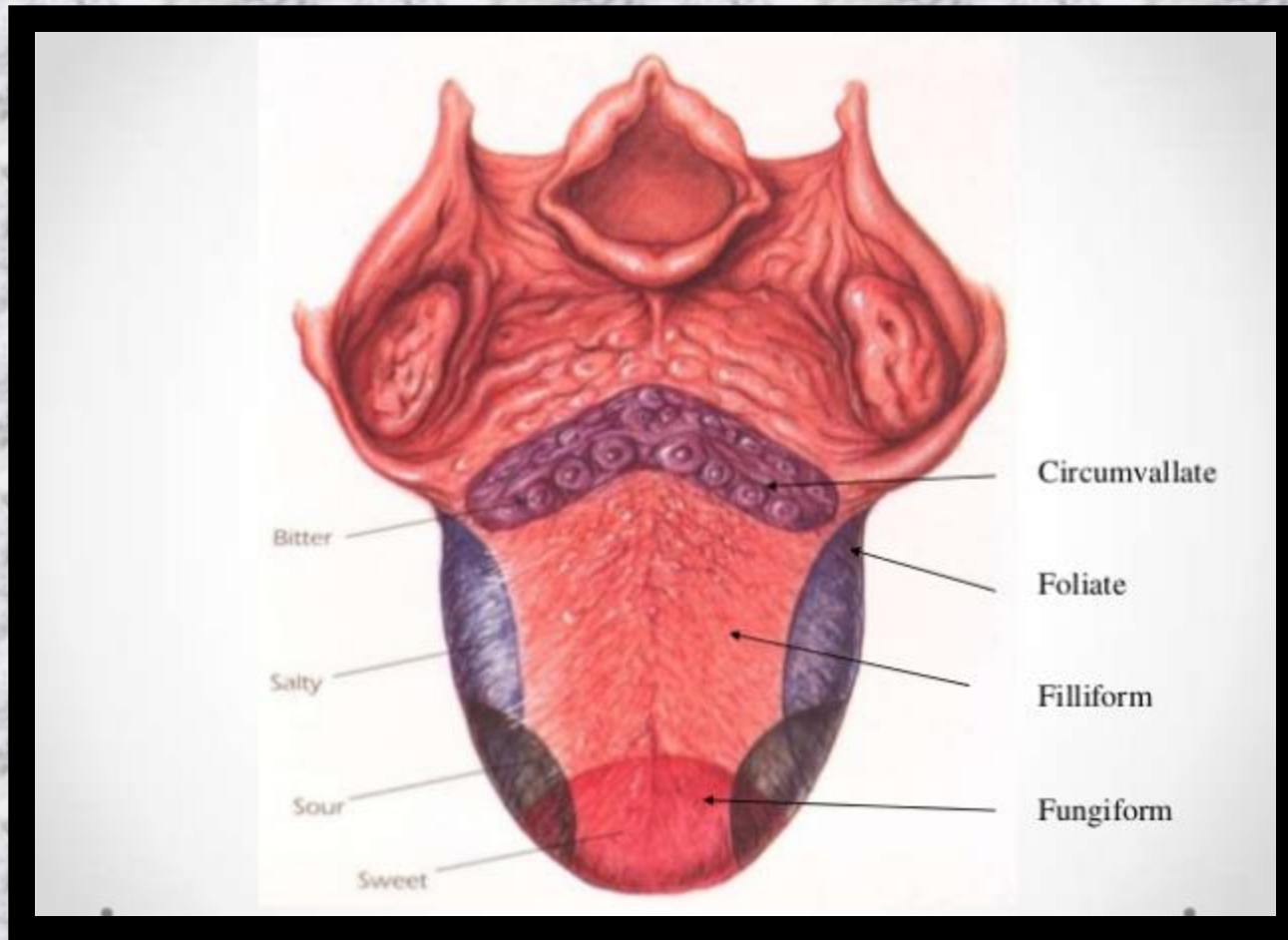
