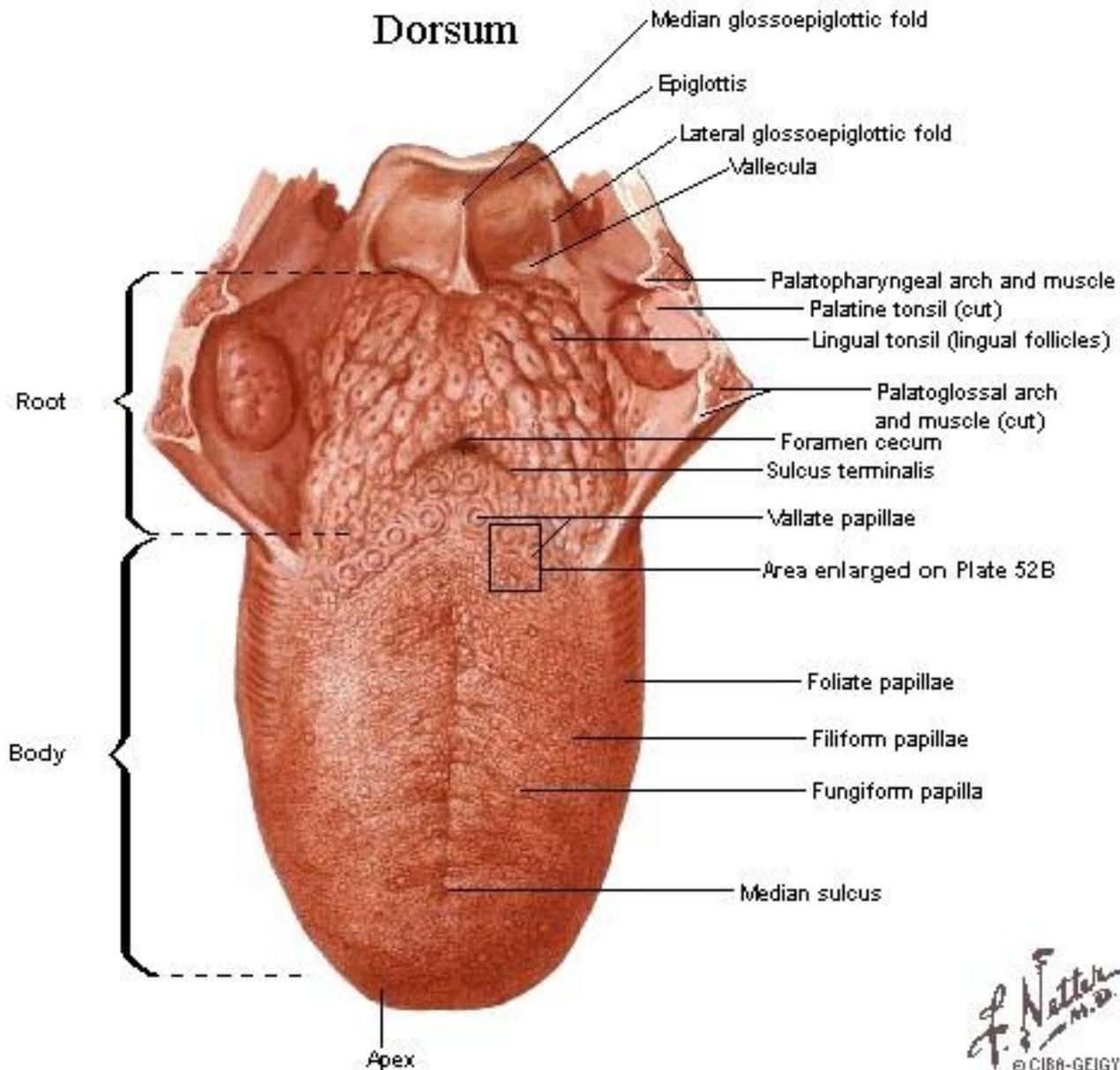


Anatomy of the Tongue



- A mass of skeletal muscle covered by mucous membrane
- Midline septum separating two muscular halves
- Has dorsum, tip, inferior surface and root
- Anterior 2/3 (oral part) - faces upwards towards the hard palate
- Posterior 1/3 (pharyngeal part) - faces backwards towards the oropharynx
- Stratified squamous epithelium:
 - ✓ **keratinised** on the **oral** part
 - ✓ **non-keratinised** on the **pharyngeal** part

Tongue Dorsum



- Tip - is the most anterior - merges into the inferior surface
- Mucous membrane of the inferior surface - thin and smooth (similar to FOM and cheek)

Oral anterior 2/3 of the dorsum of the tongue:

- covered by mucous membrane into which underlying muscles are inserted
- surface is roughened by the presence of 3 types of papillae: filiform, fungiform and vallate papillae
 - ✓ **Filiform papillae:**
 - conical projections that give rise to velvety appearance of the tongue
 - located along the entire dorsum of the tongue, but they are not involved in taste sensation

✓ **Foliate papillae:**

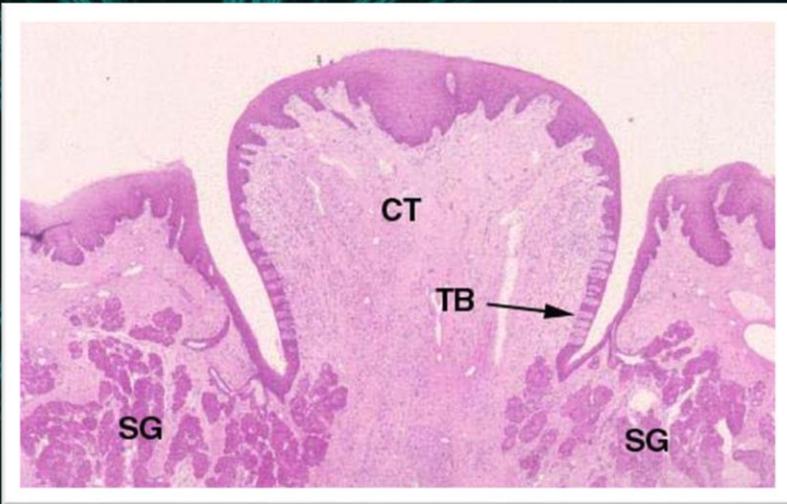
- small folds of mucosa located along the lateral surface of the tongue

