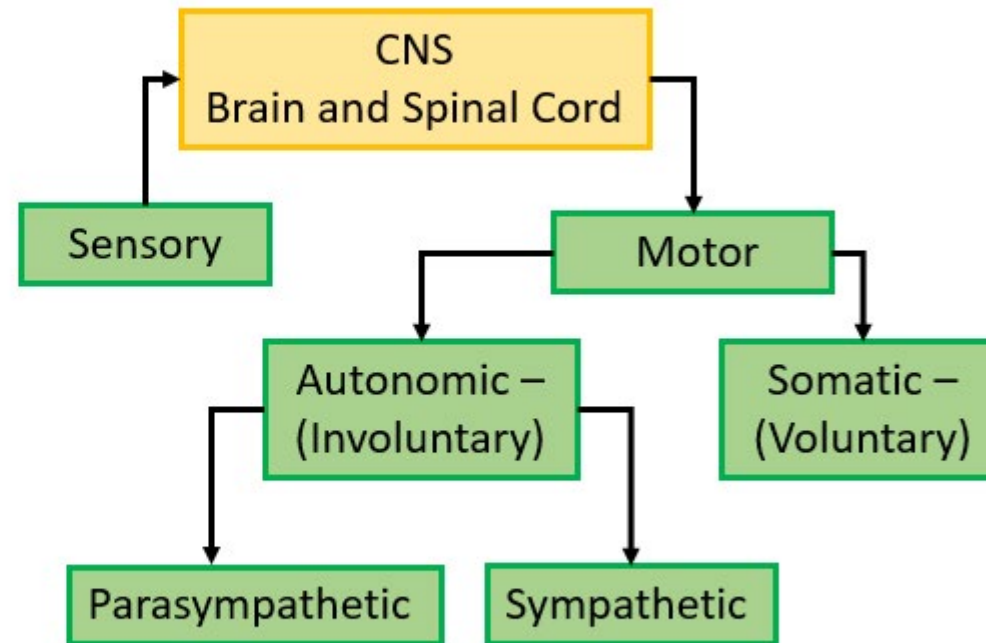
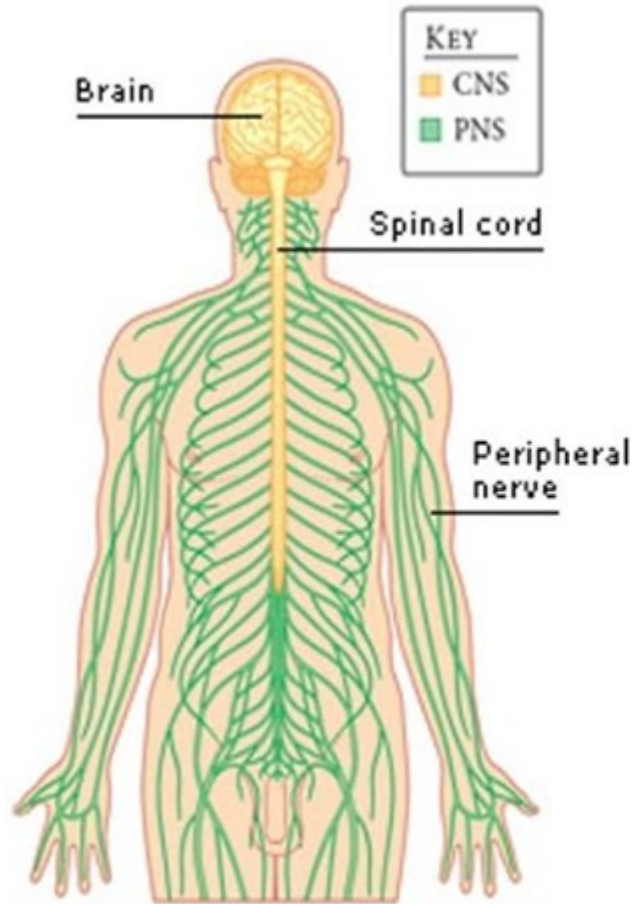


Divisions of the Nervous System - Overview

Peripheral Nervous System (PNS) - Sensory



Ch4 HP: The nervous system is highly organised

Date:

Human Biology Year 12 ATAR

Do Now

Complete the past exam question given, under test conditions (not for actual marks)

Lesson Agenda

- 1: Do Now
- 2: Peripheral NS overview and PNS- Sensory
- 3: Work on Review Worksheet: PNS overview and sensory
- 4: Lesson summary and wind-up

Suggested Study

- Compulsory: Complete review worksheet, mark and correct using answer key on Connect.
- Read through today's notes and textbook section
- Write out the steps involved in transmission across the synapse.

NEXT LESSON

- Past Exam Question
- PNS- Motor, Reflex Arcs

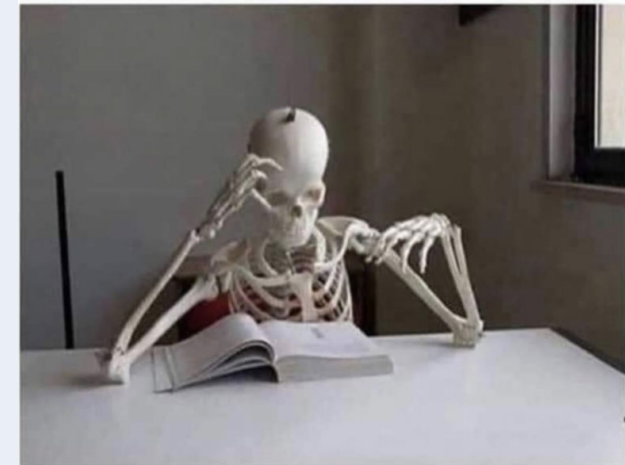
Learning Aims

- List the main parts of the Nervous System
- Describe how the PNS nerves connect with the CNS
- Describe the function of the PNS-Sensory
- Briefly describe how the sense organs receive information and pass it via the sensory PNS to the CNS
- Describe the receptors involved in touch and proprioception.
- List different sensors in the body, where they are located, and what they sense.
- Describe the organisation of sensory neurons and their pathway into the spinal cord.

Key Vocabulary

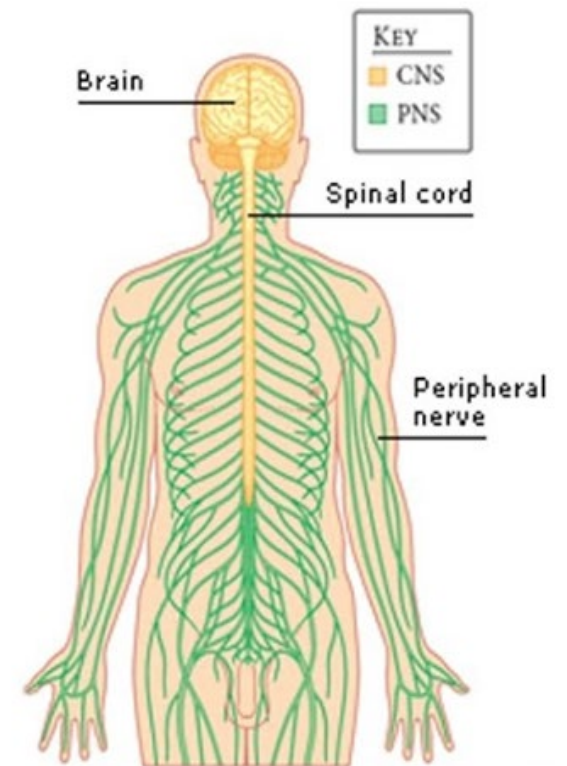
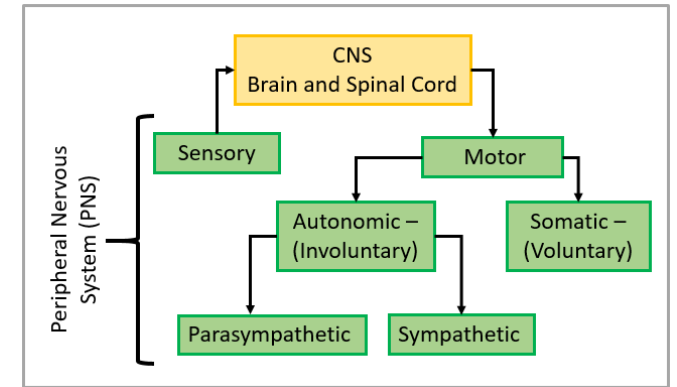
Peripheral Nervous System (PNS)
Central Nervous System (CNS)
Sensory
Receptors
Proprioception
Dorsal
Ventral
Ganglion

When you have to read the same page over and over because you keep zoning out.