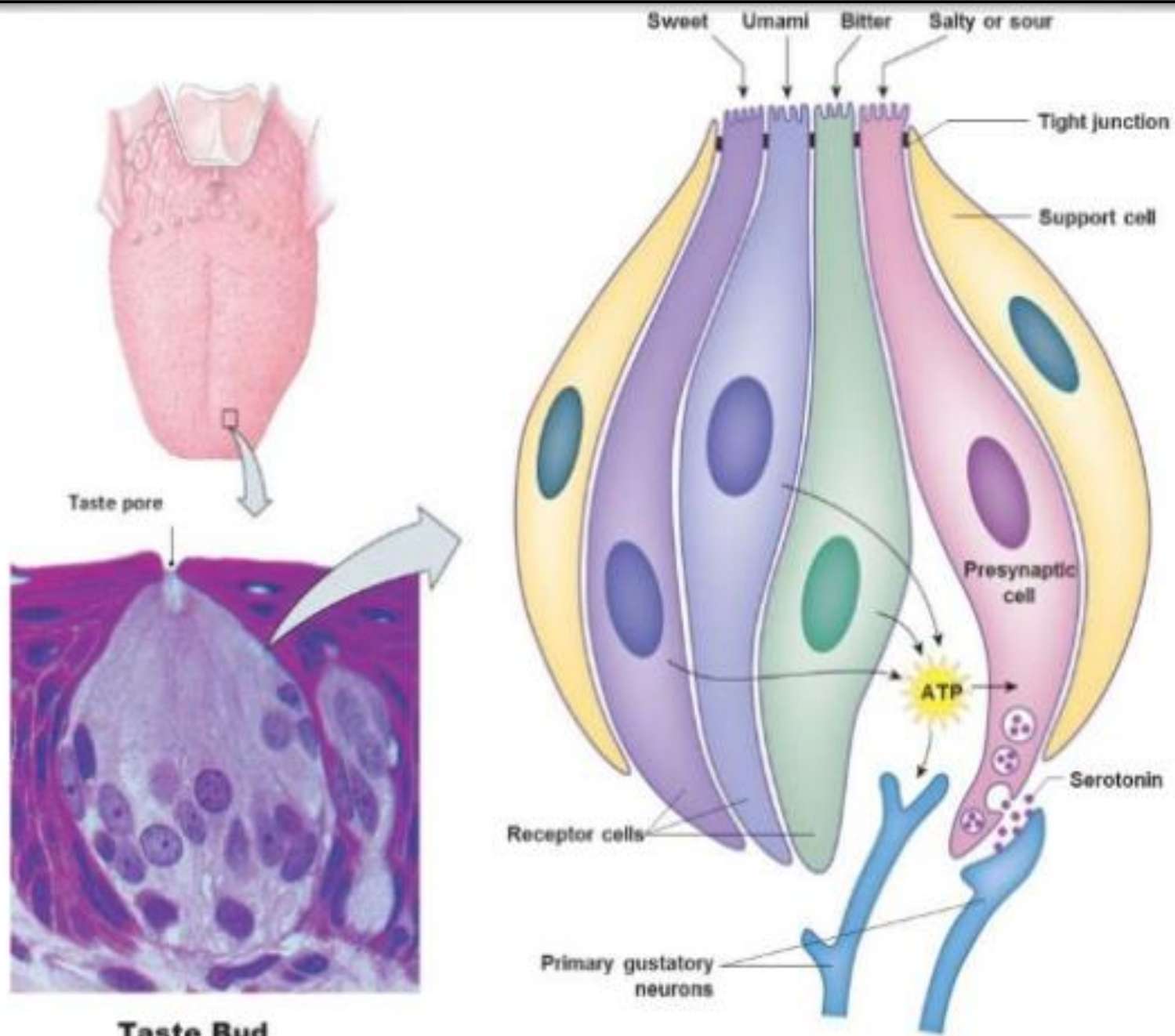


