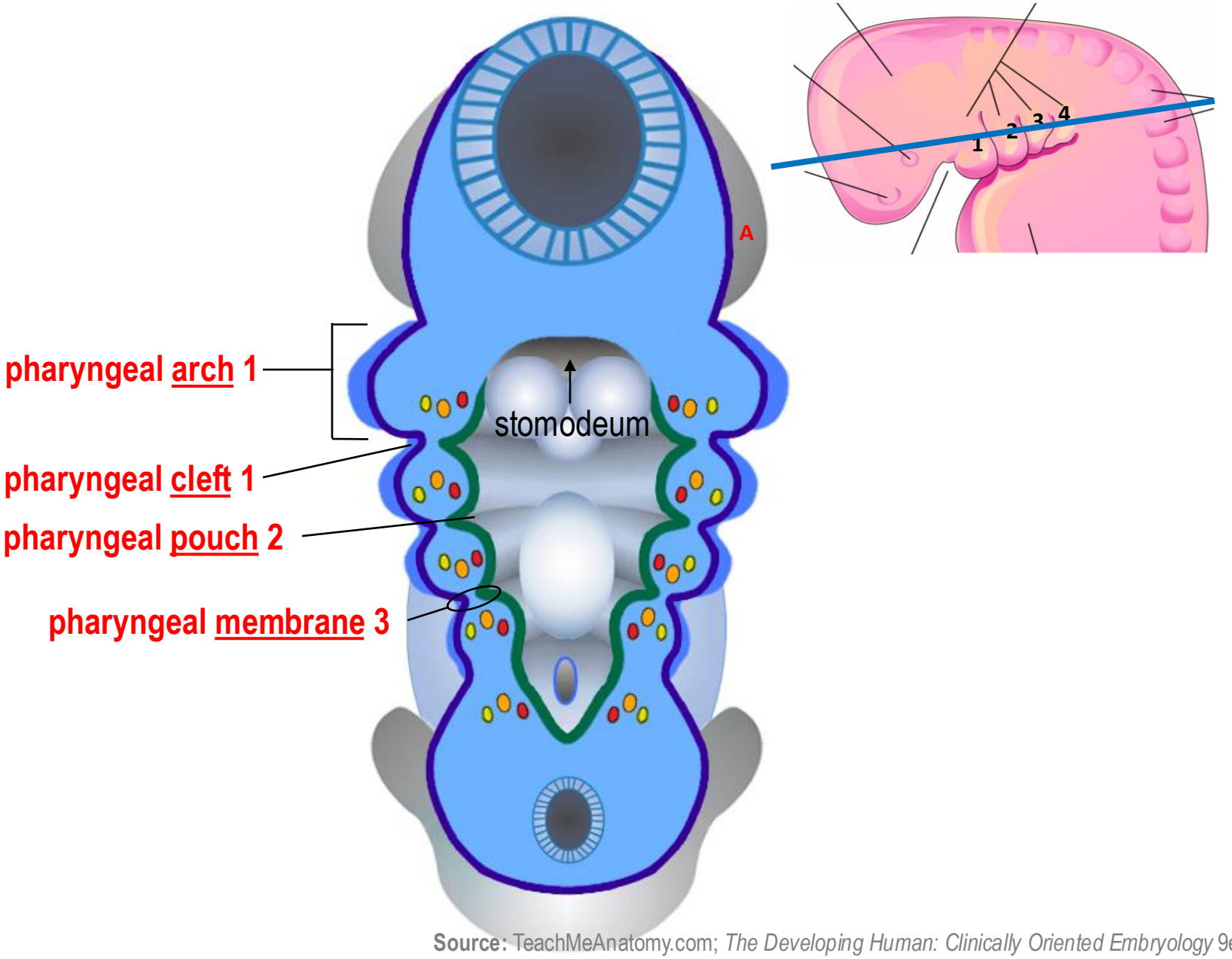
Pharyngeal Apparatus

4 components

1. Pharyngeal arches
2. Pharyngeal clefts
3. Pharyngeal pouches
4. Pharyngeal membranes



Source: TeachMeAnatomy.com; *The Developing Human: Clinically Oriented Embryology* 9e

