

Veterinary Anatomy  
(Unit – 8)

Topic

PHARYNGEAL ARCHES AND THEIR DERIVATIVES

by

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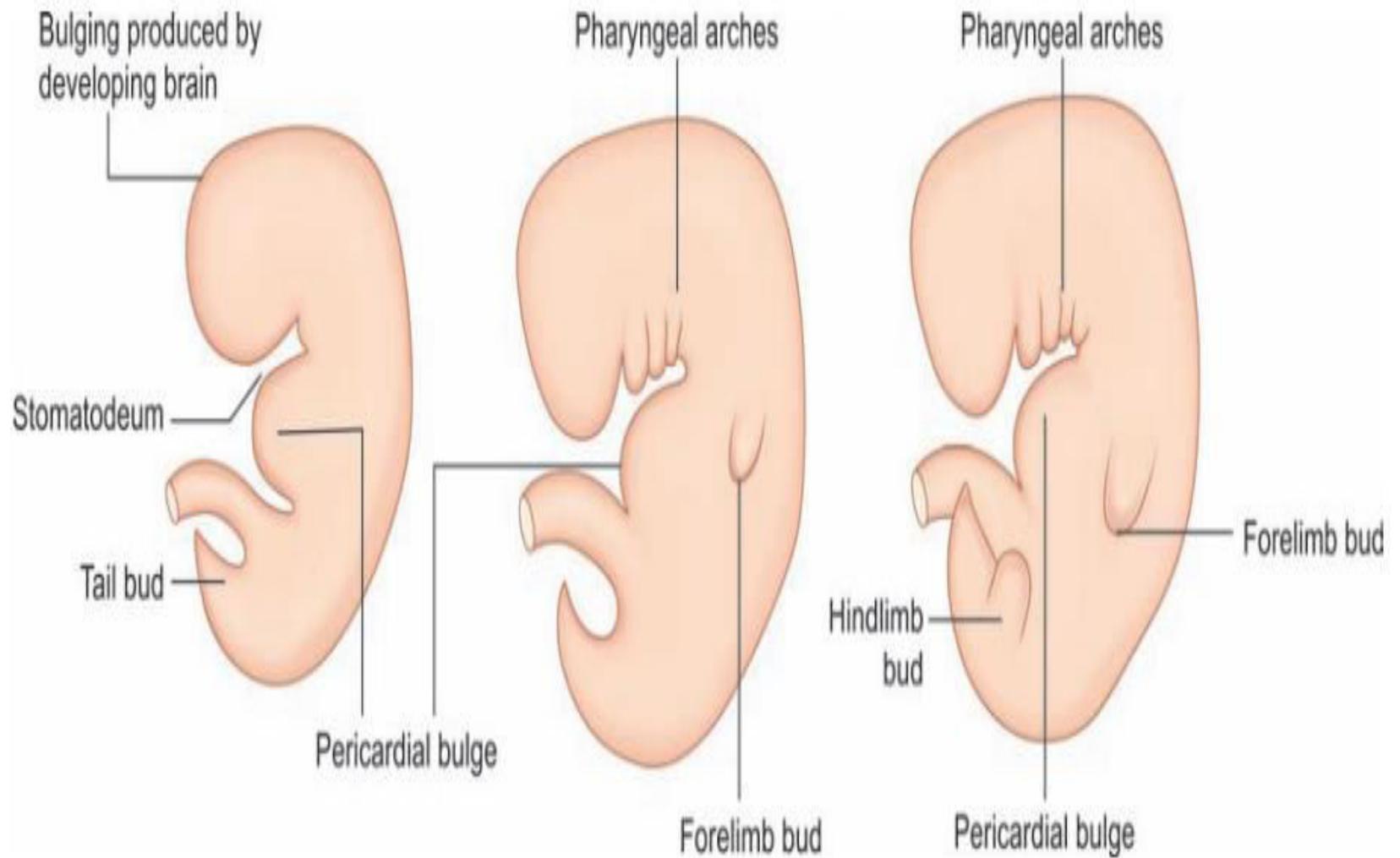
