!! JAY AMBE !!

15. GUSTATORY SENSATION/TONGUE

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Anatomy of Gustatory Sensation:

Gustation is the special sense associated with the tongue.

The surface of the tongue, along with the rest of the oral cavity, is lined by a stratified squamous epithelium.

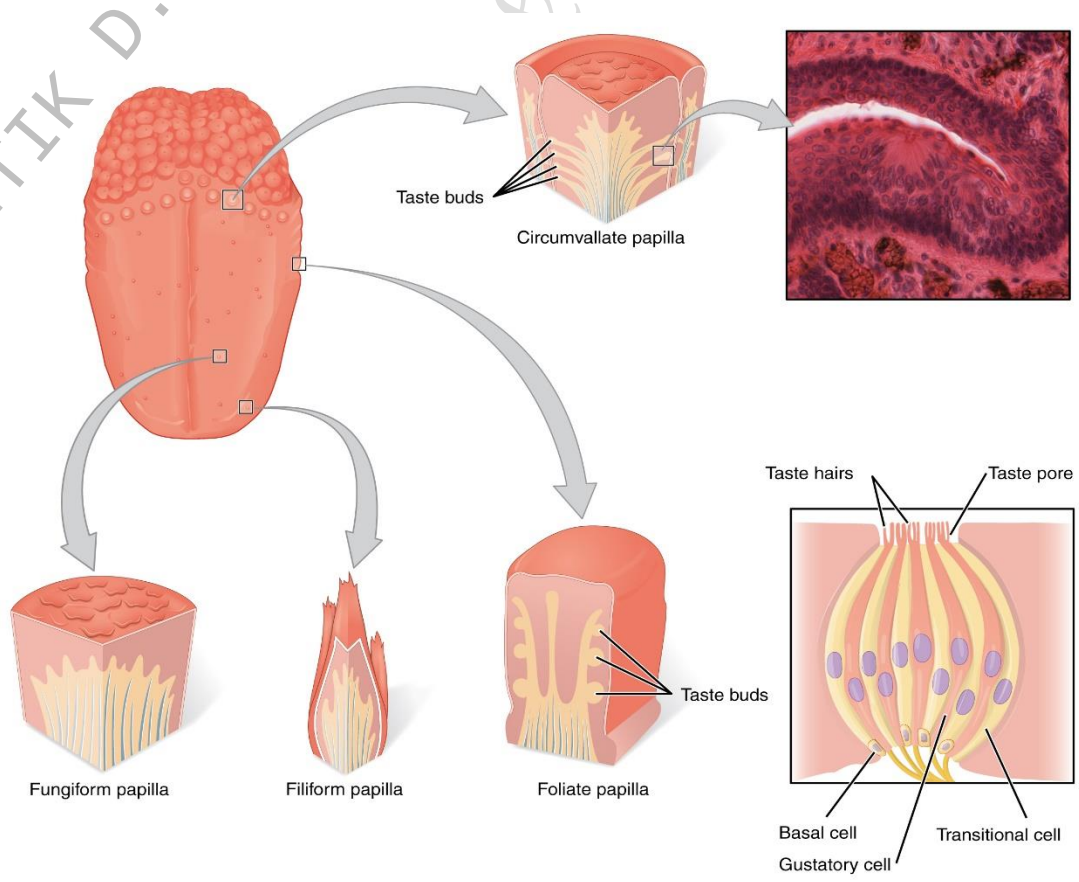
Raised bumps called papillae (singular = papilla) contain the structures for gustatory transduction.

There are four types of papillae, based on their appearance:

1. Circumvallate,
2. Foliate,
3. Filiform, and
4. Fungiform.

Within the structure of the papillae are taste buds that contain specialized gustatory receptor cells for the transduction of taste stimuli. These receptor cells are sensitive to the chemicals contained within foods that are ingested, and they release neurotransmitters based on the amount of the chemical in the food.

Neurotransmitters from the gustatory cells can activate sensory neurons in the facial, glossopharyngeal, and vagus cranial nerves.



