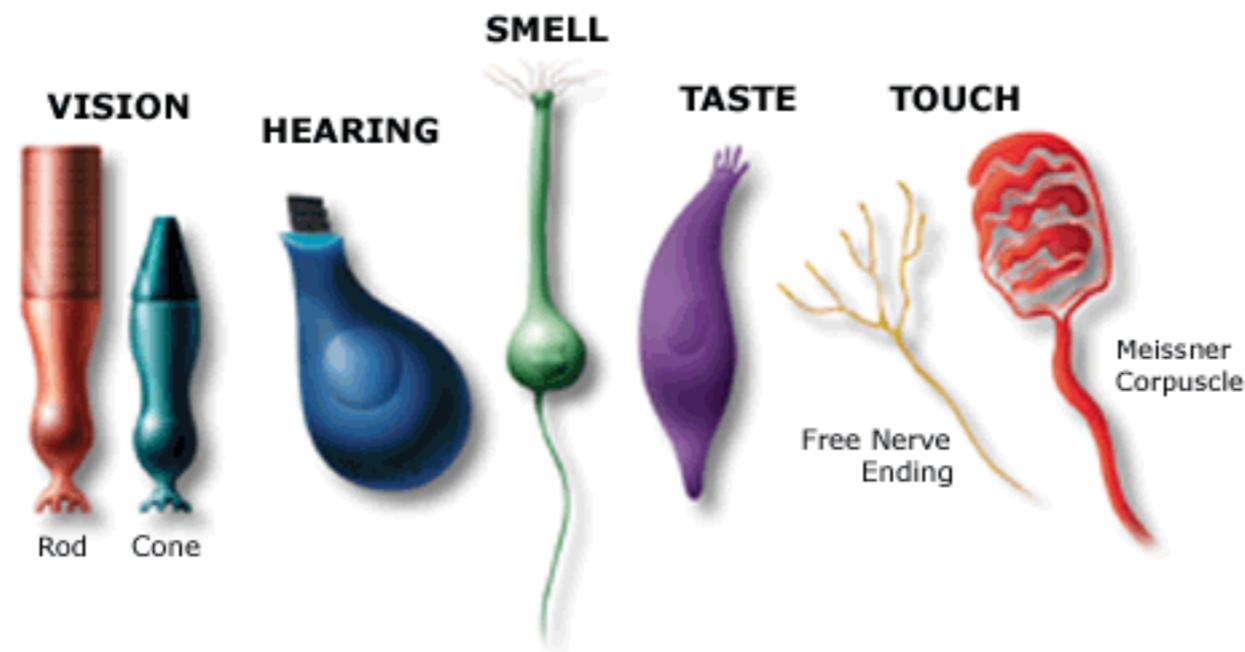


Sensory Receptors



Characteristics of Life

Connection

- In order to survive, animals can detect certain sensations from a stimulus, a change in one or more conditions (e.g., light, sound, temperature).
- The stimulus can come from a change in the external or internal (inside the body) environment.
- Reactions to those sensations are controlled by sense receptors.

What are sensory receptors?

- Structures designed to respond to one type of environmental change.
- They are sensory nerve endings that receive information and conduct a process of generating nerve impulses to be transmitted to the brain for interpretation and perception.
- Sensory receptors vary in classifications but generally initiate the same process of registering stimuli and creating nerve signals.

Main Types of Sensory Receptors

- Chemicals (chemoreceptors)
- Temperature (thermoreceptors)
- Pressure (mechanoreceptors)
- Light (photoreceptors)
- Pain (nociceptors)

Chemoreceptors

- Detect chemicals within the environment (internally & externally)
- For example, the chemical processes of smelling (olfactory sensation) and tasting (gustatory sensation) begin when molecules from substances go into noses or into mouths where they dissolve and stimulate special chemical receptor cells.
- These cells transmit messages to brain areas where we detect odors and tastes.

