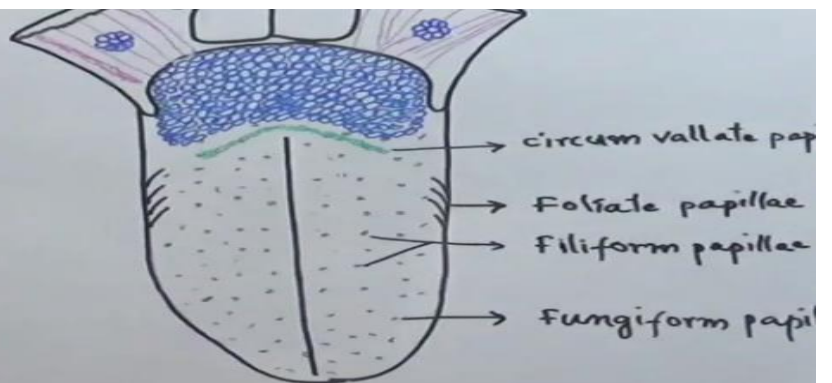


Structure and function of tongue

TONGUE

- * Tongue is a muscular sense organ.
- * Freely movable, attached to the floor of oral cavity by a fold called 'Frenulum'.
- * Tongue is covered with moist pink tissue called 'Mucosa'.
- * upper surface of Tongue has small projections called Papillae / Taste Buds.
- * Tongue acts as Universal tooth Brush.
- * Helps in mixing saliva with food, taste detection, deglutition and speaking.
- * Tongue consists 3 types of Papillae.
 - 1) Fungiform Papillae: At anterior Margin and tip of Tongue, helps in tasting salty and sweets.

TASTE CENTRES ON TONGUE



- 2) Filiform Papillae: On the surface of Tongue, helps to taste sour and Umami/meaty Flavour.
- 3) Circumvallate Papillae: on posterior surface / Base of Tongue.
 - Helps to Taste the bitter material.

Functions

- ① gustatoreceptors (Taste)
- ② mixing of food with saliva
- ③ articulation of speech.
- ④ Swallowing the food (Bolus)

circumvallate papillae

fungiform

filiform

salty

sweet

- ② Fungiform papillae
 - * more than circumvallate.
- ③ Filiform papillae
 - * smallest & most numerous.
 - * No taste buds.

Sense Organs

③ gustatoreceptors (Taste recep).