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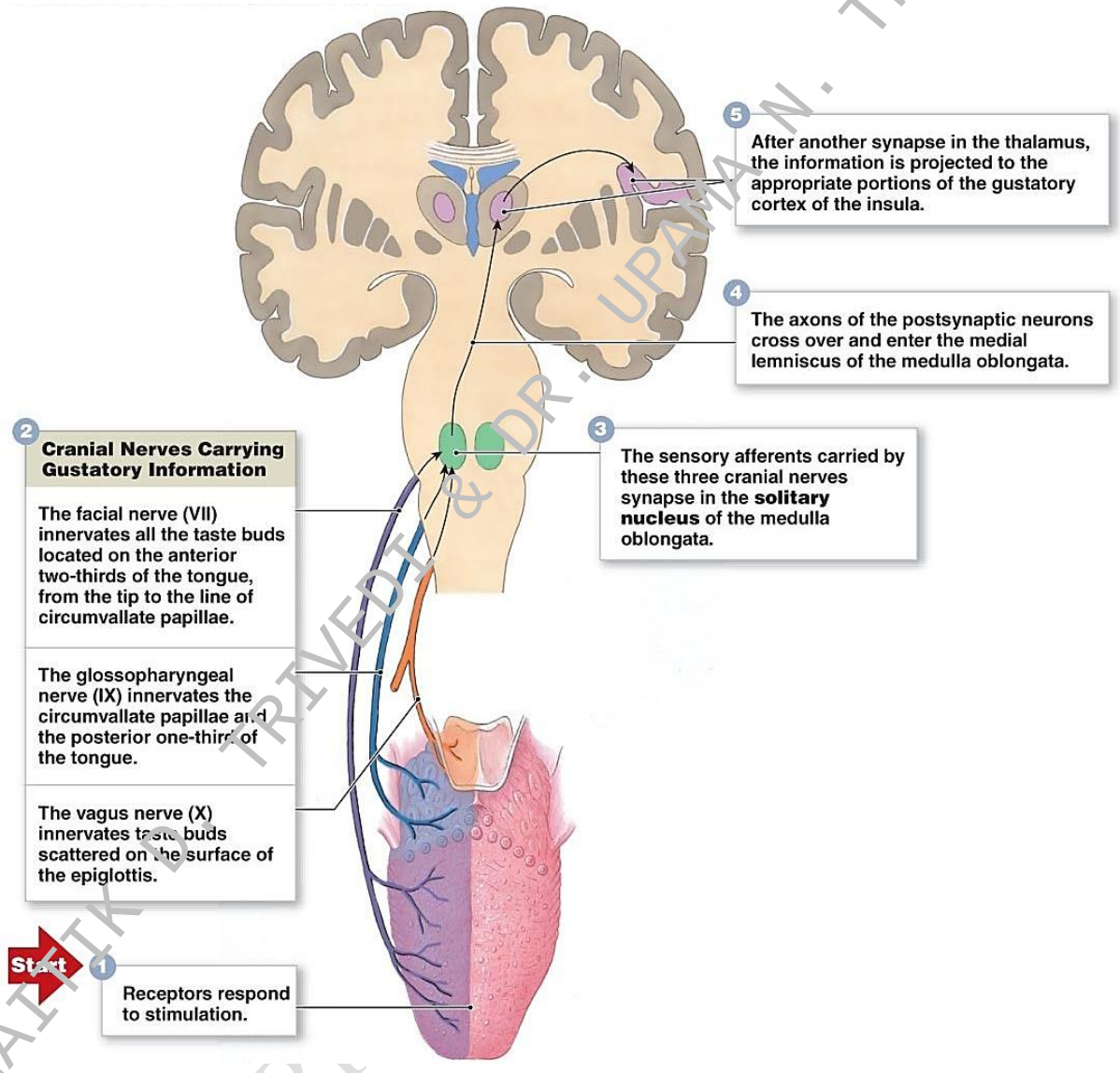
Physiology of Gustation:



The gustatory system is much simpler than the olfactory system.