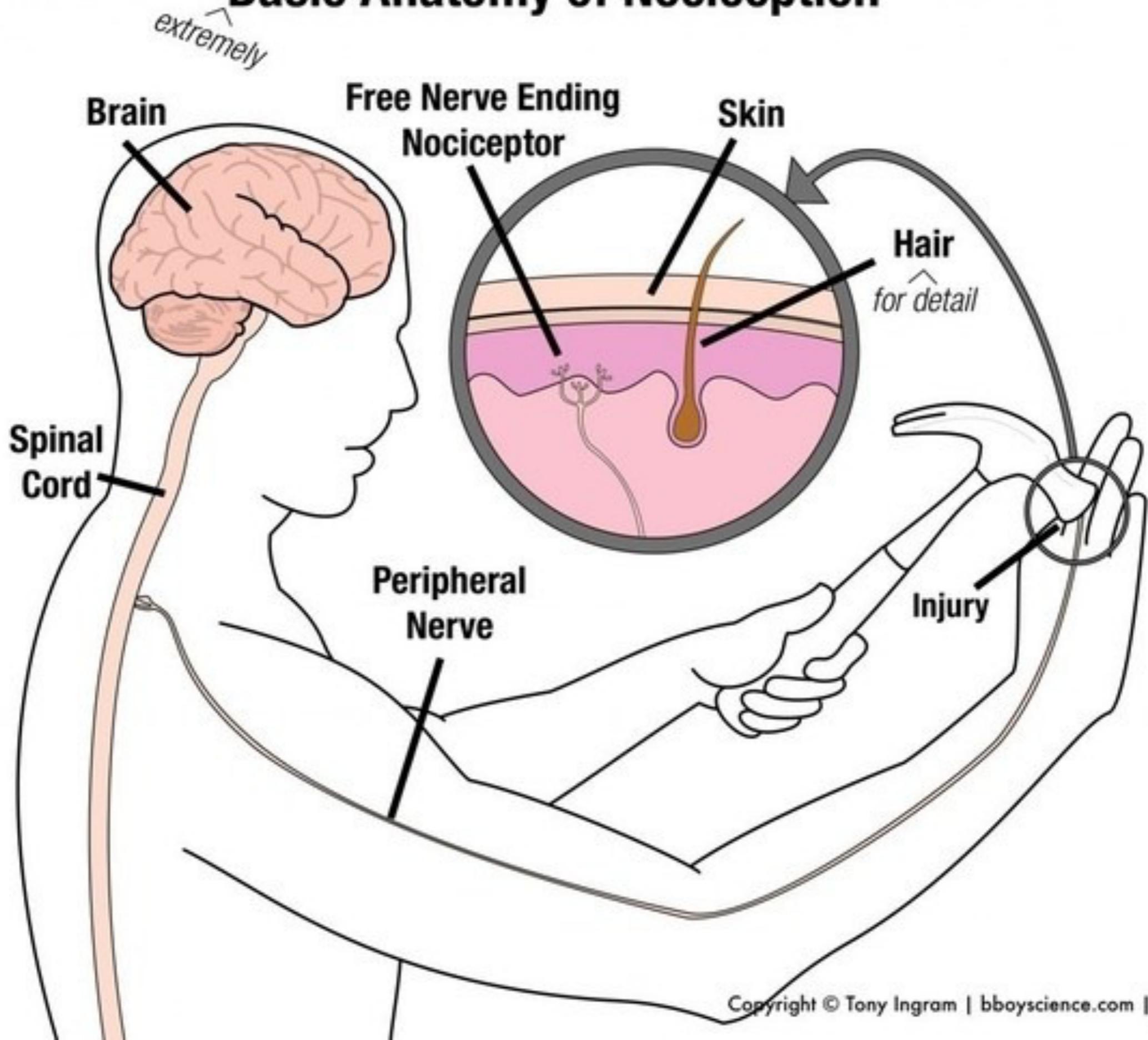
Chemoreceptors-Continued

- We also remember people, places, or events associated with these sensations.
- The neural systems for these two chemical senses can tell apart thousands of different odors and flavors.
- Chemical changes also occur when damaged tissues release chemicals detected by pain receptors.

Nociceptors

- Responsible for assessing damage to body
- Alert us to potentially damaging stimuli at the skin by detecting extremes in temperature and pressure and injury-related chemicals.
- Send “possible threat” signals to the spinal cord and the brain.

