Sensory System

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Objectives

1. Somatic senses
2. Sensory receptors
3. classification of receptors

A. Based on the type of adequate stimulus

B. Based on the source from which they receive information.

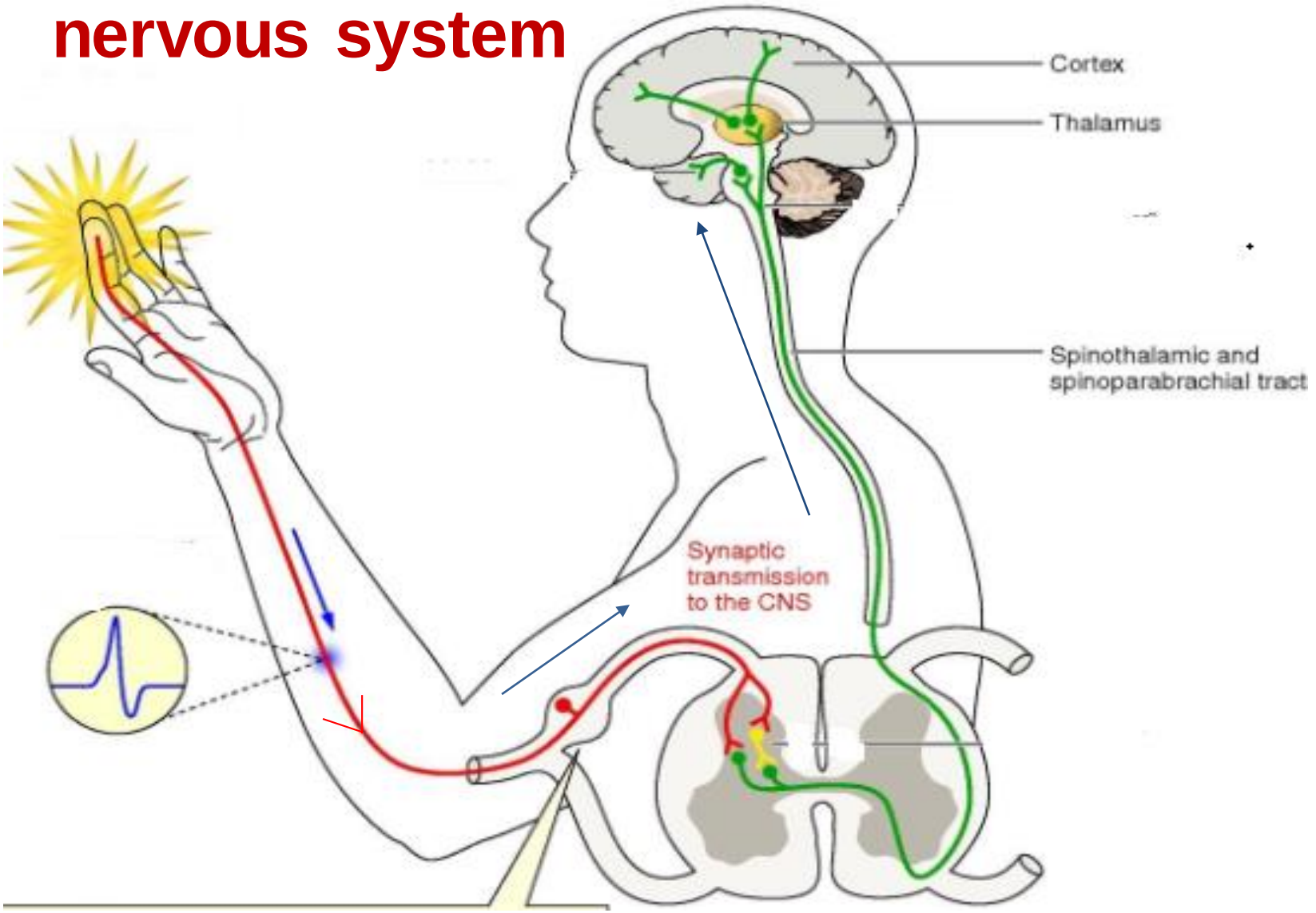
C. Based on adaptation

Somatic Senses

- somatic senses are the nervous mechanisms that collect sensory information from all over the body.