Neurophysiology of smell and taste (gustation)

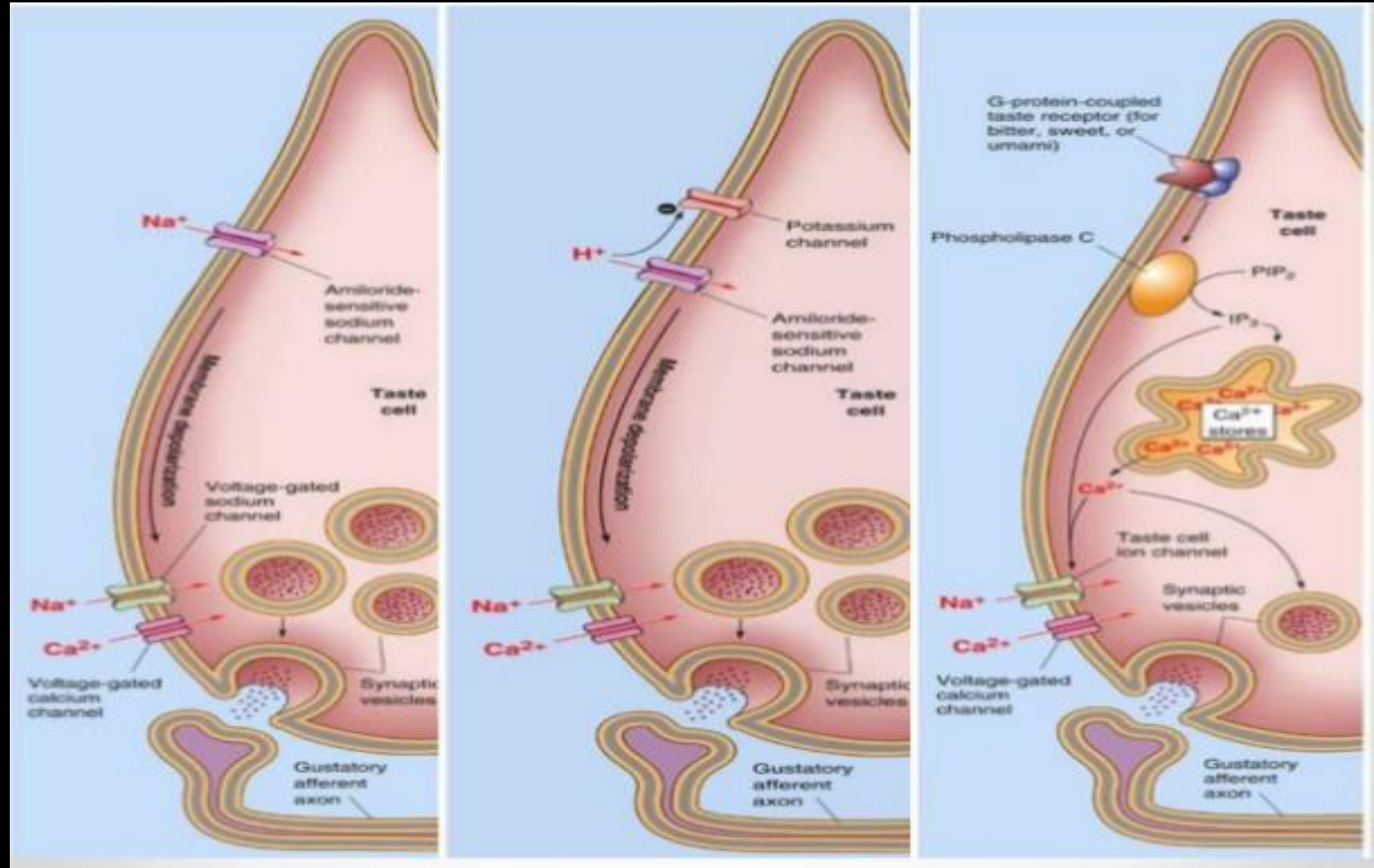
Dr. Arwa Rawashdeh

Physiology of taste





Mechanism of stimulation

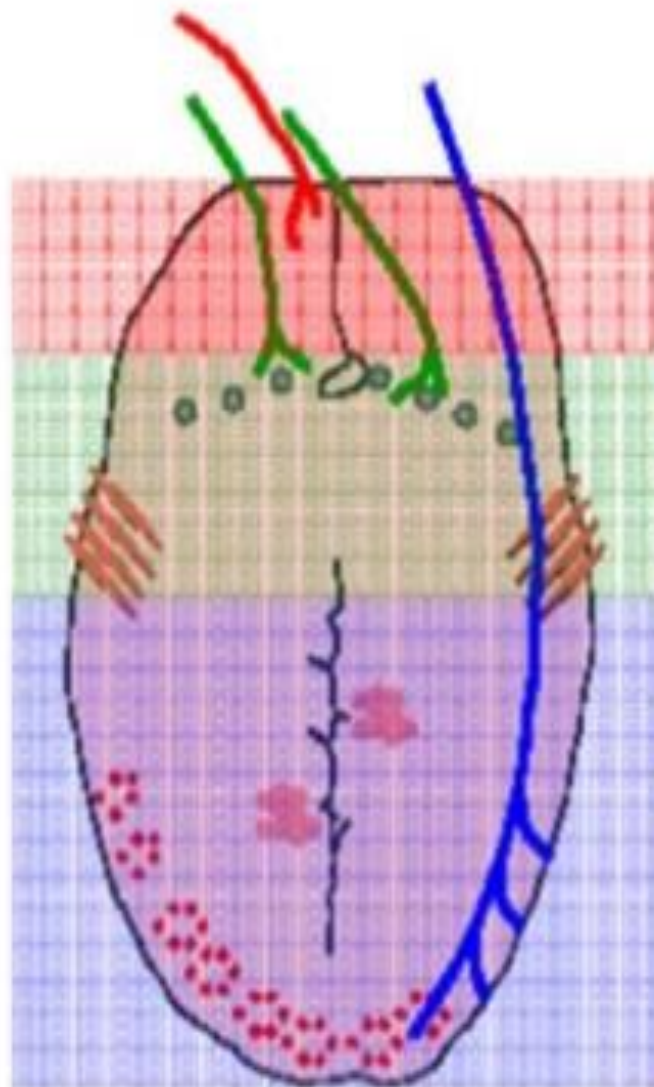


Gustatory Nerves

Pharynx, Epiglottis,