✓ **Fungiform papillae:**

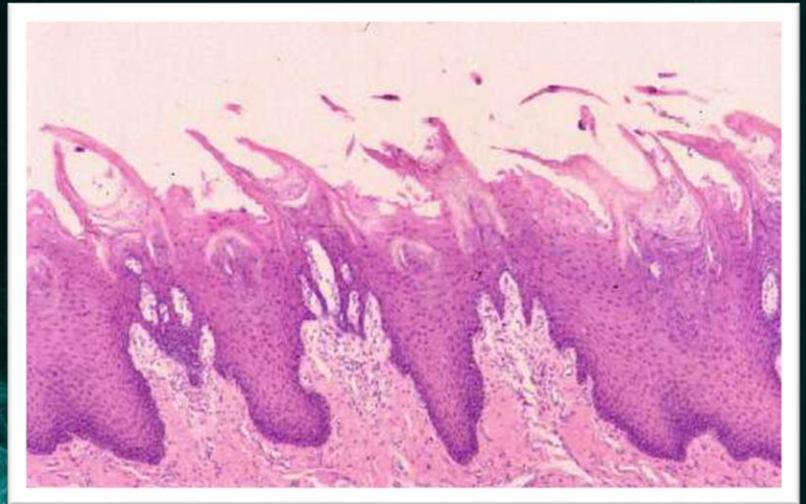
- visible as discrete pink pinheads
- more numerous towards the edge of the tongue
- each bears a few taste buds

✓ **Vallate papillae:**

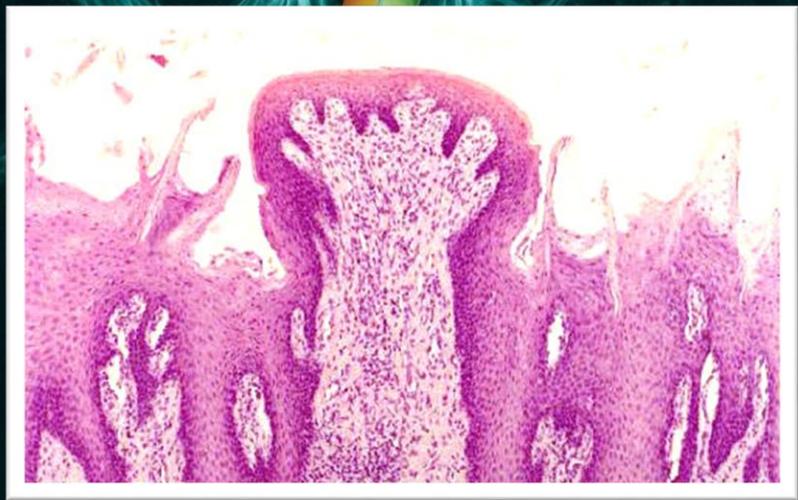
- are about a dozen in number
- arranged in the form of a V with apex pointing backwards
- each is a cylindrical projection surrounded a circular sulcus and a raised outer wall
- there are many taste buds and serous glands in the sulcus that surrounds each vallate papillae (as there are no other glands on the dorsum of anterior 2/3 of the tongue)



