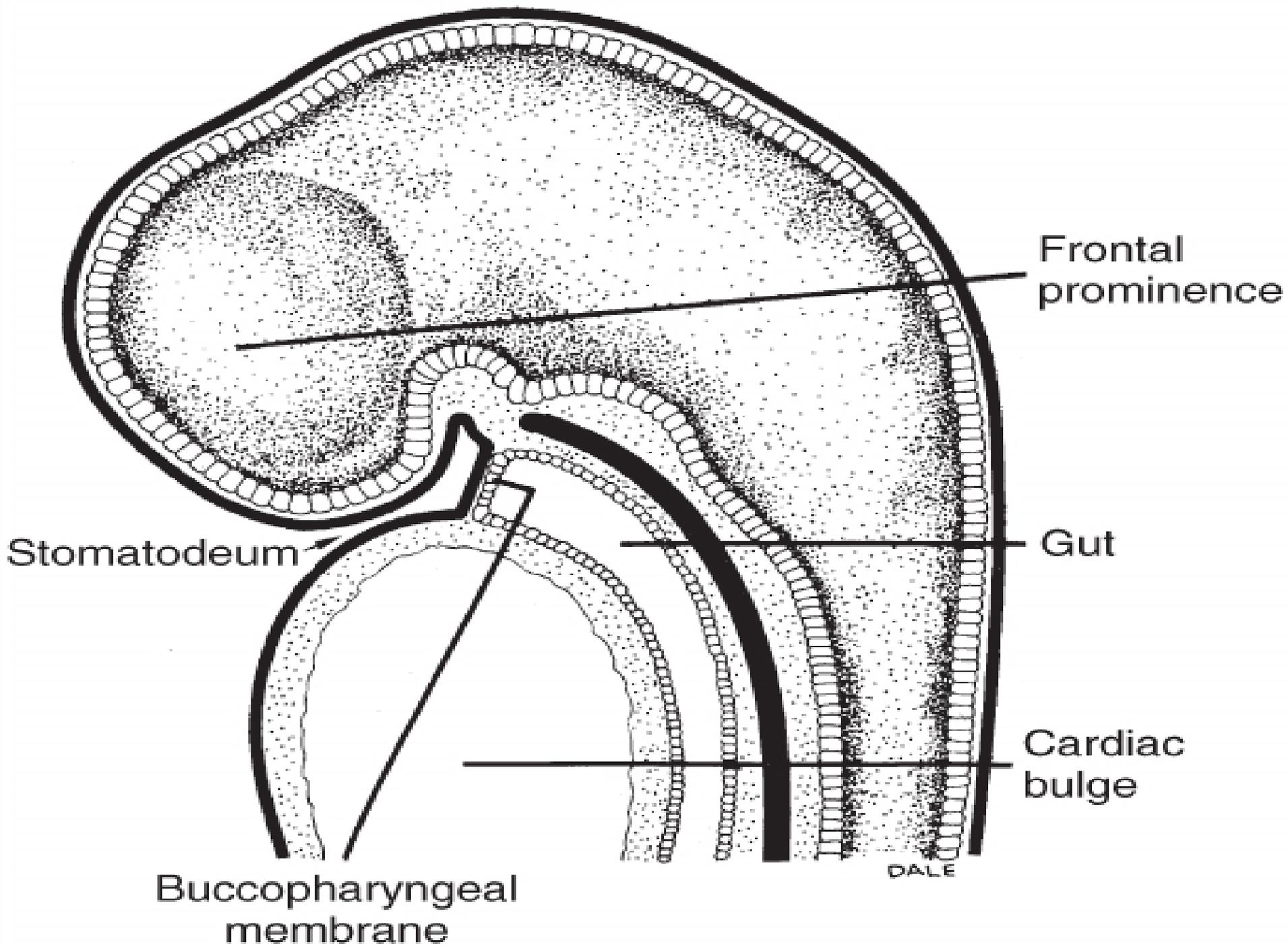


# Brachial (Pharyngeal) arches and the primitive mouth:

When the stomadeum first forms, it is delimited;