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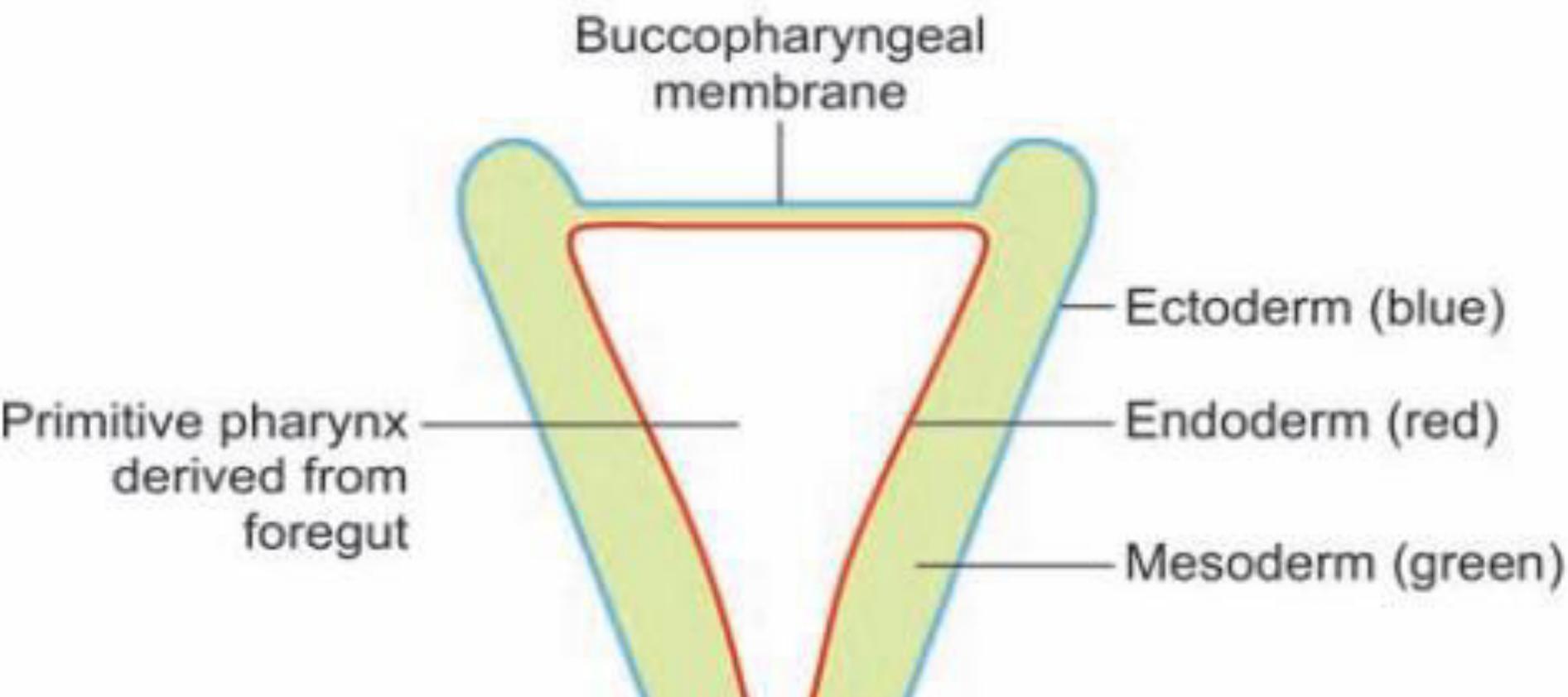
## **Pharyngeal arches are rod-like thickenings of mesoderm present in the wall of the foregut**