Vallate Papillae



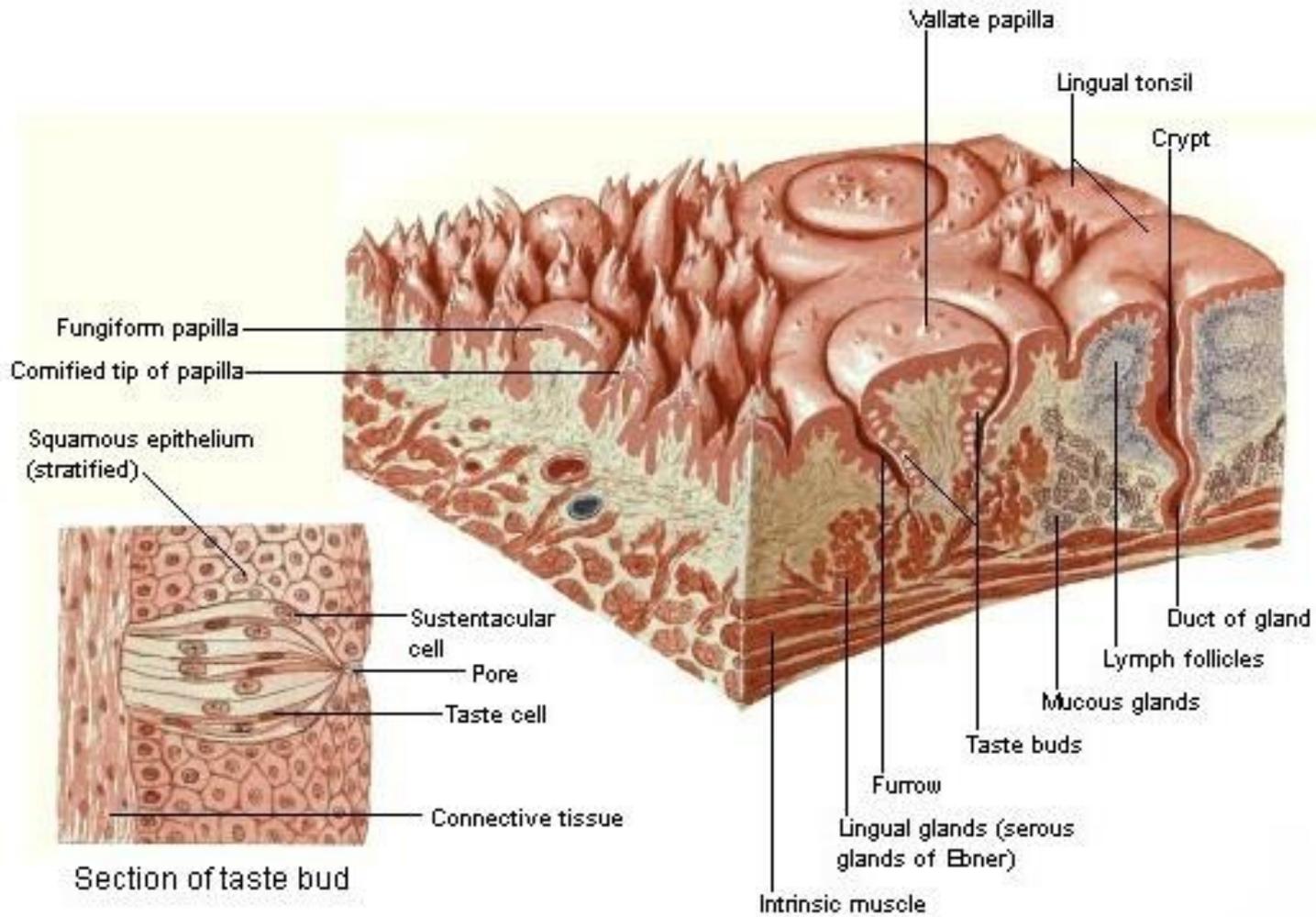
Filiform Papillae



Fungiform Papillae

- **sulcus terminalis:** ill defined shallow groove which marks the junction of the oral and the pharyngeal part of the tongue
 - vallate papillae are far back on the oral surface - not in contact with the food being chewed; but the food juices and saliva reach them - so flavours are transmitted to them
-
- There are scattered mucous and serous glands under the tip and sides
 - On the undersurface behind the tip there is a rather large mixed gland on the each side of midline - **anterior lingual gland**
 - From each gland small ducts open on the undersurface of the tongue
 - Ranula - retention cyst of this gland

Tongue - Schematic Stereogram



Posterior 1/3 of the dorsum of the tongue:

- is the anterior wall of the oropharynx
- extends from sulcus terminalis and epiglottis
- Foramen caecum: is a small depression at the apex of the sulcus - the remains of the upper end of the thyroglossal duct
 - ✓ there are no papillae behind this sulcus
- Smooth mucous membrane has a nodular appearance - constitute the lingual tonsil, part of Waldeyer's ring.
- Between tongue and epiglottis - midline flange of mucous membrane (median glossoepiglottic fold).
 - ✓ Each side of which is depression (valleculae), bounded laterally by similar mucosal fold (lateral glossoepiglottic fold), extending from the side of the epiglottis to the wall of the pharynx

Inferior surface of the tongue:

- Lingual frenulum - a small midline septum of mucous membrane - unites it to the floor of the mouth
- Lateral to this - deep lingual vein (visible through the mucosa); lingual artery and nerve (not visible)
- Farther laterally is another fold of mucosa - fimbriated fold
- Foliate papillae - a series of parallel folds of mucous membrane on the sides of the posterior part of the tongue

- Palatoglossal arches (anterior pillars of the fauces) - ridge of mucous membrane raised up by palatoglossus muscles
 - ✓ extends from the undersurface of the front of the soft palate to the sides of tongue in line with the vallate papillae
 - ✓ the whole constitutes oropharyngeal isthmus
 - closed by depression of the palate and elevation of dorsum of tongue
 - narrowed by contraction of palatoglossus muscle

Muscles

- **Divided into:**
 - ✓ **intrinsic** (wholly within the tongue and not attached to the bone)
 - superior longitudinal
 - inferior longitudinal
 - transverse
 - vertical
 - ✓ **extrinsic** (attached to the bone)
 - genioglossus
 - hyoglossus
 - styloglossus
 - palatoglossus

Intrinsic Muscles

- **Superior longitudinal muscle:**
 - ✓ lies beneath mucous membrane
 - ✓ shortens the tongue, make its dorsum concave
- **Inferior longitudinal muscle:**
 - ✓ lying close to the inferior surface of the tongue
 - ✓ between genioglossus and hyoglossus
 - ✓ shortens the tongue, make its dorsum convex

- **Transverse muscle:**

- ✓ extends from median septum to the margins
- ✓ makes the tongue narrow and elongated

- **Vertical muscle:**

- ✓ found at the borders of the anterior part of the tongue
- ✓ makes the tongue broad and flattened