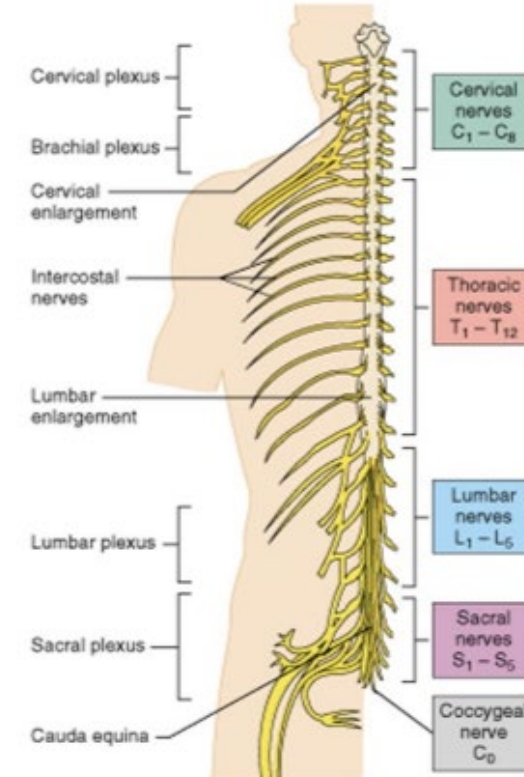
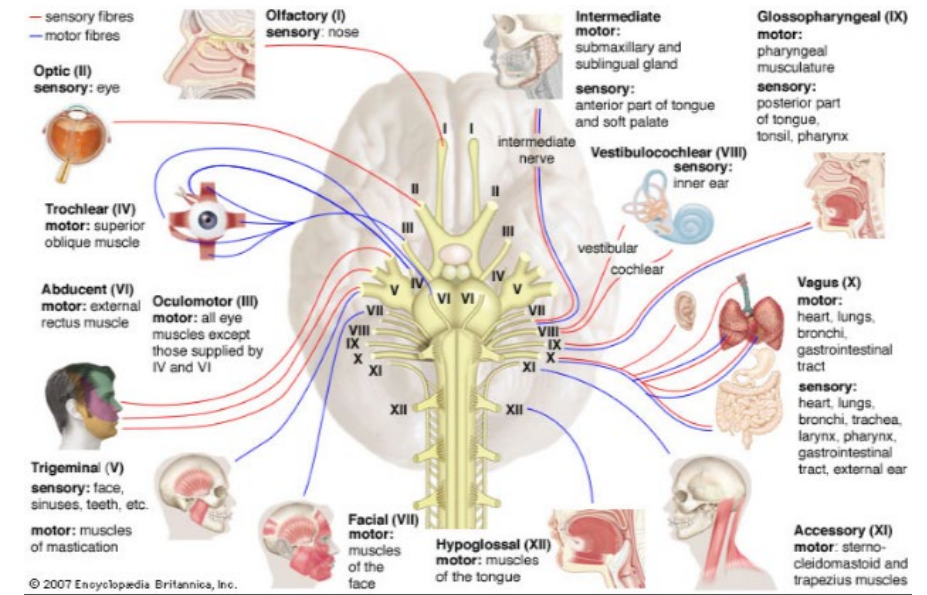
Overview

- Nervous system consists of the brain, spinal cord, and all nerves.
- Peripheral Nervous System (PNS) – we will focus on this now
 - Sensory and motor neurons, bundled into nerves
 - Take information to and from CNS
 - Clusters of nerve cell bodies (*ganglia*), outside of CNS
- Central Nervous System (CNS) – we will focus on this after PNS
 - brain and spinal cord



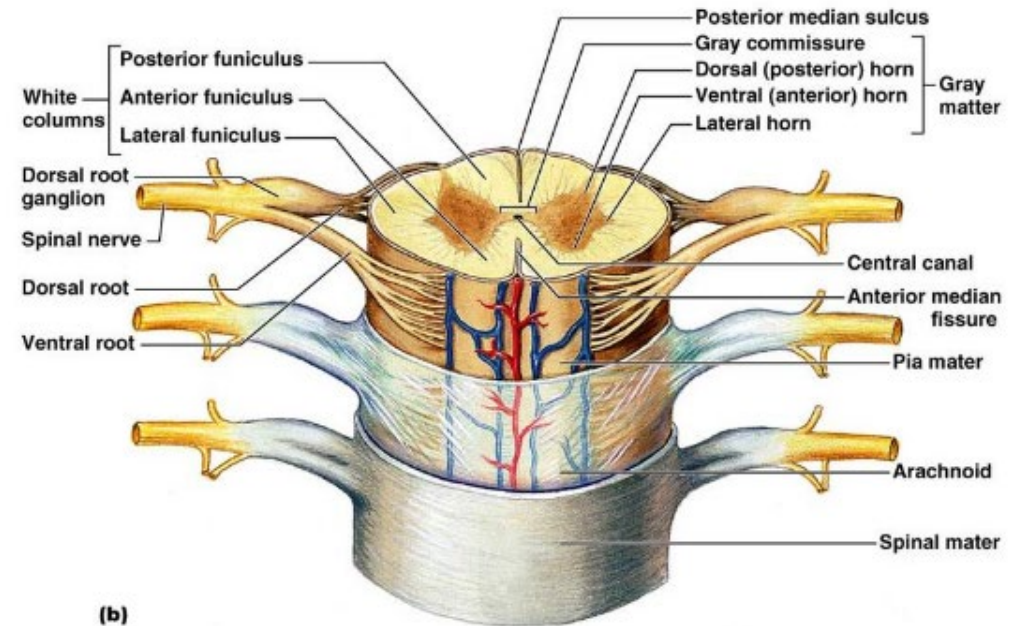
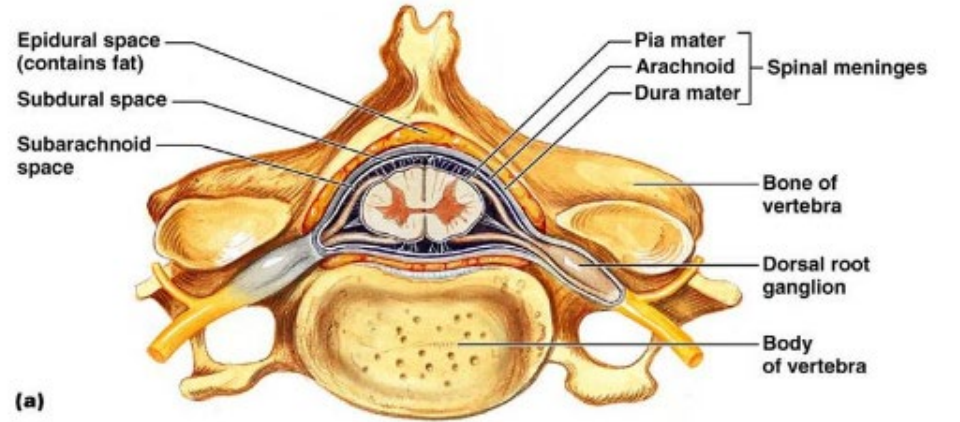
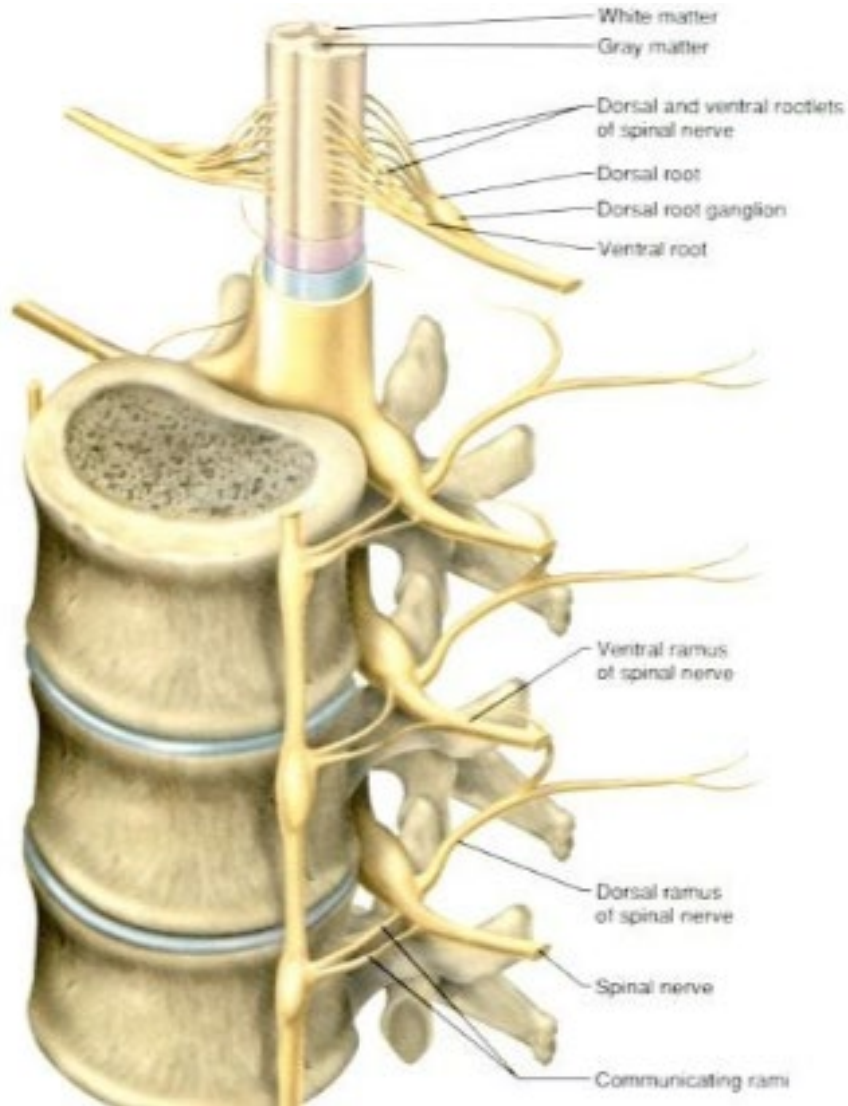
Nerves

