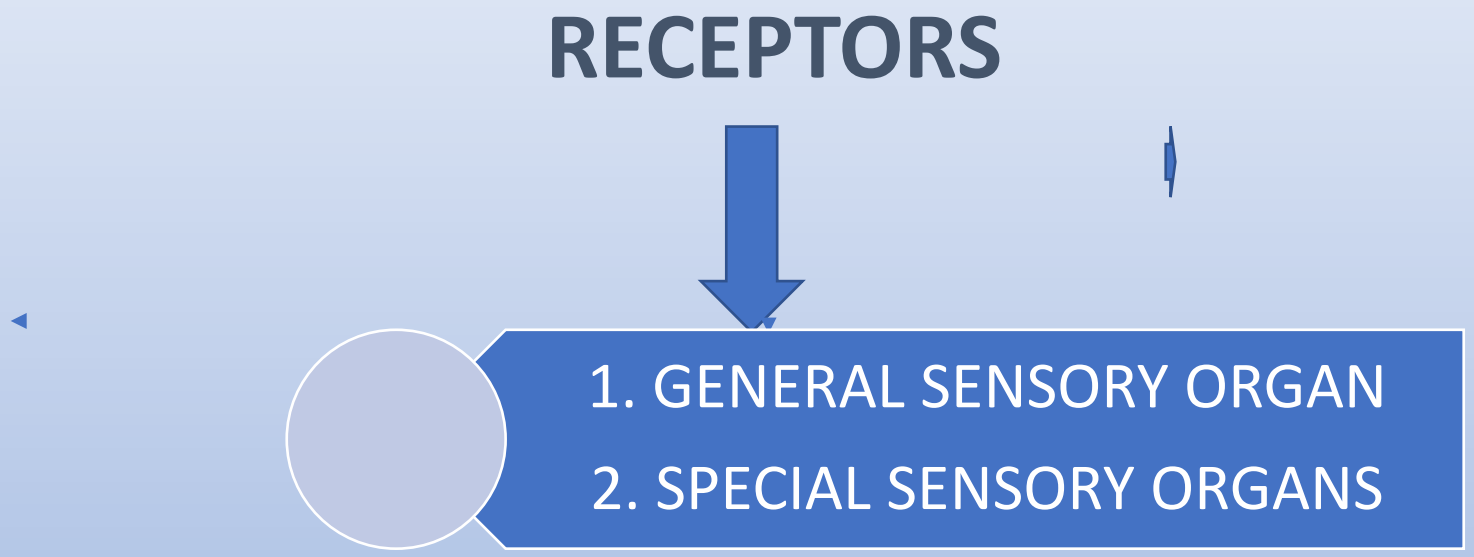
RECEPTORS
PG Semeser II

Classification of Receptors



GENERAL SENSORY ORGAN:

- **GENERAL SOMATIC RECEPTORS**

Anatomical Classification:

- **Free Sensory Receptor**
- **Encapsulated Sensory Receptor**
- **Associated Sensory Receptor**

Locational Classification:

- **Cutaneous Receptor-** For light,temperature, touch,pressure,pain.
- **Proprioreceptor**- For striated muscles,joints and tendons.
- **GENERAL VISCERAL RECEPTORS**

SPECIAL SENSORY ORGAN

- Chemoreceptors
- Radiation Receptors
    - Photo Receptors
    - Infra Receptors
- Mechanoreceptors
- Electro receptors

Anatomical classification of GENERAL SOMATIC RECEPTOR

FREE SENSORY RECEPTOR

- The terminus of a sensory receptor lacks any specialized association
- The nerve endings may be arborized (a fine branching structure at the end of the nerve fiber),or branch extensively to increase the area monitored.
- Free sensory receptors mainly interprets sensation of pain

Example- Tissue damage leading to swelling and direct stimulation like toothache or extreme heat or cold.