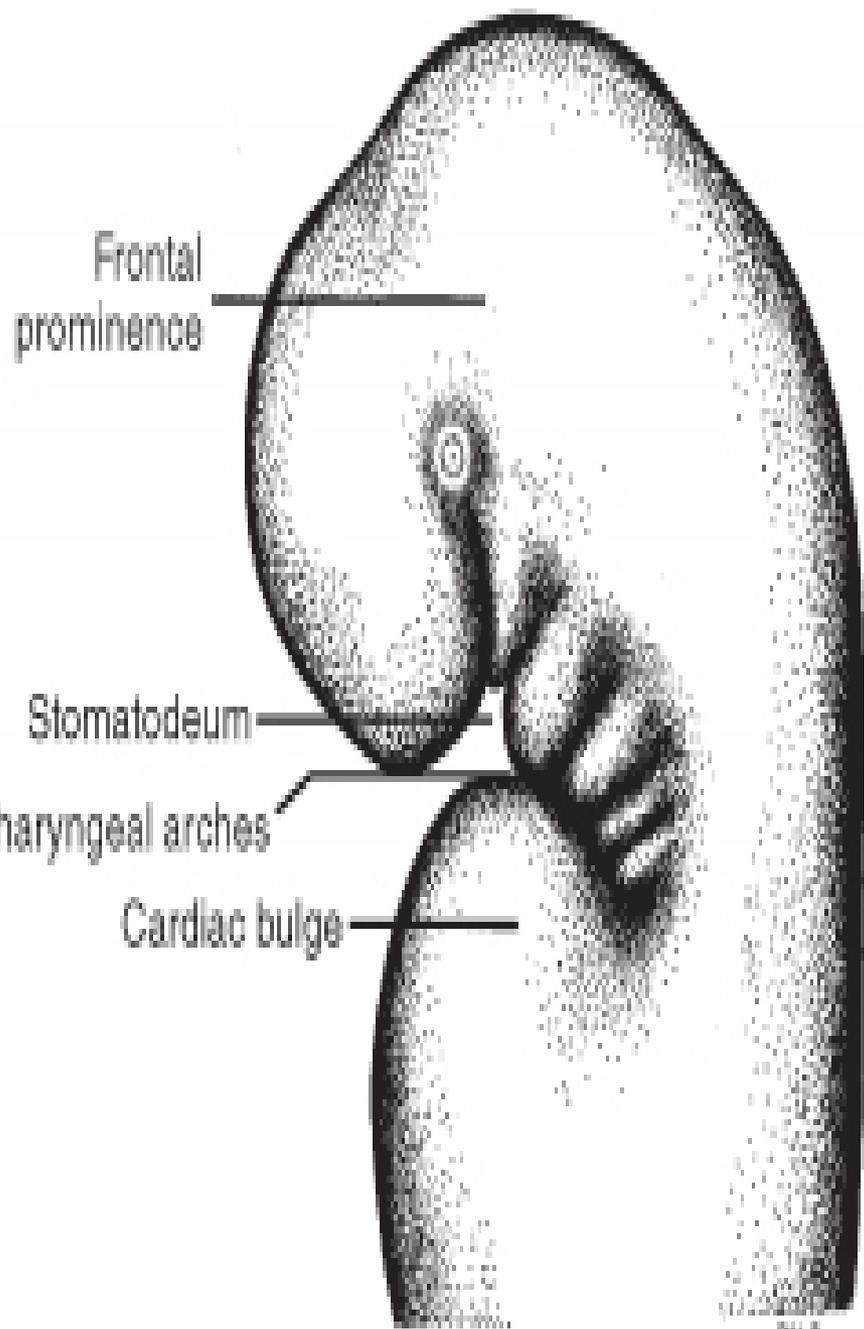
- rostrally by the frontal prominence.
- caudally by the developing cardiac bulge.
- The buccopharyngeal membrane separates the stomadeum from the foregut but this soon breaks down so that the stomadeum communicates directly with foregut.
- Laterally the stomadeum becomes limited by the first pair of pharyngeal or brachial arches.