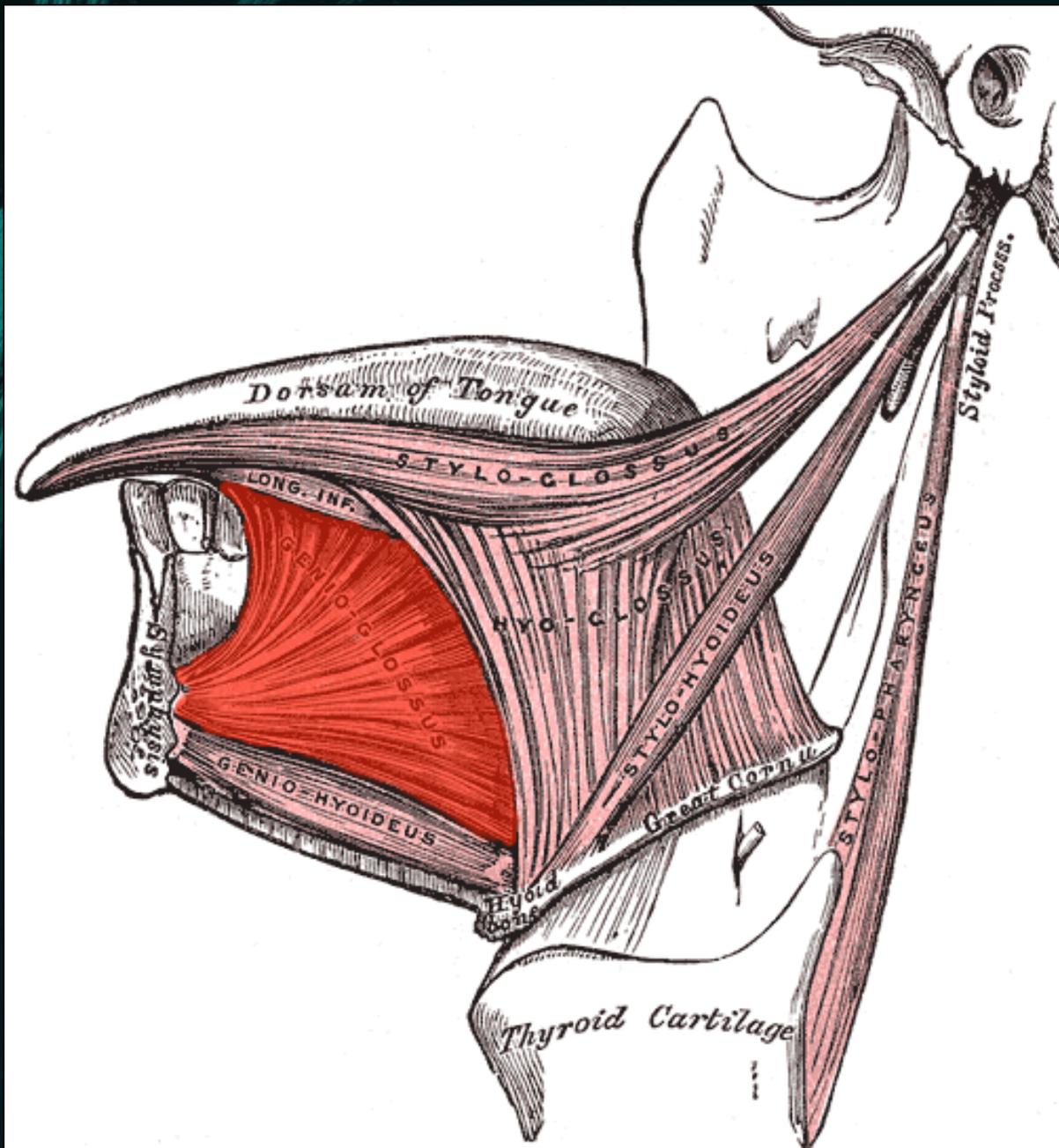
Extrinsic Muscles

- **Genioglossus:**

- ✓ **origin:** Upper genial tubercle of mandible
- ✓ **insertion:** the fibres radiate widely to be inserted into the mucous membrane of the tongue; the lowest fibres passing down to the hyoid body

- **Hyoglossus:**

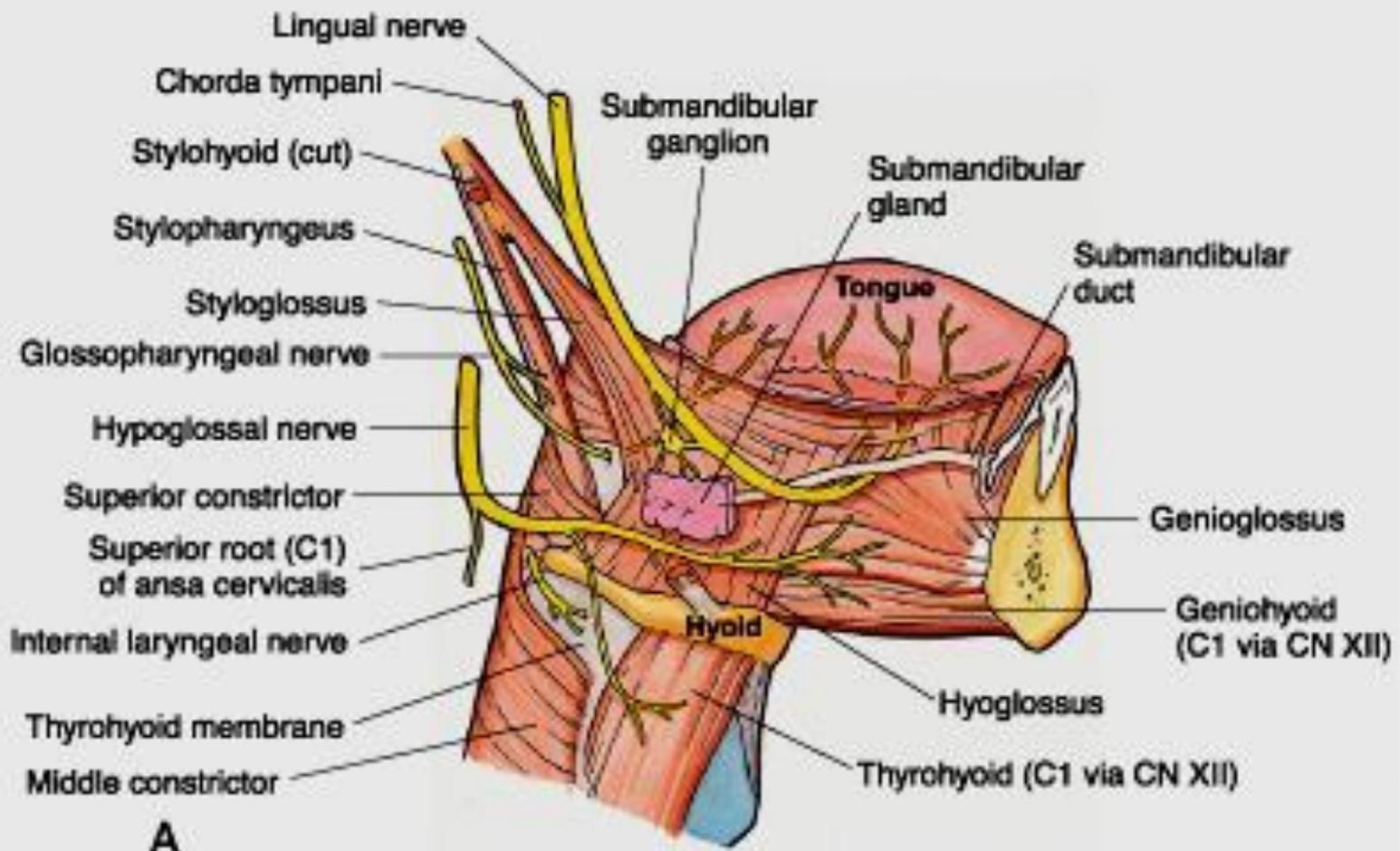
- ✓ **origin:** from the length of the greater horn of the hyoid bone and from lateral part of its body
- ✓ **insertion:** the fibres extend upward and its upper border interdigitating at right angles with the fibres of styloglossus, and is attached to the side of the tongue



- ✓ Superficial to muscle from the above downwards:
 - lingual nerve
 - submandibular duct
 - hypoglossal nerve with its accompanying veins

- ✓ Passing deep to its posterior border from above downwards:
 - glossopharyngeal nerve
 - styloid ligament
 - lingual artery

- **Styloglossus:**
 - ✓ **origin:** from the front of the lower part of the styloid process and the upper part of the stylohyoid ligament



✓ **insertion:** passes forwards below the superior constrictor to be inserted into the side of the tongue, interdigitating with upper fibres of hyoglossus