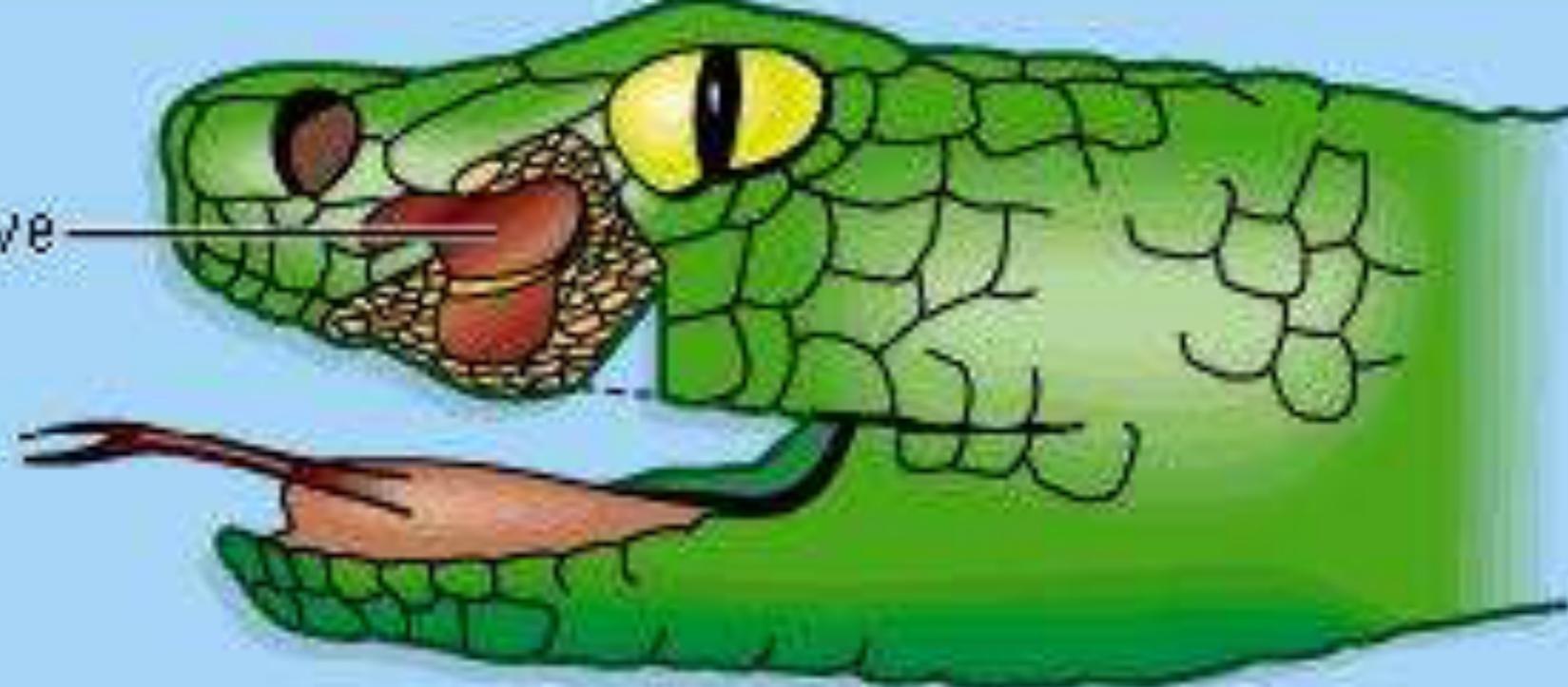
Basic Anatomy of Nociception



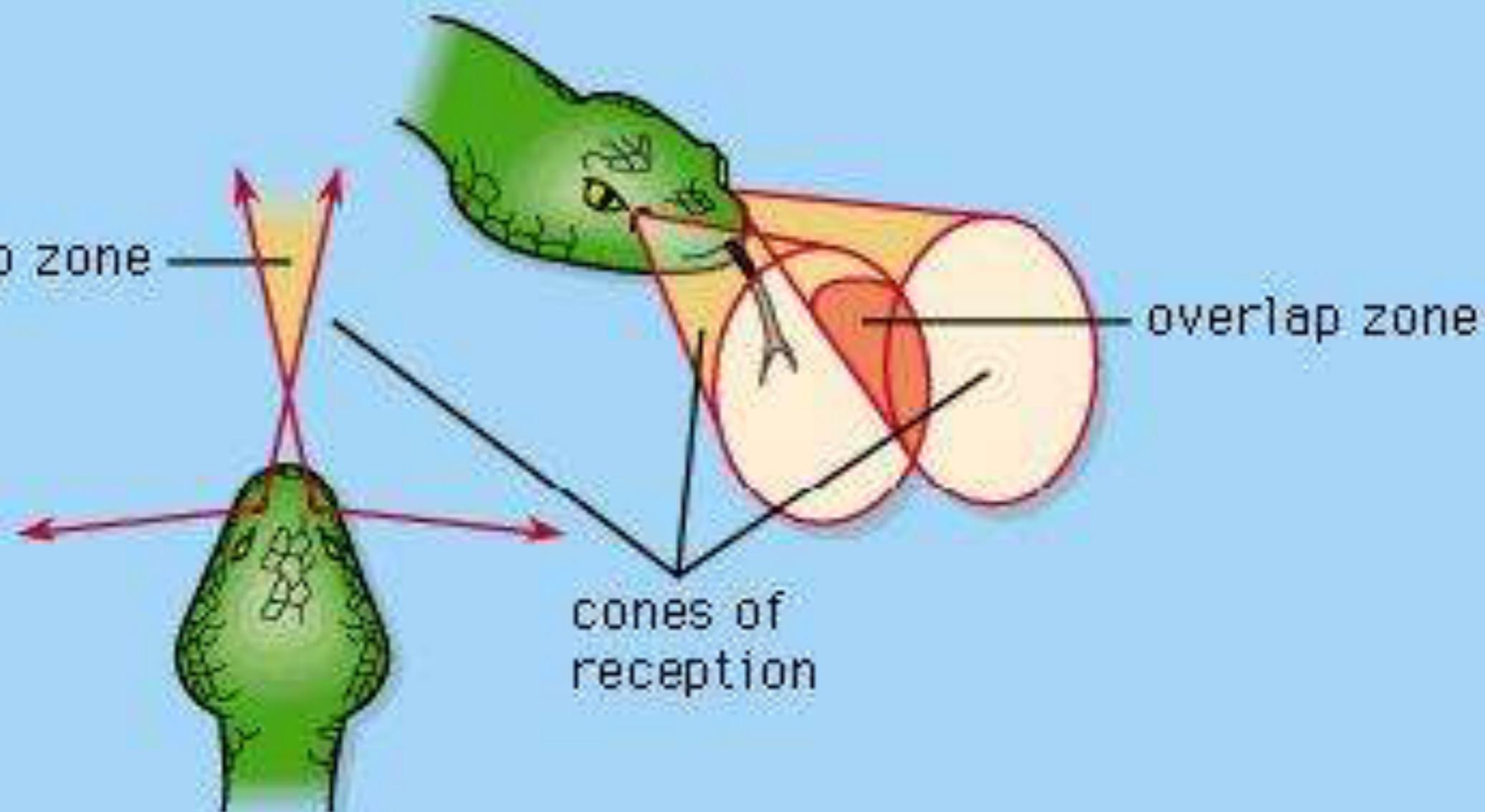
Thermoreceptors

- Detect changes/differences in temperature (internally & externally)
- Thermoreceptors are able to detect heat and cold and are found throughout the skin in order to allow sensory reception throughout the body.
- The location and number of thermoreceptors will determine the sensitivity of the skin to temperature changes.
- Thermoreceptors are also located in other parts of our bodies, such as our skeletal muscles, liver, hypothalamus, etc.