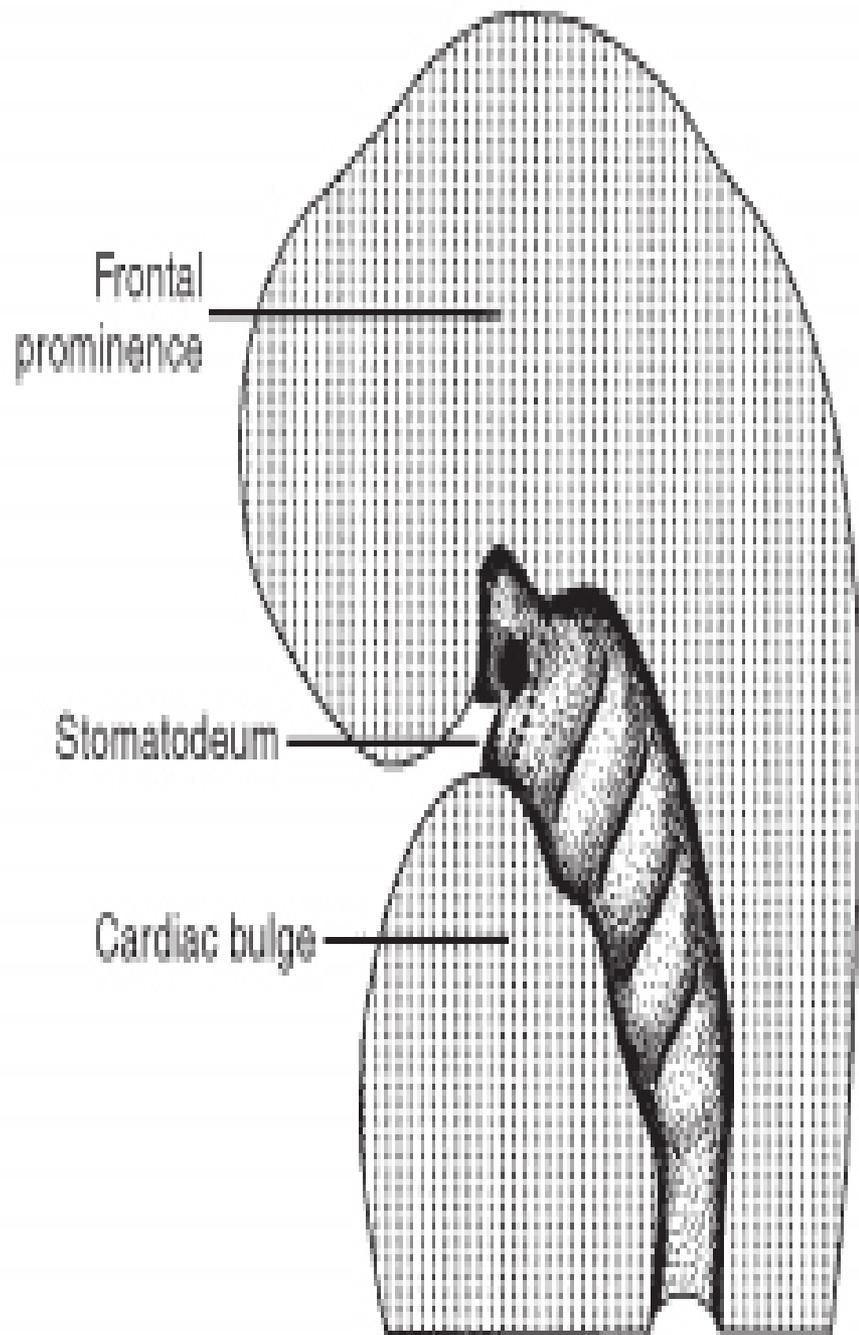
# Anatomy of an arch:

- The inner aspect is covered by endoderm (ectoderm in the case of the first arch because it forms in front of the buccopharyngeal membrane).
- the outer surface by ectoderm.
- The neural crest mesenchyme (called ectomesenchyme) condenses to form bar of cartilage, the arch cartilage.