Esophagus

1/3 of anterior
tongue innervated by
glossopharyngeal nerve

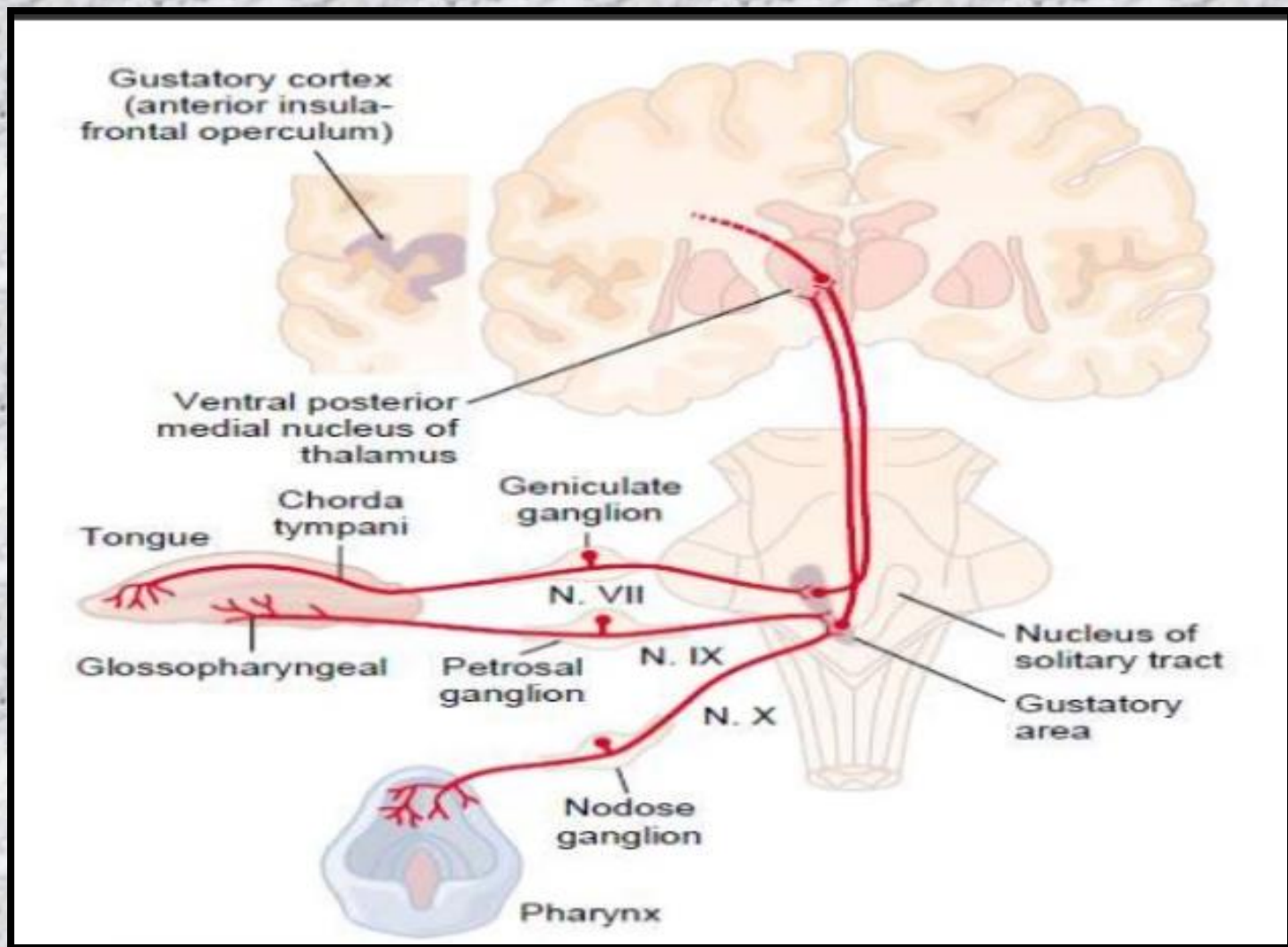
2/3 of anterior tongue
innervated by tympanic
nerve



Vagus
Nerve (X)

Glossopharyngeal
Nerve (IX)

Facial
Nerve (VII)