heat-sensitive
membrane



overlap zone

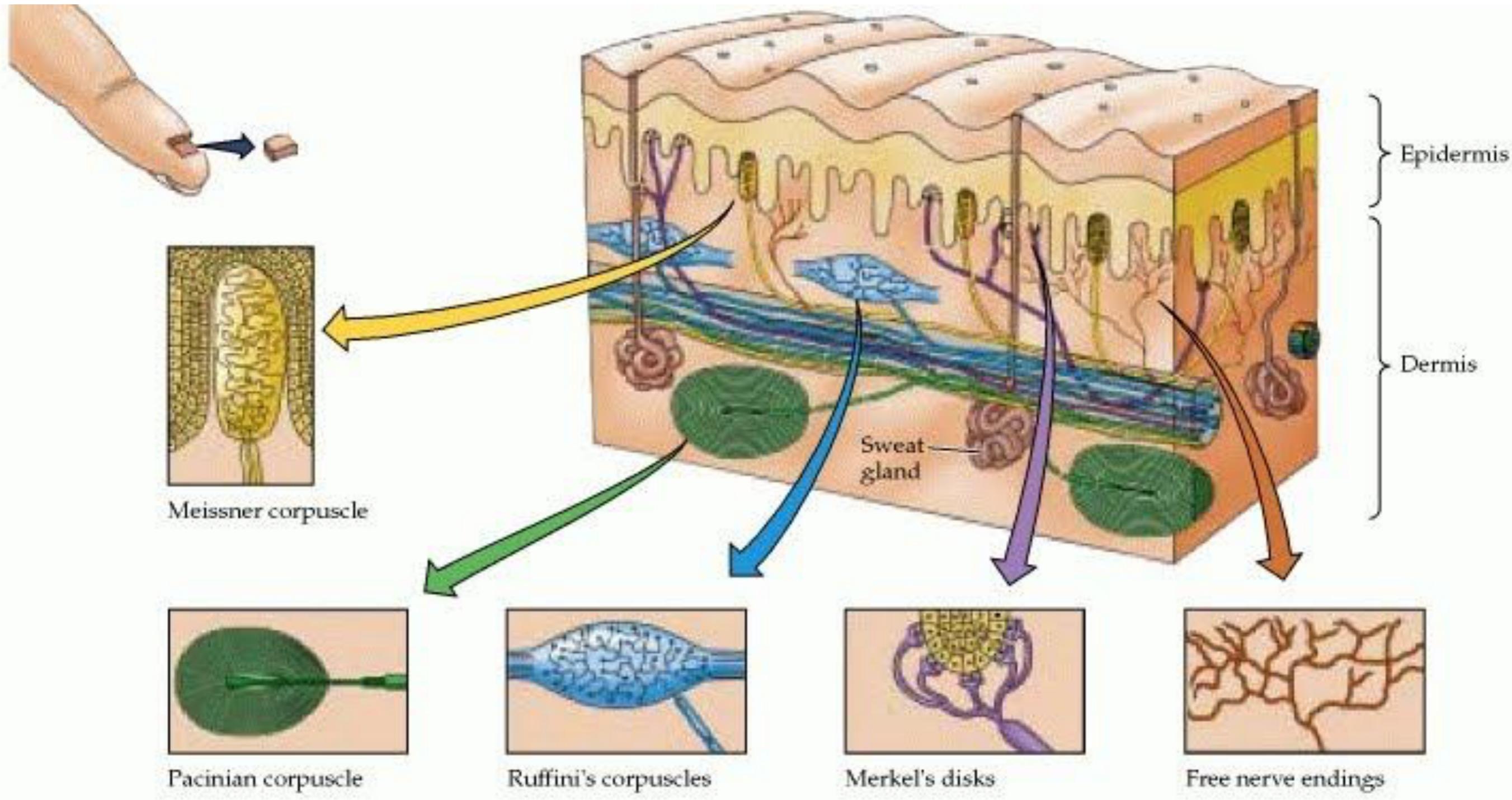


overlap zone

cones of
reception

Mechanoreceptors

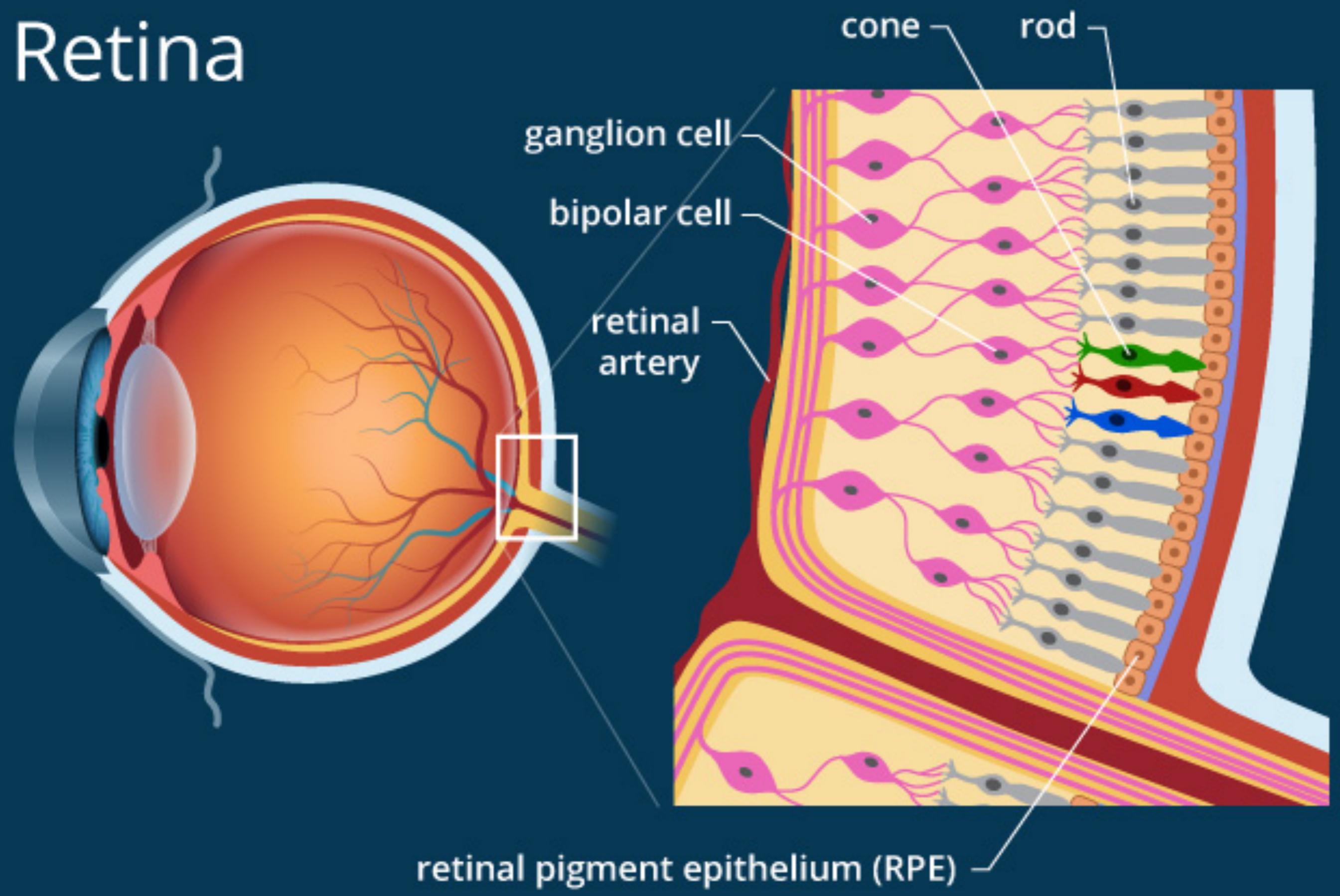
- Respond to mechanical (tactile) stimuli
- We have several receptors of mechanical stimuli that respond with nerve impulses in sensory neurons if they are physically deformed by an outside force such as touch, pressure, stretching, sound waves, or motion.
- Mechanoreceptors enable us to detect touch, detect sounds and the motion of the body, and sense the position of our muscles, bones, and joints, which is called the sense of proprioception.



Photoreceptors

- Respond to light from the electromagnetic spectrum
- Eyes are the only organ that detect visible light using different receptors in the retina for color (cones) and brightness (rods).
- These signals transmitted by the optic nerve to the brain.

Retina



The Five Senses

- **Sight:** photoreceptors
- **Hearing:** mechanoreceptors
- **Touch:** mechanoreceptors & nociceptors
- **Smell:** chemoreceptors
- **Taste:** chemoreceptors