- At first there are six arches. The fifth arch disappears and only five remain.
- The ventral ends of the arches of the right and left sides meet in the middle line in the floor of the pharynx.
- In the interval between any two arches, the endoderm (lining the pharynx) is pushed outward to form a series of pouches. These are called endodermal or pharyngeal pouches.
- Opposite each pouch the surface ectoderm dips inward as an ectodermal cleft.
- Each pharyngeal arch contains a skeletal element (cartilage that may later form bone), striated muscle supplied by the nerve of the arch and an arterial arch.
- The cartilage of the first arch (Meckel's cartilage) gives origin to the incus and malleus (of middle ear).
- The cartilage of the second arch forms the stapes, the styloid process and part of the hyoid bone.
- The cartilage of the third arch forms the greater part of the hyoid bone.
- The cartilages of the fourth and sixth arches give rise to the cartilages of the larynx.

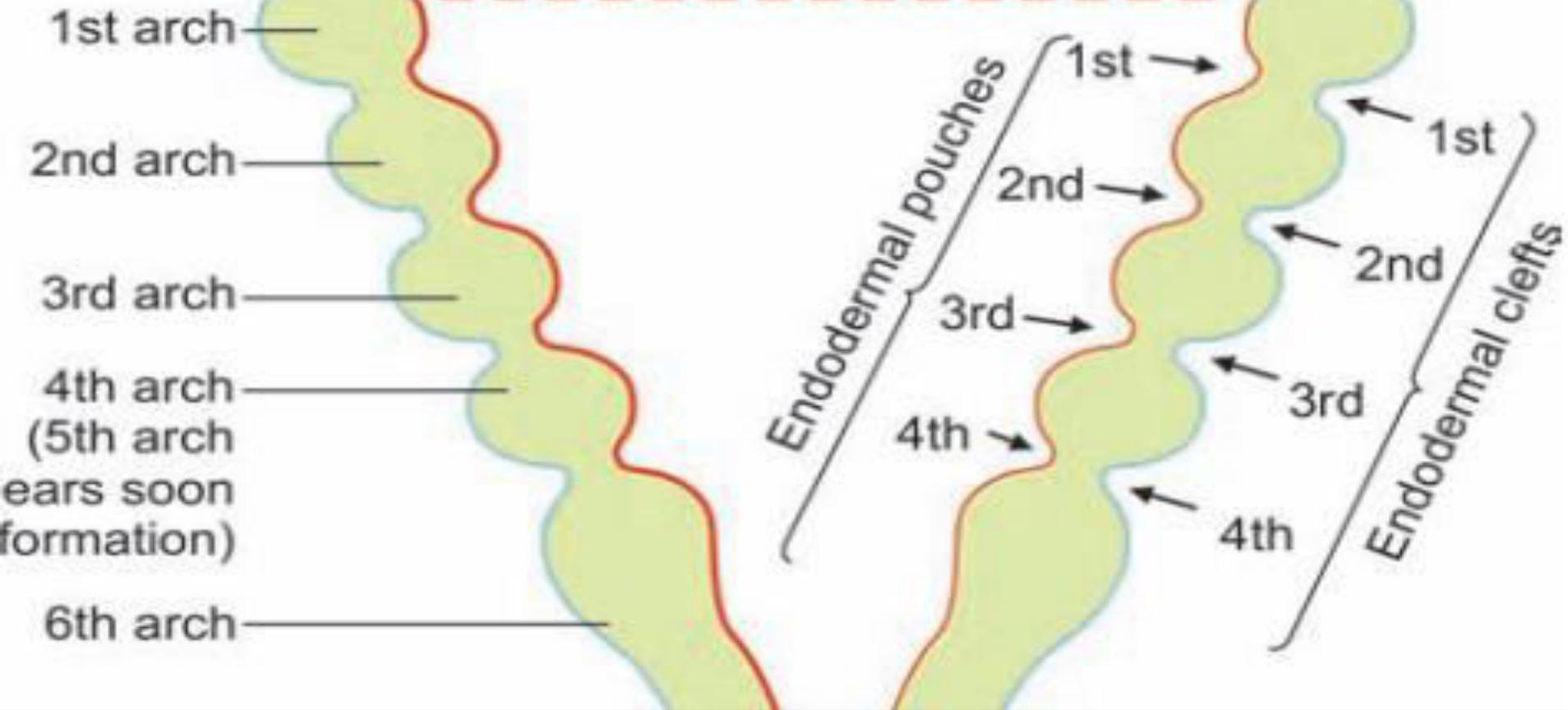
**The nerves of the pharyngeal arches are as follows: First arch = mandibular; second arch = facial; third arch = glossopharyngeal; fourth arch = superior laryngeal; fifth arch = recurrent laryngeal. The muscles supplied by these nerves are derived from the mesoderm of the arch concerned.**