- These senses are in contradistinction to the special senses, which mean specifically vision, hearing, smell, taste, and equilibrium

Sensory parts of nervous system



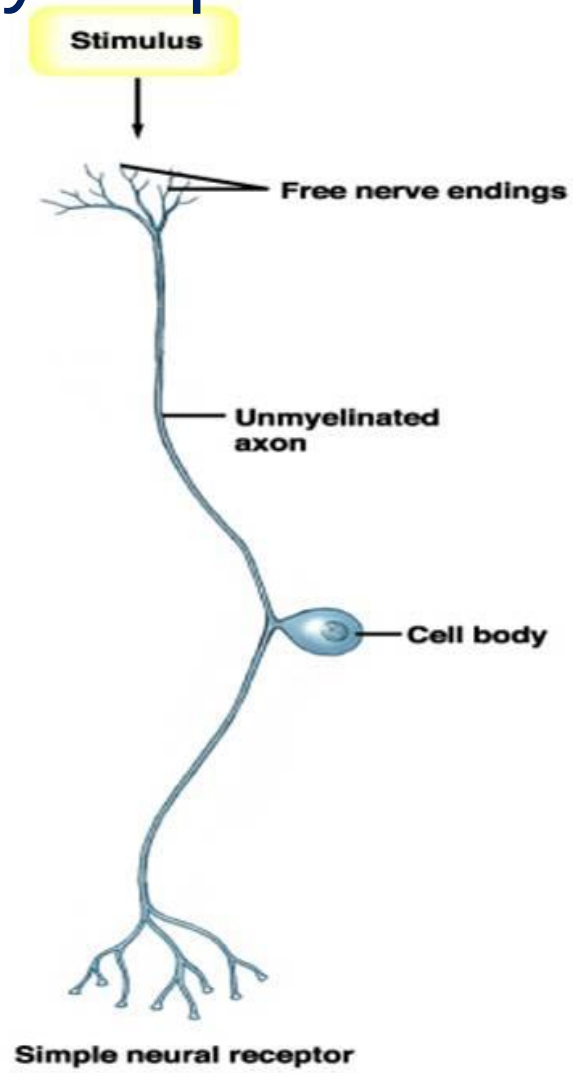
Sensory receptor

- may be part of a neuron or a specialized cell that detect changes in the internal and external environment and act as transducers.