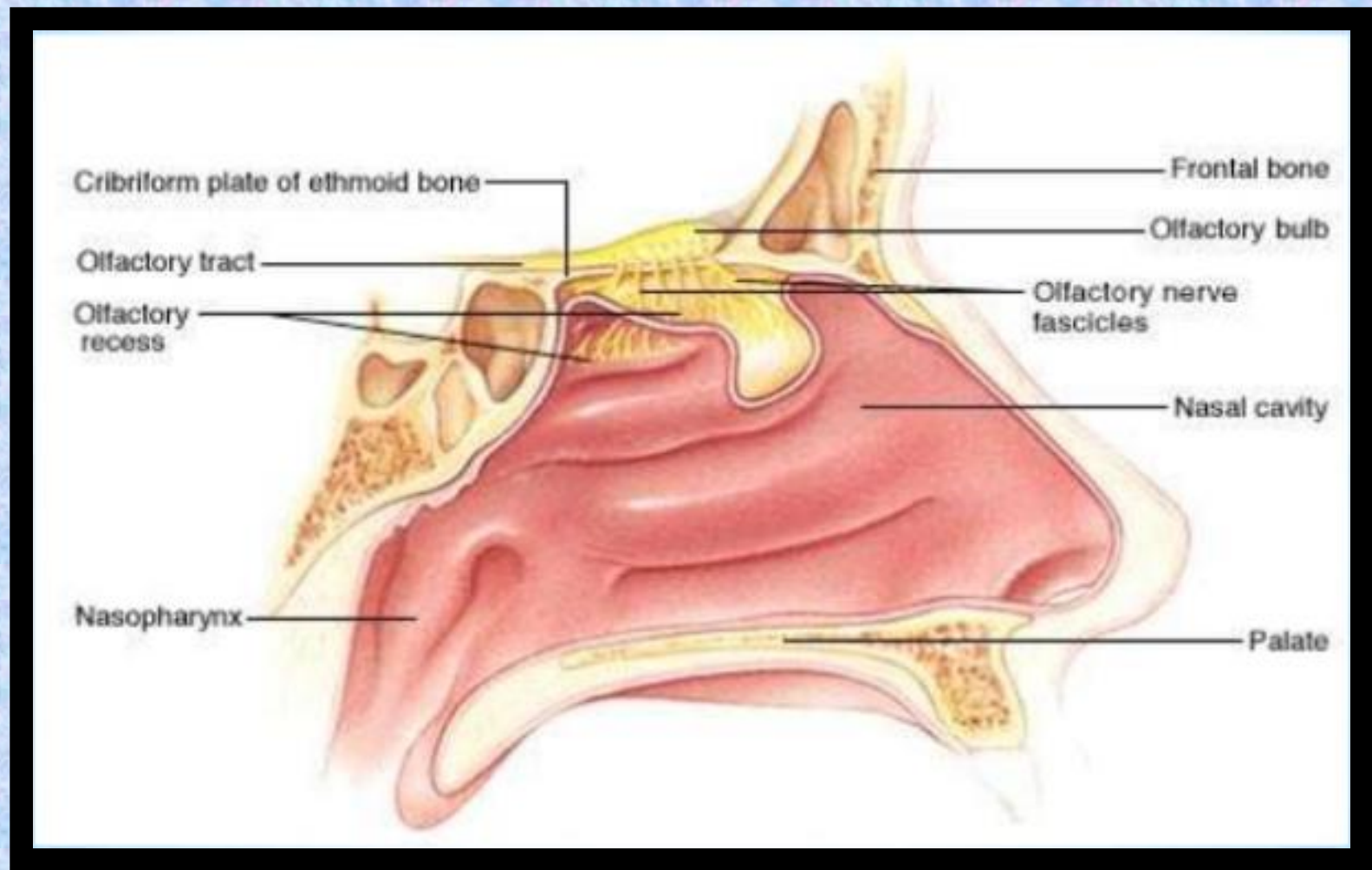


- Geniculate ganglion

Herpes zoster, also known as shingles, is caused by the reactivation of the varicella-zoster virus (VZV), the same virus that causes varicella (chickenpox)

- Bell's palsy is an unexplained episode of facial muscle weakness or paralysis. This condition results from damage to the facial nerve (the 7th cranial nerve)