- The arches progressively separate the primitive stomadeum from the developing heart.
- The arches are seen as bulges on the lateral aspect of the embryo and are separated externally by small clefts called brachial grooves. On the inner aspect of the pharyngeal wall are corresponding small depressions called pharyngeal pouches that separate each of the brachial arch internally.



24-1



24-2

## Fate of grooves and pouches:

- ✓ The **first groove** and **pouch** are involved in the formation of the external auditory meatus, tympanic membrane, tympanic antrum, mastoid antrum, and Eustachian tube.
- ✓ The **second, third, and fourth grooves** normally are obliterated by overgrowth of the second arch forming.
- ✓ The **second pouch** largely is obliterated by the development of the palatine tonsil; a part persists as the tonsillar fossa.

- ✓ The **third pouch** forms the inferior parathyroid gland and the thymus gland.
- ✓ The **fourth pouch** gives origin to the superior parathyroid gland and thyroid gland.
- ✓ The **fifth pouch** is rudimentary and thus disappears or becomes incorporated into the fourth pouch.

# Formation of the face:

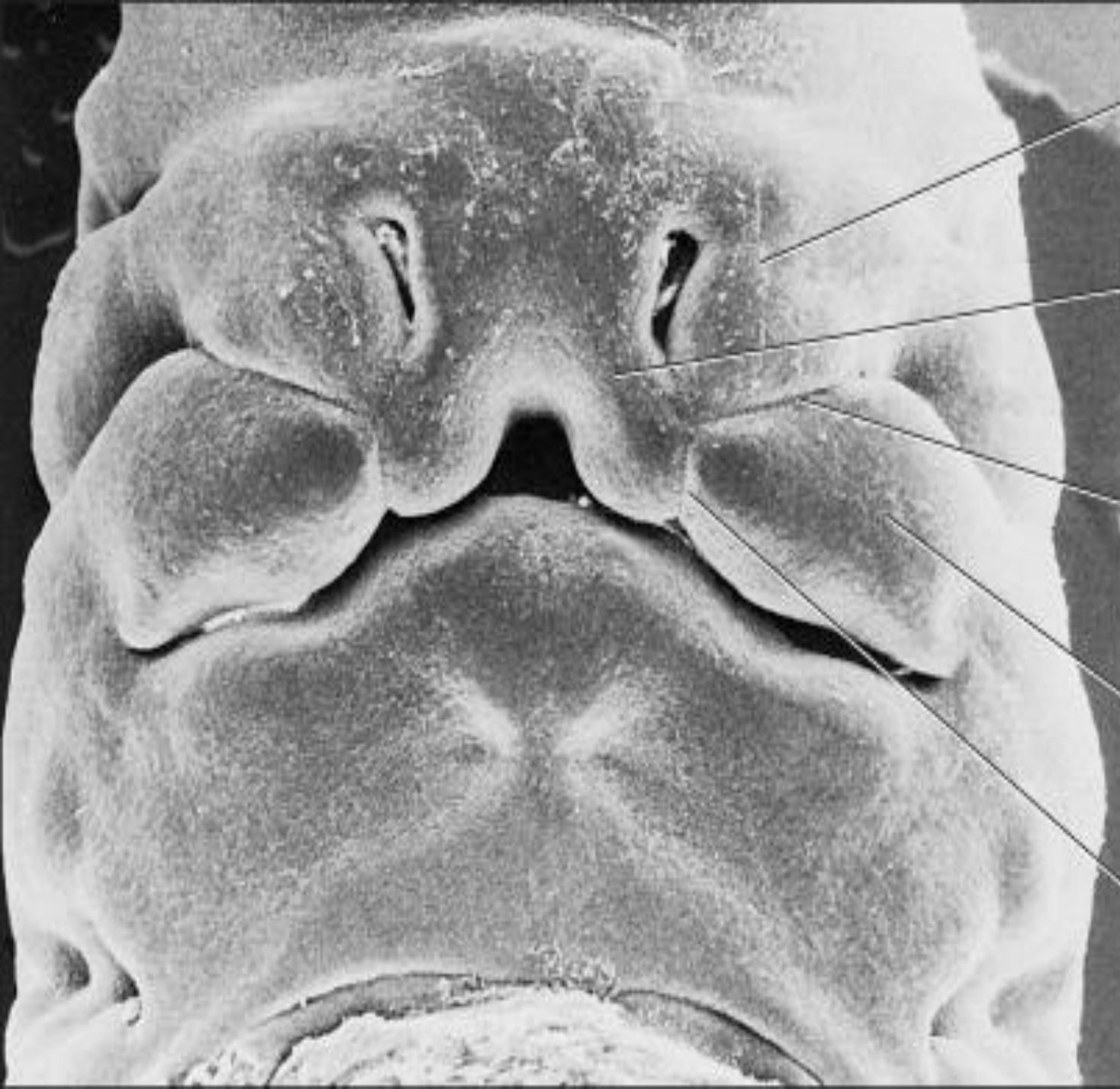
## At about 28 days;