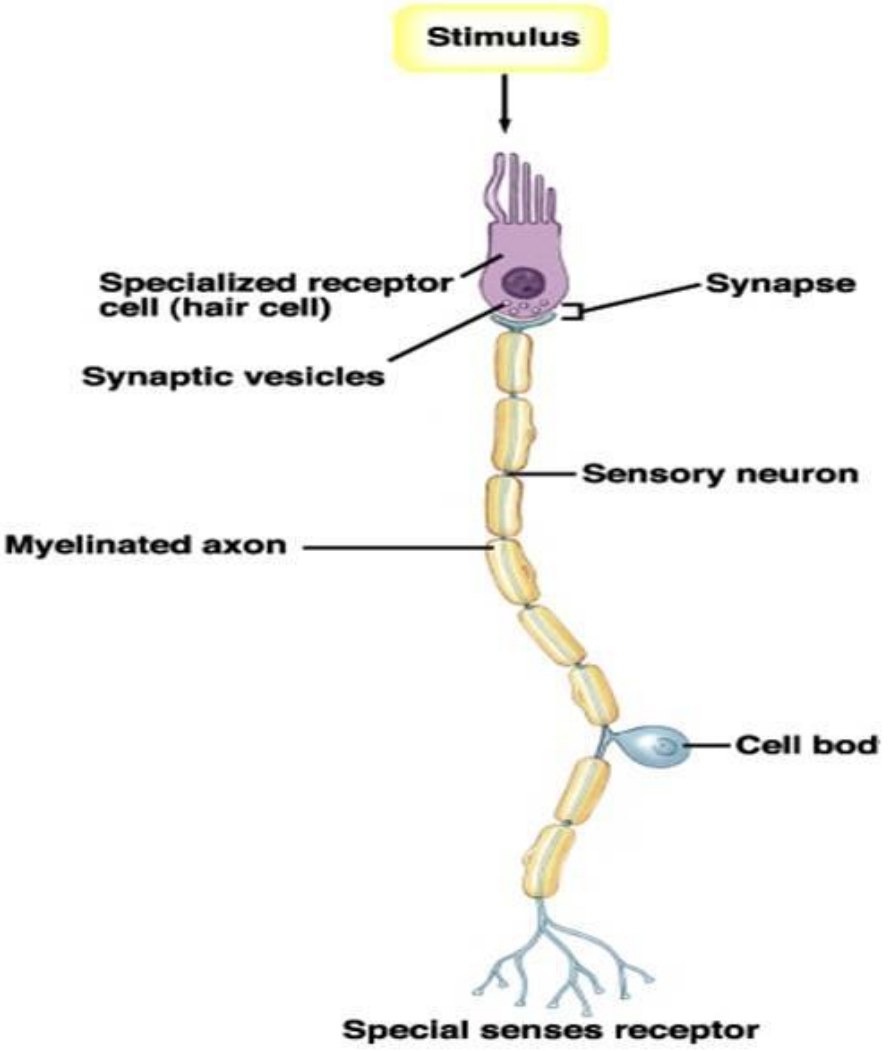
- converting many forms of energy into electrical signals (action potential) which are transmitted by sensory neurons to the brain.

Sense receptors

May be part of a neuron or a specialized cell



Simple neural receptor



Special senses receptor

Adequate stimulus

The receptors are adapted to respond to one particular form of energy at a much lower threshold than other receptors respond to this form of energy.