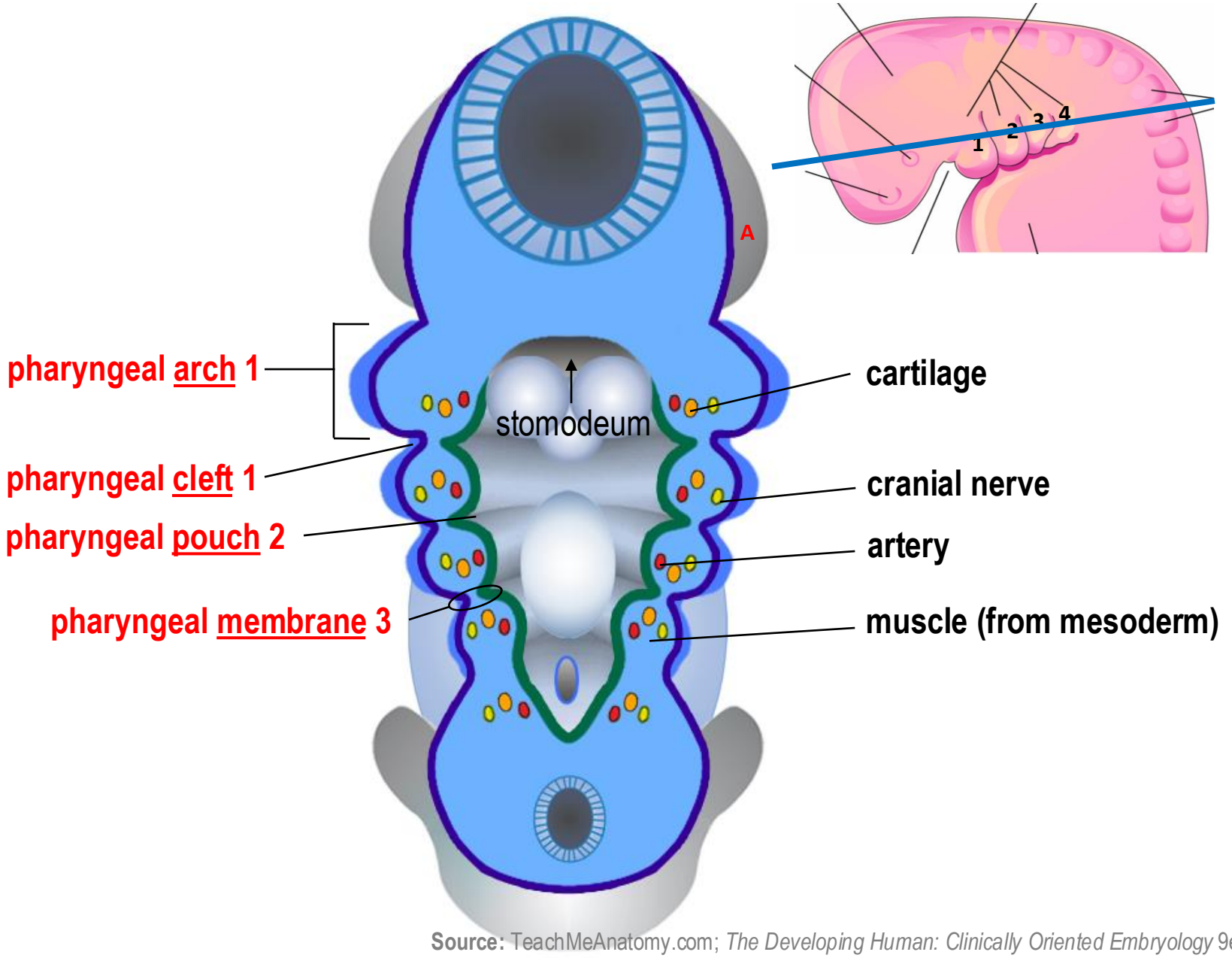
Pharyngeal Apparatus

4 components

1. Pharyngeal arches
2. Pharyngeal clefts
3. Pharyngeal pouches
4. Pharyngeal membranes

Each pharyngeal arch has 4 derivative structures:

1. Bone & Cartilage
2. Artery
3. Nerve
4. Muscle (from mesoderm)



Source: TeachMeAnatomy.com; *The Developing Human: Clinically Oriented Embryology* 9e

Pharyngeal Apparatus Derivatives

Create a Table:

Arch Number	Bone & Cartilage	Muscles	Arteries	Cranial Nerve	Pouch, Cleft, Membrane Derivatives
1 (“mandibular”)					
2 (“hyoid”)					
3 (“carotid”)					
4 (“systemic”) 6 (“pulmonary”)					

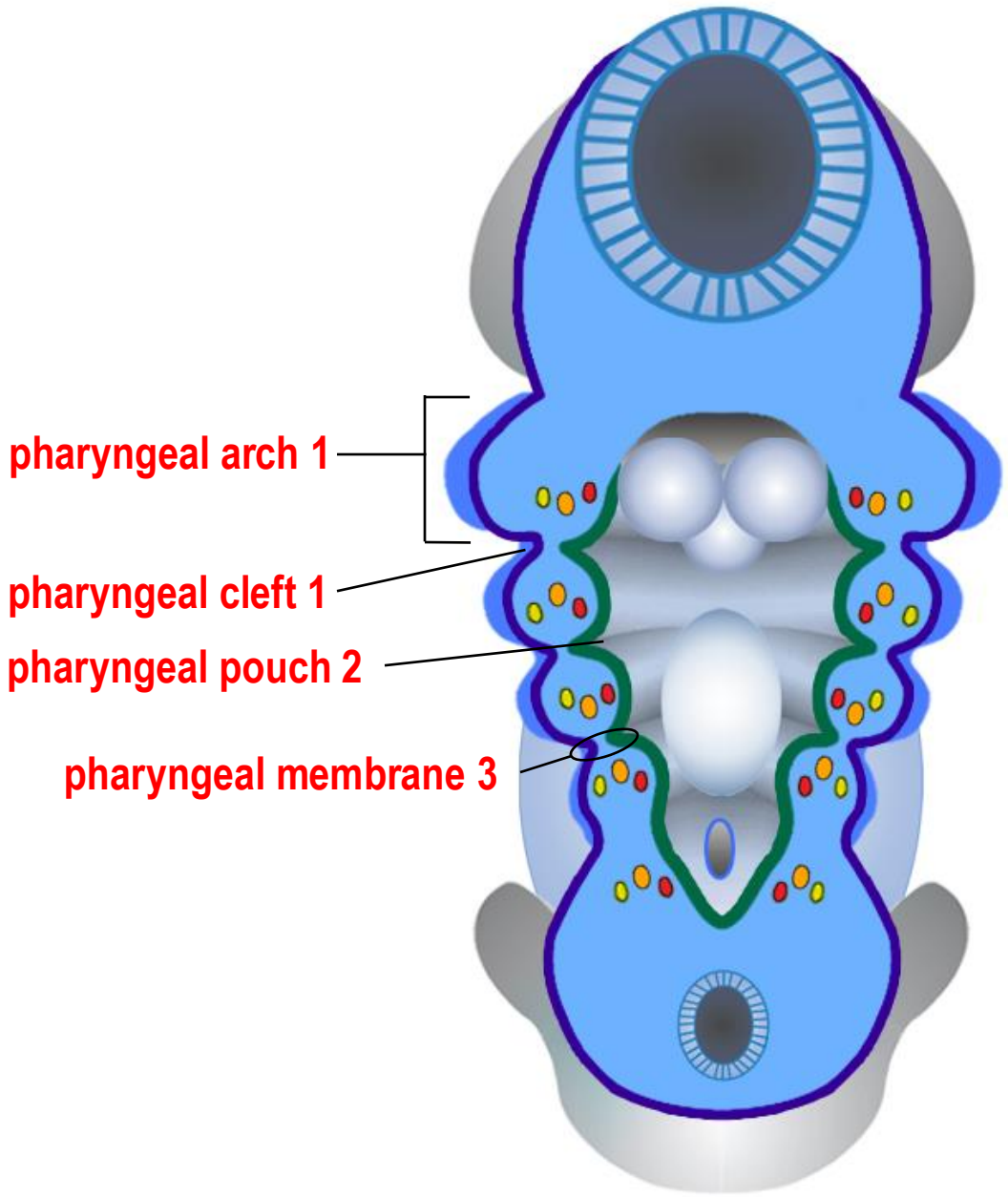
Pharyngeal Apparatus Derivatives

Create a Table:

Know this table for the exam.