- **Palatoglossus:**

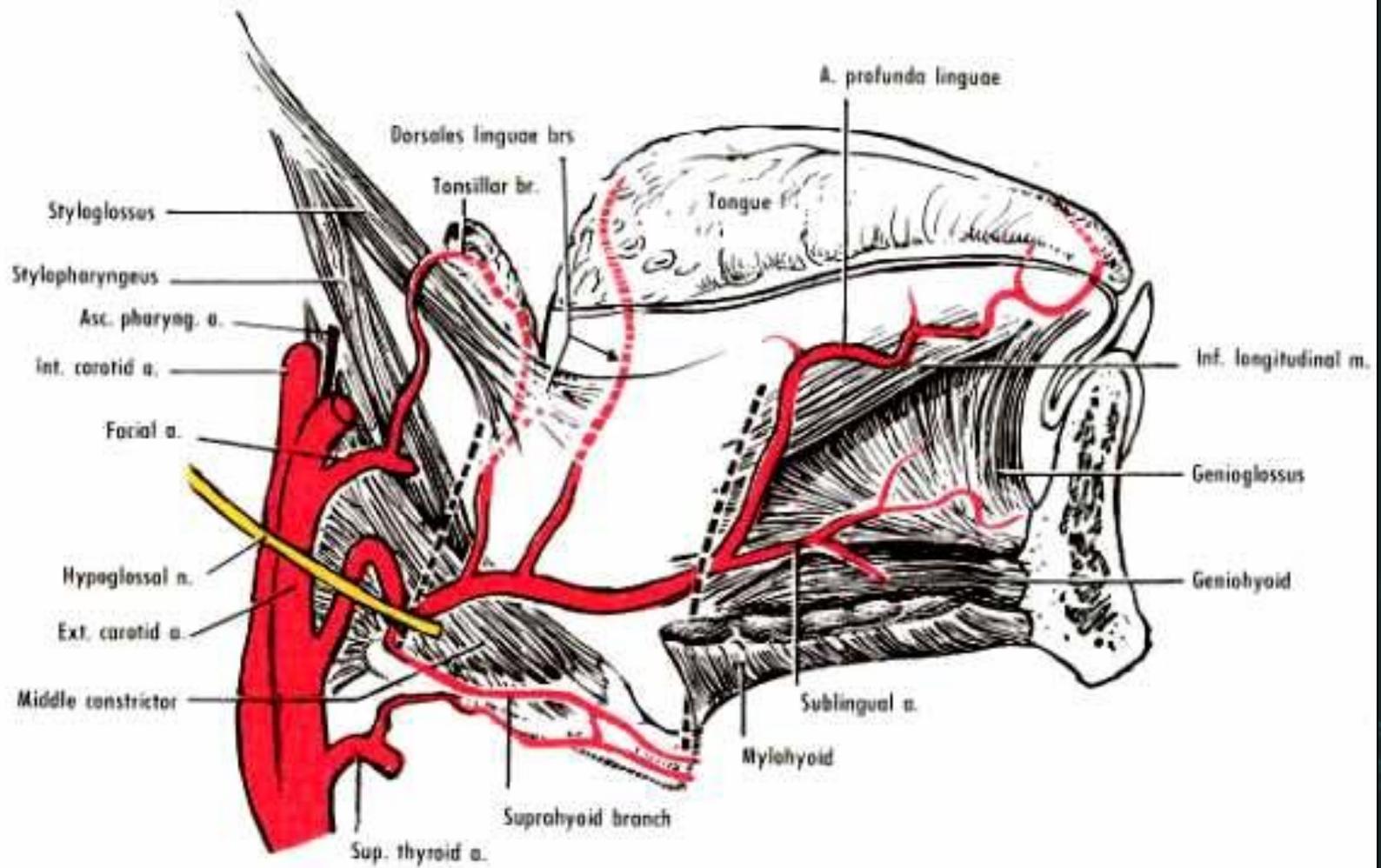
- ✓ **origin:** arises from the undersurface of the palatine aponeurosis

- ✓ **insertion:** side of the tongue (junction of oral and pharyngeal part)

Muscles	Origin	Insertion	Action(s)
Genioglossus	Upper genial tubercle of mandible	Upper fibres: tip of the tongue Middle fibres: dorsum Lower fibres: hyoid bone	Upper fibres: retract the tip Middle fibres: depress the tongue Lower fibres: pull the posterior part forward (thus protrusion of the tongue from the mouth)
Hyoglossus	Greater cornu, front of lateral part of body of hyoid bone	Side of tongue	Depress the tongue Retracting the protruded tongue
Styloglossus	Tip, anterior surface of styloid process	Side of tongue	Pulls the tongue upwards and backwards during swallowing
Palatoglossus	Oral surface of palatine aponeurosis	Side of tongue (junction of oral and pharyngeal part)	Pulls up root of tongue, approximates palatoglossal arches, closes oropharyngeal isthmus