The particular form of energy to which a receptor is most sensitive is called **its adequate stimulus.**

Example:
The adequate stimulus for the rods and cones in the eye is light (an example of electromagnetic energy).

Classification of receptors

A. Based on the type of adequate stimulus

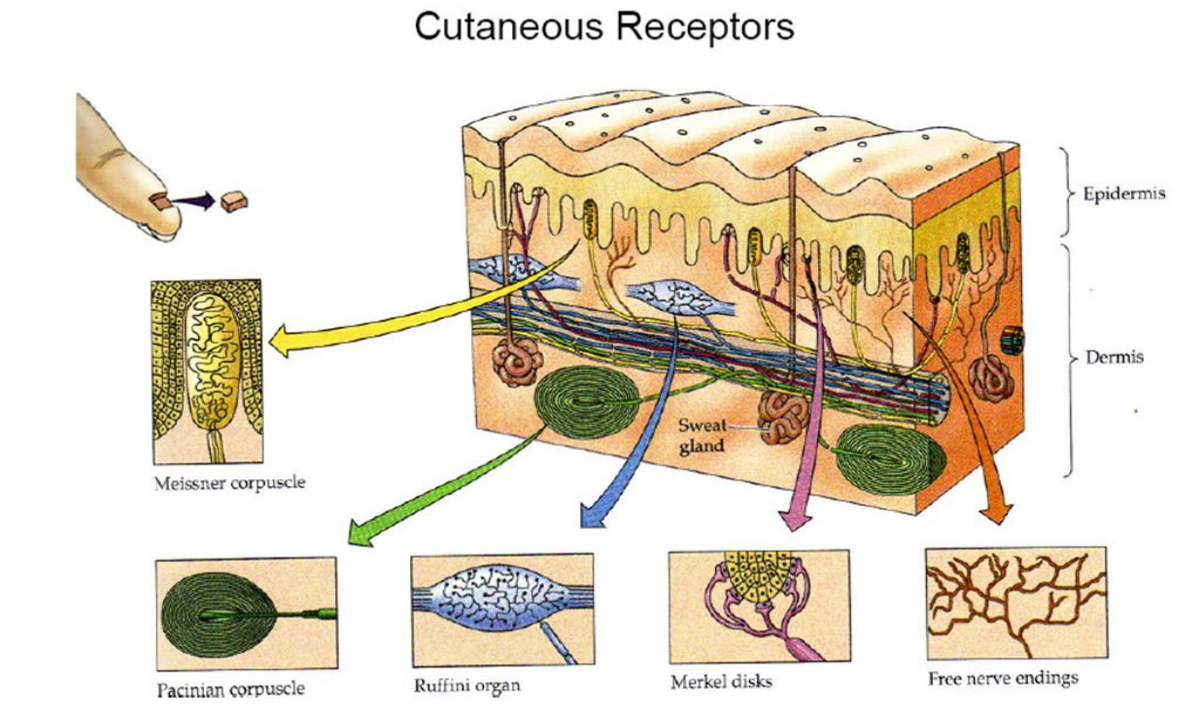
5 types:

- Mechanoreceptors
- Thermoreceptors
- Nociceptors (pain receptors)
- Photoreceptors (electromagnetic receptors)
- Chemoreceptors

1. Mechanoreceptors:

Detect mechanical compression or stretching of the receptors or of the tissues adjacent to the receptors

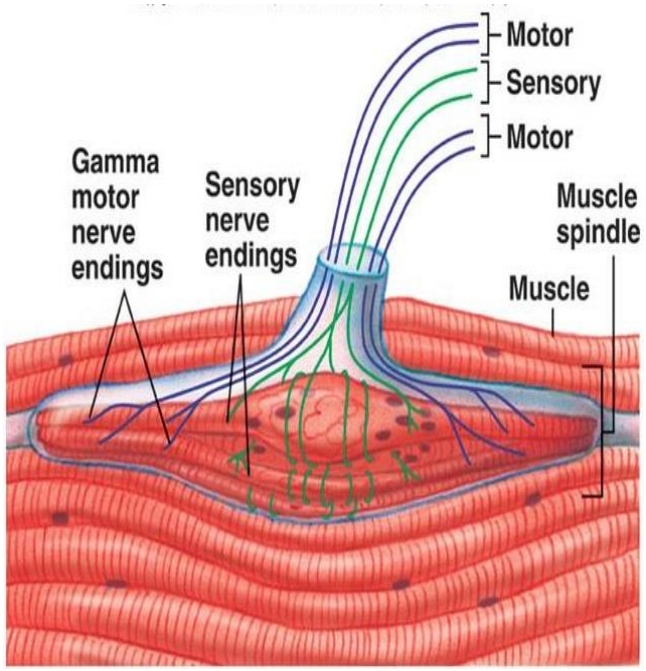
Example of Mechanoreceptors

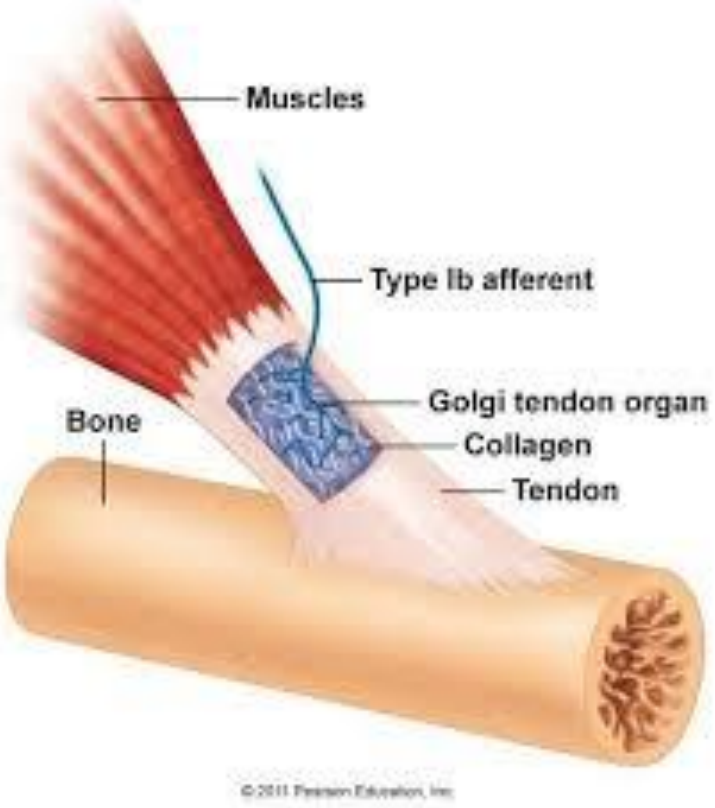


Skin tactile sensibilities

Meissner corpuscles, Pacinian corpuscles, Merkel cells, Ruffini endings and Free nerve endings

