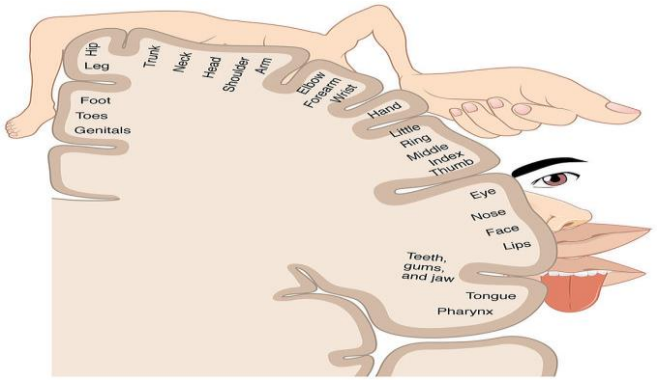
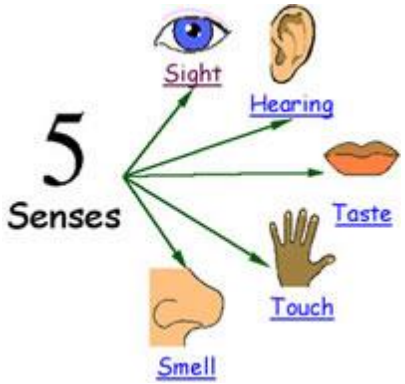
Al-Zahraa (A.S.) University for Women
College of Health and Medical Techniques
Department of Radiological Techniques

Sensation In Physiology
Lab 6

Asst. Lect . Duaa Raad





What is Sensation In Physiology?

- Sensation refers to our ability to detect and sense the internal and external physical qualities of our environment
- Our senses include both exteroception (stimuli that occur outside of our body) and interoception (stimuli occurring inside of our bodies)
- Our primary senses are considered to be sight,hearing,taste, .smell, and touch

All senses require one of four fundamental sensory capacities:

chemoreception, photoreception, mechanoreception, or Thermoreception.

The peripheral nervous system (PNS) consists of sensory receptors to communicate with other parts of the body

Type Of Receptors

- Chemoreception: A physiological response to chemical stimuli.
- Mechanoreception : A physiological response to mechanical forces like pressure, touch, and vibration.
- Photoreception: A physiological response to light, as occurs during vision in animals.
- Thermoreception: A physiological response to relative or absolute changes in temperature.

What are the Sense Organs?

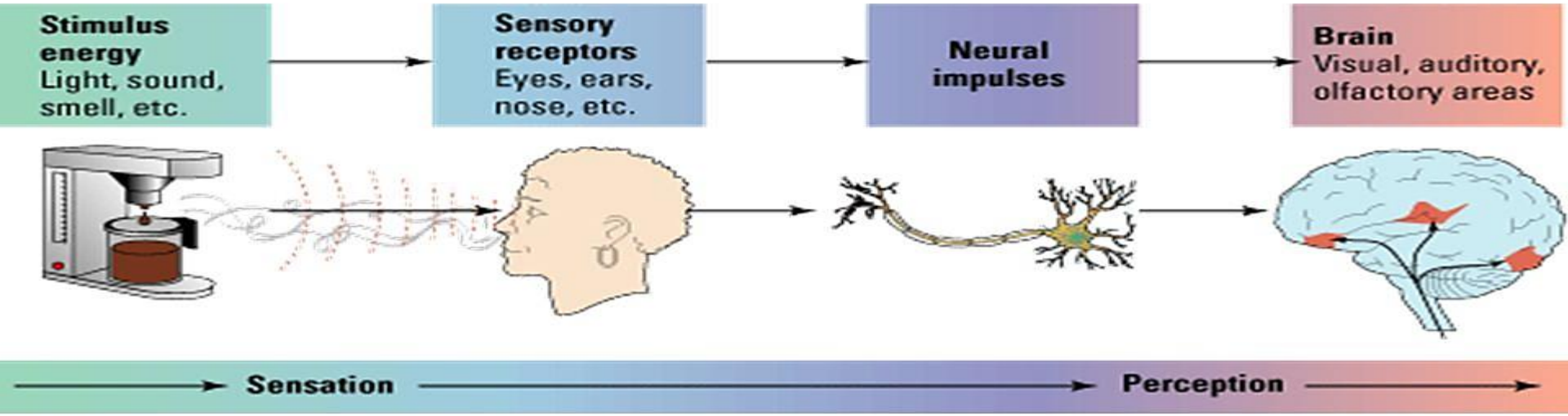
Sense organs provide the required data for interpretation through various organs and a network of nerves in response to a particular physical phenomenon.

