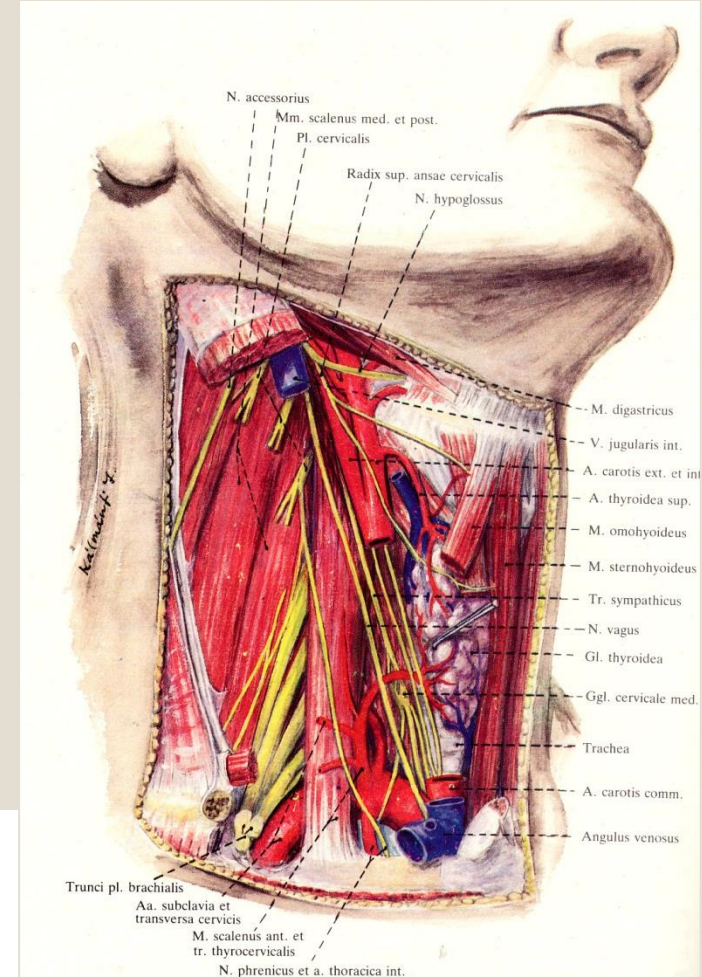
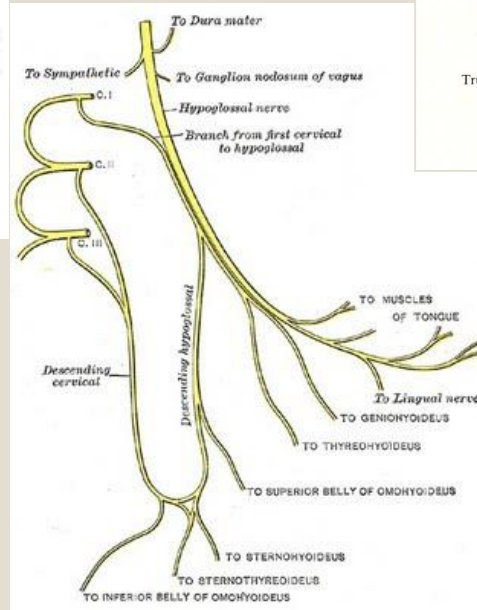
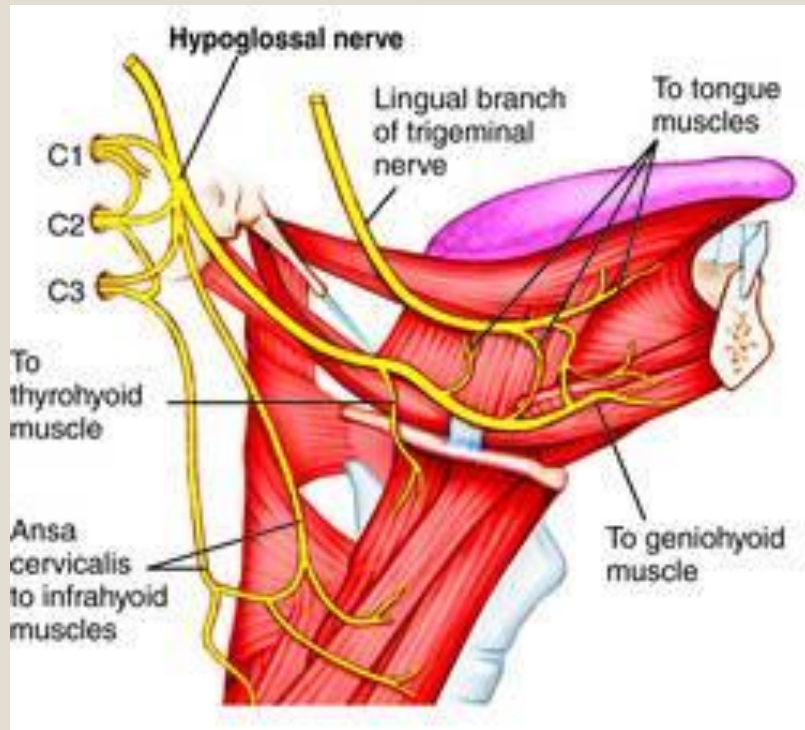