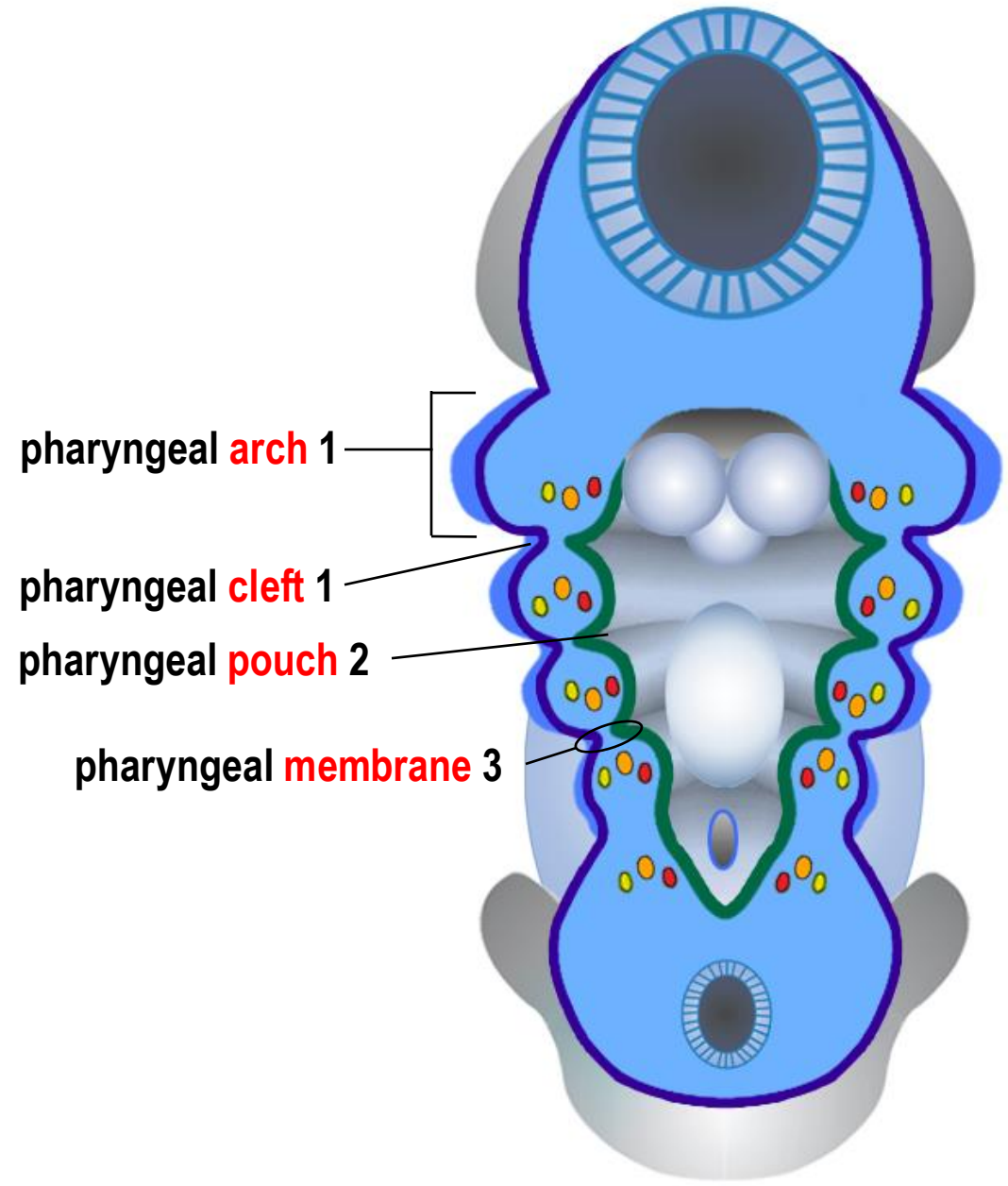
Arch Number	Bone & Cartilage	Muscles	Arteries	Cranial Nerve	Pouch, Cleft, Membrane Derivatives
1 (“mandibular”)					
2 (“hyoid”)					
3 (“carotid”)					
4 (“systemic”) 6 (“pulmonary”)					

Pharyngeal Pouches, Clefts, Membranes



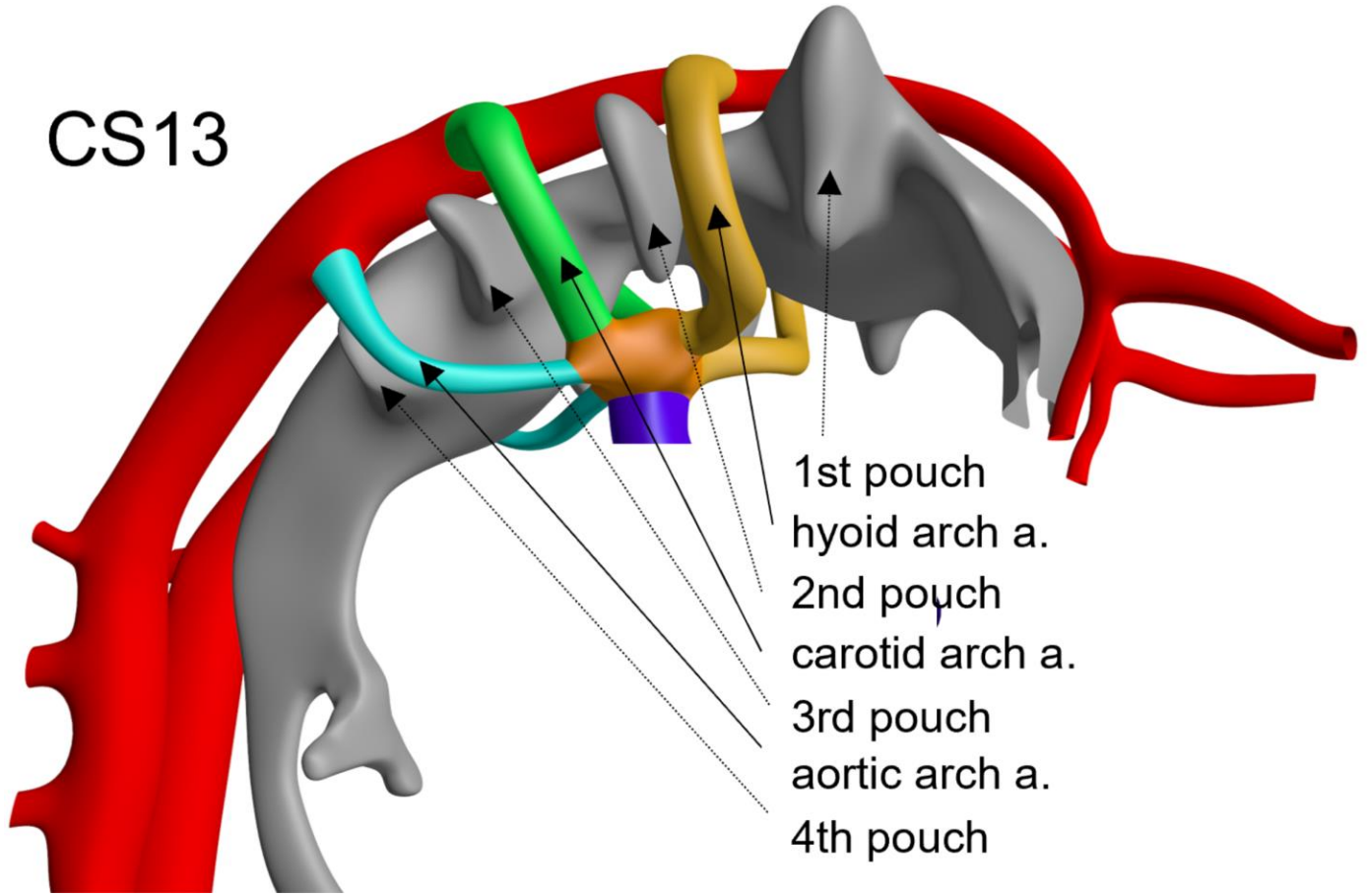
Source: TeachMeAnatomy.com; *Langman's Medical Embryology* 13e

