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Course title: **Gross Anatomy of
head and neck**

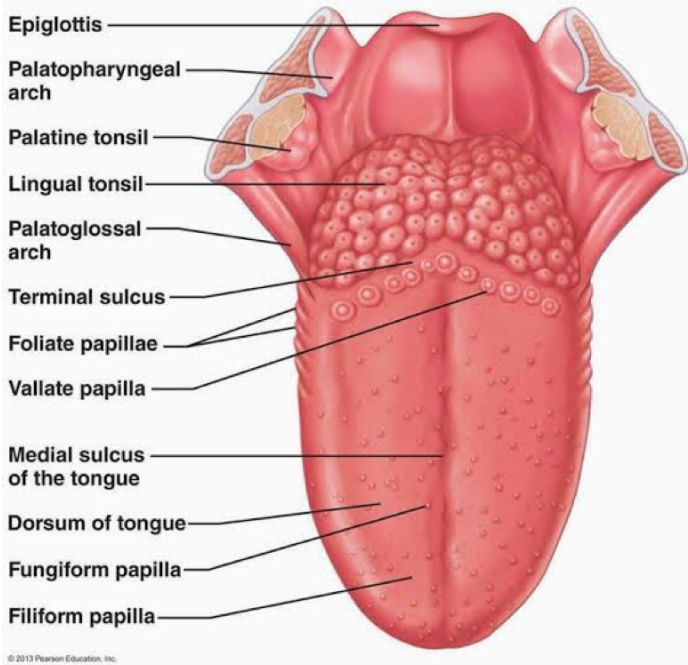
Course code: **ANA 301**

Assignments answers

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Introduction

The tongue is a muscular mobile organ in the mouth. It is vital for chewing and swallowing food, as well as for speech making.



- The tongue is covered with moist, pink tissue called mucosa. Tiny bumps called *papillae* give the tongue its rough texture.
- Thousands of taste buds cover the surfaces of the papillae.
- Taste buds are collections of nerve-like cells that connect to nerves running into the brain.
- The four common tastes are sweet, sour, bitter, and salty. A fifth taste, called umami, results from tasting glutamate.
- The tongue is anchored to the mouth by webs of tough tissue

and mucosa.

-The tether holding down the front of the tongue is called the frenum. In the back of the mouth, the tongue is anchored into the hyoid bone.

-It's posterior part forms the anterior wall of oropharynx

The papillae covering the tongue can be further divided into 4, namely:

1. **Vallate papillae** are arranged in a V-shape anterior to the sulcus terminalis and studded with numerous taste buds. Innervation is by the glossopharyngeal nerve (CN IX).
2. **Fungiform papillae** are mushroom-shaped papillae with erythematous domes, located on the lateral aspects and at the apex of the tongue.
3. **Filiform papillae** are slim, cone-shaped projections

organized in rows parallel to the sulcus terminalis.

4. **Foliate papillae** are rarely found in humans (vestigial).

Another important part of the tongue is the lingual tonsil, a collection of nodular lymphatic tissue towards the posterior one-third of the dorsum of the tongue.

Muscles

The muscles of the tongue's are divided into two namely:

Intrinsic muscles

Extrinsic muscles

Intrinsic muscles which are muscles found within the tongue

1. The **superior longitudinal lingual** muscle, which shortens the tongue and curls it upward.
2. The **inferior longitudinal lingual** muscle, which shortens the tongue and curls it downward.
3. The **transverse lingual**

muscle, which elongates and narrows the tongue.

4. The **vertical lingual** muscle, which flattens the tongue.

The tongue's extrinsic muscles which take origin outside the tongue and can move the tongue are:

1. The **genioglossus** muscle, which protrudes the tongue, and is innervated by the hypoglossal nerve (CN XII).
2. The **styloglossus** muscle, which draws up the sides of the tongue to create a trough for swallowing following adequate mastication. The pair of styloglossus muscles works together on each side to retract the tongue. The styloglossus muscle is innervated by the hypoglossal nerve (CN XII).
3. The **hyoglossus** muscle, which depresses and retracts

the tongue and is innervated by the hypoglossal nerve (CN XII).

4. The **palatoglossus** muscle, which elevates the posterior tongue, closes the oropharyngeal isthmus, aids in the initiation of swallowing, and prevents the spill of saliva from the vestibule into the oropharynx by maintaining the palatoglossal arch. It is the only extrinsic muscle of the tongue that is not innervated by the hypoglossal nerve; instead, it is innervated by the vagus nerve (CN X).

Blood Supply and Lymphatics

Blood supply to the tongue is predominantly from the lingual artery, a branch of the external carotid artery between the superior thyroid artery and the facial artery, which departs at the

level of the greater horn of the hyoid bone within the carotid triangle. After branching from the external carotid artery, the lingual artery passes deep to the hyoglossus muscle and superficial to the middle pharyngeal constrictor muscle. It then gives rise to the following four arteries:

1. The **suprahyoid artery** supplies the omohyoid, sternothyroid, and thyrohyoid muscles. They anastomose with the corresponding vessels from the opposite side.
2. The **dorsal lingual arteries** arise beneath the hyoglossus muscle and pass to the posterior part of the dorsum of the tongue. They supply the mucous membrane of this region as well as the glossopalatine arch, lingual tonsils, soft palate, and epiglottis. They

anastomose with their corresponding vessels on the opposite side.

3. The **sublingual artery** branches at the anterior border of the hyoglossus muscle before passing between the genioglossus muscle and mylohyoid muscle to the sublingual gland. It supplies the sublingual gland before giving branches to the mylohyoid muscle. One branch from the sublingual artery passes posterior to the alveolar process of the mandible and anastomoses with the corresponding artery from the other side. A second branch of the sublingual artery pierces the mylohyoid muscle and anastomoses with the submental branch of the facial artery.
4. The **deep lingual artery**, which is the

termination of the lingual artery, passes between the genioglossus muscle and inferior longitudinal muscle.