- Bundles of neurons
- Can contain both sensory and motor neurons (mixed nerves)
- Connect to brain /spinal cord
- Transmit signals to and from CNS
- Cranial Nerves (attached a base of brain):
 - 12 cranial nerves
 - Some mixed nerves, others only sensory or only motor
 - Feed directly into brain base
- Spinal Nerves (attach along spinal cord)
 - 31 pairs of spinal nerves
 - All mixed nerves
 - Attach to spinal cord by 2 roots



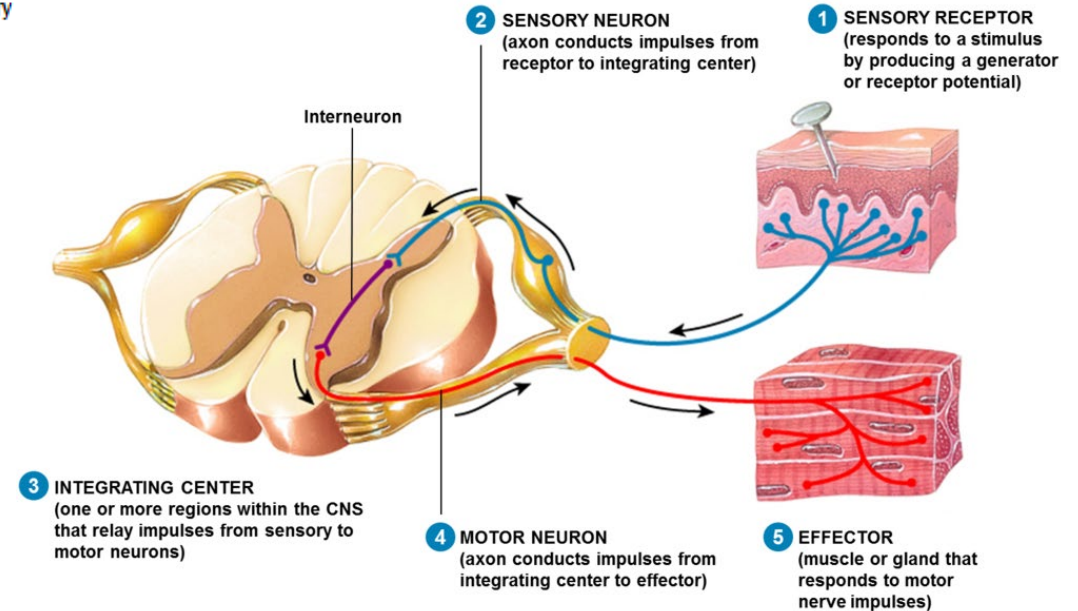
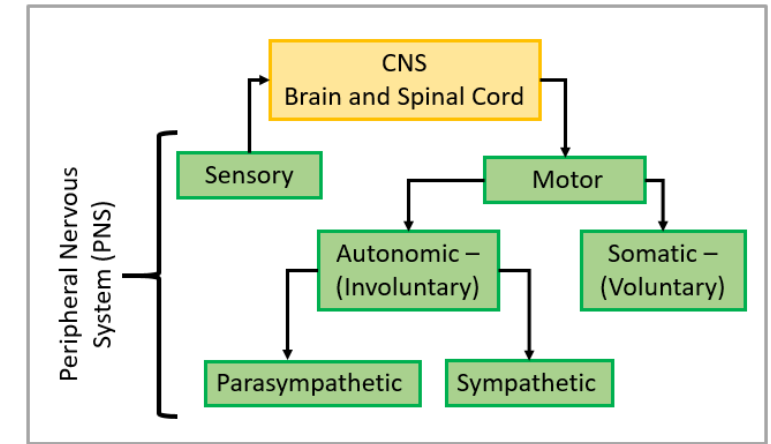
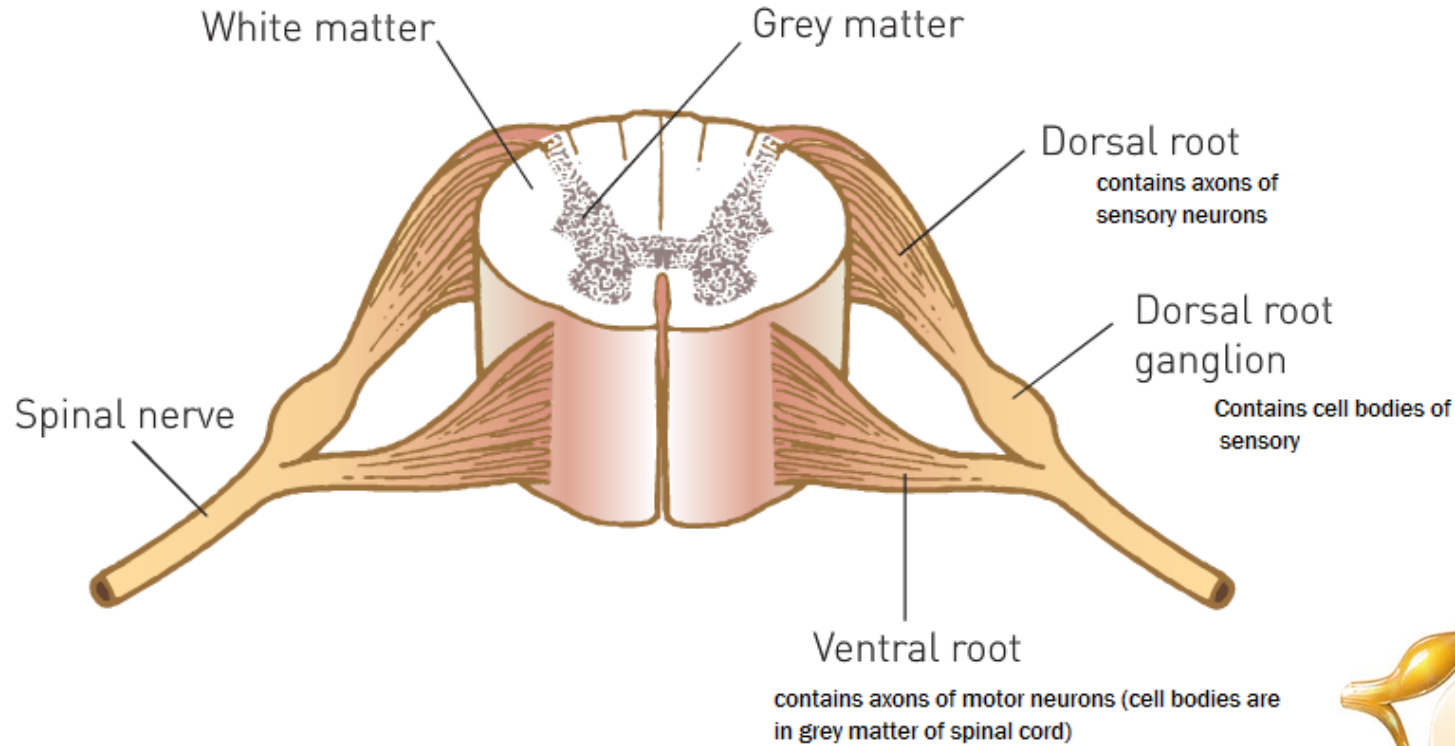
Learning Aim: Describe how PNS nerves connect with the CNS