Physiology of olfaction



Olfactory tract

Olfactory bulb

Mitral cell

Glomerulus

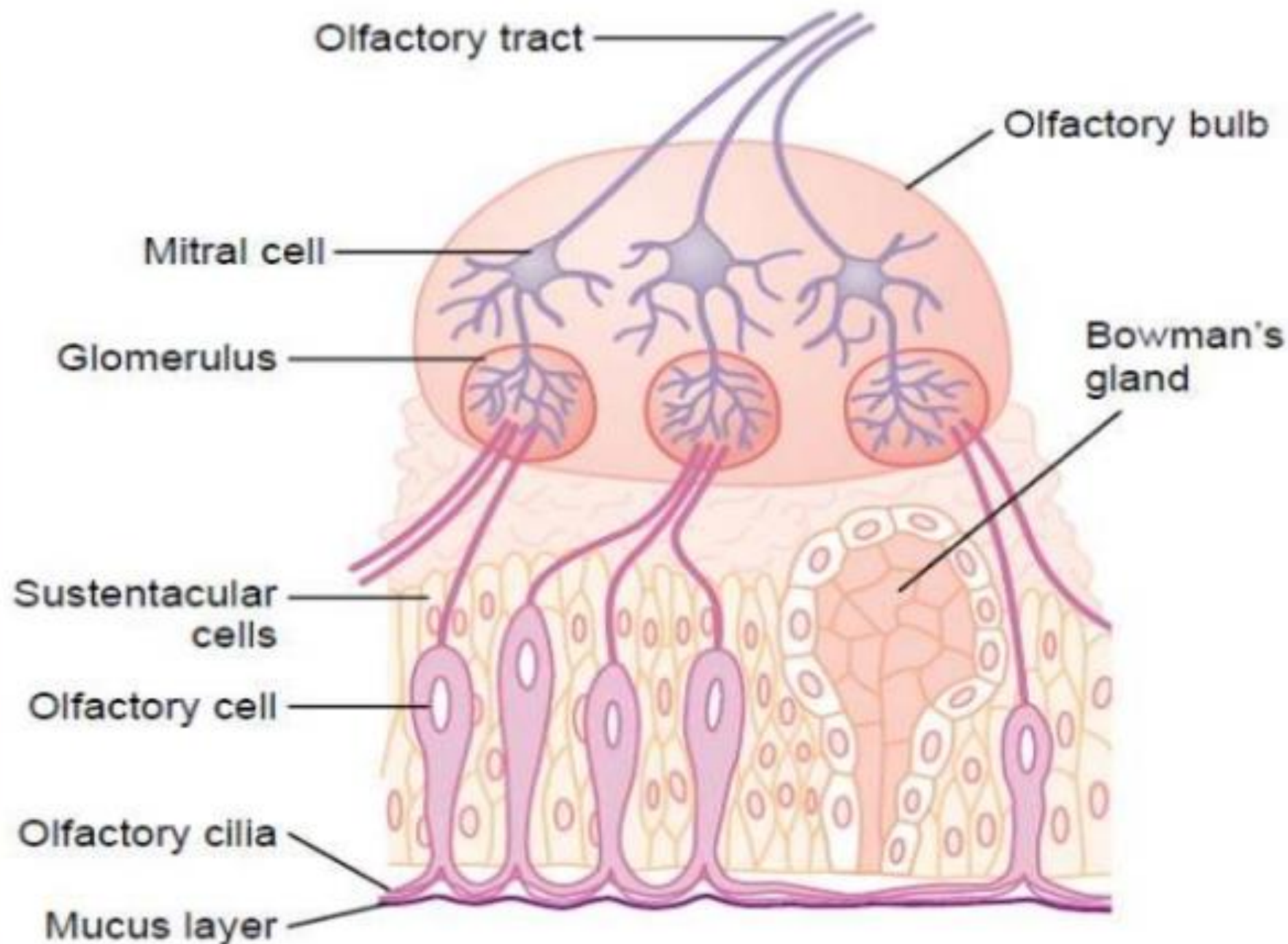