Example of mechanoreceptors



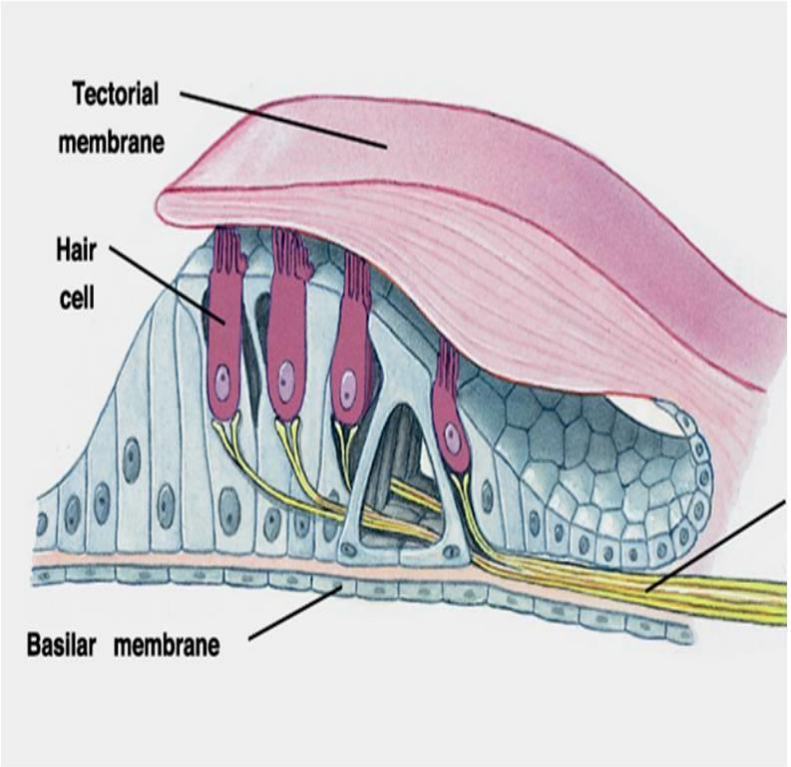


Deep tissue sensibilities

Muscle spindles, Golgi tendon receptors

Example of mechanoreceptors

- Hearing
  Hair cells

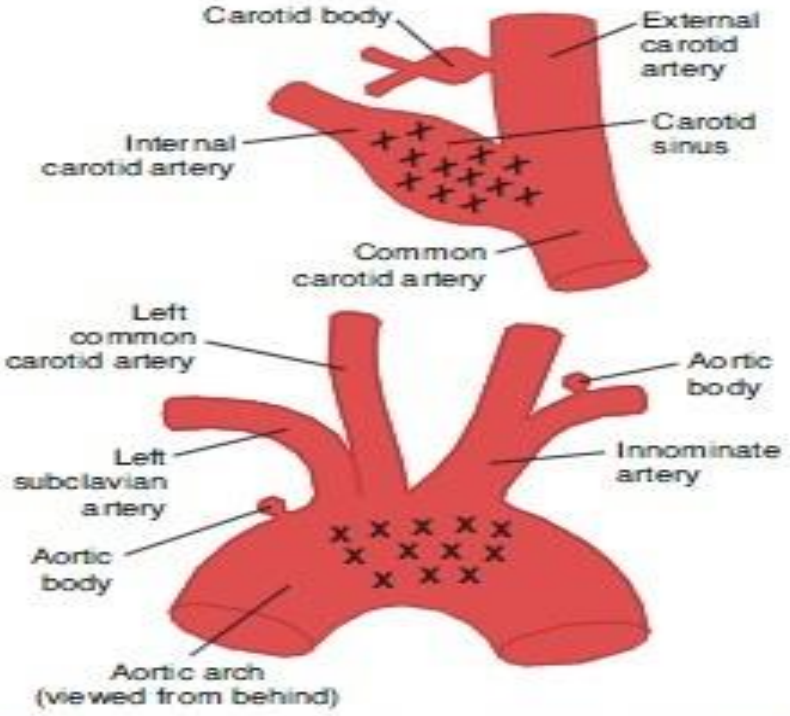


Organ of Corti in the inner ear showing the hair cells

Example of mechanoreceptors

- Arterial pressure

carotid and aortic baroreceptors



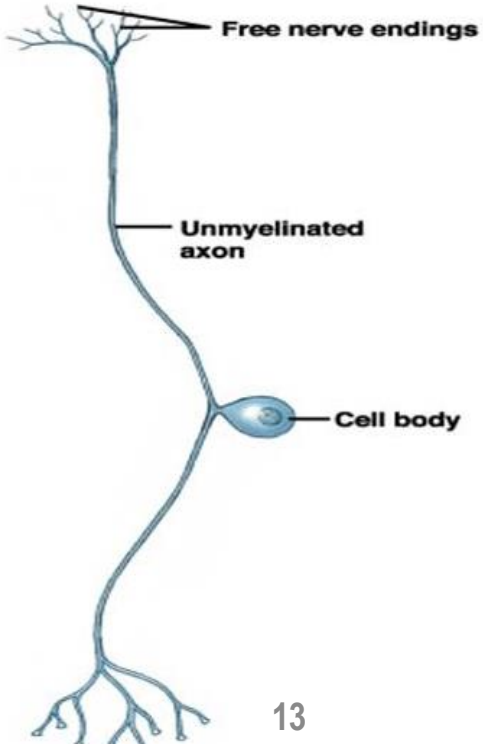
Baroreceptors area in the aortic arch and carotid sinuses