These senses govern our association and our interaction with the environment.

We have five sense organs, namely: Eyes, Ears, Nose, Tongue, and Skin ,These five sense organs contain receptors that relay information through the sensory neurons to the appropriate places within the nervous system

Sensation And Nervous System

LO 3.1 Sensation and the central nervous system

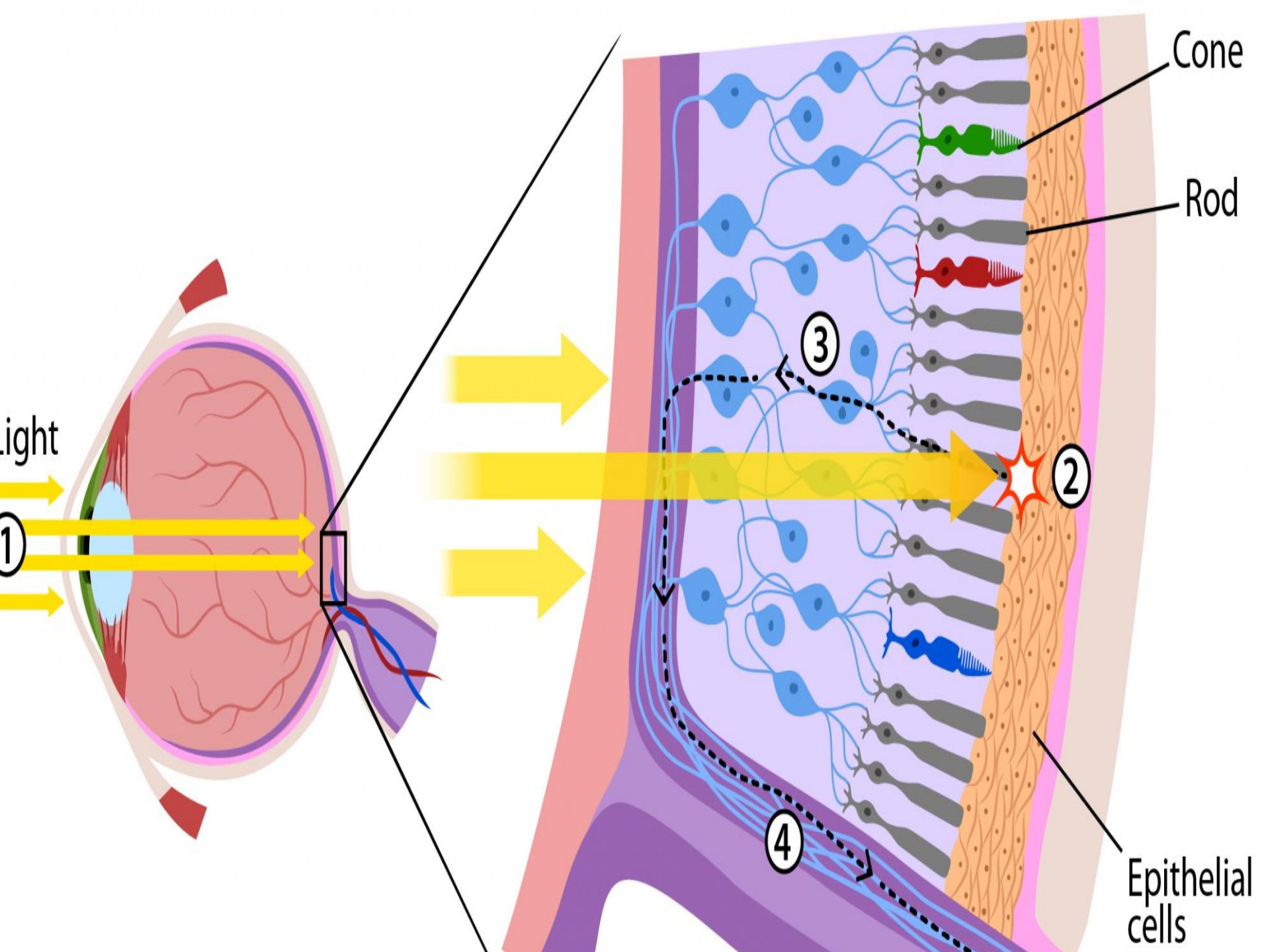