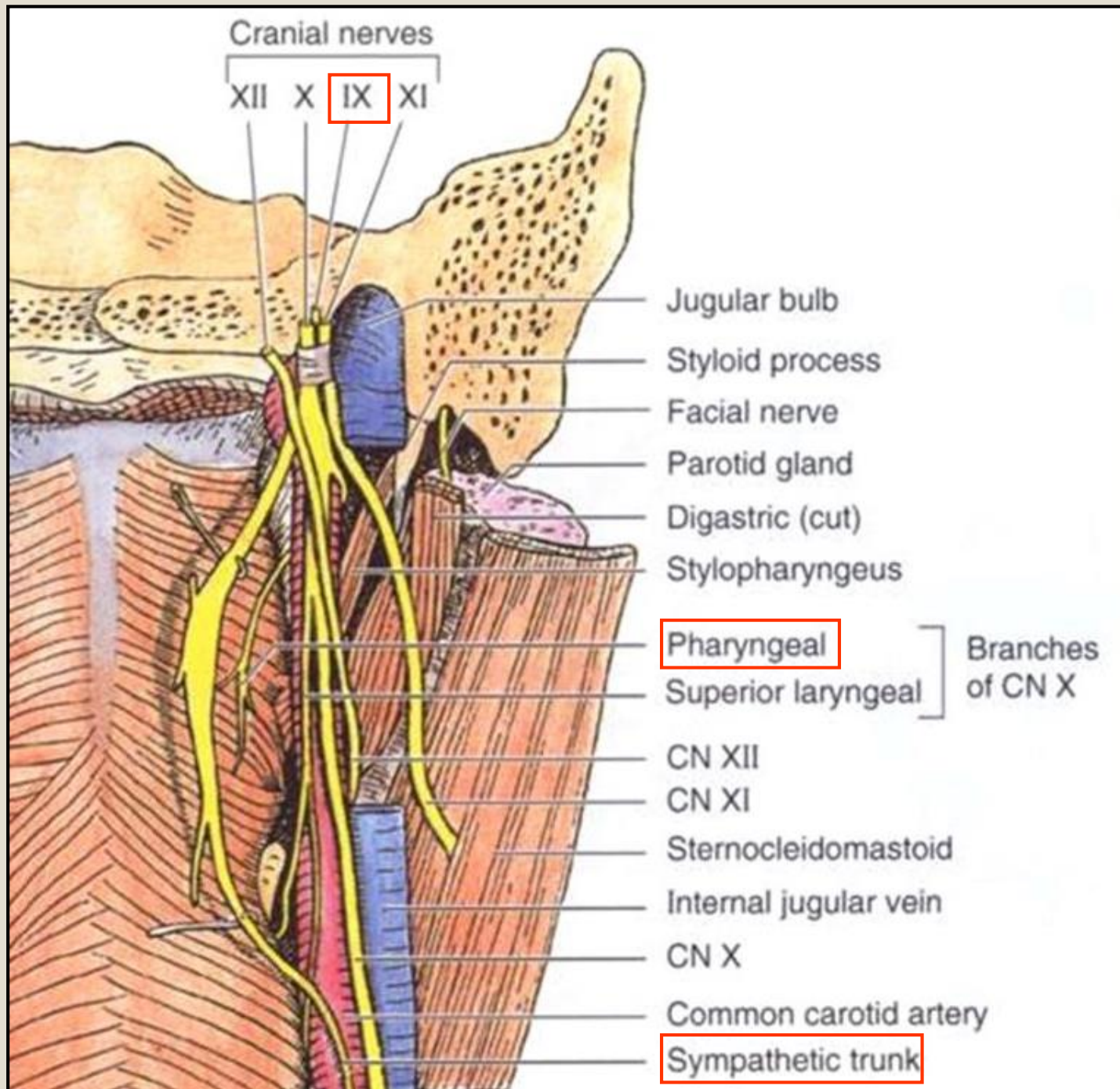




# Hypoglossal nerve – Deep cervical ansa







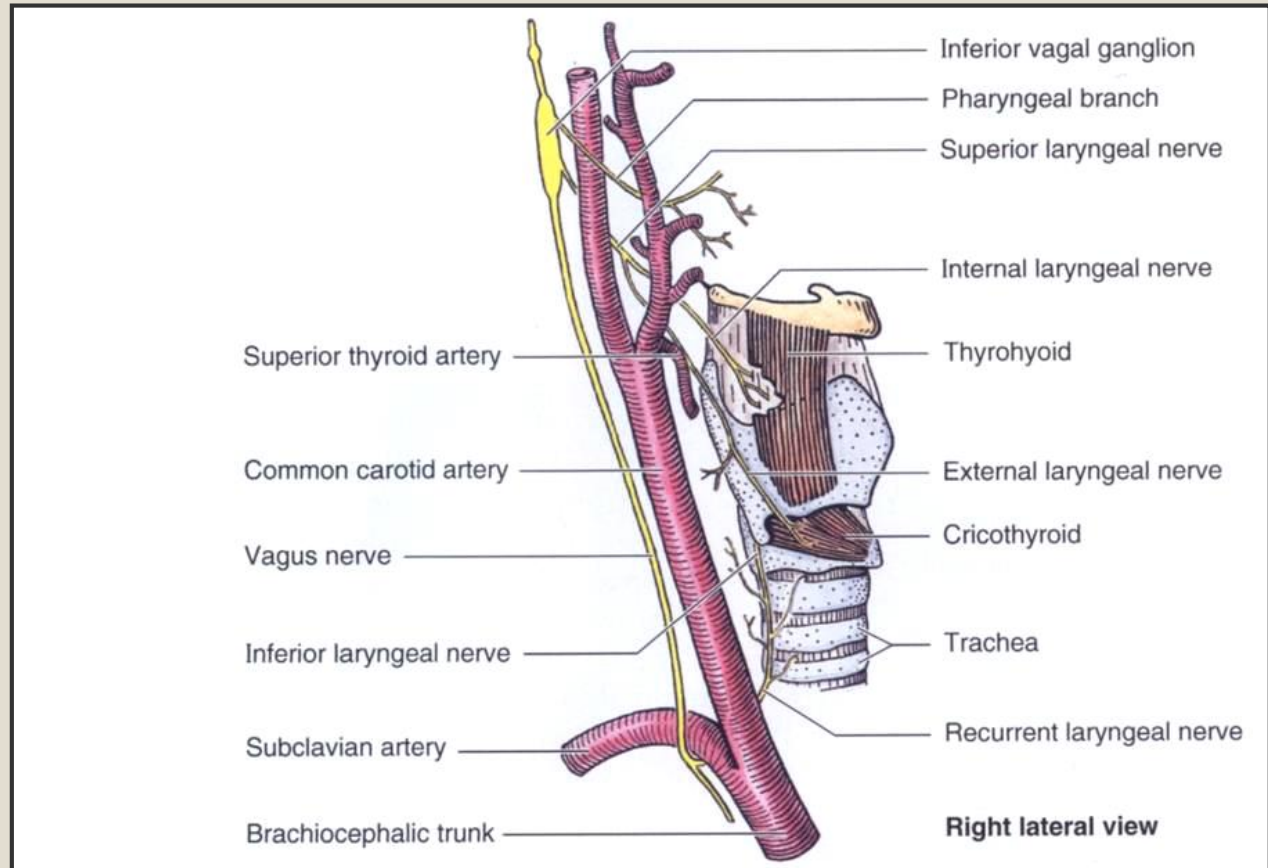
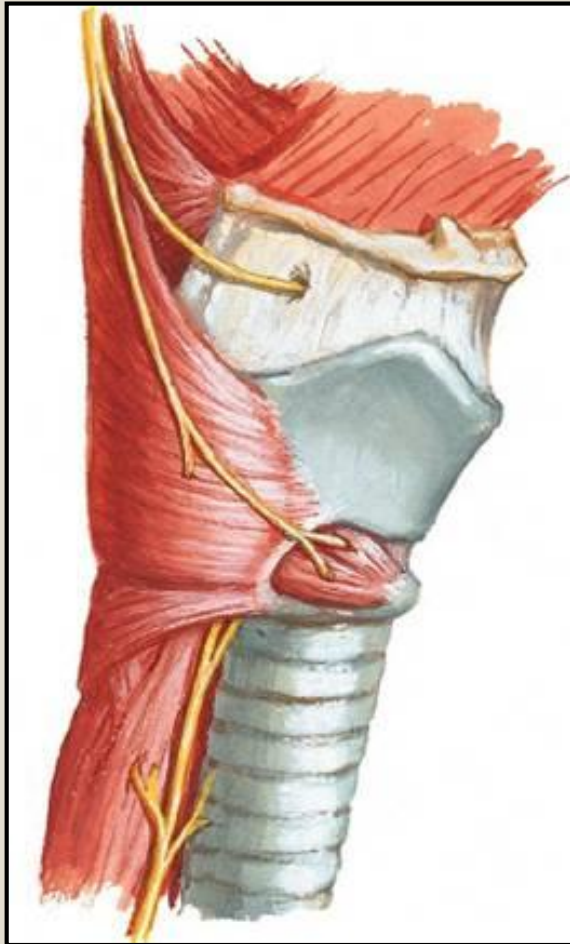