- ❖ localized thickening develop within the ectoderm of the frontal prominence, just rostral to the opening of the stomadeum.
- ❖ These thickenings are the *olfactory placodes*.
- ❖ Rapid proliferation of the underlying mesenchyme around the placodes bulge the frontal eminence forward and also produces a horseshoe-shaped ridge that converts the olfactory placode into nasal pit.

- ❖ The lateral arm of the horseshoe is called the *lateral nasal process* and the medial arm the *medial nasal process*.
- ❖ The region of the frontal prominence where these changes take place and the nose will develop is also referred to as the *frontonasal process (region)*.
- ❖ The medial nasal processes of both sides give rise to the *middle portion of the nose, middle portion of the upper lip, anterior portion of the maxilla, and the primary palate*.
- ❖ The maxillary process grows medially and approaches the lateral and medial nasal processes **but remains separated from them by distinct grooves (the naso-optic groove and the bucconasal groove)**.

➤ The epithelium in the floor of the groove between the maxillary and lateral nasal processes forms a solid core that separates from the surface and canalizes to form the nasolacrimal duct.

✓ The lower lip is formed by merging of the two streams of the ectomesenchyme of the mandibular processes of the mandibular arch.



Lateral nasal process

Medial nasal process

Groove separating the maxillary process from the lateral nasal process (naso-optic groove)

Maxillary process

Groove separating the maxillary process from the medial nasal process (bucconasal groove)