Spinal Nerve connection to Spinal Cord



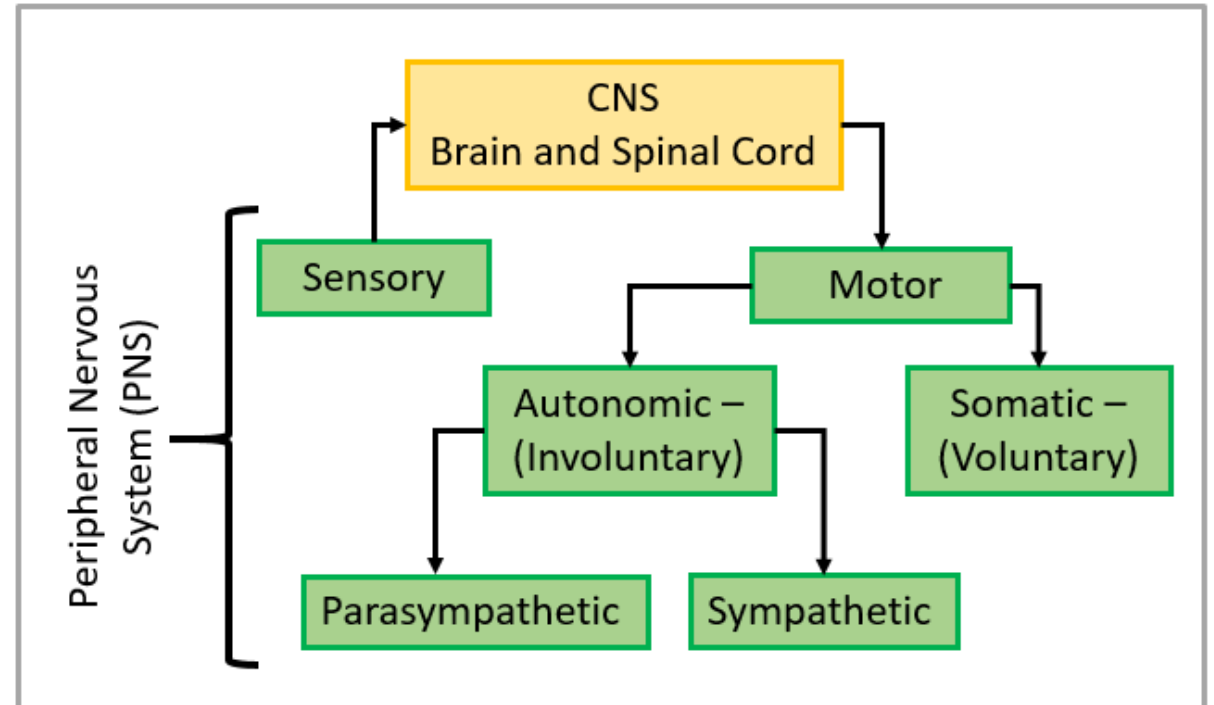
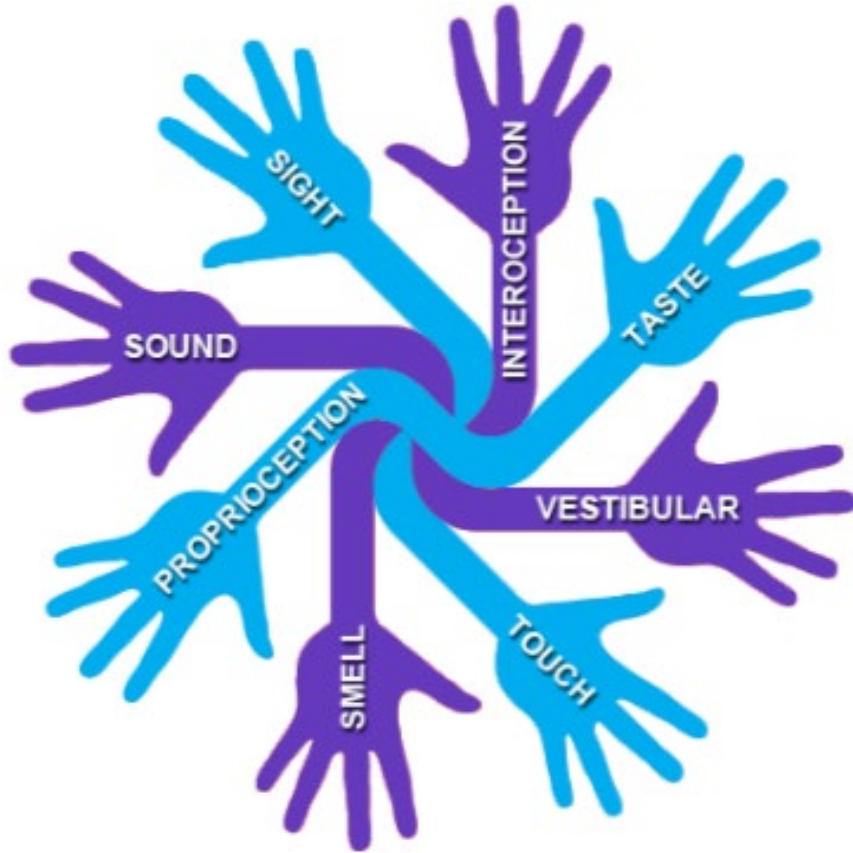
Learning Aim: Describe how PNS nerves connect with the CNS

Spinal Nerve connection to Spinal Cord



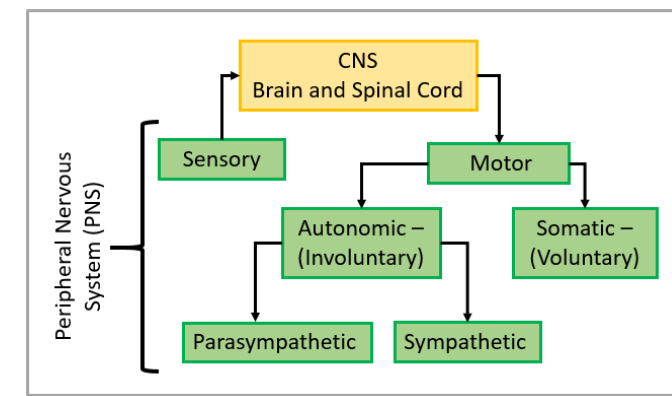
Learning Aim: Describe how PNS nerves connect with the CNS

Peripheral Nervous System: Sensory (Afferent) Division

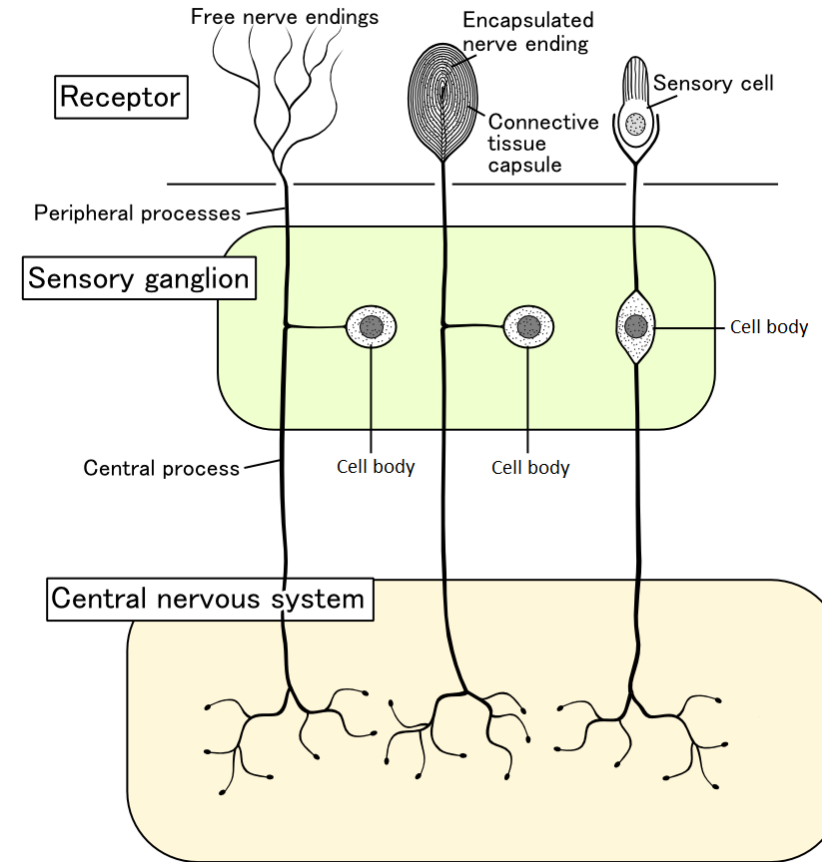


Ch4 HP: The nervous system is highly organised

Senses and Receptors (PNS-Sensory)



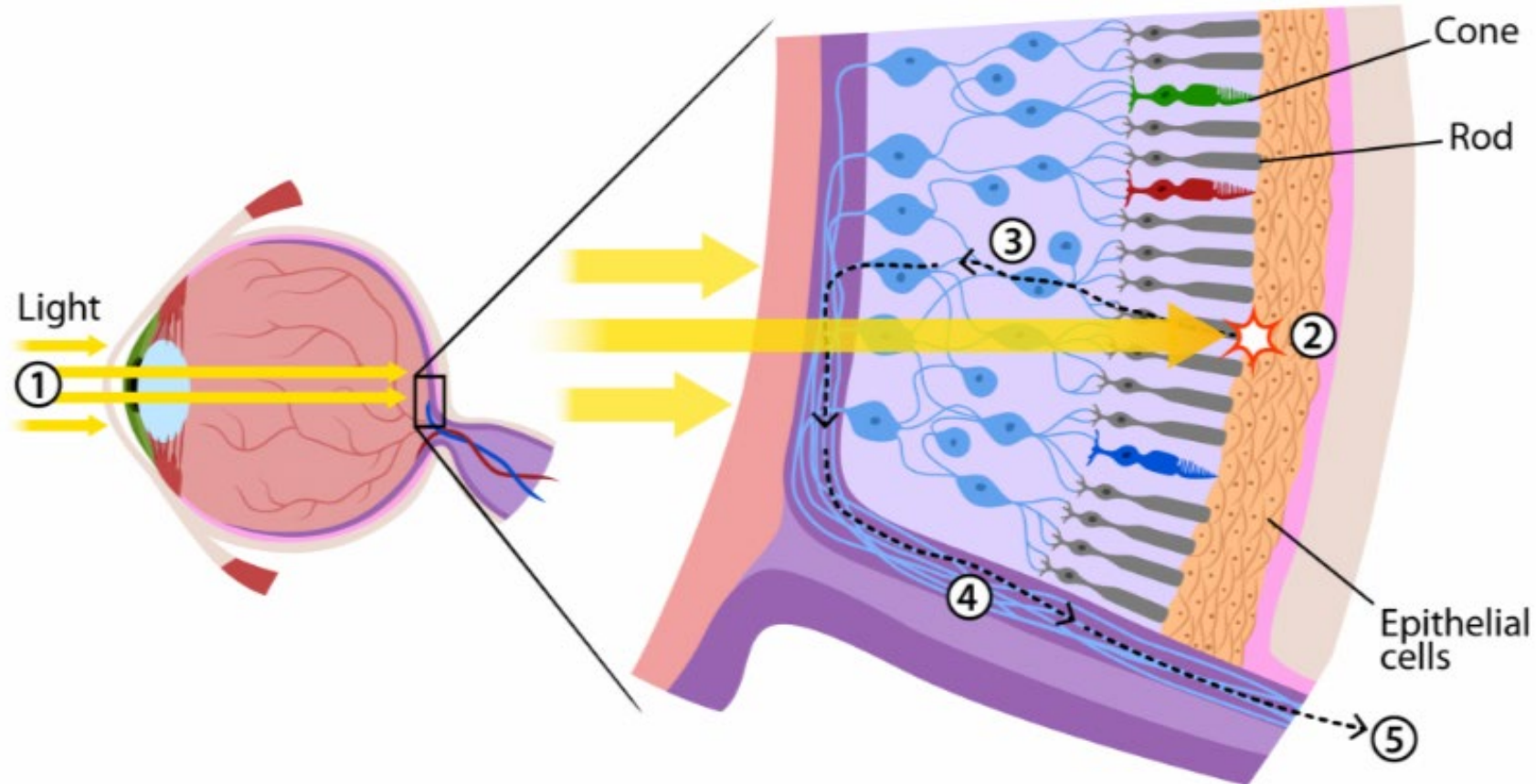
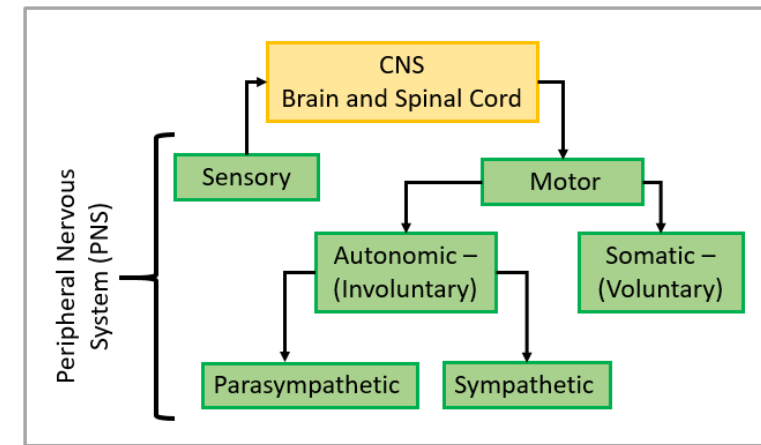
1. Body receives signals at receptors/sensors.
2. Stimulated receptors send signals to sensory neurons.
3. Signals are passed to the CNS to be integrated and acted upon.