Pharyngeal Pouches, Clefts, Membranes



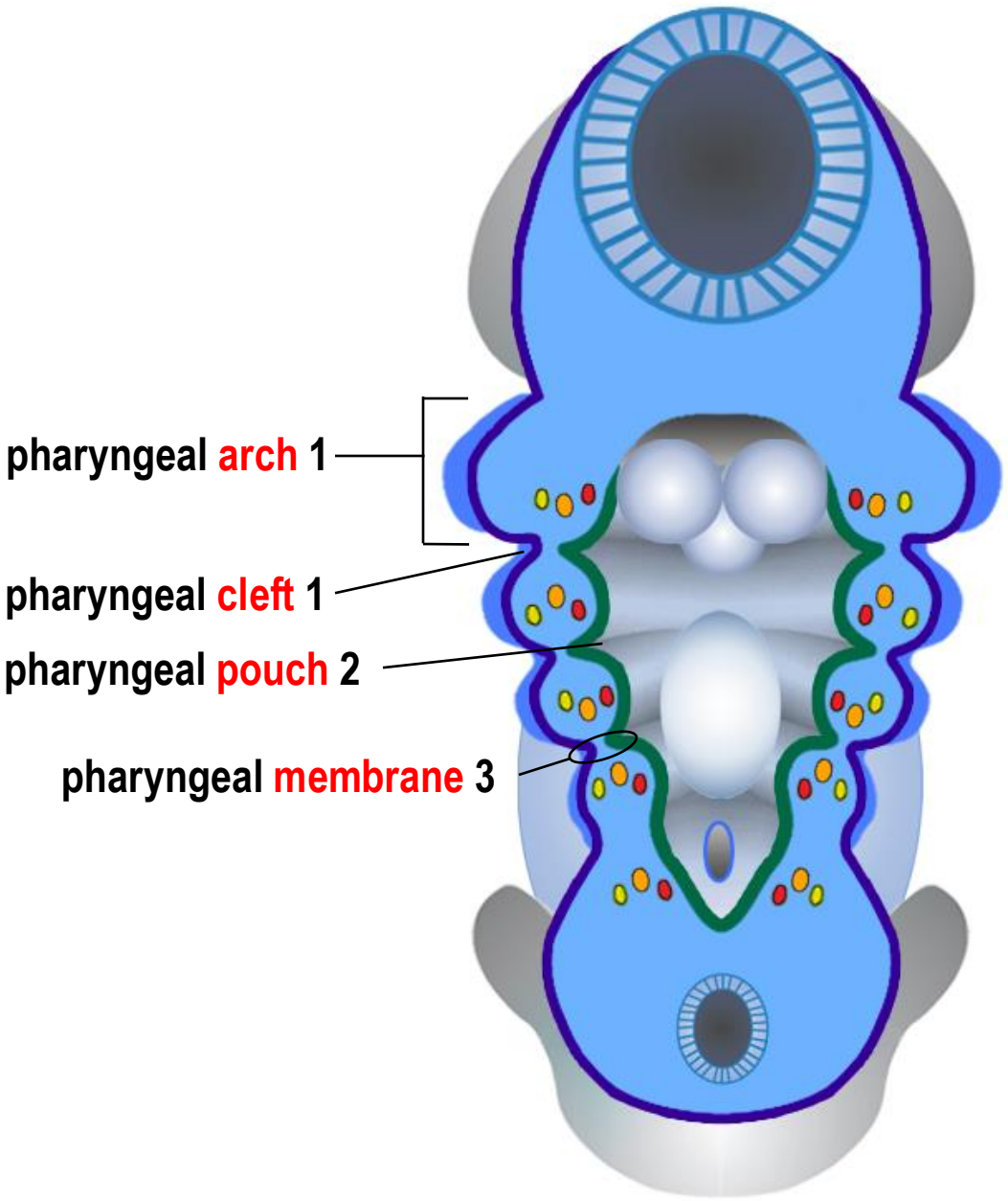
Lateral (side) view

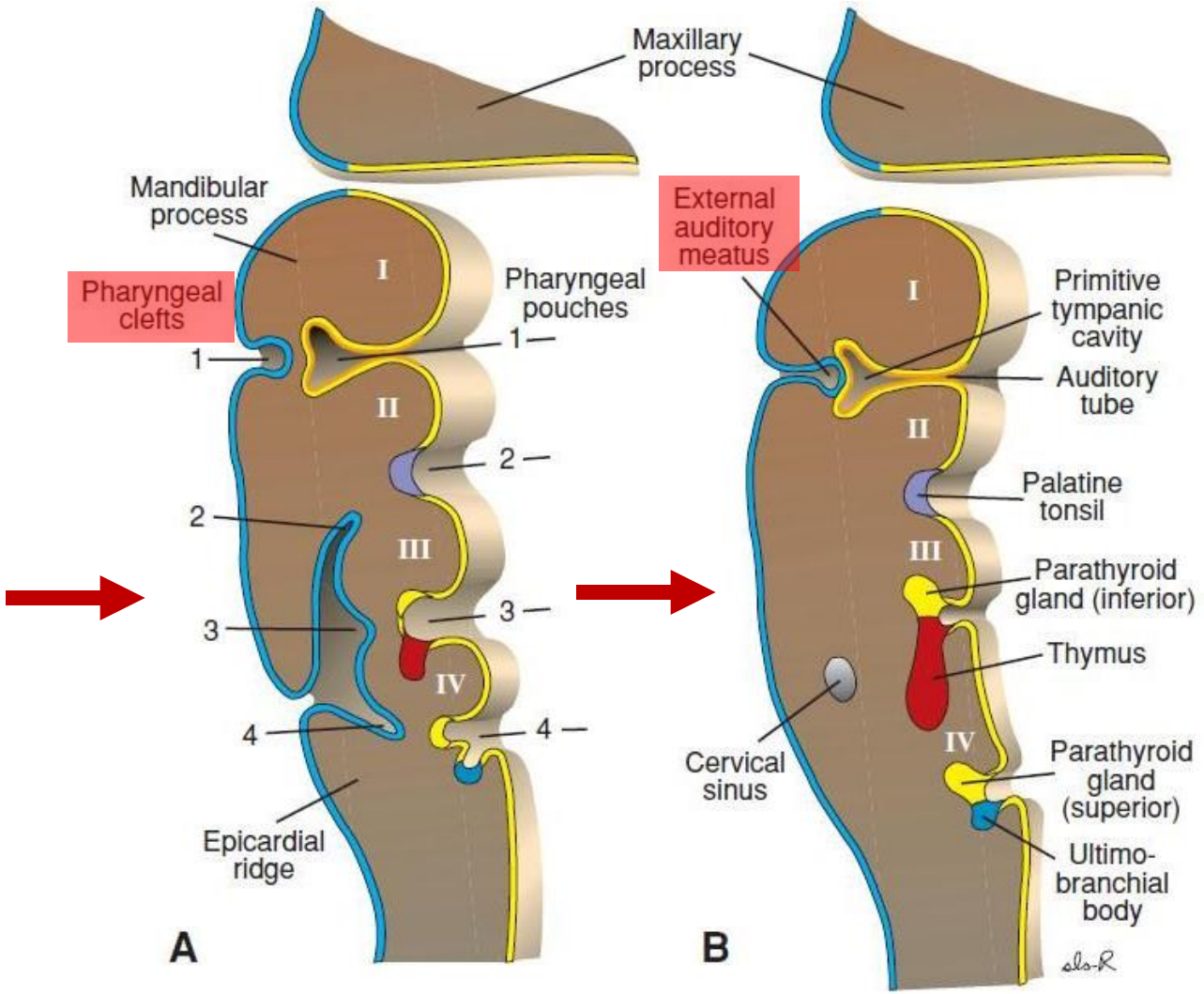
(with pharyngeal arch & membrane removed)



Source: TeachMeAnatomy.com; Graham et al. 2023

Pharyngeal Pouches, Clefts, Membranes





Clefts and Membranes 2, 3, 4 do not contribute to adult structures

Source: TeachMeAnatomy.com; *Langman's Medical Embryology* 13e

Example Question

A toddler has a hearing defect. MRI scans show that the toddler has developmental defects in the auditory (Eustachian) tube and tympanic cavity. Which pharyngeal apparatus component mostly likely developed abnormally?

A. Pharyngeal Arch 1 (“Mandibular” arch)
B. Pharyngeal Pouch 1
C. Pharyngeal Cleft 1