Bowman's gland

Sustentacular cells

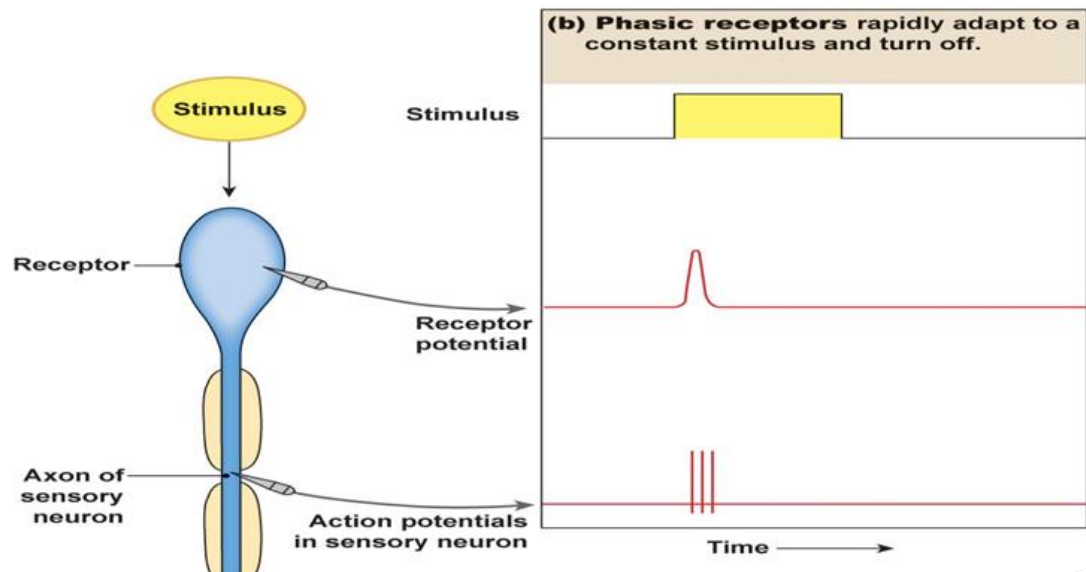
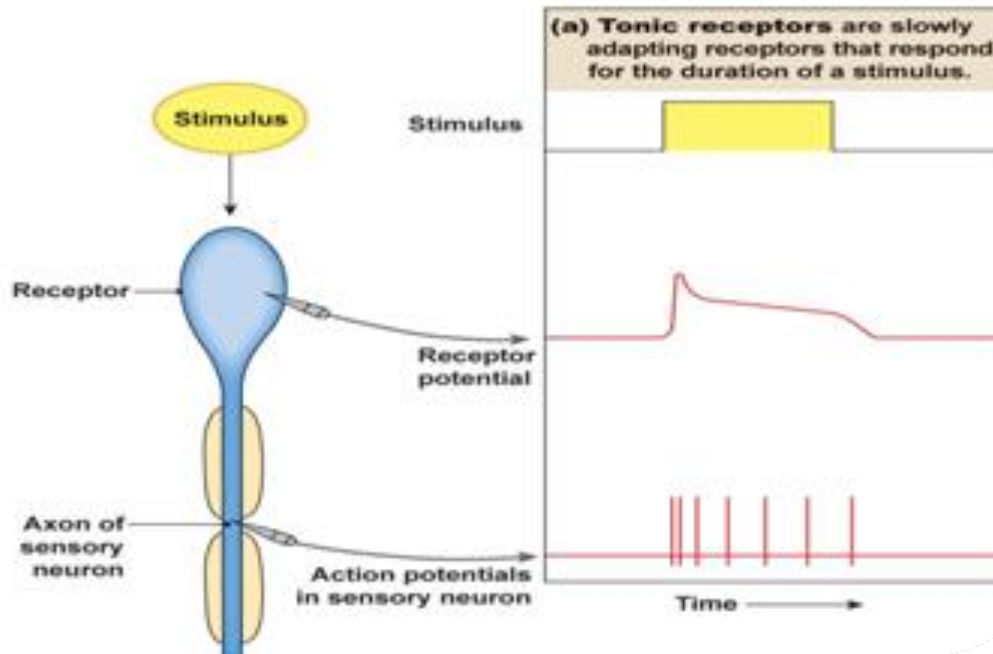
Olfactory cell