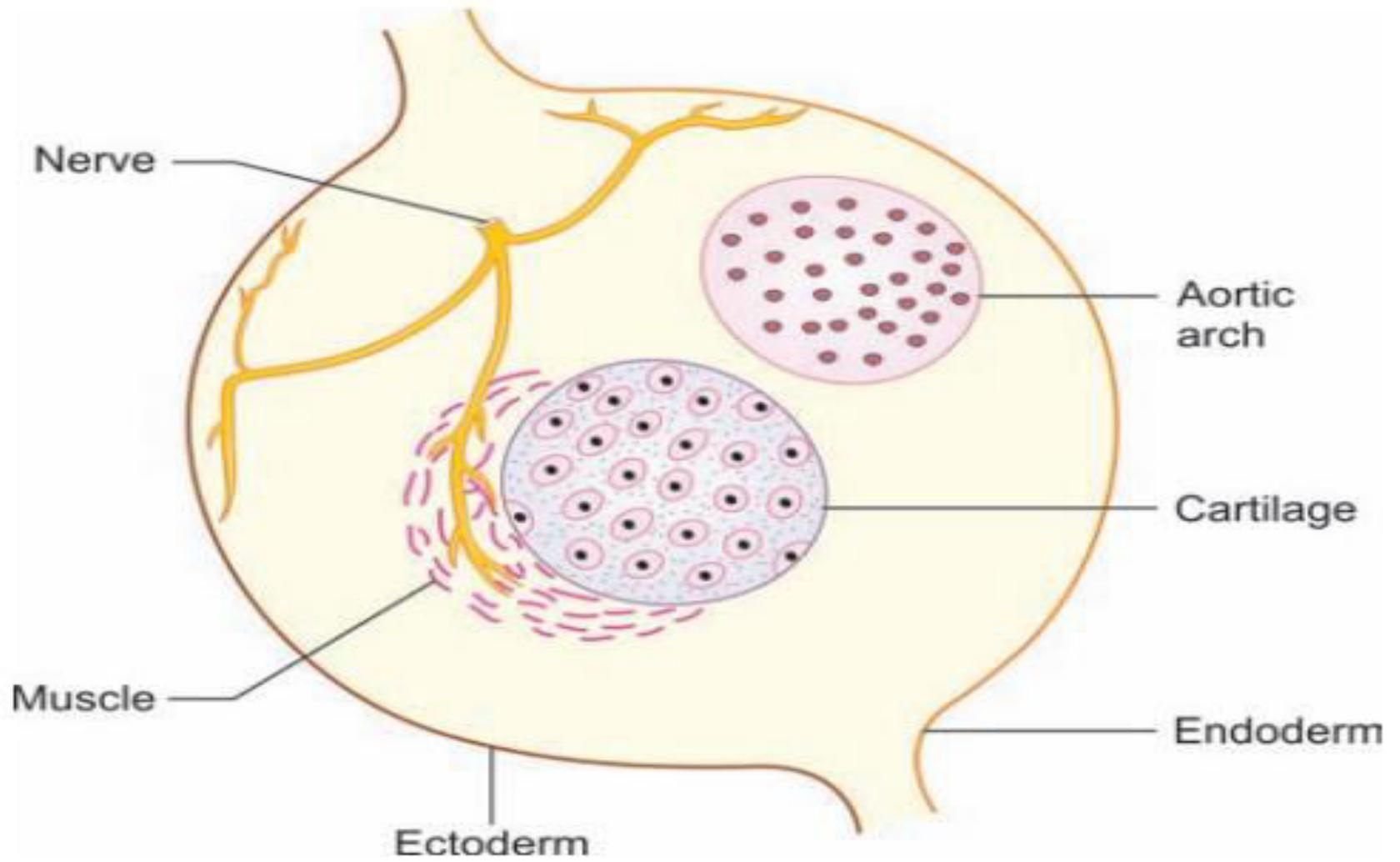
- The external acoustic meatus develops from the first ectodermal cleft.**
- The first endodermal pouch (and part of second) gives off a diverticulum called the tubotympanic recess. The middle ear and the auditory tube develop from the tubotympanic recess.**
- The palatine tonsil arises from the second pouch.**
- The inferior parathyroid gland and the thymus are derived from the third pouch.**
- The superior parathyroid gland is derived from the fourth pouch.**
- The thyroid gland develops mainly from the thyroglossal duct. This duct is formed as a median diverticulum arising from the floor of the pharynx (at the foramen cecum).**





# Buccopharyngeal membrane disappears





<i>I Arch—Mandibular Meckel's cartilage</i>	<i>II Arch—Hyoid Reichert's cartilage</i>	<i>III Arch</i>	<i>IV + VI Arches</i>
Malleus	Stapes	Greater cornu of hyoid	Thyroid
Incus	Styloid process	Lower half of body of hyoid	Cricoid
Mandible	Stylohyoid ligament		Corniculate
Maxilla	Lesser cornu of hyoid		Cuneiform
Zygomatic	Upper half of body of hyoid		Arytenoid
Palatine			Thyrohyoid ligament
Temporal (part)			Epiglottis—from mesenchyme of hypobranchial eminence
Anterior ligament of malleus			
Sphenomandibular ligament			