2. Thermoreceptors : detect changes in temperature

Cold receptors and Warm receptors

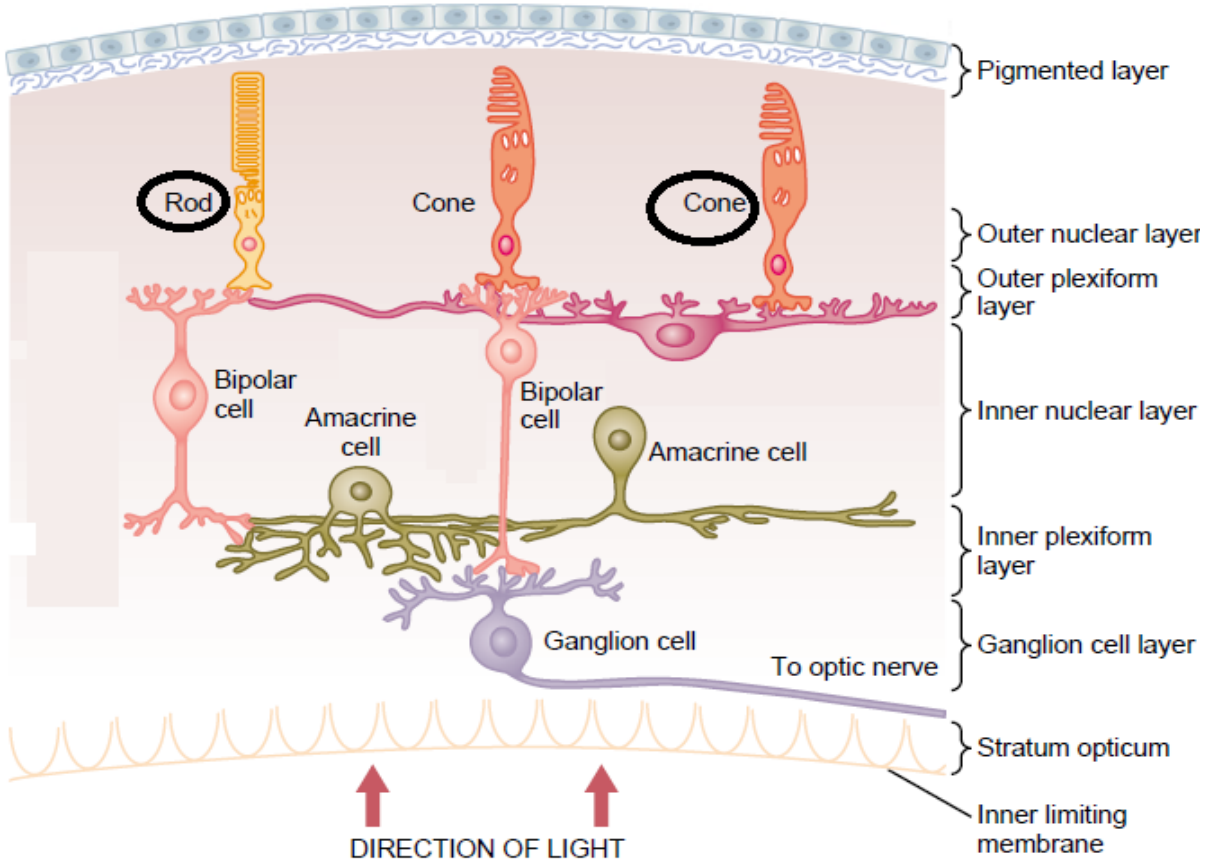
3. Nociceptors (pain receptors): detect damage occurring in the tissues.

Free nerve endings



4. Photoreceptors (electromagnetic receptors): detect light

Rods and Cones in the Retina

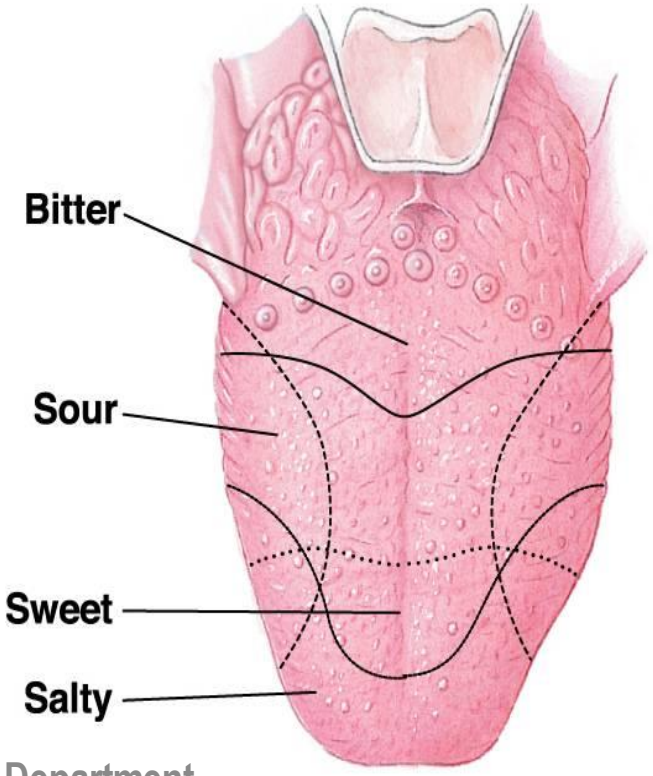


5. Chemoreceptors

stimulated by a change in the chemical composition of the environment in which they are located.