ENCAPSULATED SENSORY RECEPTOR

- The terminus of the sensory process is enclosed in a specialized structure
- It consists of nerve endings in association with epithelial like cells wrapped in a connective tissue capsule.
- This bulbous encapsulated endings add to the activity of receptors

TYPES-

a)**MEISSNER'S CORPUSCLE-Responds to touch**

b)**CORPUSCLE OF RUFFINI- Responds to warmth**

END BULBS OF KRAUSE-Responds to cold

c)**Pacinian Corpuscle** (Largest encapsulated receptors)-**Responds to pressure**

ASSOCIATED SENSORY RECEPTORS

In associated sensory receptors the terminus of a sensory pressure is **wrapped around another organ.**

Examples:

1. Nerve endings associated with base of hair follicle- When a hair follicle is moved , the entwined nerve endings at the base of the hair are stimulated.
2. Proprioreceptors-It responds to position and movements.

Located in muscles and tendon

Note-Proprioreceptive information is indispensable for determining the location of a part before and during movement

GENERAL VISCERAL RECEPTOR

They occur in visceral organs, i.e., unconscious reception of deep stimuli

TYPES-

A)CHEMORECEPTORS-

- Monitors pH of the blood(including oxygen and Carbon dioxide), which affects cardiorespiratory function.
- Monitors pH of the contents of stomach and proximal intestine, which affects digestive functions.

B)BARORECEPTORS- Monitors blood pressure

C)OSMORECEPTORS- Maintains solutes in the blood stream (in the hypothalamus and elsewhere)

SPECIAL SENSORY ORGAN

- Chemoreceptors
- Radiation Receptors
    - Photo Receptors
    - Infra Receptors
- Mechanoreceptors
- Electro receptors

CHEMICAL RECEPTORS

These are sensory receptors sensitive to chemical stimuli

- Primarily two varieties:

1) OLFACTORY RECEPTORS- Sensitive to smell
2) GUSTATORY RECEPTORS-Sensitive to taste

RADIATION RECEPTOR

- Radiation travels in waves:
- Cosmic radiation has shortest wavelength and Radio waves have longest wavelength. These two with intermediate wavelength constitute the **SPECTRUM OF ELECTROMAGNETIC RADIATION**.
- Visible Spectrum- A very narrow band of light within the electromagnetic spectrum which human eyes are normally sensitive to and can perceive.
- Types of radiation receptors:

1. PHOTO RECEPTOR- The most important photoreceptor is the Eye

2. INFRA RED RECEPTOR

INFRA RED RECEPTORS

- Infra red radiation lies just to the right of the visible spectrum.
- Only some Vertebrates have special sense organs that respond to infrared radiation.

Note- This is specially useful at night when visible light is usually unavailable.

Examples:

1. Infra red receptors are present on the faces of Vampire Bats that feed on Ungulates- Apparently the infrared receptors help these bats to detect warm blood vessels beneath the thick skin of the prey

2.Most discrete infrared receptors are found in two groups of snakes: Boa(non poisonous) and Pit Vipers (poisonous). The receptors help in prey detection.

MECHANORECEPTORS

Mainly three types of mechanoreceptors are found performing three discrete functions

1. **LATERAL LINE SENSE ORGANS**-Detects water current .

2. **VESTIBULAR APPARATUS**-Senses change in equilibrium and thus helps in maintaining balance.

3. **AUDITORY SYSTEM-Responds** to sound.

- Neuromast organ (or modification of it) is the fundamental component of all the three types of mechanoreceptors.

ELECTRO RECEPTORS

- Absent in tetrapods
- Most fishes possess electroreceptors that are sensory receptors responsive to weak electrical fields
- Electroreceptors are modified neuromast organs located in pits within the skin that are predominately concentrated on the fish's head.
- Types:

  1. Ampullary Receptors
  2. Tuberous Receptors

RHEORECEPTORS

- Rheoreceptor is an exteroreceptor that responds to water current or movement of water around the animal.
- Rheoreceptor is only present in aquatic animals and absent in terrestrial animals
- Four general kind of rheoreceptors have been recognized in fishes and aquatic Amphibians:\

1. Lateral line Sense Organ
2. Sensory Pit Organ
3. Ampulla of Lorenzini
4. Vesicles of Salvi

IMPORTANCE OF NEUROMAST SYSTEM IN AQUATIC VERTEBRATE

The significance of neuromast system in aquatic Vertebrate life can be understood by-

- Disappearance of the system in terrestrial Vertebrates.
- A rich supply of nerve fibers from cranial nerves supply the system.
- Extensive development of the system in fast swimming species in comparison to slow moving species.