Learning Aim: Describe the function of the PNS Sensory

Sense organs (PNS-Sensory):

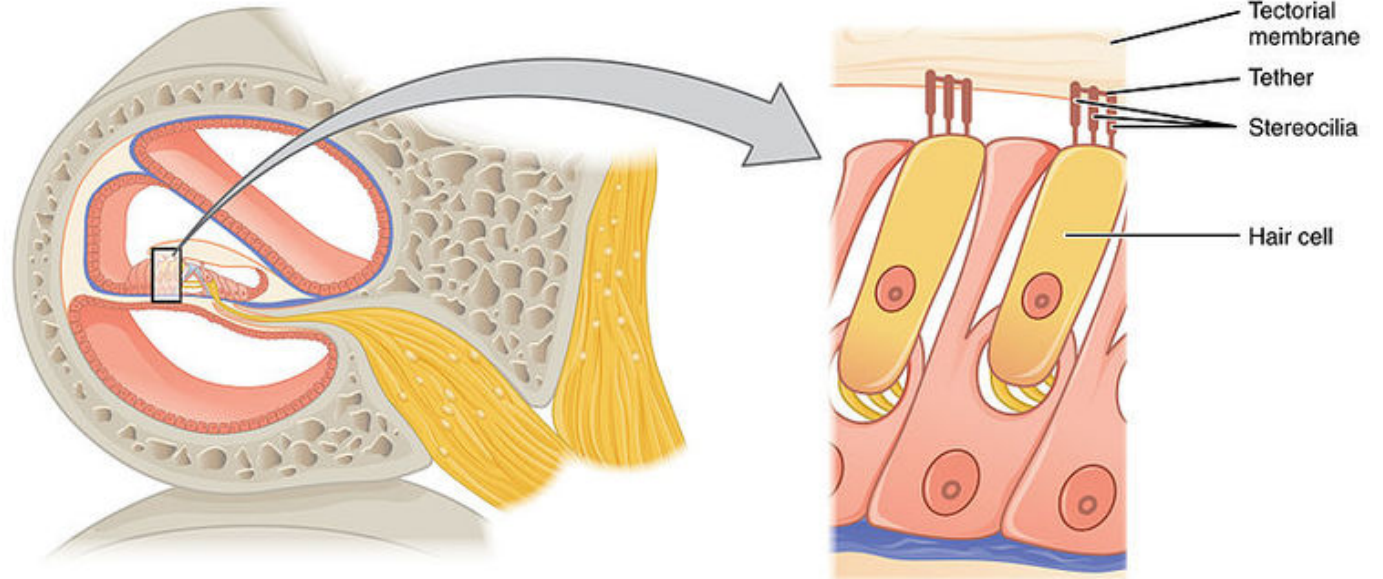
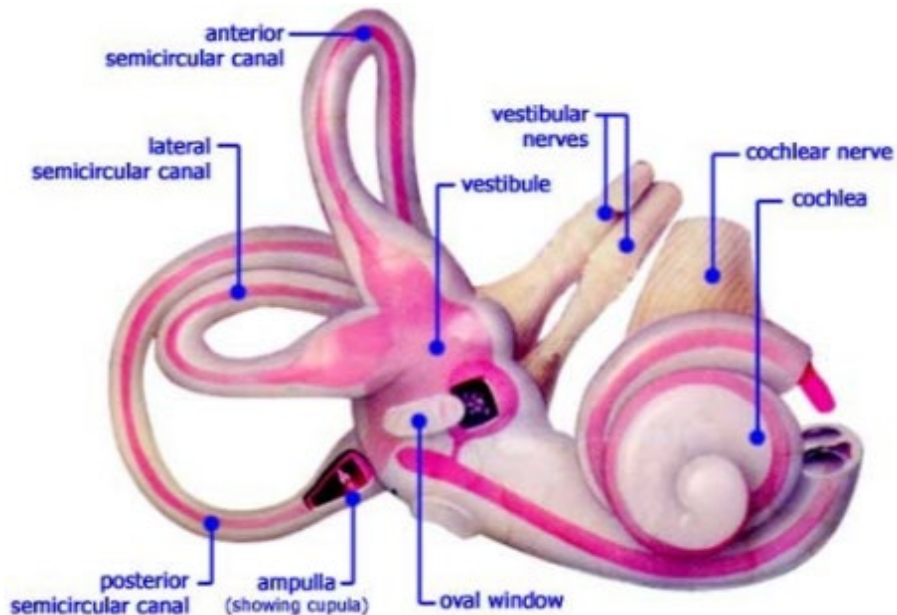
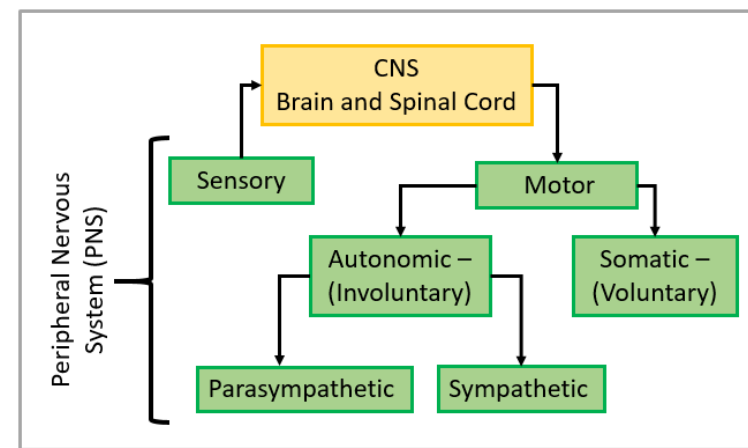
- Eye:
 - Rod and cone cells in retina stimulated by light
 - Transmit signals via optic nerve to brain



Learning Aim: Briefly describe how the sense organs receive information and pass it via the sensory PNS to the CNS

Sense Organs:

- Ear:
 - Cochlea contains fluid and fine hair-like sensors that detect sound waves.
 - Transmit signals to brain via auditory nerve
 - Vestibular system series of canals and specialised sensory cells that detect position of head – balance.
 - Signals sent to brain via vestibular nerve