# Sup. laryngeal nerve

r. externus ( cricothyroid m.)

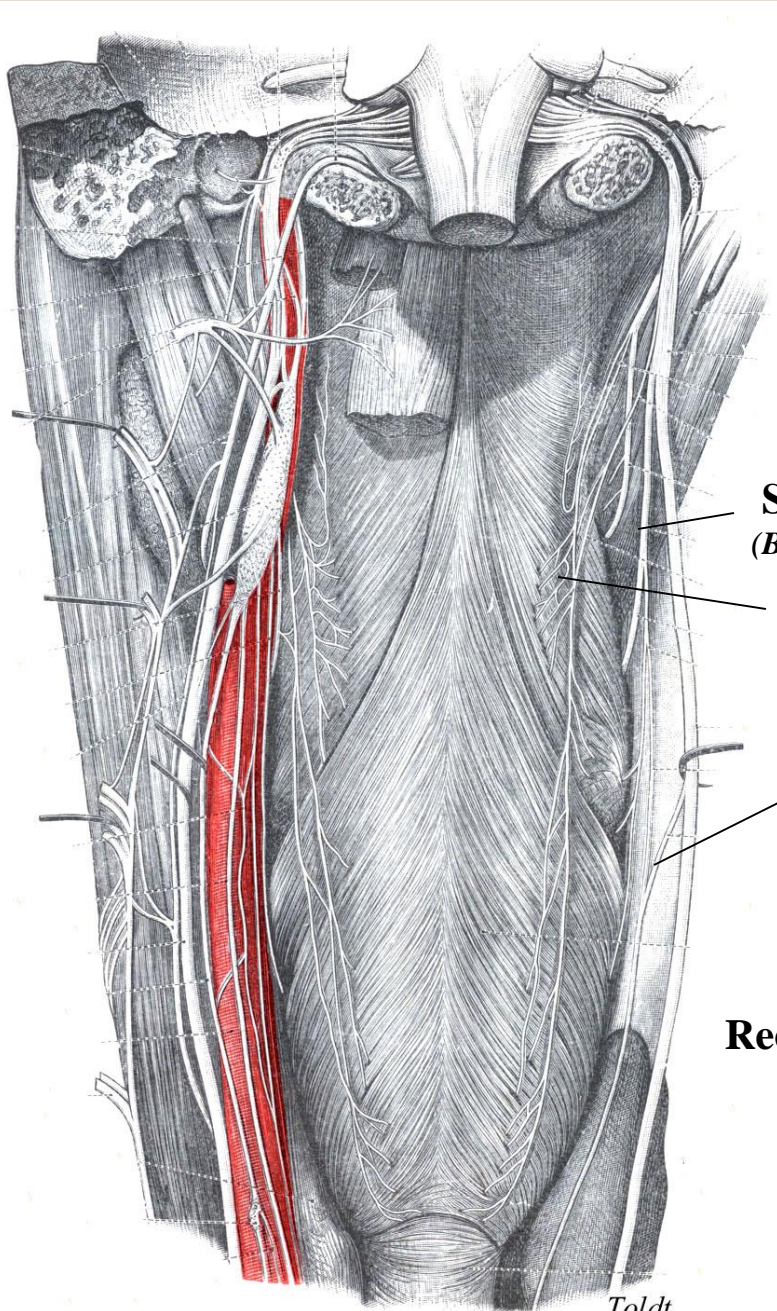
r. internus

# Recurrent and inf. laryngeal nerve





# Cranio-cervical part of the vagus