4 basic Tastes

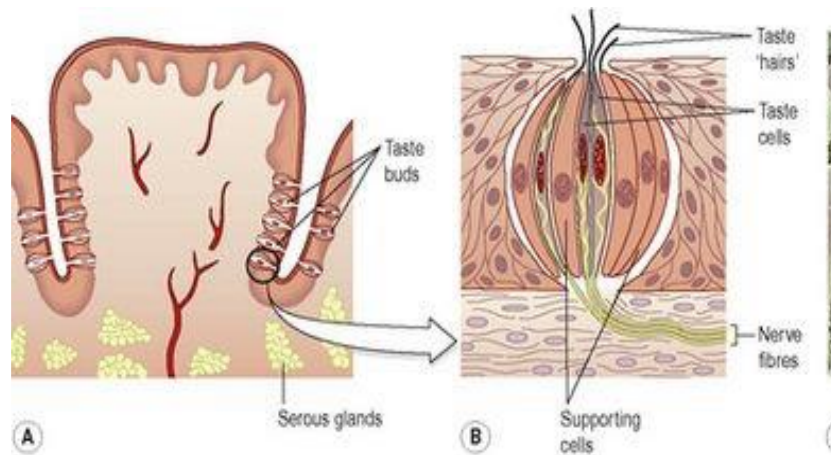
Tongue

Sweet

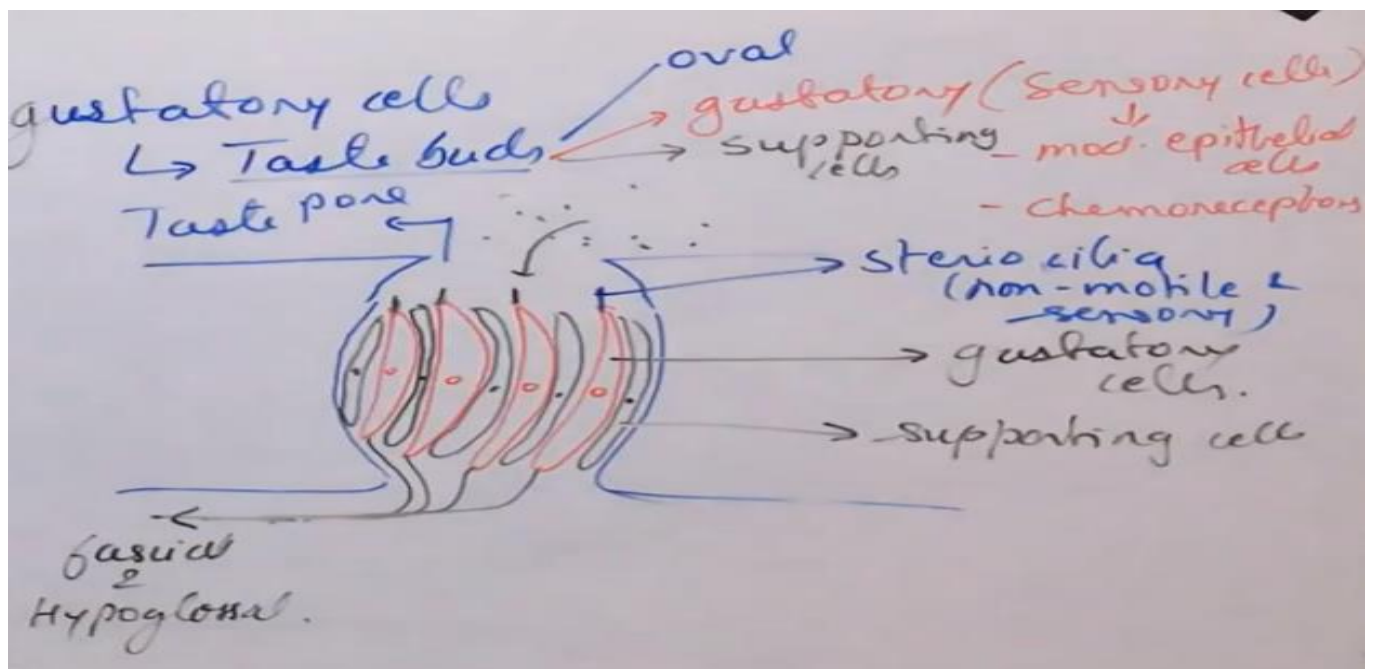
Salty

Sour

Bitter



A section of a papilla. **B.** A taste bud



Physiology of taste

Four fundamental sensations of taste have been described – sweet, sour, bitter and salt. This is probably an oversimplification because perception varies widely and many ‘tastes’ cannot be easily classified. It is thought that all taste buds are stimulated by all ‘tastes’. Taste is impaired when the mouth is dry, because substances can only be ‘tasted’ when in solution. The sense of taste triggers salivation and the secretion of gastric juice.

It also has a protective function, e.g. when foul-tasting food is eaten, reflex gagging or vomiting may be induced.

Anatomy of Taste Buds and Papillae

The receptors for sensations of taste are located in the taste buds . Most of the nearly 10,000 taste buds of a young adult are on the tongue, but some are found on the soft palate (posterior portion of the roof of the mouth), pharynx (throat), and epiglottis (cartilage lid over voice box). The number of taste buds declines with age.

Each **taste bud** is an oval body consisting of three kinds of epithelial cells: supporting cells, gustatory receptor cells, and basal cells.

The **supporting cells** surround about 50 **gustatory receptor cells** (GUS-ta-tōr-ē) in each taste bud.

Gustatory microvilli (*gustatory hairs*) project from each gustatory receptor cell to the external surface through the **taste pore**, an opening in the taste bud.

Basal cells, stem cells found at the periphery of the taste bud near the connective tissue layer, produce supporting cells, which then develop into gustatory receptor cells. Each gustatory receptor cell has a life span of about 10 days.

Taste buds are found in elevations on the tongue called **papillae** which increase the surface area and provide

a rough texture to the upper surface of the tongue). Three types of papillae contain taste buds:

1. About 12 very large, circular **vallate papillae** or *circumvallate papillae* form an inverted V-shaped row at the back of the tongue. Each of these papillae houses 100–300 taste buds.
2. **Fungiform papillae** (FUN-ji-form = mushroomlike) are mushroomshaped elevations scattered over the entire surface of the tongue that contain about five taste buds each.
3. **Foliate papillae** are located in small trenches on the lateral margins of the tongue.

Physiology of Gustation

Chemicals that stimulate gustatory receptor cells are known as **tastants**. Once a tastant is dissolved in saliva, it can make contact with the plasma membranes of the gustatory microvilli, which are the sites of taste transduction.

The result is a depolarizing receptor potential that stimulates exocytosis of synaptic vesicles from the gustatory receptor cell. In turn, the liberated neurotransmitter molecules trigger graded potentials that produce nerve impulses in the first-order sensory neurons that synapse with gustatory receptor cells.