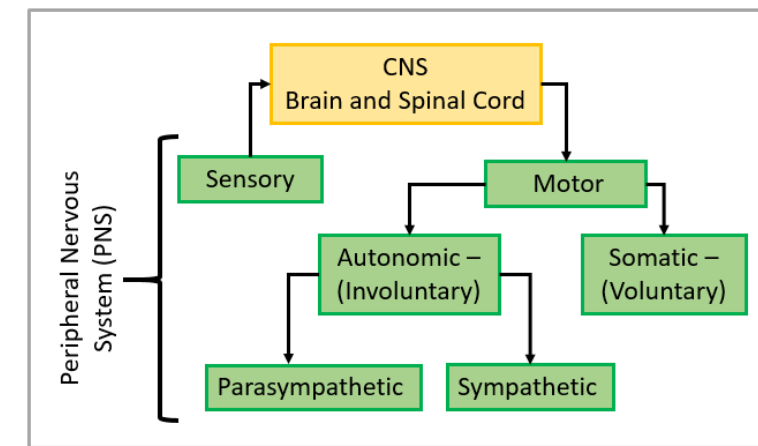
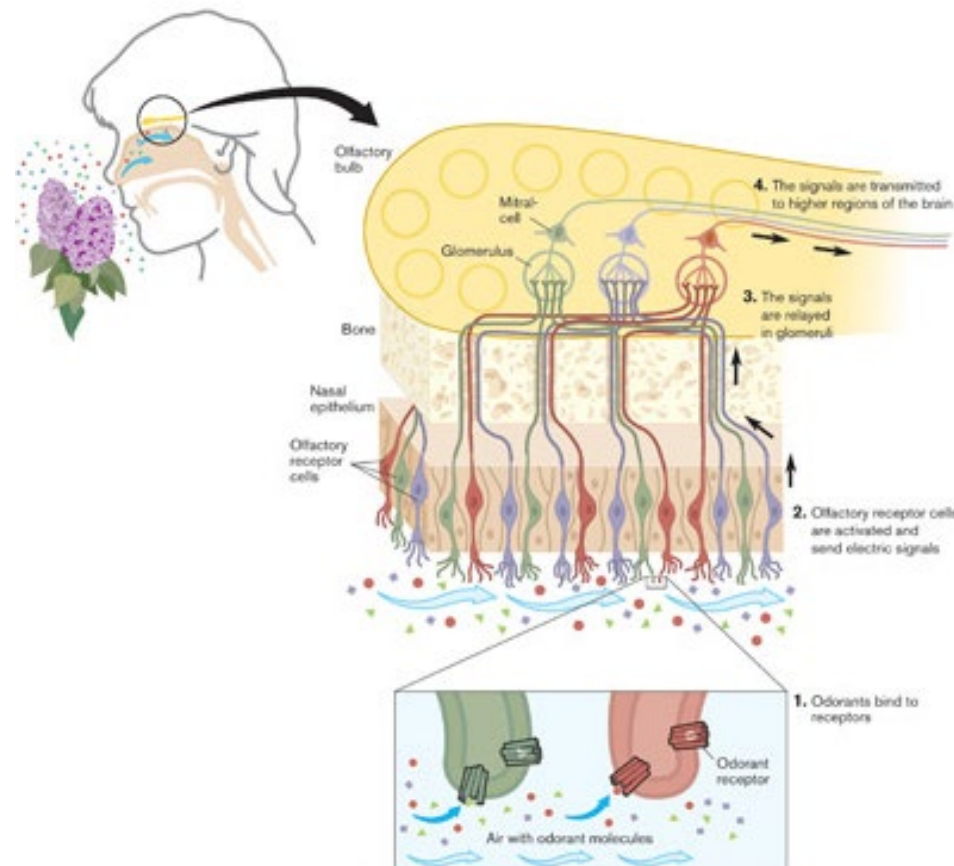
Learning Aim: Briefly describe how the sense organs receive information and pass it via the sensory PNS to the CNS

Sense Organs:

Nose (olfactory)

- Specialised cells in nasal cavity send signals to brain via olfactory bulb and olfactory nerve.

Odorant Receptors and the Organization of the Olfactory System

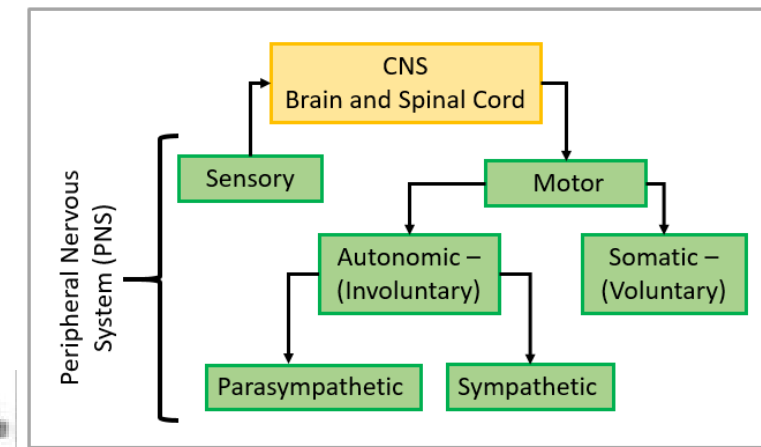
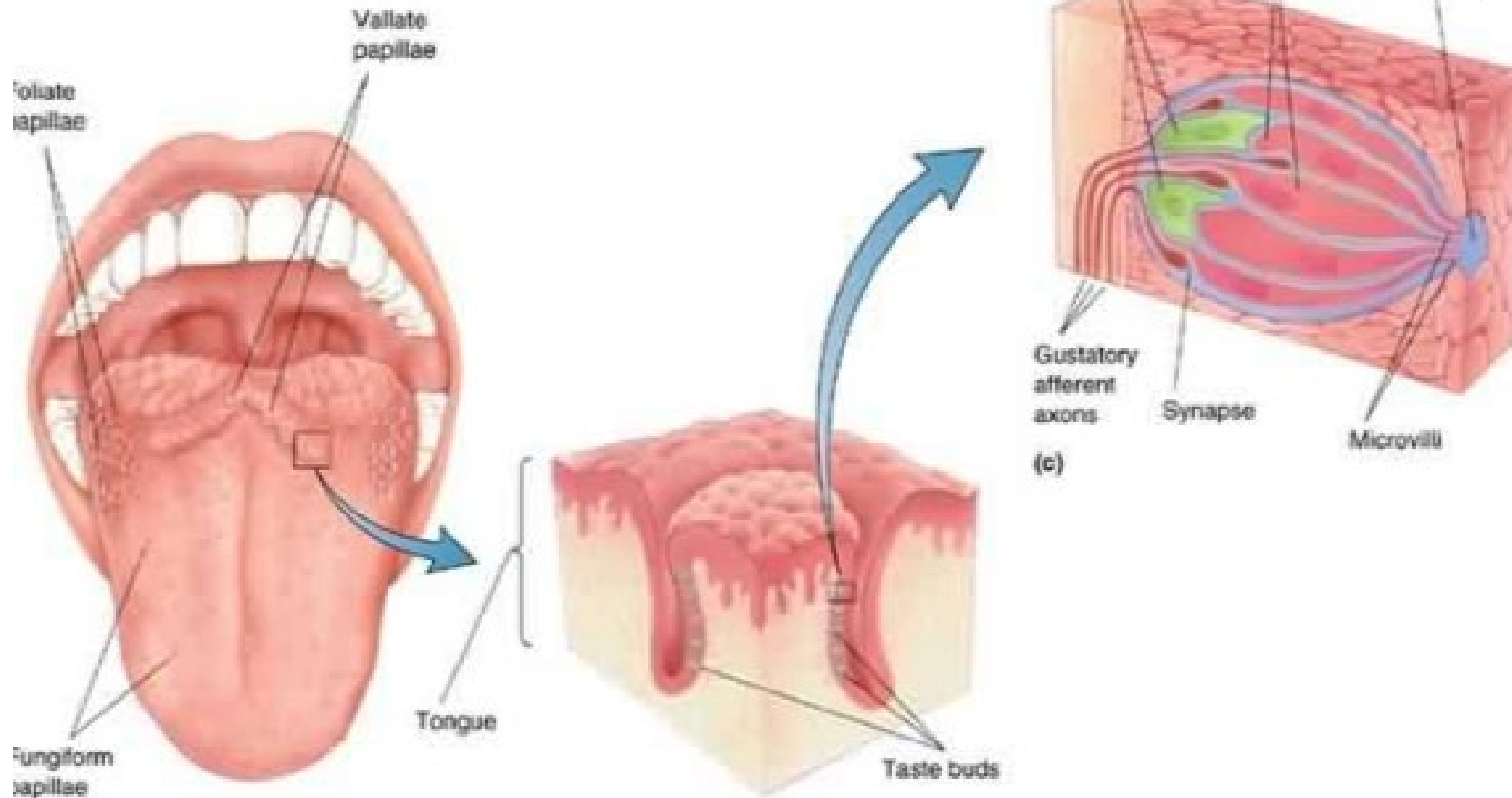


Learning Aim: Briefly describe how the sense organs receive information and pass it via the sensory PNS to the CNS

Sense Organs:

Taste

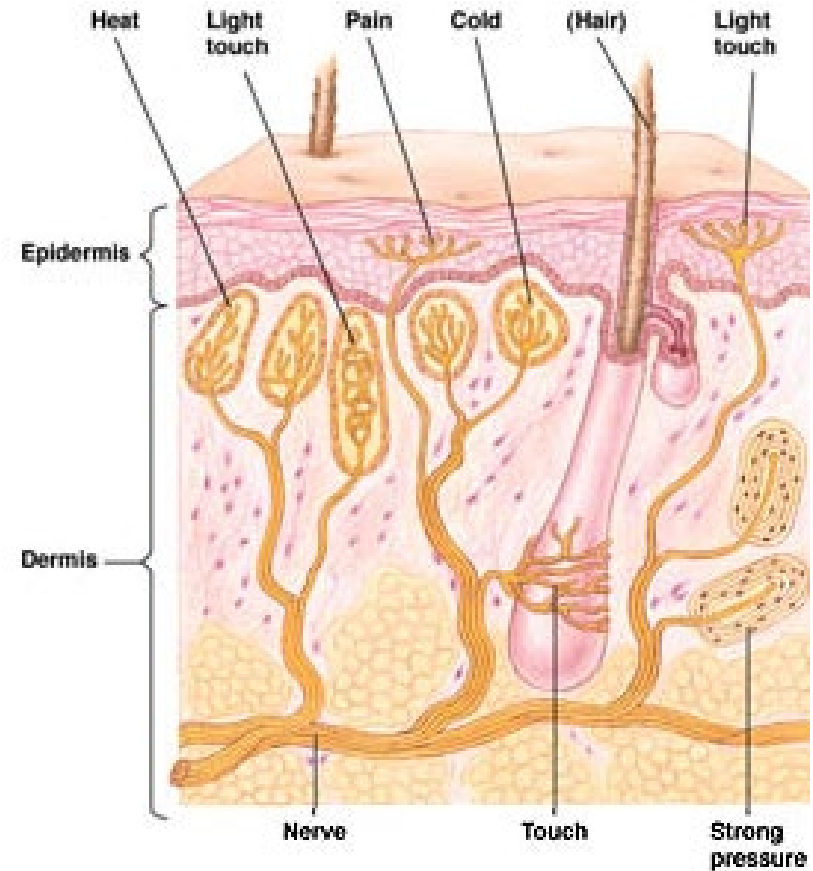
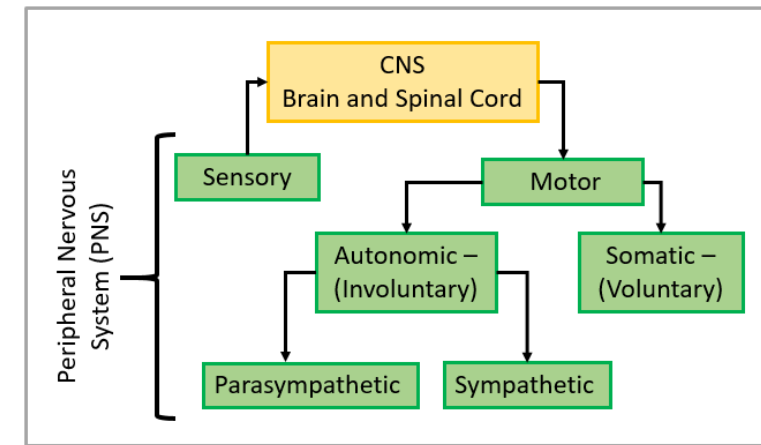
- Specialised cells within epithelium of tongue send signals via facial nerve and other fibres



Learning Aim: Briefly describe how the sense organs receive information and pass it via the sensory PNS to the CNS

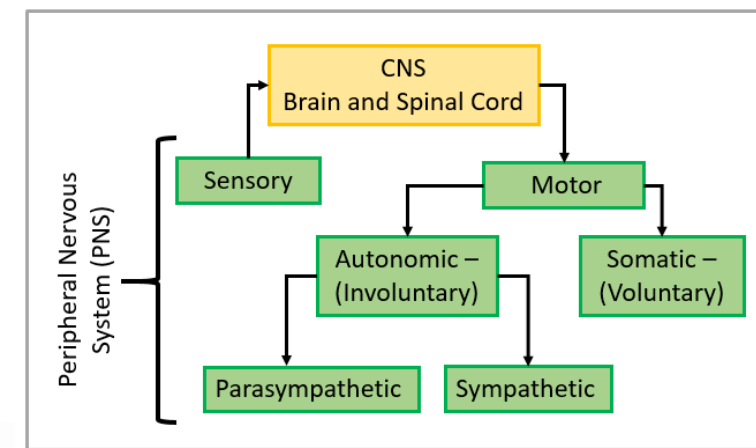
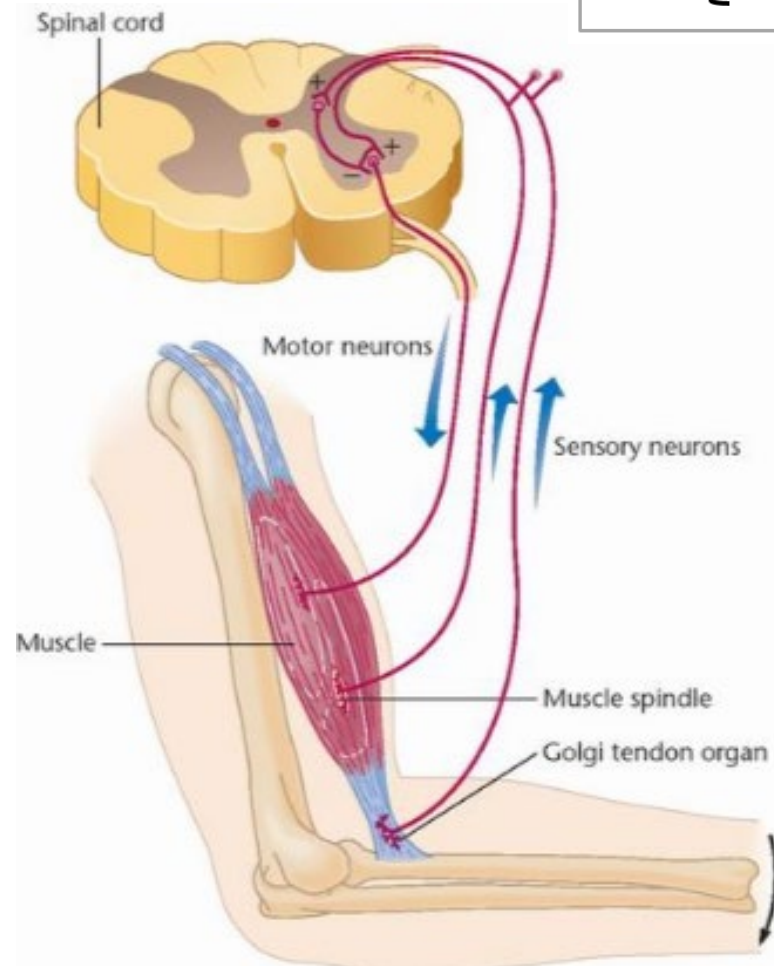
Senses and receptors

- Touch
 - Specialised cells in the skin
 - Heat (thermoreceptors)
 - light pressure
 - pain
 - cold
 - strong pressure
 - Send signals via sensory nerves to the CNS



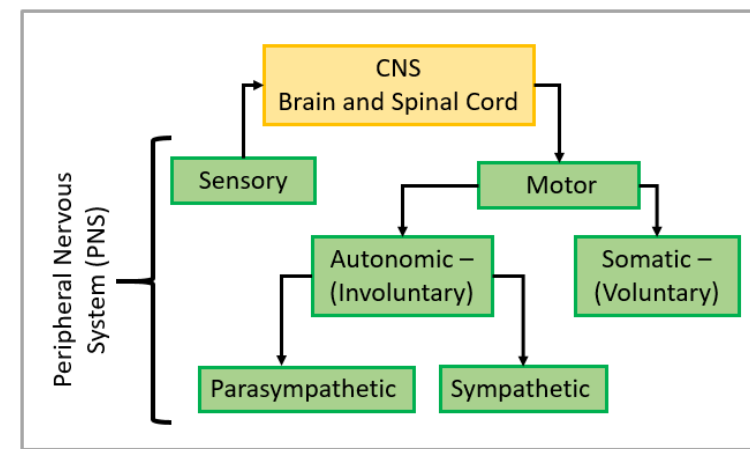
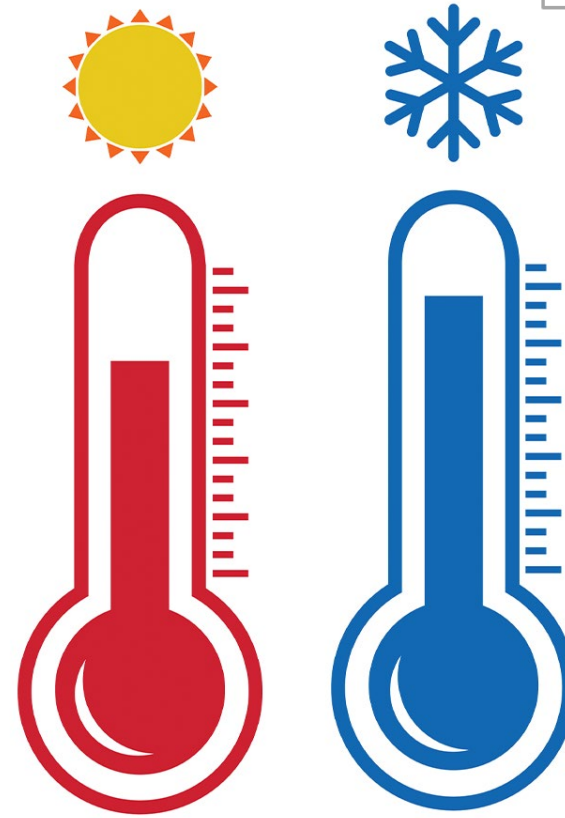
Senses and Receptors

- Proprioception
 - Receptors located in muscles and joints provide information about body positioning