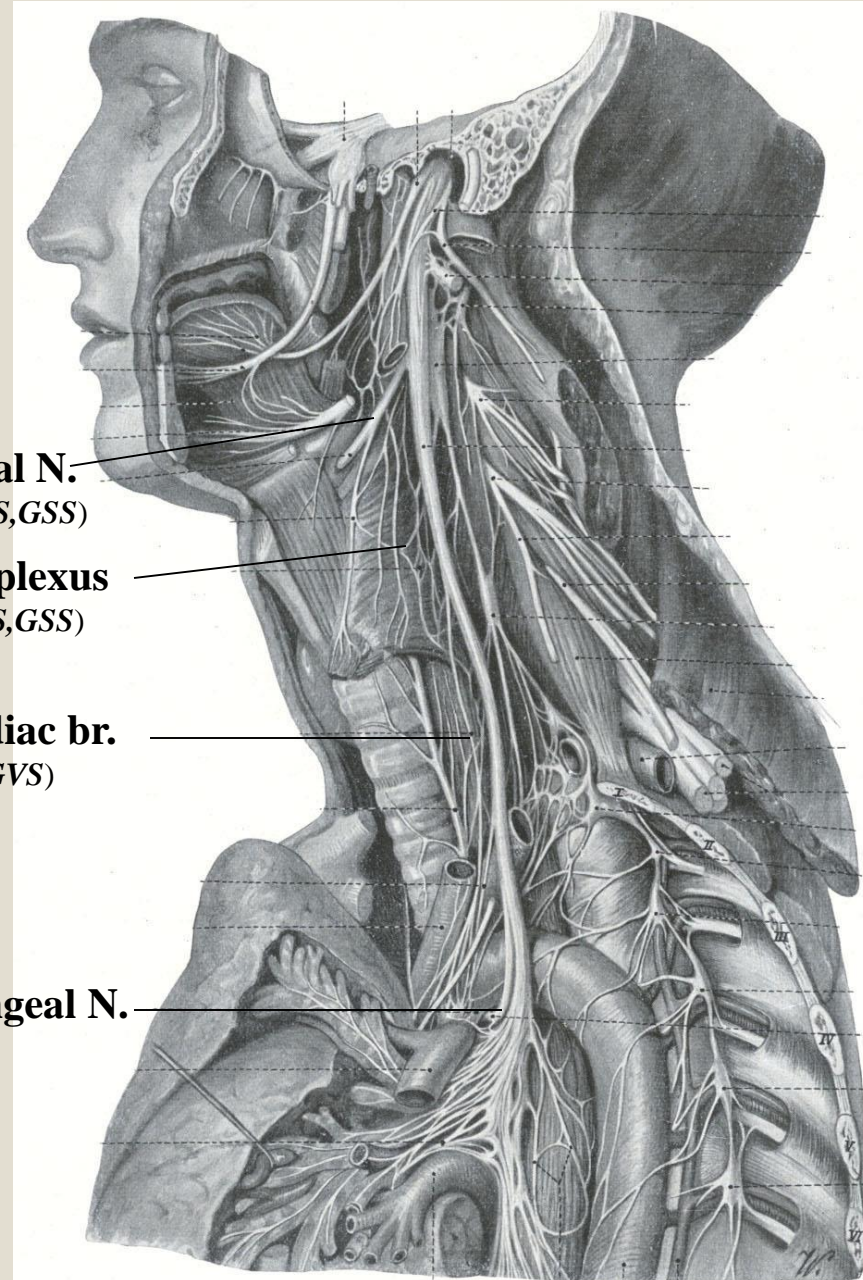


**Sup. Laryngeal N.**  
(*BM, GVM, GVS, SVS, GSS*)

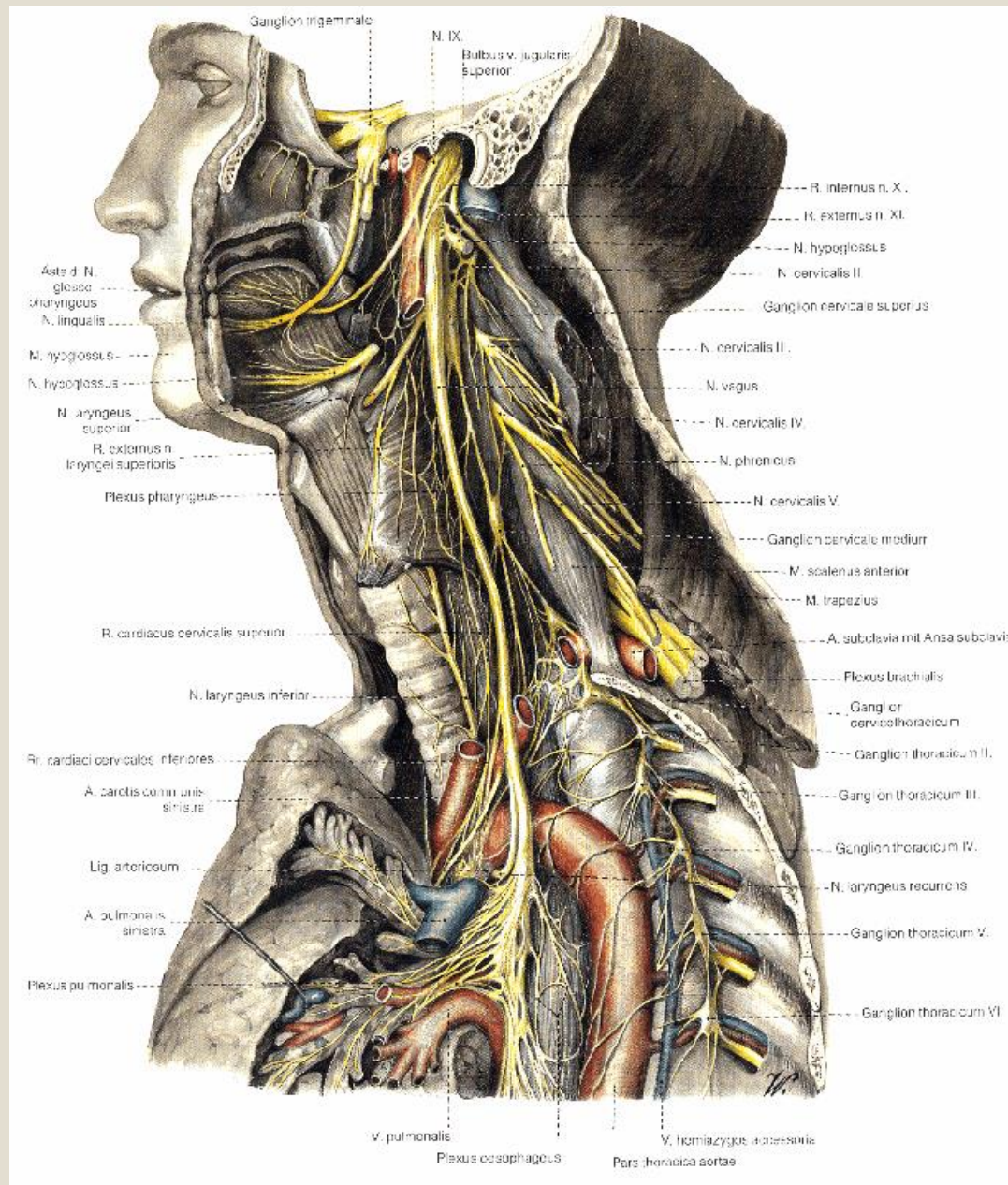
**Pharyngeal plexus**  
(*BM, GVM, GVS, GSS*)