Five primary taste submodalities are generally recognized:

1. sweet,
2. sour,
3. salty, and
4. bitter and
5. Umami.

Research at the turn of the 20th century led to recognition of the fifth taste, umami, during the mid-1980s. Umami is a Japanese word that means “delicious taste,” and is often translated to mean savory. Very recent research has suggested that there may also be a sixth taste for fats, or lipids.

Sweet

- Generally, sweetness is caused by a form of sugar or alcohol. Certain amino acids may also taste sweet.
- Examples of sweet foods include: Honey, strawberries, candy, fruit juice, cake etc…

Sour

- Sourness, or tartness, is the taste of acids. It's brought on by hydrogen ions.
- Example of sweet foods include: Vinegar, lemon juice, cranberries, yogurt, buttermilk

Salty

- Saltiness is usually caused by table salt, or sodium chloride, that's added to food. It can also be caused by mineral salts.
- Salty foods include: Soy sauce, processed meat, preserved olives, fries etc …

Bitter

- Bitterness is due to many different molecules. These molecules are usually found in plants.
- Bitter foods include: coffee, wine, dark chocolate, arugula etc …

Savory

- Savory taste is caused by amino acids. It's commonly brought on by aspartic acid or glutamic acid. Occasionally, savory is also called "umami" or "meaty."
- Savory foods include: Meat broth, aged cheese, ripe tomatoes, asparagus etc …

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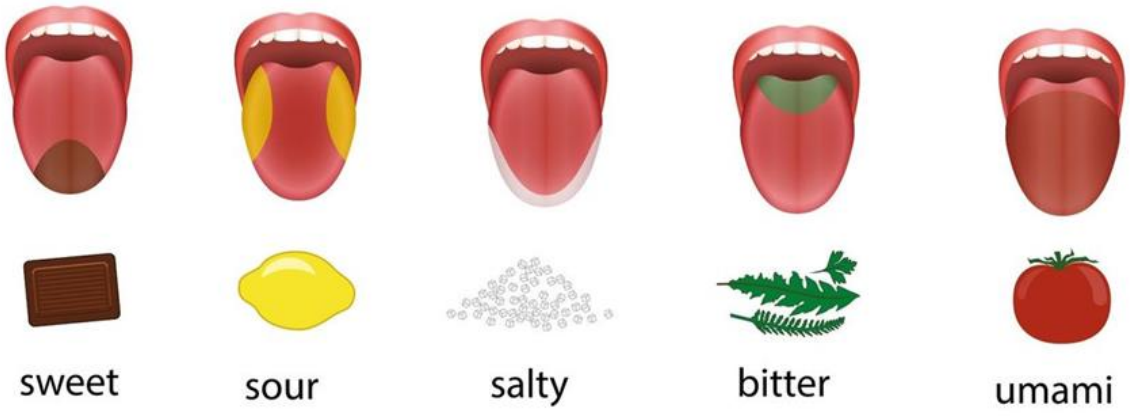
Taste	Taste substance	Common foods
Sweet	Sucrose Fructose Glucose	Sugar  Honey  Candy 
Sour	Acetic acid Citric acid Lactic acid	Vinegar  Lemons  Limes  Yogurt 
Salty	Sodium chloride	Salt 
Bitter	Caffeine Alkaloids Momordicin	Coffee  Bitter melon  Chocolate (90% cacao mass) 
Umami	Glutamate Inosinate Guanylate	Tomatoes  Cheese  Meat  Fish  Dried shiitake mushrooms 

Different regions on the tongue exhibit different maximal sensitivities to the four taste submodalities.

- Tip of the tongue is the most sensitive to sweetness
- Front half of each side of tongue detect saltiness
- Posterior half of each side of tongue detect sour taste.
- Back or rear of the tongue detect bitterness.
- The Umami taste sensation is most intense when coupled with the salty taste.



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