# Formation of the secondary palate:

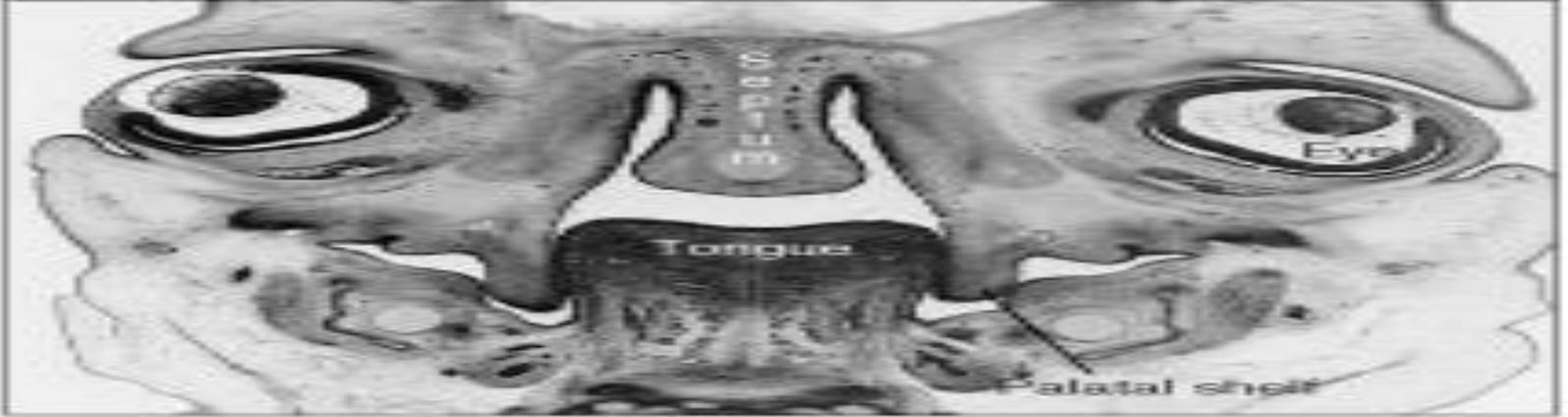
- Initially a common oronasal cavity is bounded anteriorly by the primary palate and occupied mainly by the developing tongue.
- The formation of the secondary palate commence between 7 and 8 weeks and completes around third month of gestation.
- Three outgrowths appear in the oral cavity; the nasal septum grows downward from the frontonasal process along the midline, and two palatine shelves or processes, one from each side, extend from maxillary processes toward the midline. The shelves are directed first downward on each side of the tongue.

After the seventh week of development;

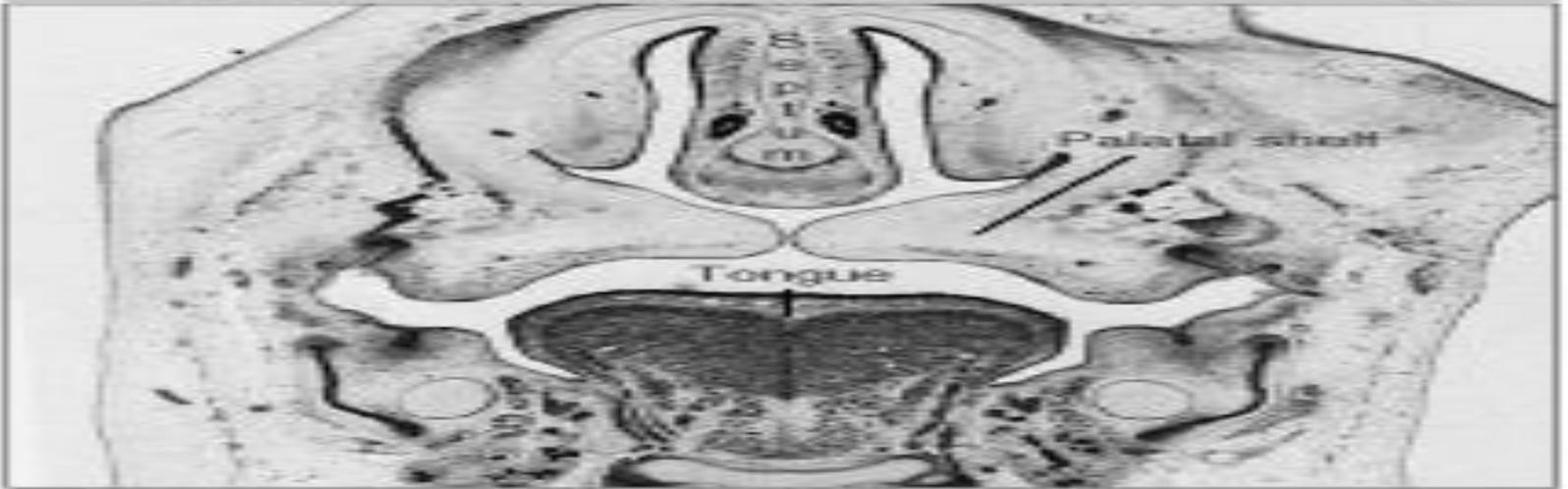
✓ the tongue is withdrawn from between the shelves, which now elevate and fuse with each other above the tongue and with the primary palate.