**Sup. cardiac br.**  
(*GVM, GVS*)

**Recurrent laryngeal N.**  
(*BM, GVM, GVS*)

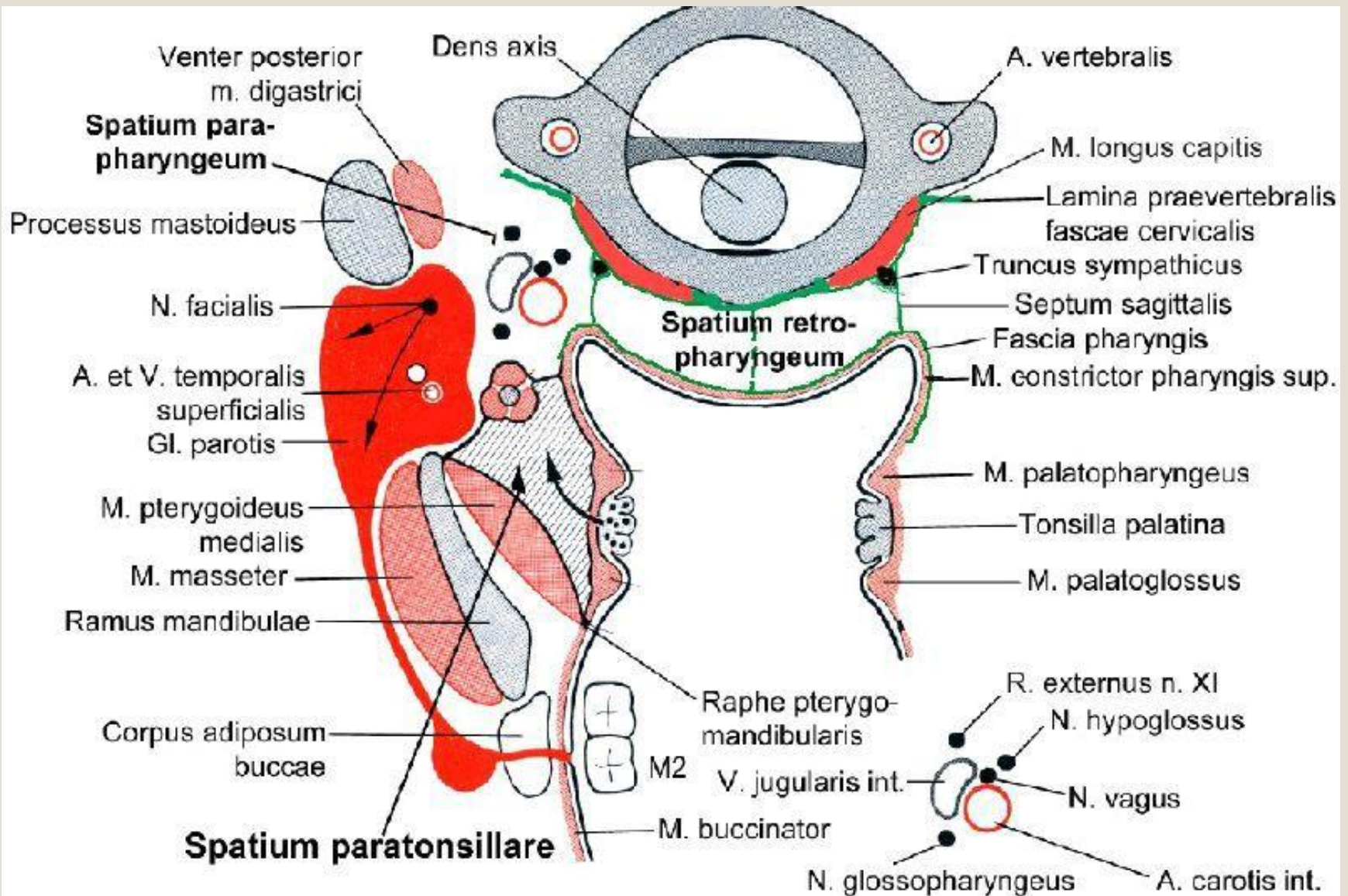