D. Pharyngeal Arch 2 (“Hyoid” arch)
E. Pharyngeal Pouch 2

Clinical Correlate Thyroglossal Duct Cyst, Sinus; Pyramidal Lobe

Thyroglossal Duct Sinus

Thyroglossal Duct Cyst

Ectopic Thyroid Gland

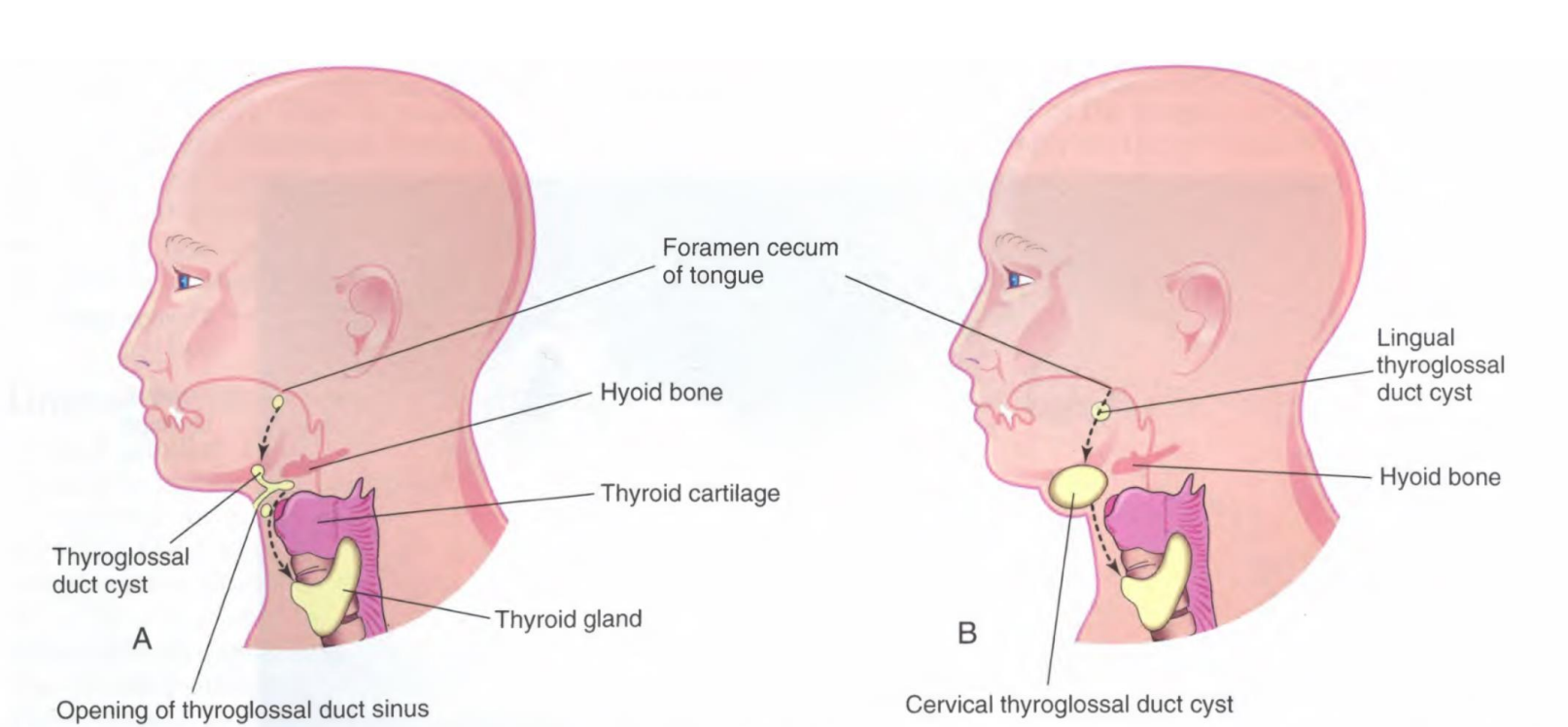


FIGURE 9–19 **A,** Sketch of the head and neck showing the possible locations of thyroglossal duct cysts. A thyroglossal duct sinus is also illustrated. The *broken line* indicates the course taken by the thyroglossal duct during descent of the developing thyroid gland from the foramen cecum to its final position in the anterior part of the neck. **B,** Similar sketch illustrating lingual and cervical thyroglossal duct cysts. Most thyroglossal duct cysts are located just inferior to the hyoid bone.