✓ thus separating the primitive oral cavity into nasal and oral cavity.

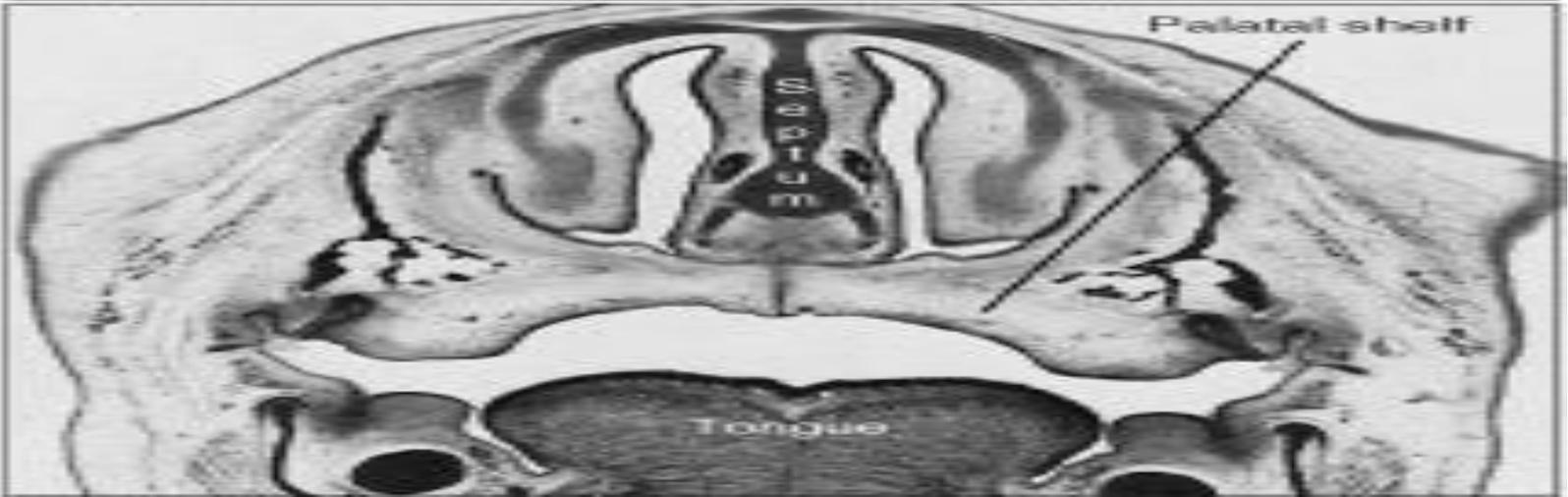
A



B



C



# Formation of the tongue:

- ✓ The tongue begins to develop at about 4 weeks.
- ✓ The pharyngeal arches meet in the midline beneath the primitive mouth.
- ✓ Local proliferation of the mesenchyme then gives rise to number of swellings in the floor of the mouth.
- First, a swelling (*tuberculum impar*) arises in the midline in the mandibular process and is flanked by two other bulges, the *lingual swellings*.
- These lateral lingual swellings quickly enlarge and merge with each other and the tuberculum impar to form a large mass, from which the mucous membrane of the anterior two thirds of the tongue is formed.

- ❑ The root of the tongue arises from the *hypobranchial eminence*,
- ❑ The hypobranchial eminence gives rise to the mucosa covering the root, or posterior third, of the tongue.
- ❑ The muscles of the tongue have a different origin; they arise from the occipital somites, which have migrated forward into the tongue area, carrying within them their nerve supply, twelfth cranial (hypoglossal) nerve.

Thank you