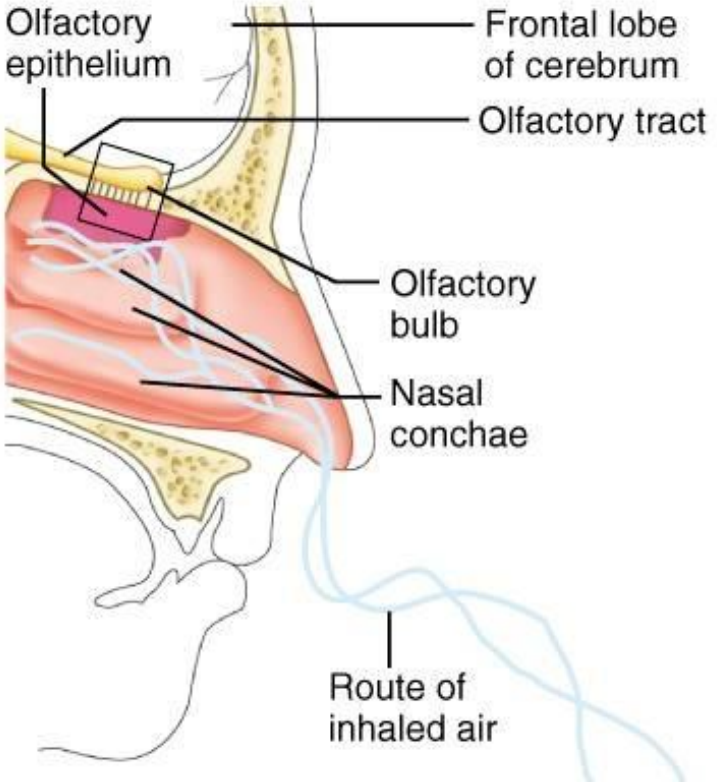
Example of chemoreceptors

- Taste → Receptors of taste buds



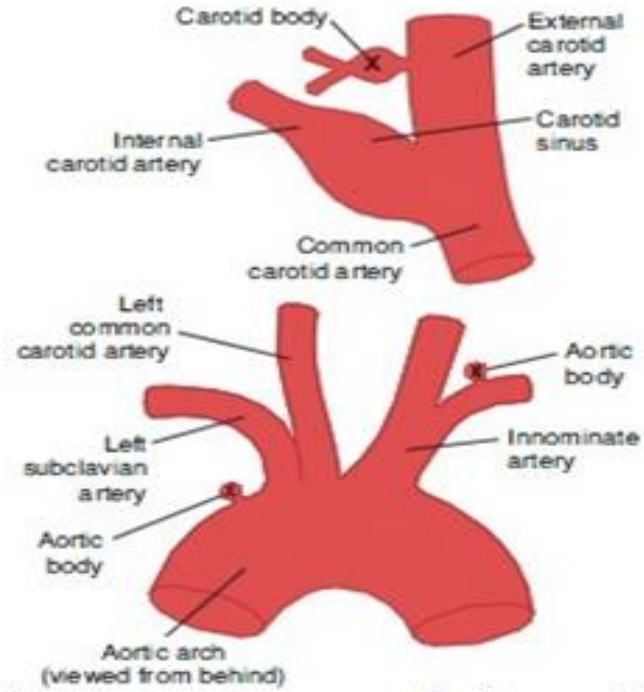
Example of chemoreceptors

Smell → Receptors of olfactory epithelium



Example of chemoreceptors

Arterial oxygen → Receptors of aortic and carotid bodies



Chemoreceptors area in the aortic and carotid bodies

B. Based on the source from which they receive information :

Extreoceptors	receive inputs from outside the body.
Interoceptors	monitor the internal conditions of the body.
Proprioceptors	mechanoreceptors which sense movements and relative position of the body parts and orientation of the body.

C. Based on adaptation :

- Slowly adapting receptors
- Rapidly adapting receptors

Recap

1. Somatic senses are the nervous mechanisms that collect sensory information from all over the body.

2. **Sensory receptor** may be part of a neuron or a specialized cell that detect changes in the internal and external environment and act as transducers

3. receptors classified based on the adequate stimulus and based on the source of stimulation, and on the adaptation level.

Thank You