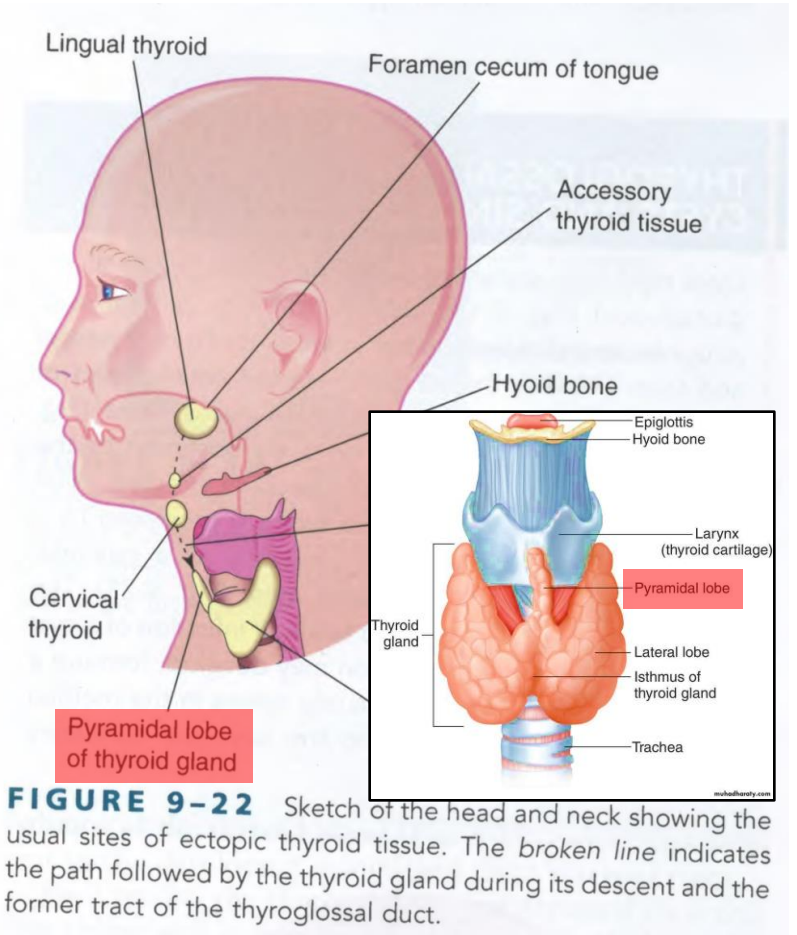
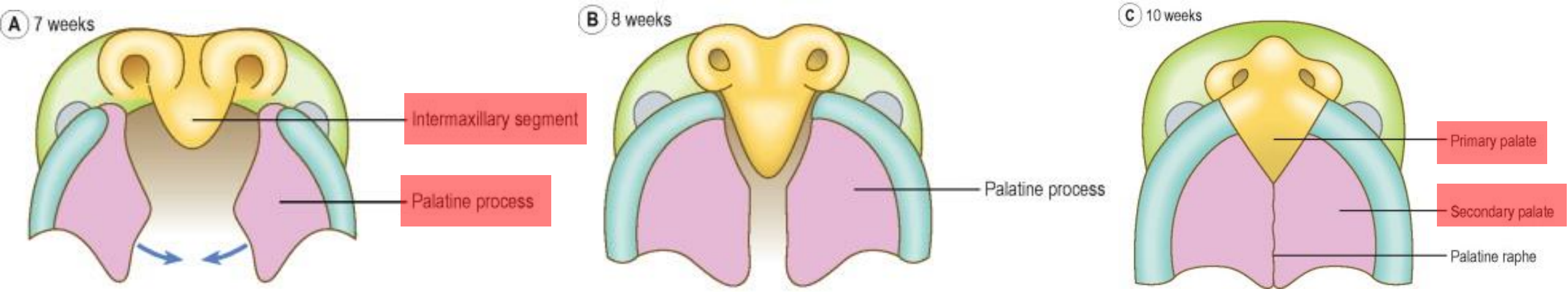


FIGURE 9–22 Sketch of the head and neck showing the usual sites of ectopic thyroid tissue. The *broken line* indicates the path followed by the thyroid gland during its descent and the former tract of the thyroglossal duct.

- Thyroglossal duct cyst forms in the midline (not lateral) of the neck from incomplete closure of the thyroglossal duct. Rupture of this cyst from infection, creates a sinus.
- Ectopic thyroid gland is the existence of gland tissue along the path of the thyroglossal duct (common).