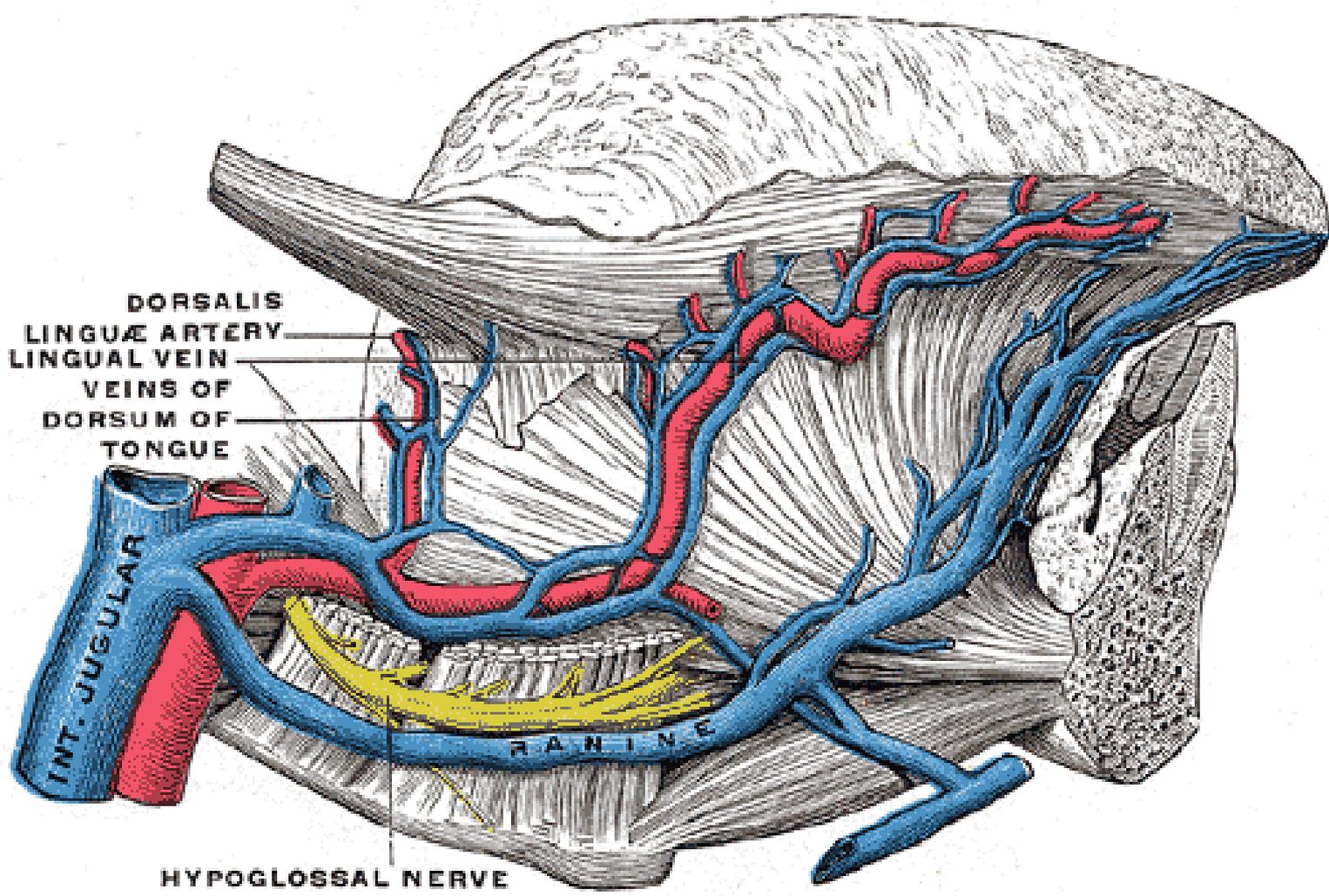
Blood Supply

- Tongue is supplied by the **lingual artery**
 - ✓ run above the greater horn of the hyoid bone deep to hyoglossus
 - ✓ passes forwards to the tip
 - ✓ beneath hyoglossus it gives off dorsal lingual branches into the posterior part
 - ✓ at the anterior border of hyoglossus it gives a branch to the sublingual gland and the floor of the mouth
 - ✓ fibrous septum dividing the two halves of the tongue prevents any significant anastomosis of blood vessels across the midline



- **Venous tributaries**

- ✓ accompanying the lingual artery
- ✓ its dorsal branches form the lingual vein
- ✓ from the tip by deep lingual vein
- ✓ it runs back superficial to hyoglossus and is joined at the anterior border of the muscle by the sublingual vein (from the sublingual gland) to form the *vena comitans of the hypoglossal nerve*
- ✓ it continues backwards close to the nerve and joining either the lingual, facial or internal jugular vein
- ✓ lingual vein usually joins the internal jugular near the greater horn of the hyoid bone