Menu

Sight

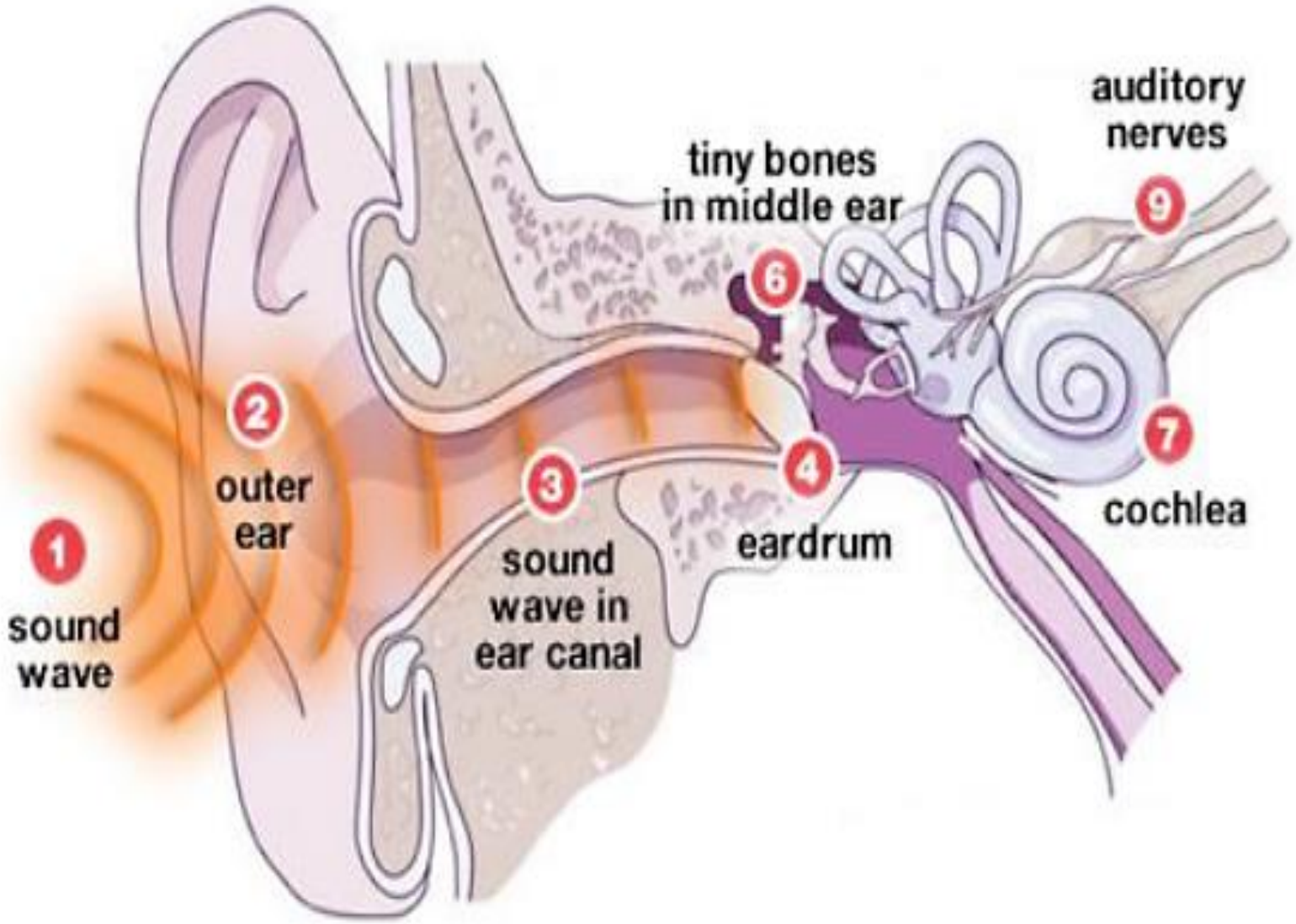
Sight or vision (ophthalmoception) is the ability of the eye(s) to focus and detect images of visible light on photoreceptors in the retina that generate electrical nerve impulses for varying colors, hues, and brightness. There are two types of photoreceptors: rods and cones Rods are very sensitive to light, but do not distinguish colors.