Source: *The Developing Human: Clinically Oriented Embryology* 9e

⚕ Clinical Correlate ⚕ Cleft Lip, Cleft Palate

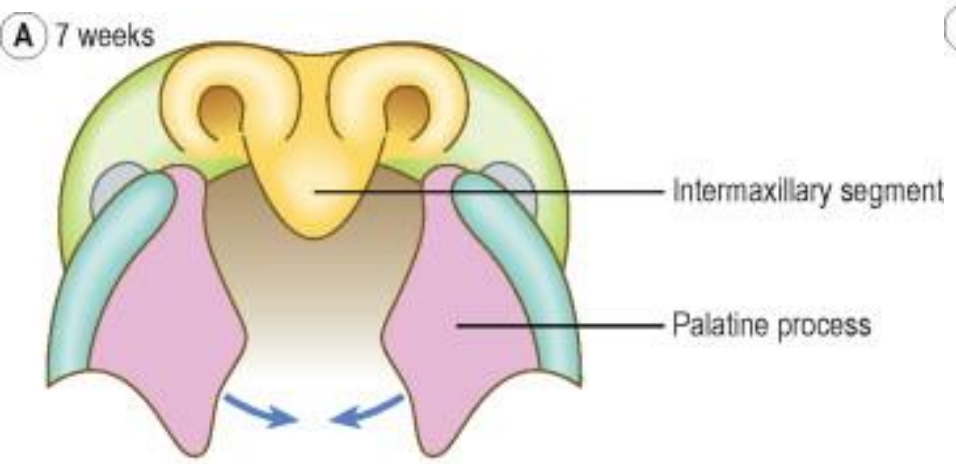


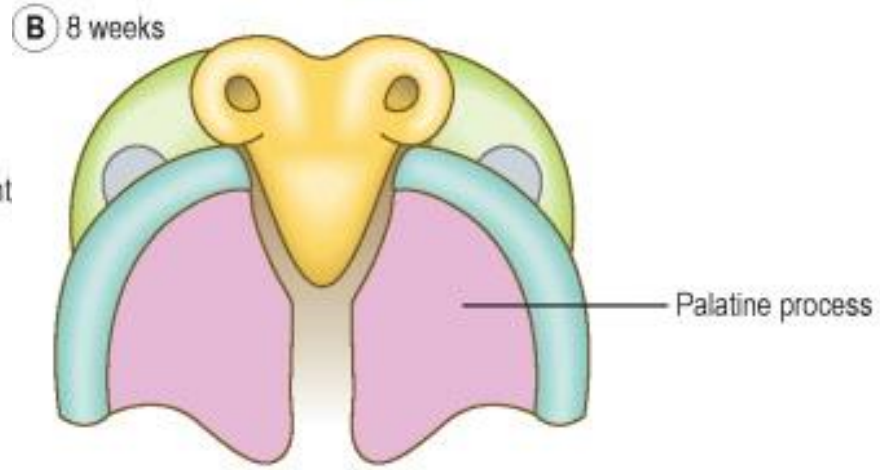
The palate forms through two stages

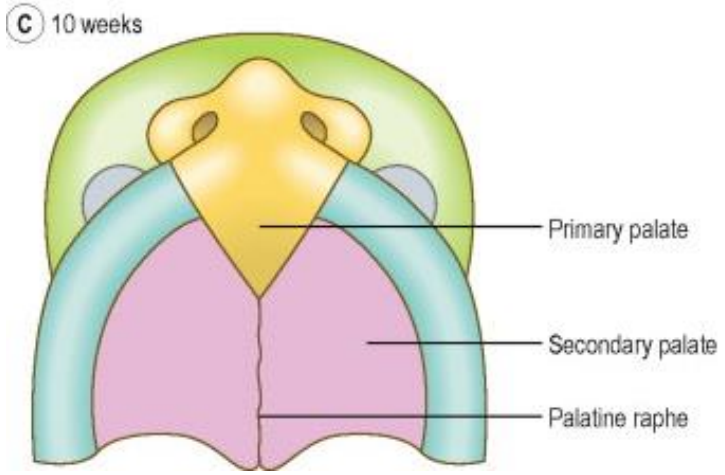
- Primary palate: extension of the intermaxillary segment from the nasal prominences.
- Secondary palate: joining of the palatine process from the maxillary prominences.

Source: ScienceDirect

⚕ Clinical Correlate ⚕ Cleft Lip, Cleft Palate





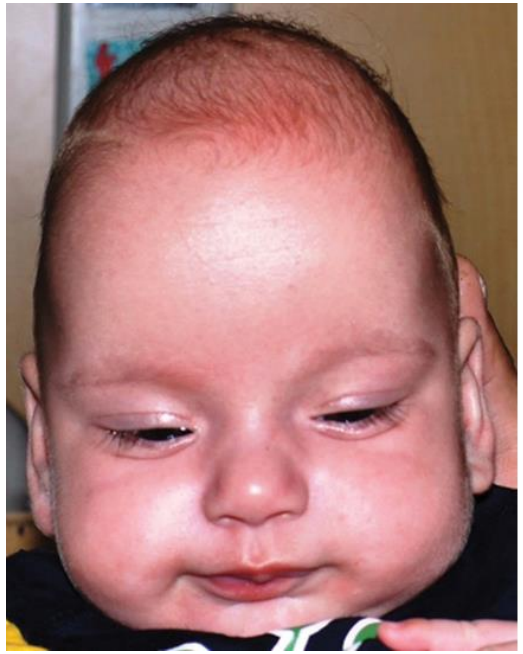


Cleft Lip & Palate: caused by incomplete closure of the maxilla and/or palate. Occurs in 1 in ~1,000 births.

- Results in abnormal facial appearance, defective speech.
- Treatment involves surgery and any therapies (e.g., speech) to improve related conditions.

Source: ScienceDirect; *The Developing Human: Clinically Oriented Embryology* 9e

⚕ Clinical Correlate ⚕ Craniosynostosis, Microcephaly, Hydrocephalus



Craniosynostosis: deformity in the cranium due to premature closure of sutures/fontanelles. Type of defect depends on which suture closes prematurely.