DORSALIS
LINGUÆ ARTERY
LINGUAL VEIN
VEINS OF
DORSUM OF
TONGUE

INT. JUGULAR

LINGUAL VEIN

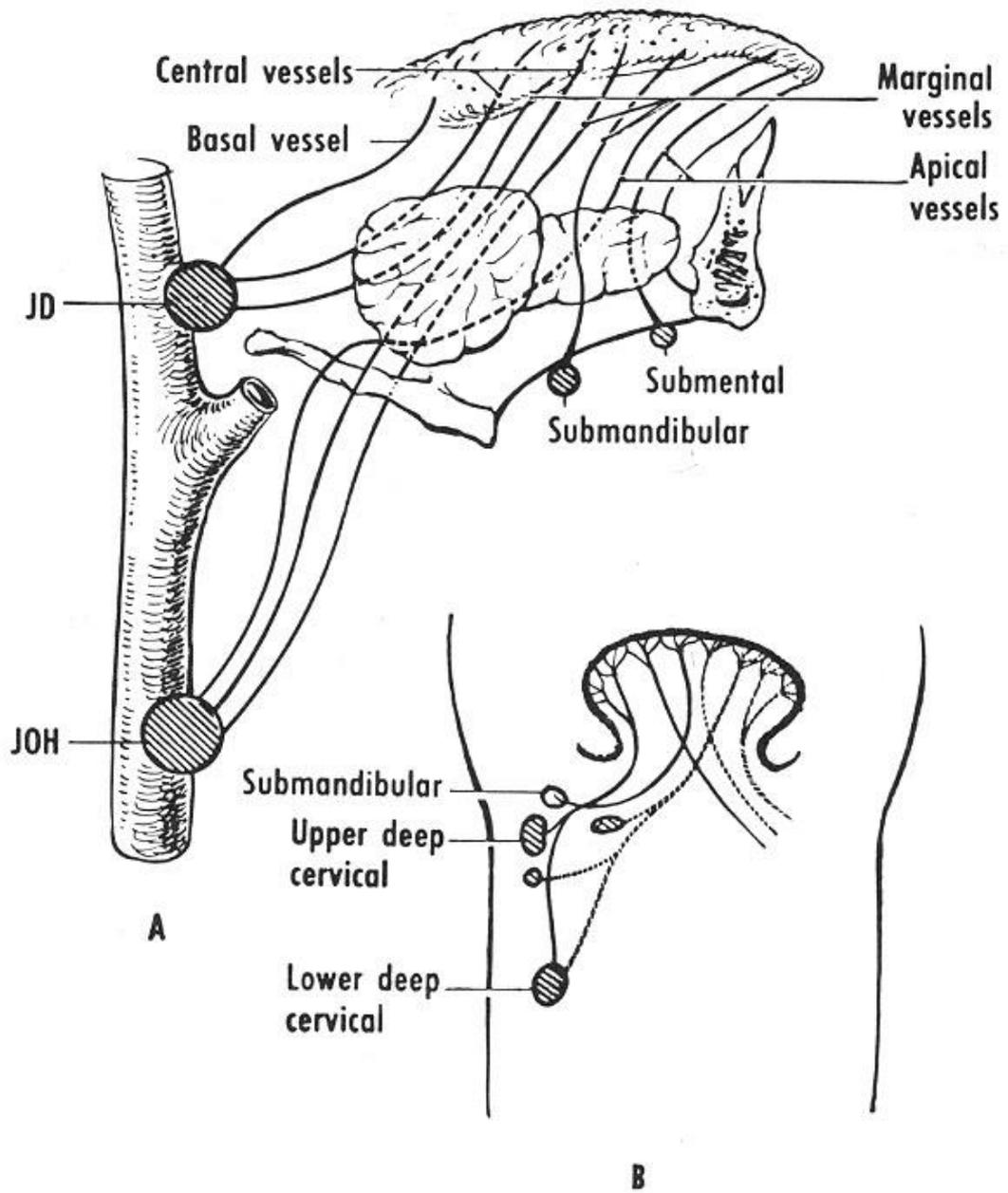
HYPOGLOSSAL NERVE

Lymphatic Drainage

- Lymph from one side (esp. of the posterior side), may reach the nodes of the both sides of the neck (in contrast to the blood supply which remains **unilateral**)
- Tip - drain to submental nodes or directly to deep cervical nodes
- Marginal lymphatics from the anterior part tend to drain to ipsilateral submandibular nodes or directly to deep cervical nodes
- Central lymphatics - drain to deep cervical nodes of either side
- Posterior part - drains directly and bilaterally to deep cervical nodes

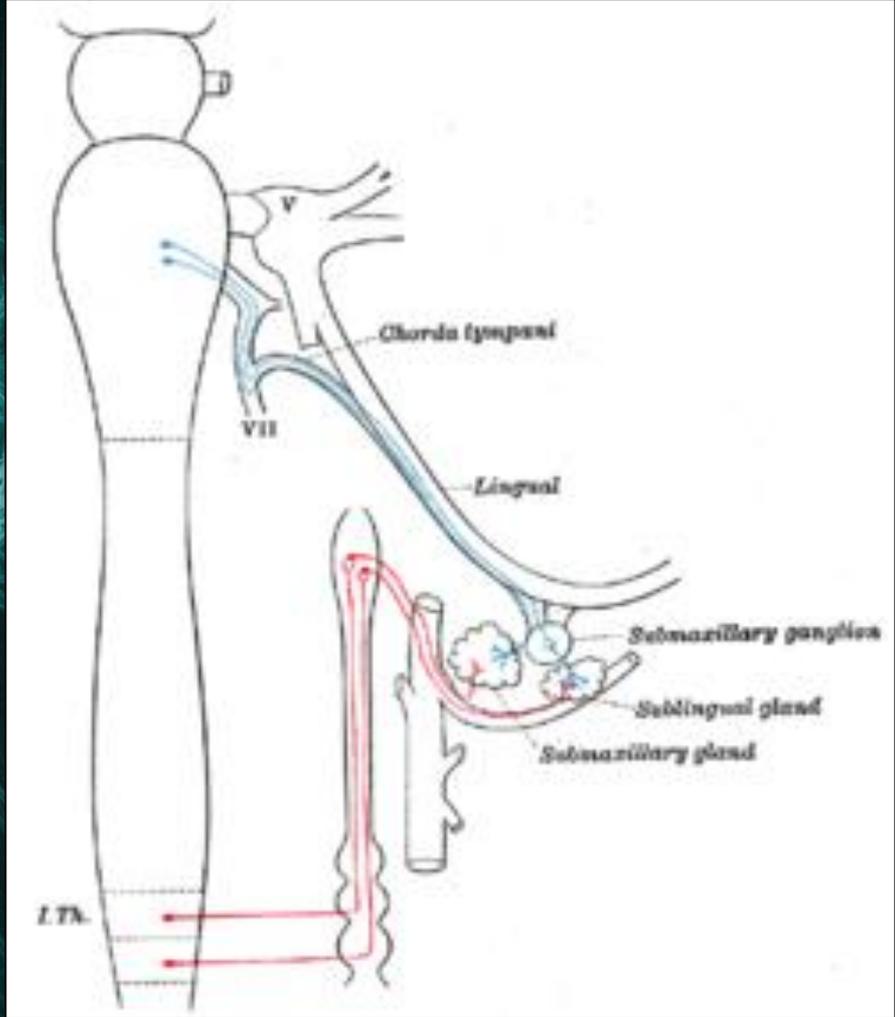
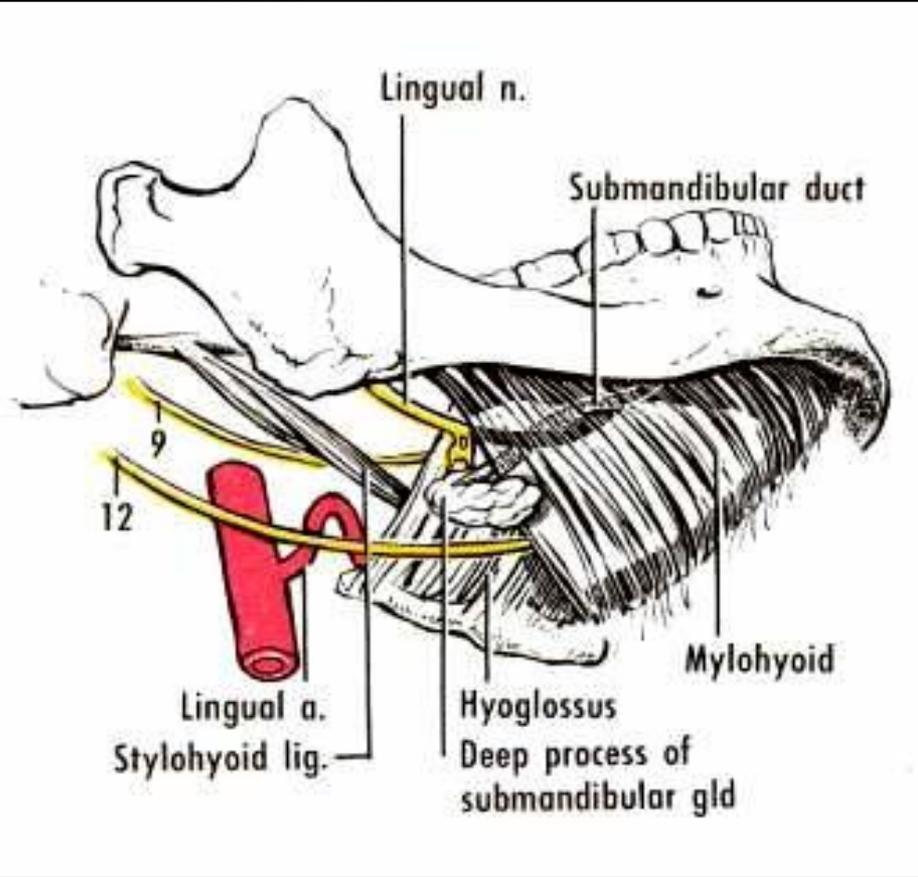
- The deep cervical nodes usually involved: jugulodigastric and jugulo-omohyoid nodes
- All lymph from the tongue is believed to eventually drain through the jugulo-omohyoid node before reaching the thoracic duct or right lymphatic duct