Cones distinguish colors, but are less sensitive to dim light. The inability to see is called blindness.


Cone
Rod
Light
1
2
3
4
Epithelial cells

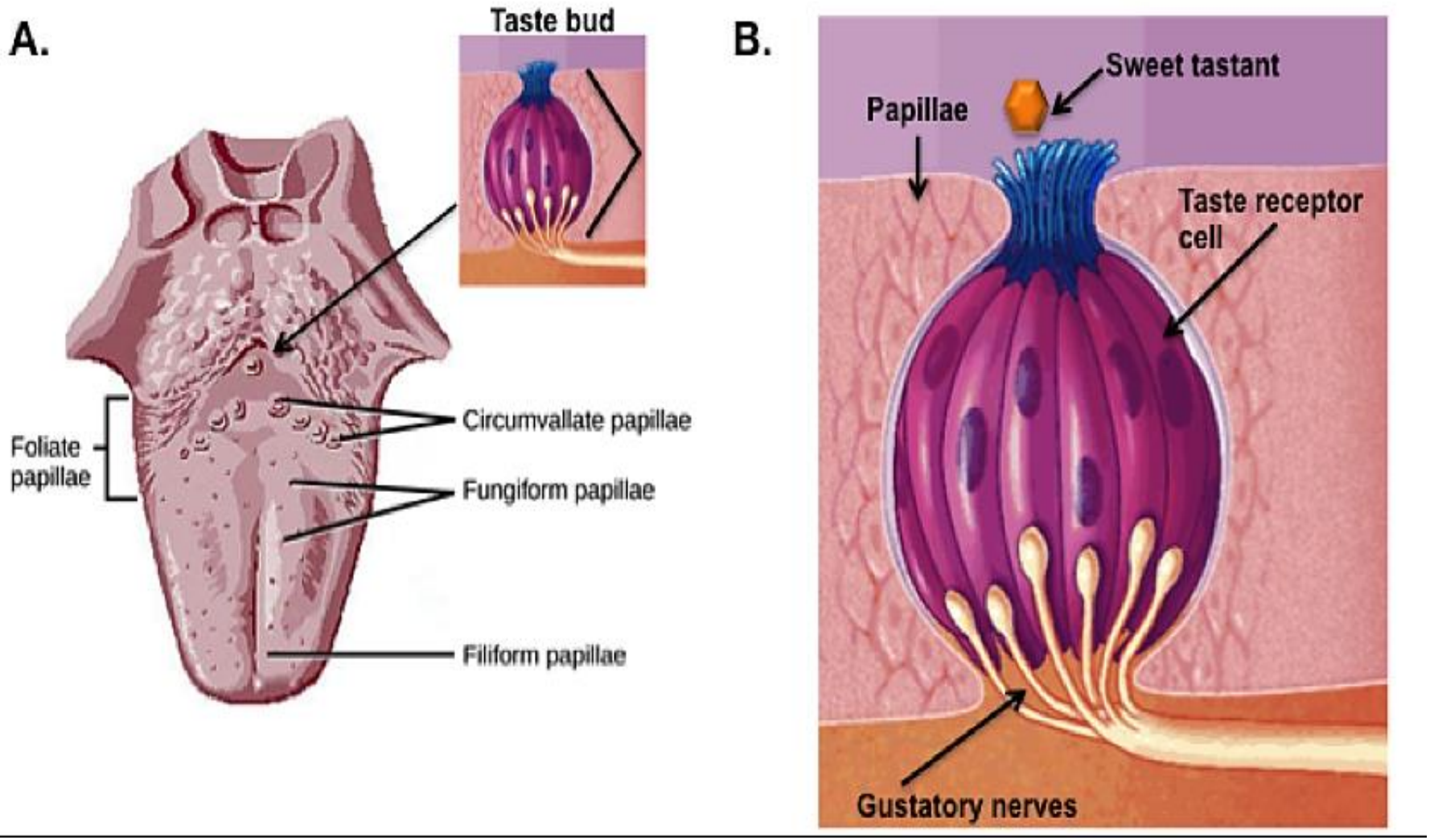
Hearing

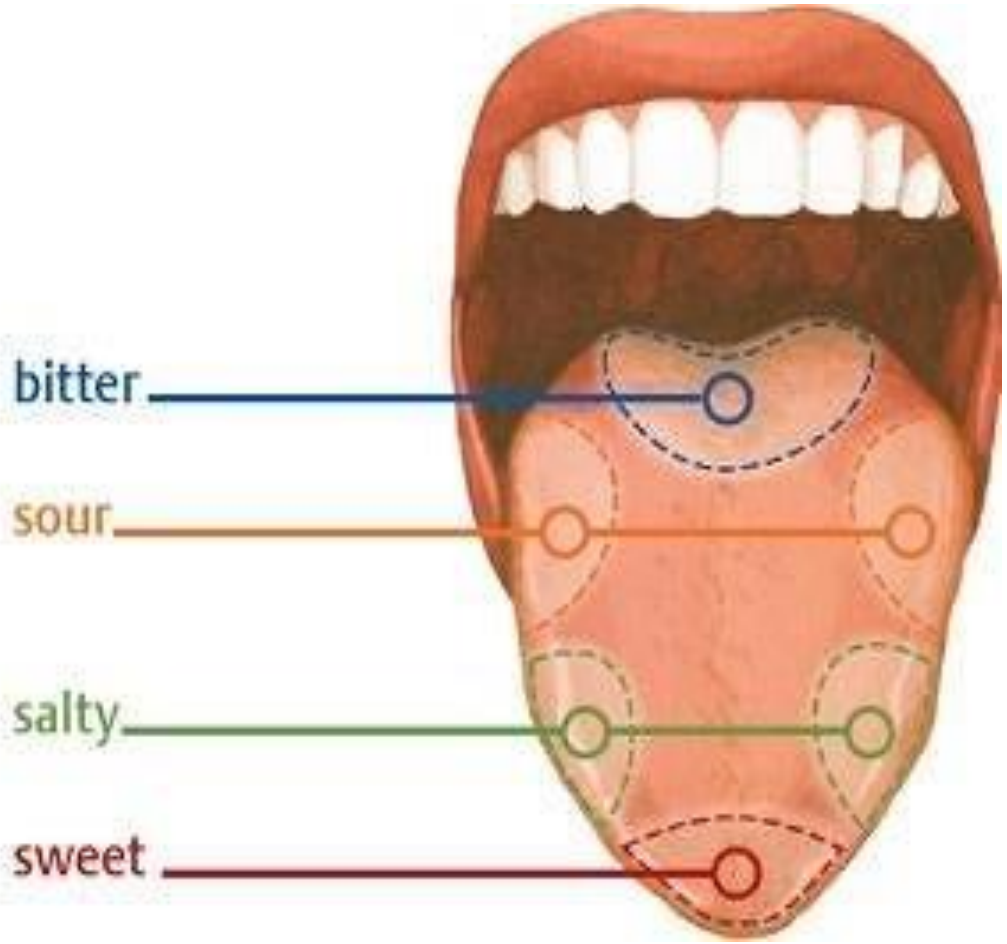
- Hearing or audition (audioception) is the sense of sound perception.
- Mechanoreceptors in the inner ear turn vibration motion into electrical nerve pulses. The vibrations are mechanically conducted from the eardrum through a series of tiny bones to hair-like fibers in the inner ear that detect the mechanical motion of the fibers
- Sound can also be detected as vibrations conducted through the body by tactition.
- Inability to hear is called deafness or hearin impairment.