Nerve supply

-The hypoglossal nerve (CN XII) provides motor innervation to all of the intrinsic and extrinsic muscles of the tongue except for the palatoglossus muscle, which is innervated by the vagus nerve (CN X). It runs superficial to the hyoglossus muscle. Lesions of the hypoglossal nerve cause deviation of the tongue to the ipsilateral (i.e., damaged) side.

-Taste to the anterior two-thirds of the tongue is achieved through innervation from the chorda tympani nerve, a branch of the facial nerve (CN VII).

-General sensation to the anterior two-thirds of the tongue is by innervation from the lingual nerve, a branch of the mandibular branch of the trigeminal nerve (CN V3). The lingual nerve is

located deep and medial to the hyoglossus muscle and is associated with the submandibular ganglion.

-Taste to the posterior one-third of the tongue is accomplished through innervation from the glossopharyngeal nerve (CN IX), which also provides general sensation to the posterior one-third of the tongue.

-Taste perception also is performed by both the epiglottis and the epiglottic region of the tongue, which receives taste and general sensation from innervation by the internal laryngeal branch of the vagus nerve (CN X).

Damage to the vagus nerve (CN X) causes contralateral deviation (i.e., away from the injured side) of the uvula.

Clinical application

- [Thrush](#) (candidiasis): Candida

albicans (a yeast) grows over the surface of the mouth and tongue. Thrush can occur in almost anyone, but it occurs more often in people taking steroids or with suppressed immune systems, the very young, and the elderly.

- [Oral cancer](#): A growth or ulcer appears on the tongue and grows steadily. Oral cancer is more common in people who smoke and/or drink alcohol heavily.
- Macroglossia (big tongue): This can be broken down into various categories based on the cause. These include congenital, inflammatory, traumatic, cancerous, and metabolic causes. Thyroid disease, lymphangiomas, and congenital abnormalities are among some of the causes of an enlarged tongue.
- [Geographic tongue](#): Ridges and colored spots migrate

over the surface of the tongue, periodically changing its appearance. Geographic tongue is a harmless condition.

- [Burning mouth/burning tongue syndrome](#): a relatively common problem. The tongue feels burned or scalded, or strange tastes or sensations develop. Apparently harmless, burning mouth syndrome may be caused by a mild nerve problem.
- Atrophic glossitis (bald tongue): The tongue loses its bumpy texture, becoming smooth. Sometimes this is due to anemia or a B vitamin deficiency.
- [Canker sores](#) (aphthous ulcers): Small, painful ulcers appear periodically on the tongue or mouth. A relatively common condition, the cause of canker sores is unknown;

they are unrelated to the cold sores caused by herpes viruses. Canker sores are not contagious.

- [Oral leukoplakia](#): White patches appear on the tongue that can't be scraped off. Leukoplakia may be benign, or it can progress to oral cancer.
- [Hairy tongue](#): Papillae can overgrow the surface of the tongue, giving it a white or black appearance. Scraping off the papillae corrects this harmless condition.
- [Herpes stomatitis](#): The herpes virus can uncommonly cause cold sores on the tongue. Herpes virus cold sores are usually on the lip.
- [Lichen planus](#): A harmless condition that can affect the skin or the mouth. The cause is unknown; however, it is believed to be caused by the

immune system attacking the skin and lining of the mouth

2.

The paranasal sinuses are air cavities that help circulate the air that is breathed in and out of the respiratory system. They are situated around the nasal cavity and they are all paired and sometimes symmetrical, while always being bilateral. There are four different pairs of sinuses and they are called the:

- maxillary sinuses
- frontal sinuses
- sphenoidal sinuses
- ethmoidal sinuses

Maxillary sinuses which is the largest of all sinuses and having an irregular pyramid shape. It's superior wall is formed by the bony orbit, inferiorly the alveolar bone of the maxilla, Medially the nasal cavity, while Lateral and anterior walls is formed by the cheekbones, Posteriorly are two anatomical

spaces known as pterygopalatine fossa and infratemporal fossa
Innervation - anterior superior alveolar, middle superior, posterior superior nerves (branches of the maxillary nerve)
Vascularization - anterior superior alveolar, middle superior alveolar, posterior superior alveolar arteries (branches of the maxillary artery)

Frontal sinuses

Contained by the forehead it's walls are formed Anteriorly by the forehead and superciliary arches, Superior and posterior walls by the anterior cranial fossa, Inferior wall by the bony orbit and Medially the contralateral sinus. Not fully developed at birth it reaches it normal size by eight years old
Innervation - supraorbital nerve, supratrochlear nerve (branches of the ophthalmic nerve)
Vascularization - anterior

ethmoidal, supraorbital,
supratrocheal arteries (branches
of the ophthalmic artery)

Sphenoidal sinuses

Anterior wall - nasal cavity

Superior wall - hypophyseal fossa

Inferior wall - nasopharynx and
pterygoid canal

Innervation - posterior ethmoidal
nerve (branch of the nasociliary
nerve)

Vascularization - posterior
ethmoidal, posterior lateral nasal
arteries (branches of the
ophthalmic artery)

Ethmoidal sinuses

Superior wall - anterior cranial
fossa, frontal bone

Lateral wall - bony orbit

Medial wall - nasal cavity

Innervation - anterior and
posterior ethmoidal nerves
(branches of the nasociliary
nerve)

Vascularization - anterior and posterior ethmoidal arteries (branches of the ophthalmic artery)

Clinical Application

Sinusitis: which is inflammation and swelling of the mucous lining of the paranasal sinuses