Nerve Supply

- **Motor:** all muscles of the tongue (intrinsic and extrinsic) are supplied by hypoglossal nerve except palatoglossus which is supplied by pharyngeal plexus
- **Sensory:**
 - ✓ **anterior 2/3 of the tongue:**
 - **general sensation:** lingual nerve - branch of the mandibular nerve (with cell bodies in the trigeminal ganglion)
 - **taste:** chorda tympani (with cell bodies in the geniculate ganglion of facial nerve)
 - parasympathetic secretomotor fibres to the anterior lingual gland run in the chorda tympani from the superior salivary nucleus, and relay in the submandibular ganglion

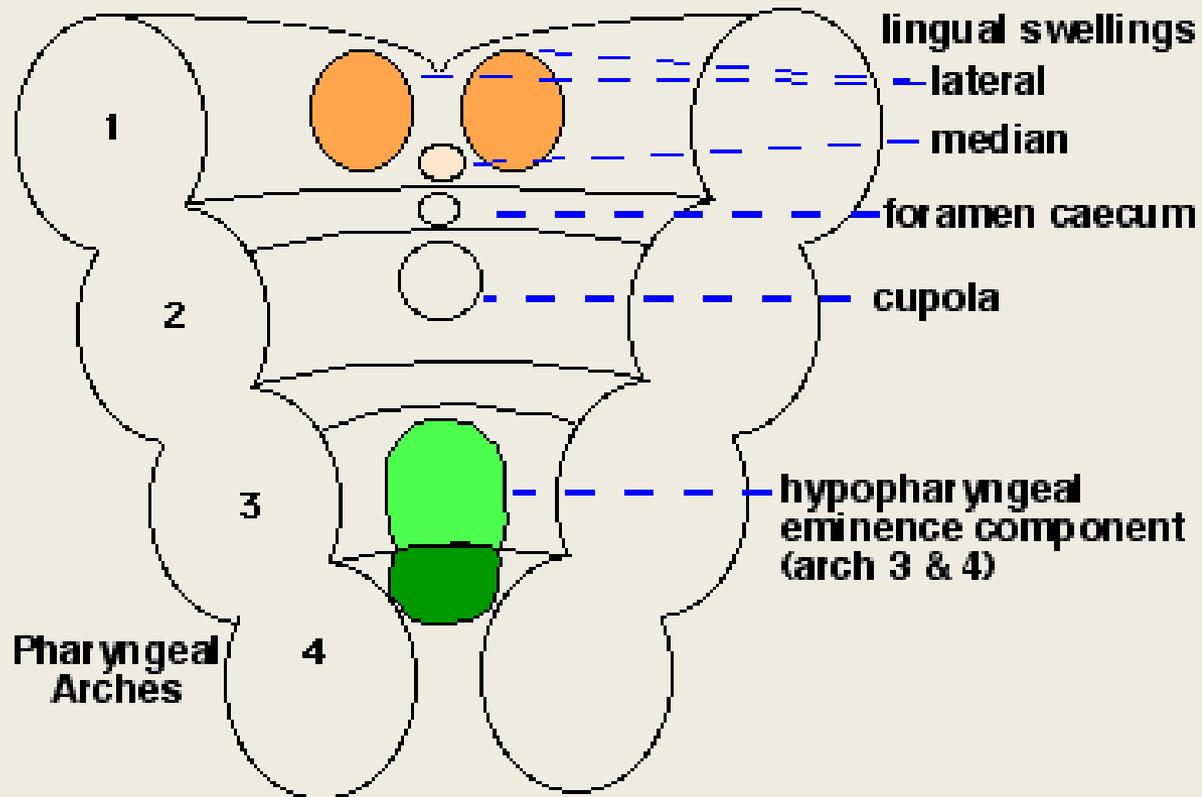


- ✓ **posterior 1/3 of the tongue:** innervated by the glossopharyngeal nerve (both general sensation and taste), with cell bodies in the glossopharyngeal ganglia in the jugular foramen
- ✓ **posterior most part of the tongue:** innervated by the vagus nerve through the internal laryngeal branch (with cell bodies in the inferior vagal ganglion)

Development of Tongue

- Starts to develop near the end of the fourth week
- **Epithelium:**
 - ✓ **Anterior 2/3:**
 - from 2 lingual swellings and one tuberculum impar, i.e., from first branchial arch
 - supplied by lingual nerve (post-trematic) and chorda tympani (pre-trematic)
 - ✓ **Posterior 1/3:**
 - from the cranial half of the hypobranchial eminence, i.e., from the third arch
 - supplied by glossopharyngeal nerve

Development of the Tongue (part 1)



✓ **Posterior most:**

- from the fourth arch
- supplied by vagus nerve
- **Muscles** develop from the occipital myotomes which are supplied by hypoglossal nerve
- **Connective tissue** develops from local mesenchyme

Applied Anatomy

- Injury to hypoglossal nerve produces paralysis of the muscles of the tongue on the side of lesion
 - ✓ infranuclear lesion (i.e., in motor neuron disease and in syringobulbia): gradual atrophy and muscular twitchings of the affected half of the tongue observed
 - ✓ supranuclear lesion (i.e., in pseudobulbar palsy): produce paralysis without palsy (tongue is stiff, small and moves sluggishly)
- The presence of rich network of lymphatics and loose areolar tissue in the substance of tongue is responsible for enormous swelling of tongue in acute glossitis
- The undersurface of the tongue is a good site for observation of jaundice

- In unconscious patients, the tongue may fall back and obstruct the air passages. This can be prevented by lying the patient on one side with head down or by keeping the tongue pulled out mechanically
- In the carcinoma of tongue, the affected site of tongue is removed surgically. All deep cervical nodes are also removed (block dissection)
- Carcinoma of posterior 1/3 of the tongue is more dangerous due to bilateral lymphatic spread

Thank You