auditory nerves
tiny bones in middle ear
9
6
2
outer ear
3
4
7
cochlea
1
sound wave
sound wave in ear canal
eardrum

Taste

- Taste (gustaoception) refers to the ability to detect substances such as food, certain minerals, poisons, etc.
- The sense of taste is often confused with the concept of flavor, which is a combination of taste and smell perception. Flavor depends on odor, texture, and temperature as well as on taste.
- Humans receive tastes through sensory organs called taste buds,or gustatory calyculi , concentrated on the upper surface of the tongue. Five basic tastes : sweet, bitter, sour, salty, and umami . The inability to taste is called Ageusia.


A.
Taste bud
Foliate papillae
Circumvallate papillae
Fungiform papillae
Filiform papillae
B.
Sweet tastant
Papillae
Taste receptor cell
Gustatory nerves

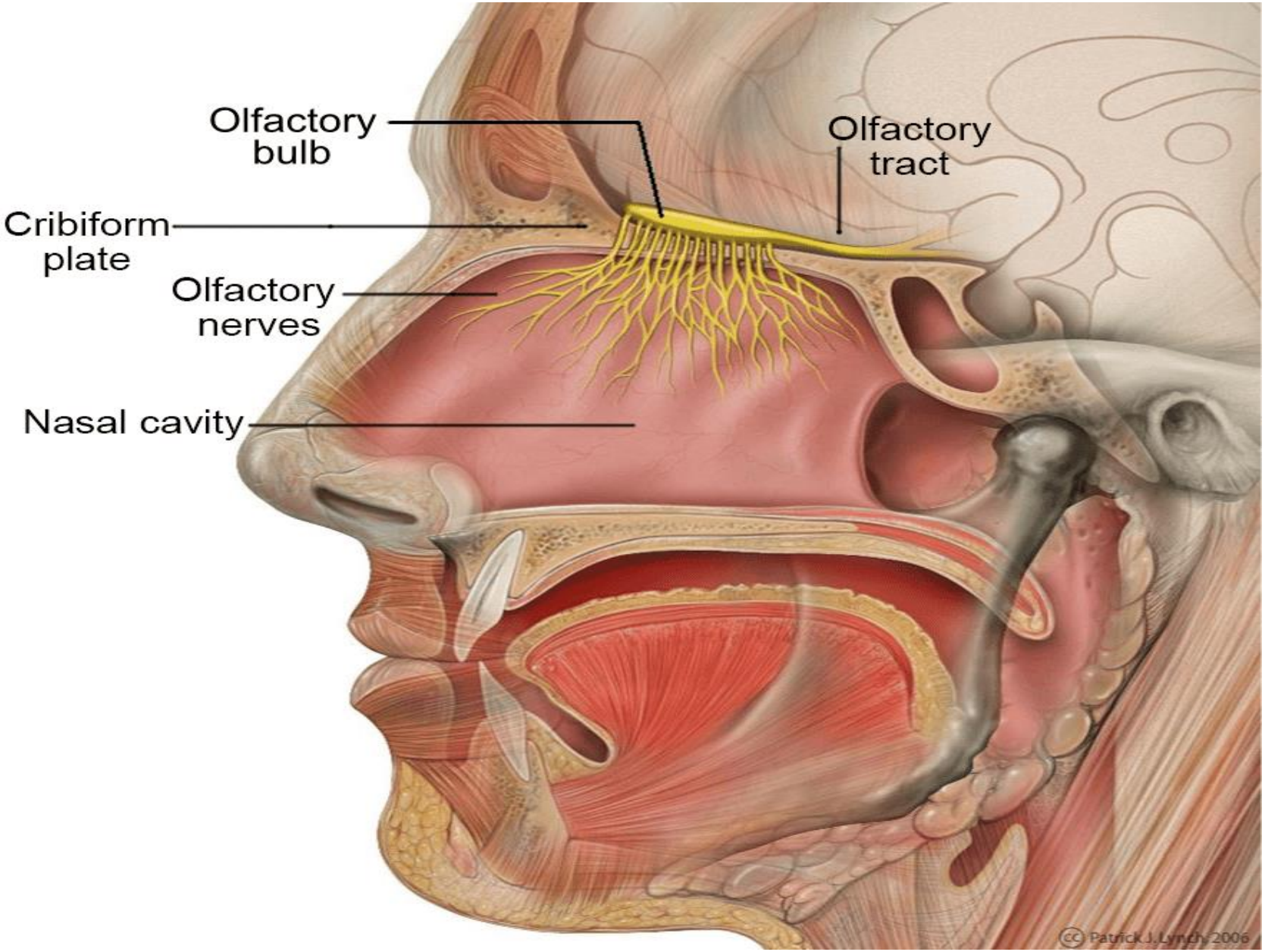

bitter
sour
salty
sweet

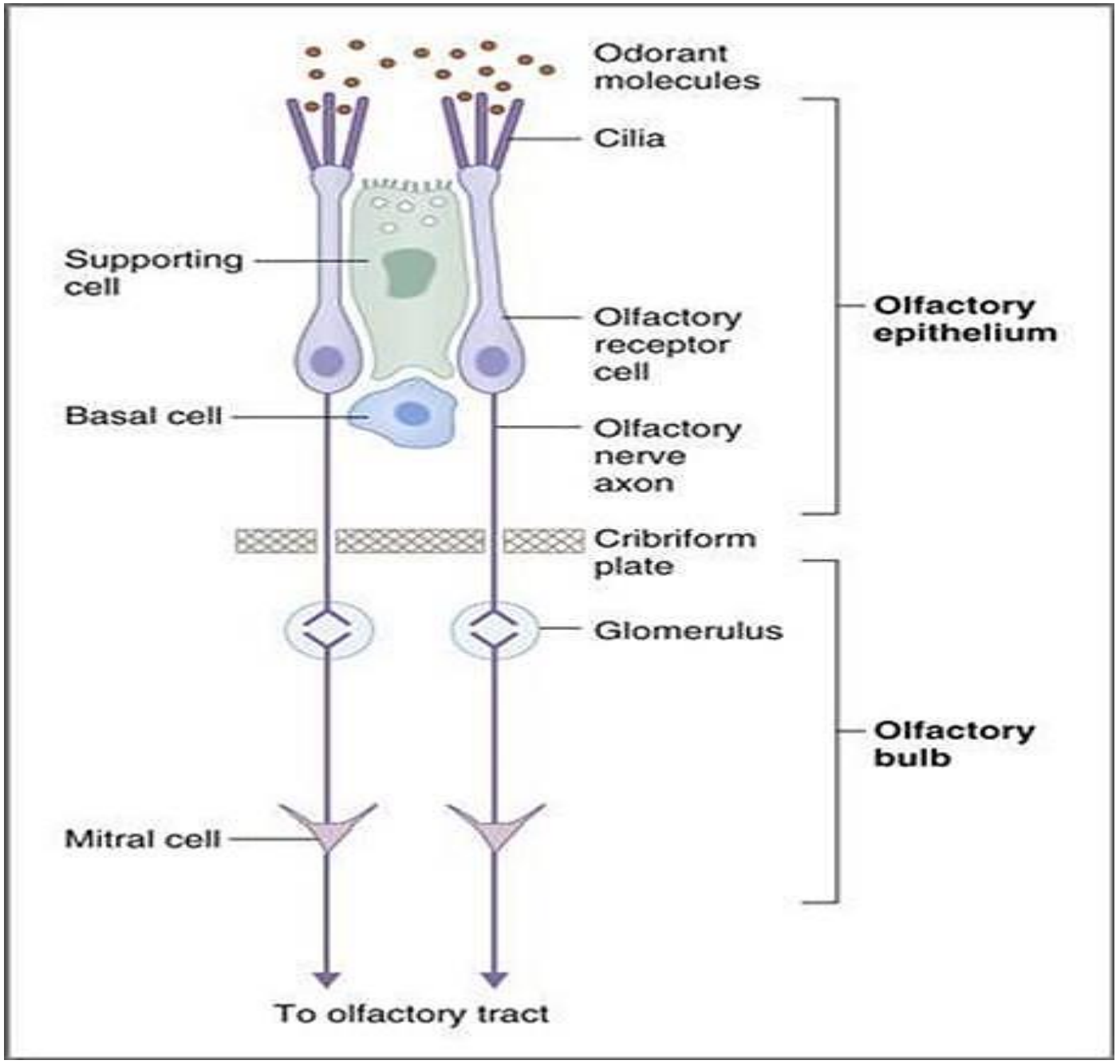
Smell