Olfactory cilia

Mucus layer



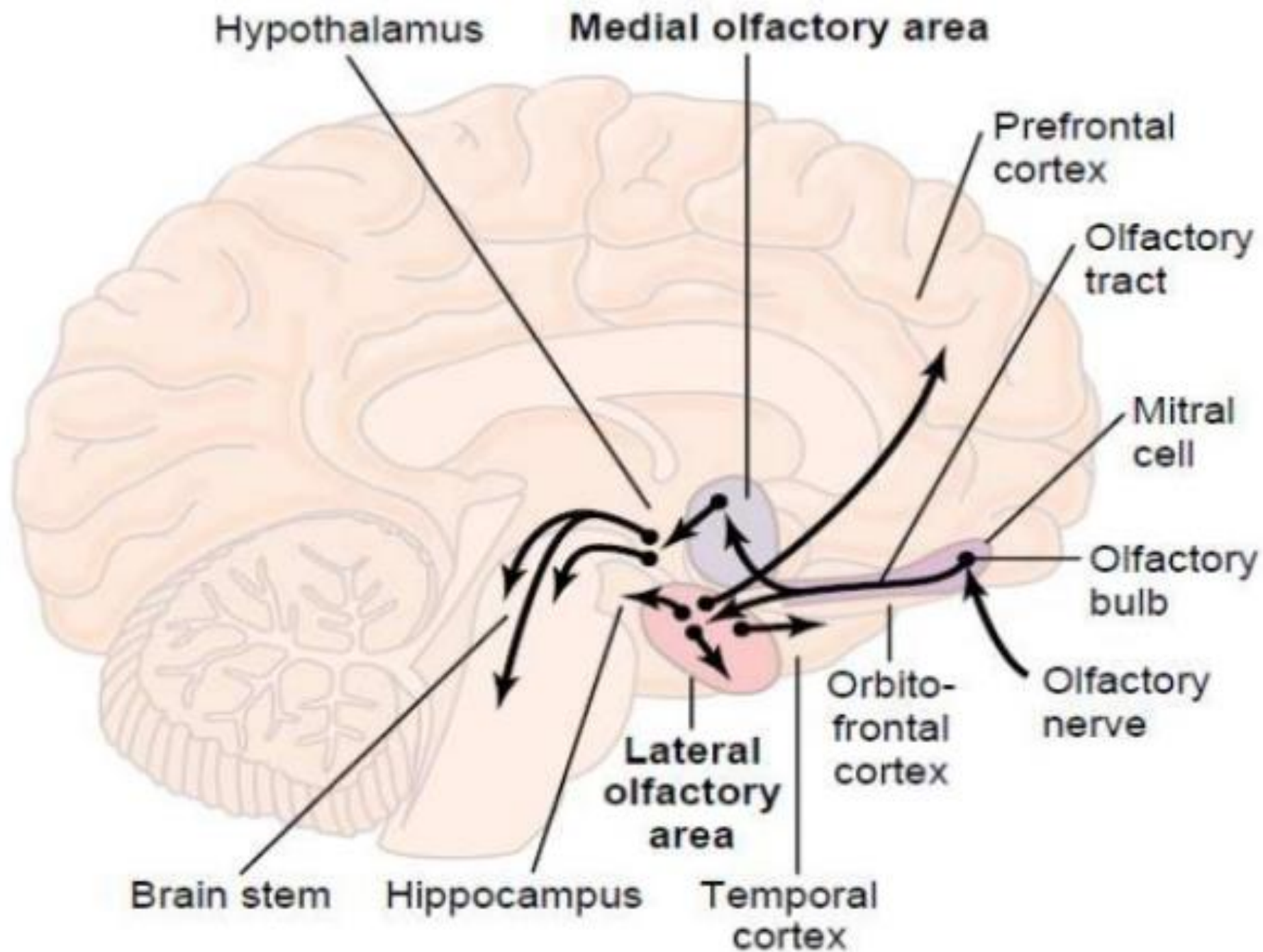
- A cilia of specific cilia express a specific protein receptors which can respond to different odorants
- One odor can bind to many different types of olfactory receptors protein
- G olfactory protein bind to GDP . But gets rid of GDP and binds with ATP and become very active
- Bind with AC that makes ATP converts into c AMP and bind to sodium channels and flow in sodium and calcium (adaptation response) and leaving chloride (component of mucus layer)



Receptors adaptation

- The duration of a stimulus is coded by duration of action potentials.
- A longer stimulus generates longer series of APs.
- If a stimulus persists, some receptors adapt or stop responding
- There are 2 classes of receptors according to how they adapt:
 - Tonic receptors – slowly adapting – they fire rapidly when first activated, then they slow and maintain firing as long as the stimulus is present (Mechanoreceptors)
 - Phasic receptors – rapidly adapting receptors – rapidly firing when first activated but stop firing if the strength of stimulus remains constant
 - This type of reaction allows the body to ignore information that was evaluated and found not to be a threat to homeostasis (smell)

Granule cells connected glomerular with mitral and when they get excited, they releasing GABA inhibitory neurotransmitter .Granule cells neurons are interneurons that are thought to be involved with fine-tuning the processing of olfactory information by doing things like helping to sharpen the contrast between different odorants.



Lateral olfactory area gives branches to :

1. Deep part in the temporal lobe ; the incus and supply the piriform cortex

2. Limbic system

Entorhinal cortex (EC) , Hippocampus
(memories)

Amygdale (emotion)

Medial olfactory area gives branches to :
Subcallosal gyrus
Orbital frontal cortex

Some small fibers can cross over
Other fibers are ipsilateral

So smell can be bilateral

All the olfactory nerves and taste nerves are intermingled
Taste is 80% smell

Anosmia

Nasal infection

Paranasal sinus infection

Olfactory groove meningiomas

Trauma rhinorrhea

sign of neurodegenerative disease

- **Only volatile substances** that can be sniffed into the nostrils can be smelled
- Substance must be at least **slightly water soluble** so that it can pass through the mucus to reach the olfactory cilia.
- substance to be at least **slightly lipid soluble**, presumably because lipid constituents of the **cilium** itself are a weak barrier to non-lipid-soluble odorants.