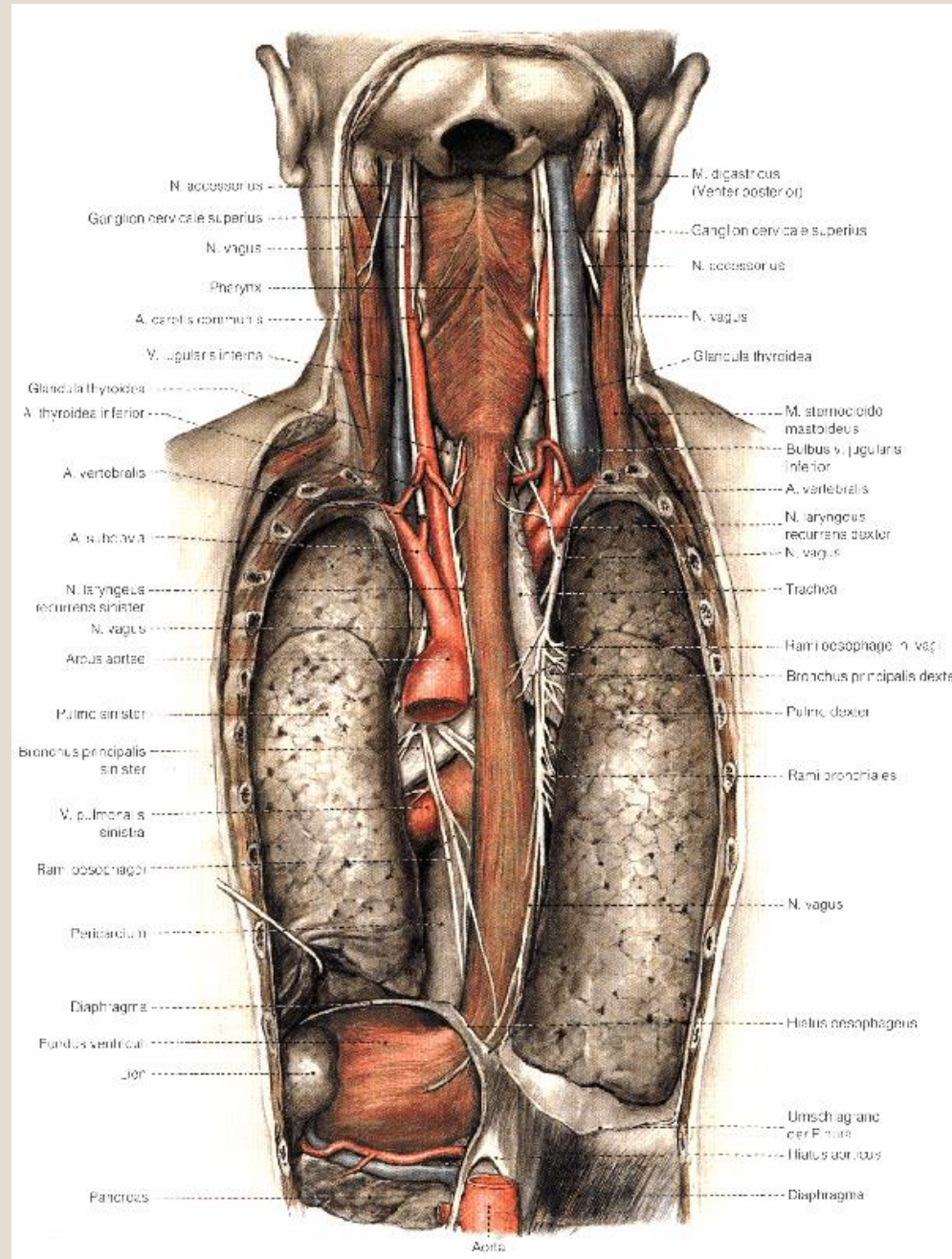




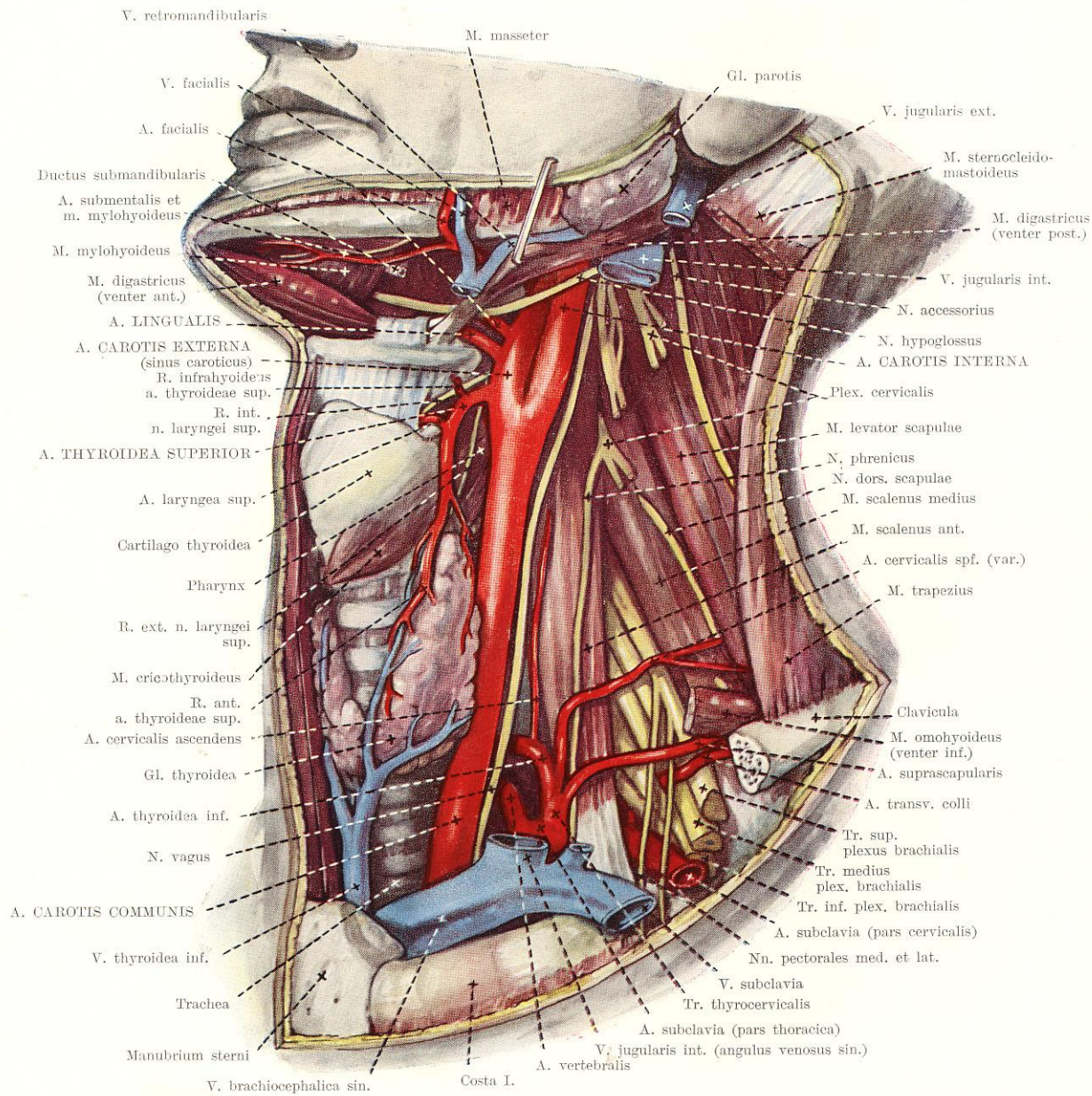


# Pharyngeal topography