The olfactory system is the sensory system used for the sense of smell (olfaction). This sense is mediated by specialized sensory cells of the nasal cavity.

In humans, olfaction occurs when odorant molecules bind to specific sites on the olfactory receptors in the nasal cavity. These receptors are used to detect the presence of smell. They come together at a structure (the glomerulus) that transmits signals to the olfactory bulb in the brain.

The inability to smell is called anosmia.


Olfactory bulb
Olfactory tract
Cribiform plate
Olfactory nerves
Nasal cavity
Patrick J. Lynch 2006


Odorant molecules
Cilia
Supporting cell
Olfactory receptor cell
Basal cell
Olfactory nerve axon
Olfactory epithelium
Cribriform plate
Glomerulus
Olfactory bulb
Mitral cell
To olfactory tract

Touch

Touch or somatosensation (tactioception, tactition, or mechanoreception), is a perception resulting from the activation of neural receptors in the skin, including hair follicles, tongue, throat, and mucosa

A variety of pressure receptors respond to variations in pressure (firm, brushing, sustained, etc.)

The touch sense of itching is caused by insect bites or allergies that involve special itch-specific neurons in the skin and spinal cord. The loss or impairment of the ability to feel anything touched is called tactile anesthesia.

Additional Senses

- Pain or nociception (physiological pain): Signals nerve and other tissue damage.
- Balance or equilibrioception: Allows the sensing of body movement,direction, and acceleration, and to attain and .maintain postural equilibrium and balance
- Body awareness or proprioception: Provides the parietal cortex of the brain with information on the relative .positions of the parts of the body

- Sense of time or chronoception: Refers to how the passage of time is perceived and experienced but is not associated with a specific sensory system.
- Human brains have a system governing the perception of Time Temperature sensing or thermoception : The sensation of heat and the absence of heat (cold).