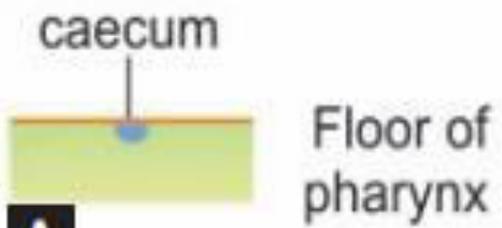
# FATE OF ENDODERMAL POUCHES

<i>Pouch</i>	<i>Derivatives</i>
1st pharyngeal pouch	<ul style="list-style-type: none"><li>• Tympani cavity</li><li>• Auditory tube</li><li>• Inner surface of the eardrum</li></ul>
2nd pharyngeal pouch	<ul style="list-style-type: none"><li>• Palatine tonsil</li><li>• Tonsillar fossa</li></ul>
3rd pharyngeal pouch	<ul style="list-style-type: none"><li>• Thymus</li><li>• Inferior parathyroid glands</li></ul>
4th pharyngeal pouch	<ul style="list-style-type: none"><li>• Superior parathyroid glands</li><li>• Thyroid gland?</li></ul>
5th pharyngeal pouch	Ultimobranchial body

## **DEVELOPMENT OF THYROID GLAND**

- The thyroid gland develops mainly from the thyroglossal duct.
- ❑ **Parafollicular cells are derived from the caudal pharyngeal complex (derived from the fourth and fifth pharyngeal pouches).**
- ❑ **The medial ends of the two mandibular arches are separated by a midline swelling called the tuberculum impar. Immediately behind the tuberculum, the epithelium of the floor of the pharynx shows a thickening in the middle line. This region is soon depressed below the surface to form a diverticulum called the thyroglossal duct.**
- ❑ **The site of origin of the diverticulum is now seen as a depression called the foramen cecum. The diverticulum grows down in the midline into the neck. Its tip soon bifurcates. Proliferation of the cells of this bifid end gives rise to the two lobes of the thyroid gland.**
- ❑ **The developing thyroid comes into intimate relationship with the caudal pharyngeal complex and fuses with it. Cells arising from this complex are believed to give origin to the parafollicular cells of the thyroid which may represent the ultimobranchial body of lower animals.**

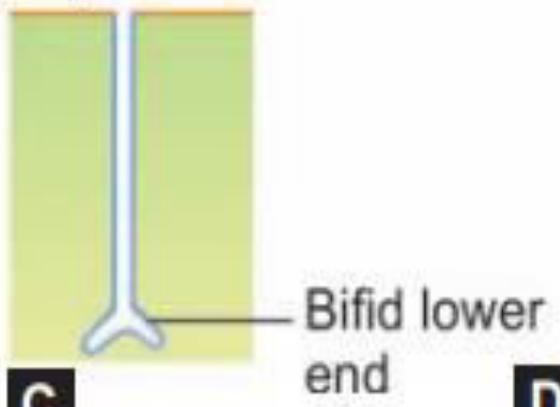
Site of foramen  
caecum



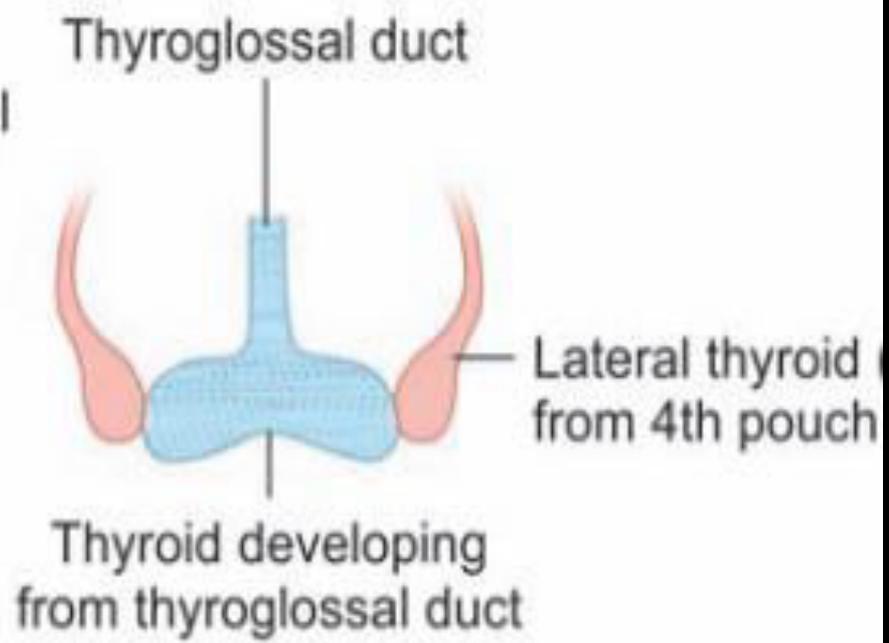
**A**



**B**



**C**



**D**

THANKS