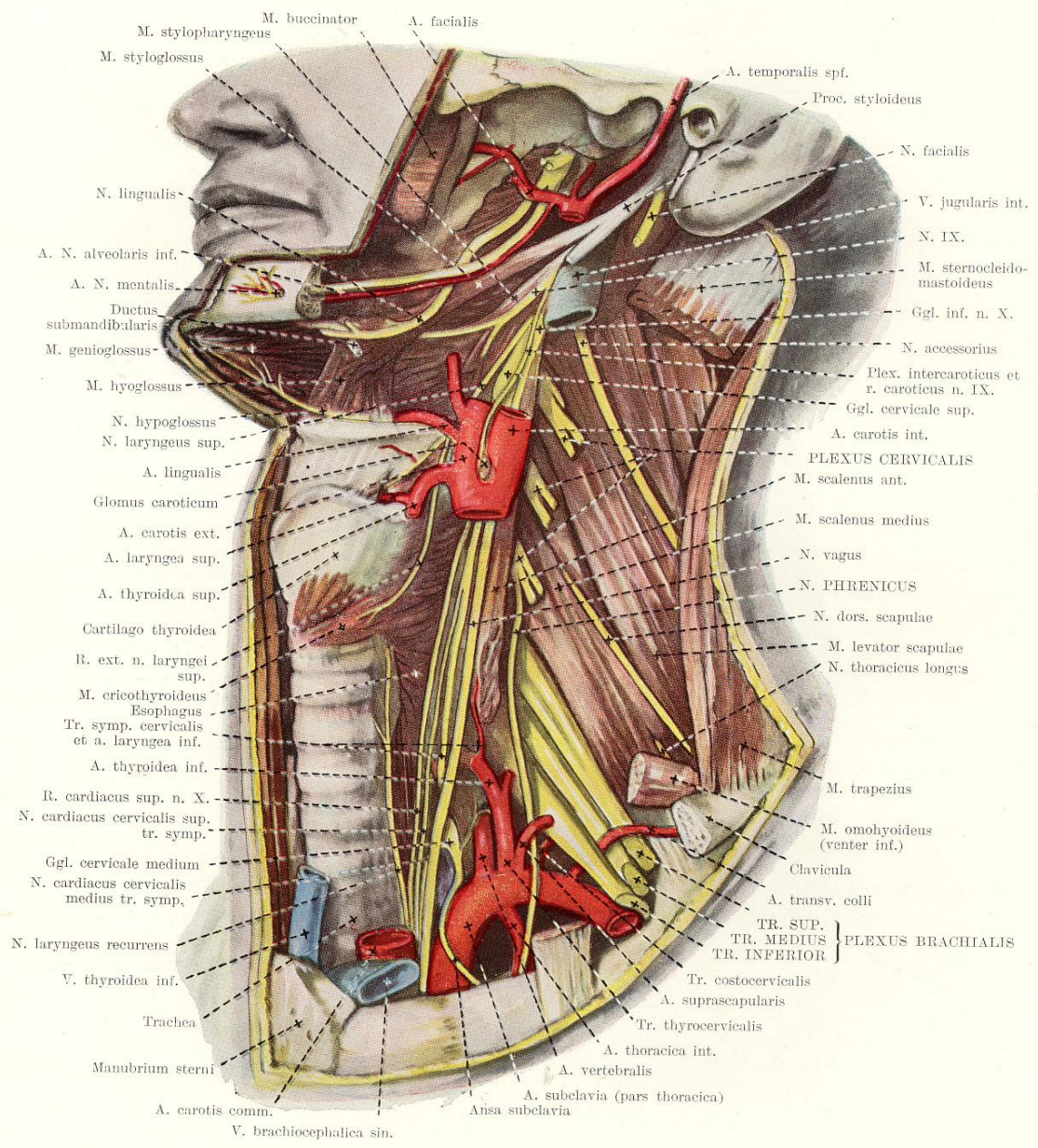




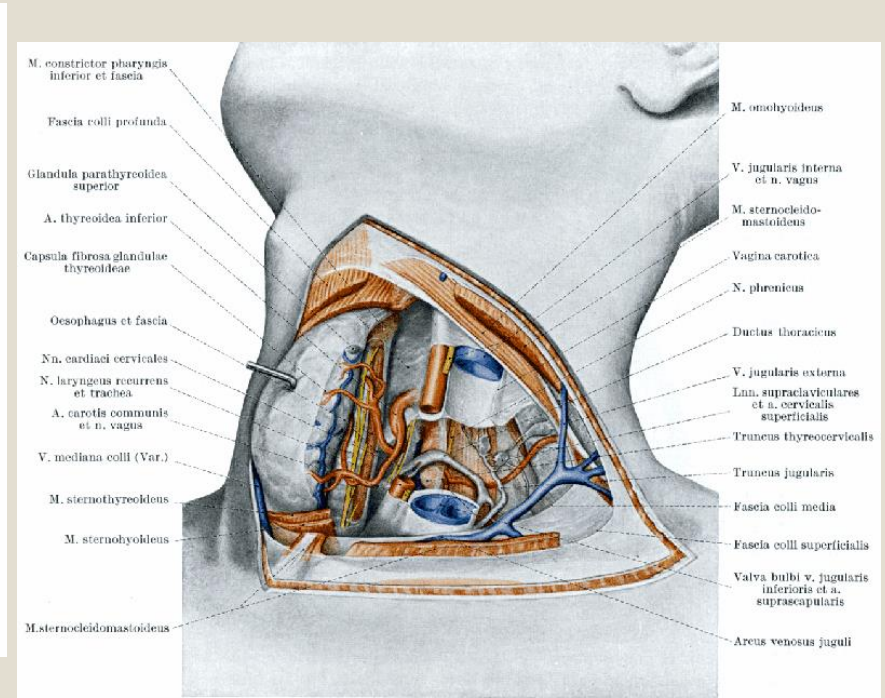
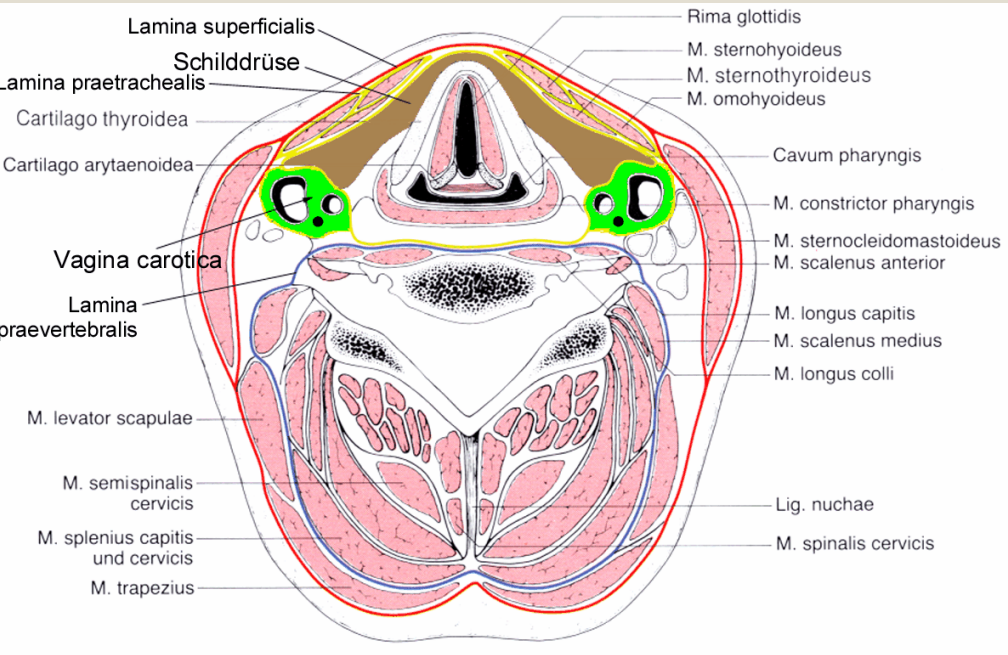