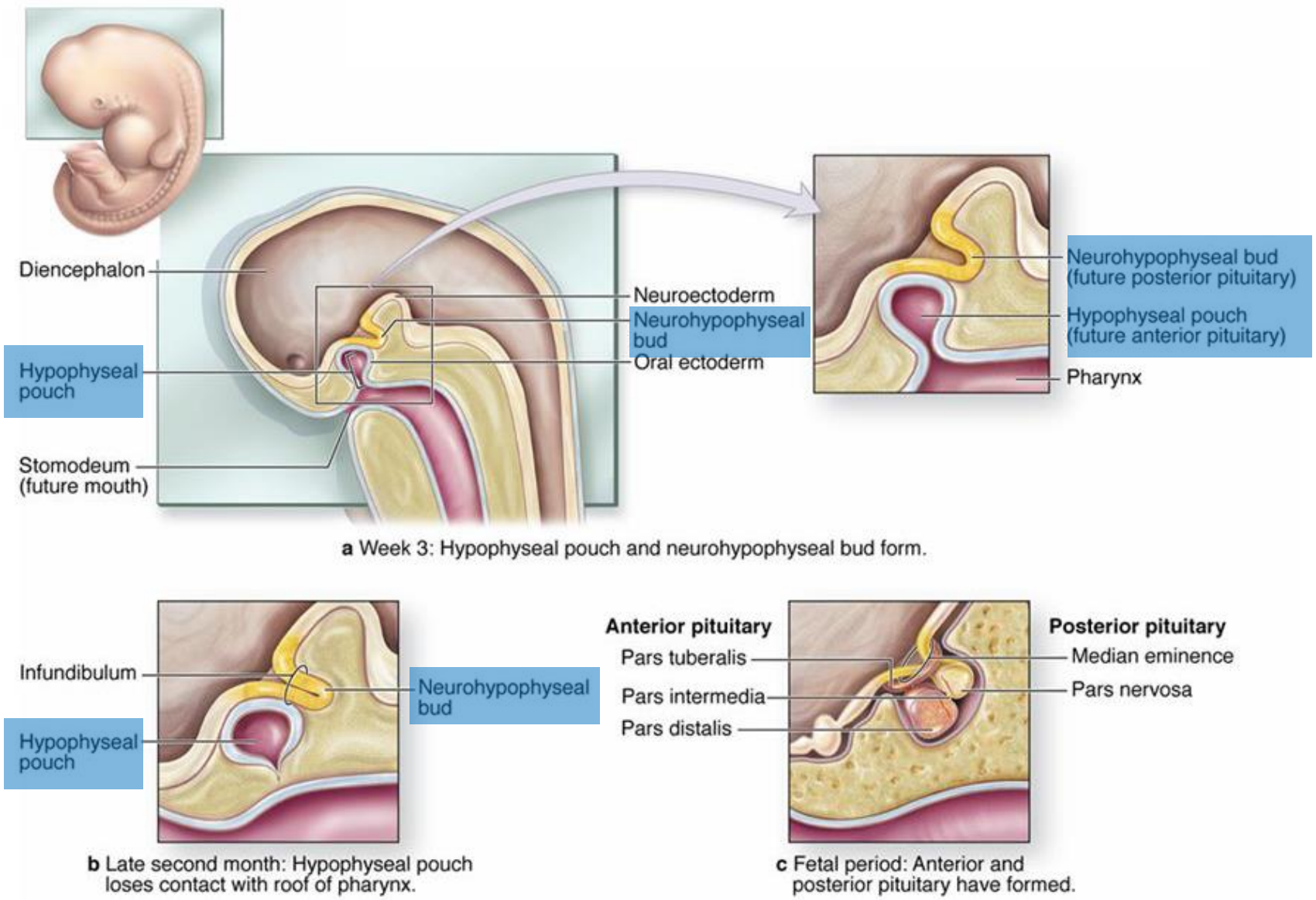
Microcephaly: caused by abnormal development of the brain, rather than premature closure of sutures. Often results in mental deficiency.

Hydrocephalus: caused by elevated pressure in ventricles due to CSF buildup (resulting in enlarged brain ventricles). Occurs 1 in ~1,000 births.

Source: Humanitas Charity; *Science*

Pituitary

Anterior and posterior lobes have completely different origins!

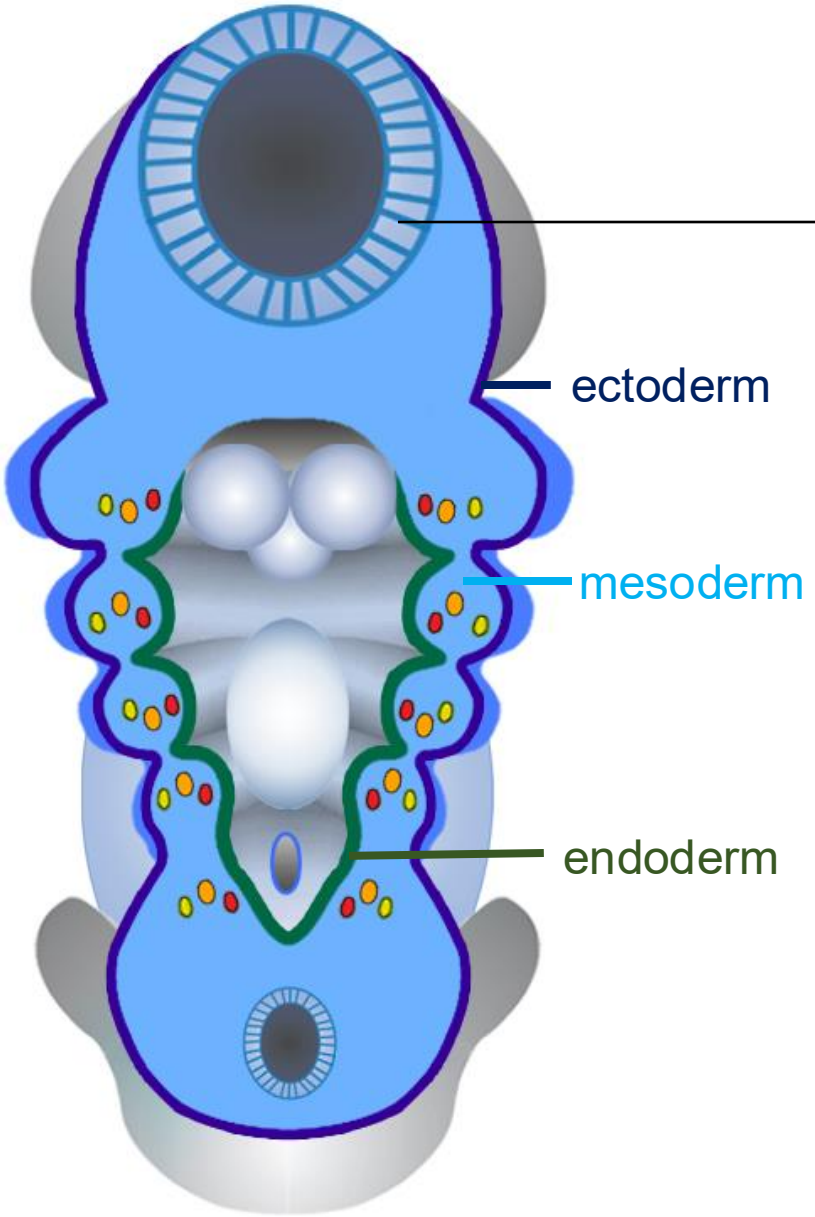


Anterior lobe: from upgrowth of ectodermal roof of the mouth (hypophyseal pouch).

Posterior lobe: from downgrowth of floor of embryonic brain (also ectodermal in origin) (neurohypophyseal bud).

Source: slideplayer.com

Germ Layer Contributions to the Head & Neck



Ectoderm

- **brain & cranial nerves:** from ectoderm-derived neural tube
- **placodes:** eye lens, vestibule, cochlea, nasal cavity
- parotid gland

Mesoderm

- **pharyngeal structures** (bone/cartilage, arteries, muscles): in general from mesoderm but interacts with ectoderm-derived **neural crest cells** (next section).
- **skull**

Endoderm

- **glands** (except for parotid gland) **& mucosae**

Lecture Feedback

Lecture Feedback:

Click HERE

Questions:

awatanab@nyit.edu