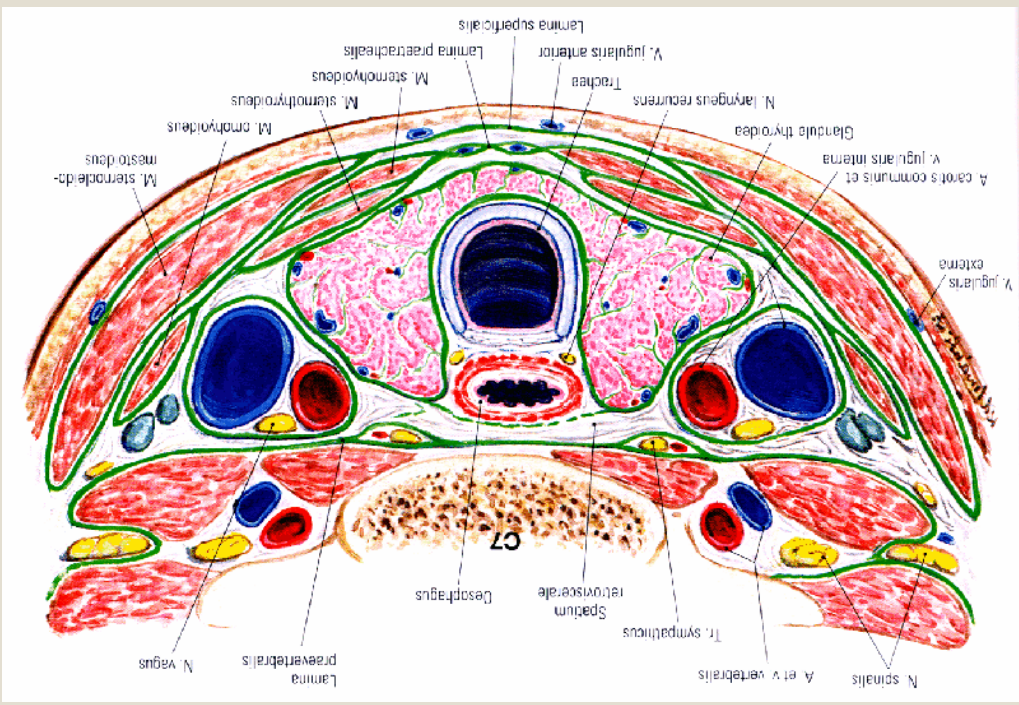
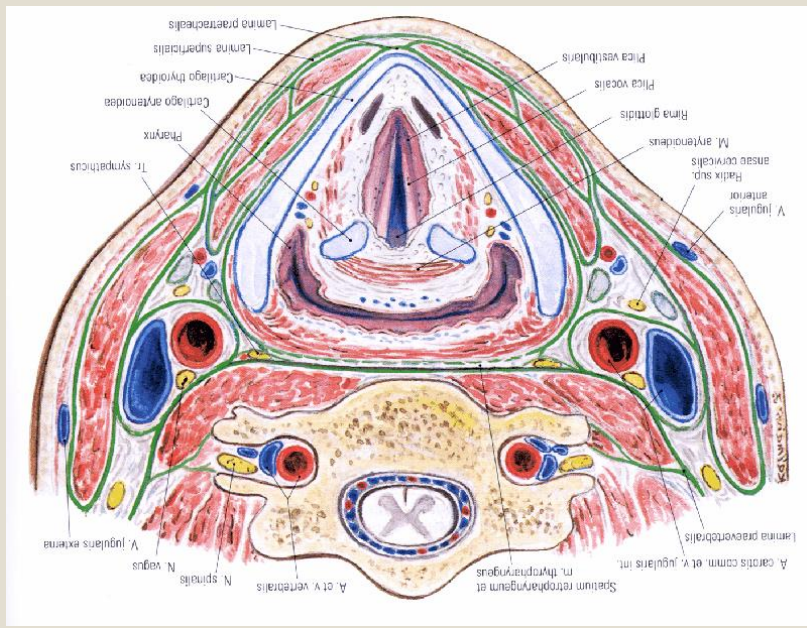








### Cervical fascia (3 lamina)





**Thank you for your kind attention!!!**