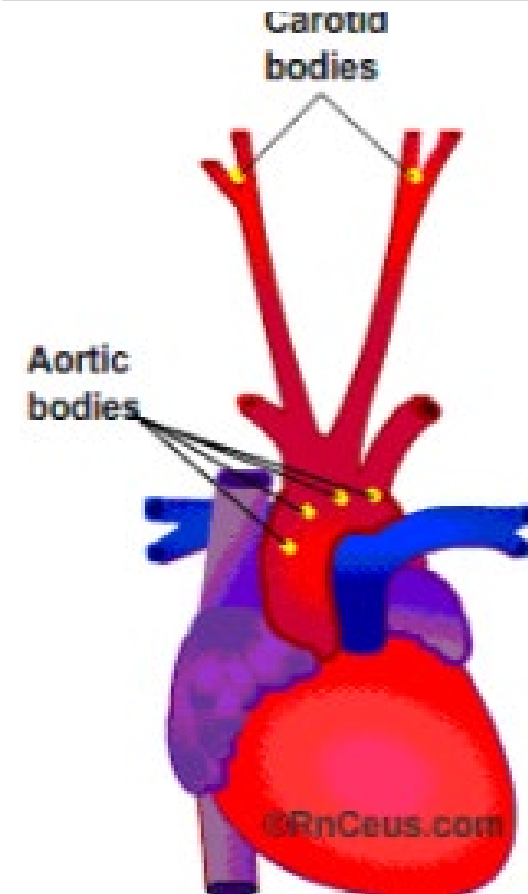
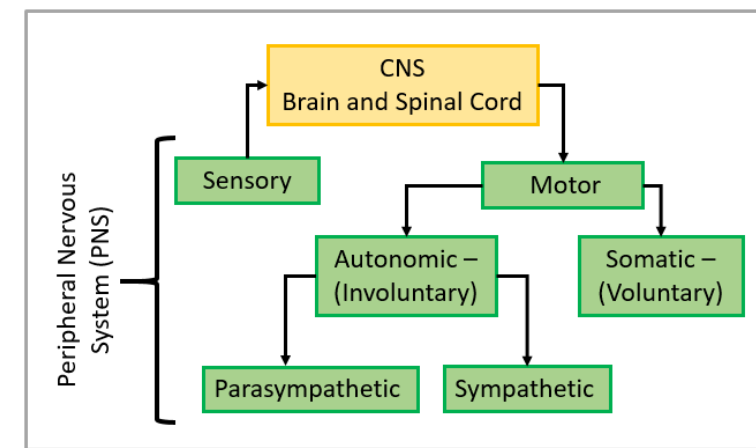
Types of receptors:

- Thermoreceptors
 - Detect heat and cold
 - Found in skin (detect surface temp)
 - Found in hypothalamus (detect temp of blood – core temp)
 - Information sent to CNS:
 - Hypothalamus regulates temperature
 - Brain: conscious perception of temperature



Types of receptors:

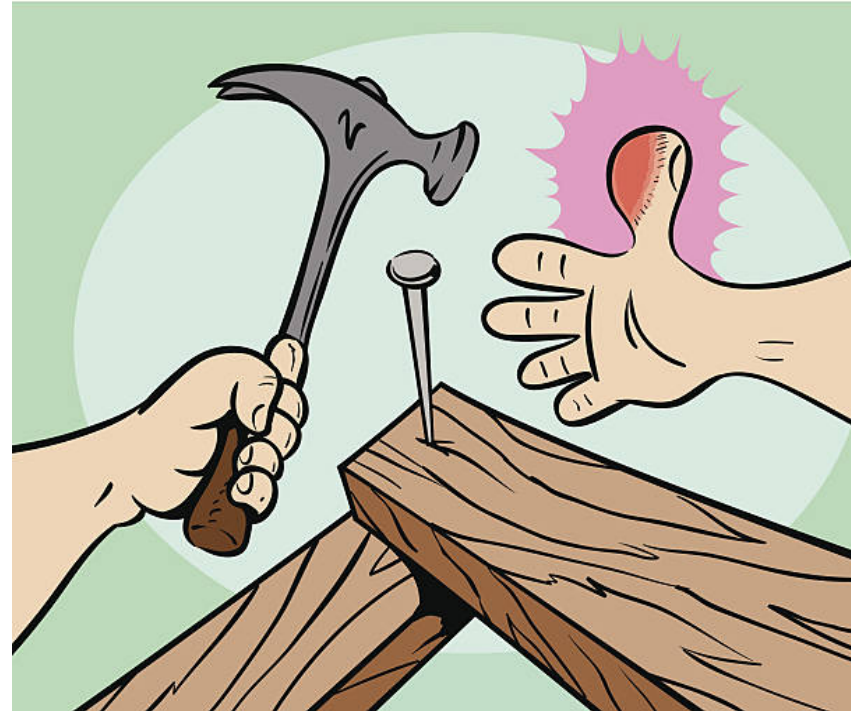
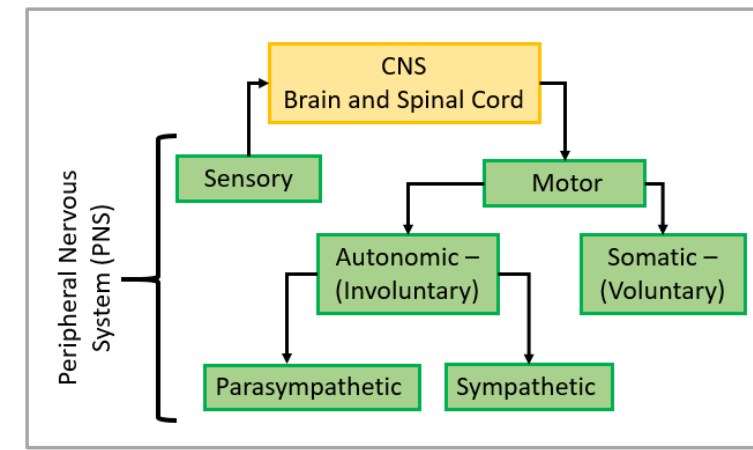
- Osmoreceptors
 - In hypothalamus
 - Detect osmotic pressure (related to ion concentration), monitoring water homeostasis
- Chemoreceptors
 - Different types of chemoreceptors
 - Stimulated by particular chemicals
 - In nose and mouth – smell and taste
 - In blood vessels (aorta and carotids): detect blood pH, O_2 and CO_2 concentration.
- Baroreceptors
 - Detect Blood Pressure
 - In carotids and aortic arch



Learning Aim: List different sensors in the body, where they are located and what they sense.

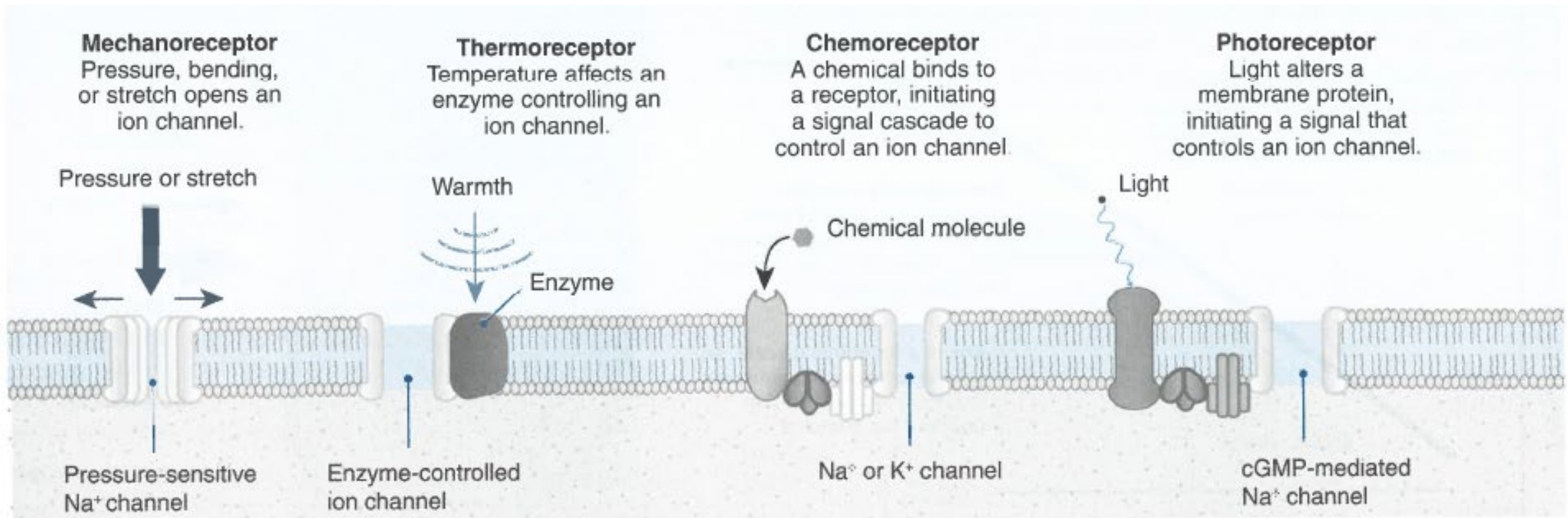
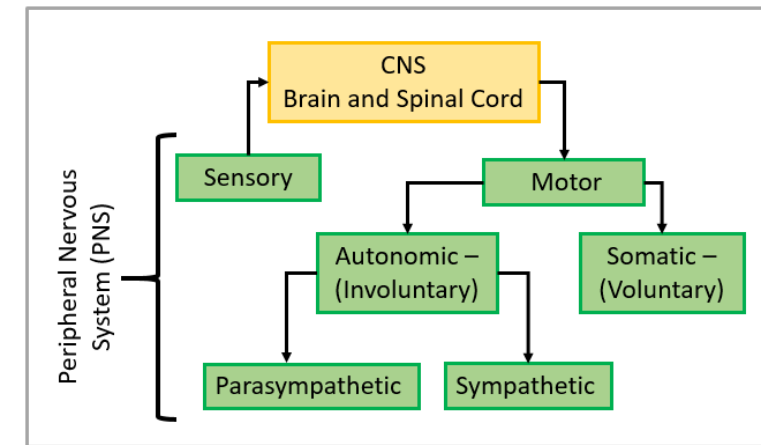
Types of receptors:

- Pain receptors (nociceptors)
 - In almost all organs
 - Many in skin and mucous membranes
 - None in brain
- Stimulated by tissue damage, or risk of tissue damage, and carry signals to brain.



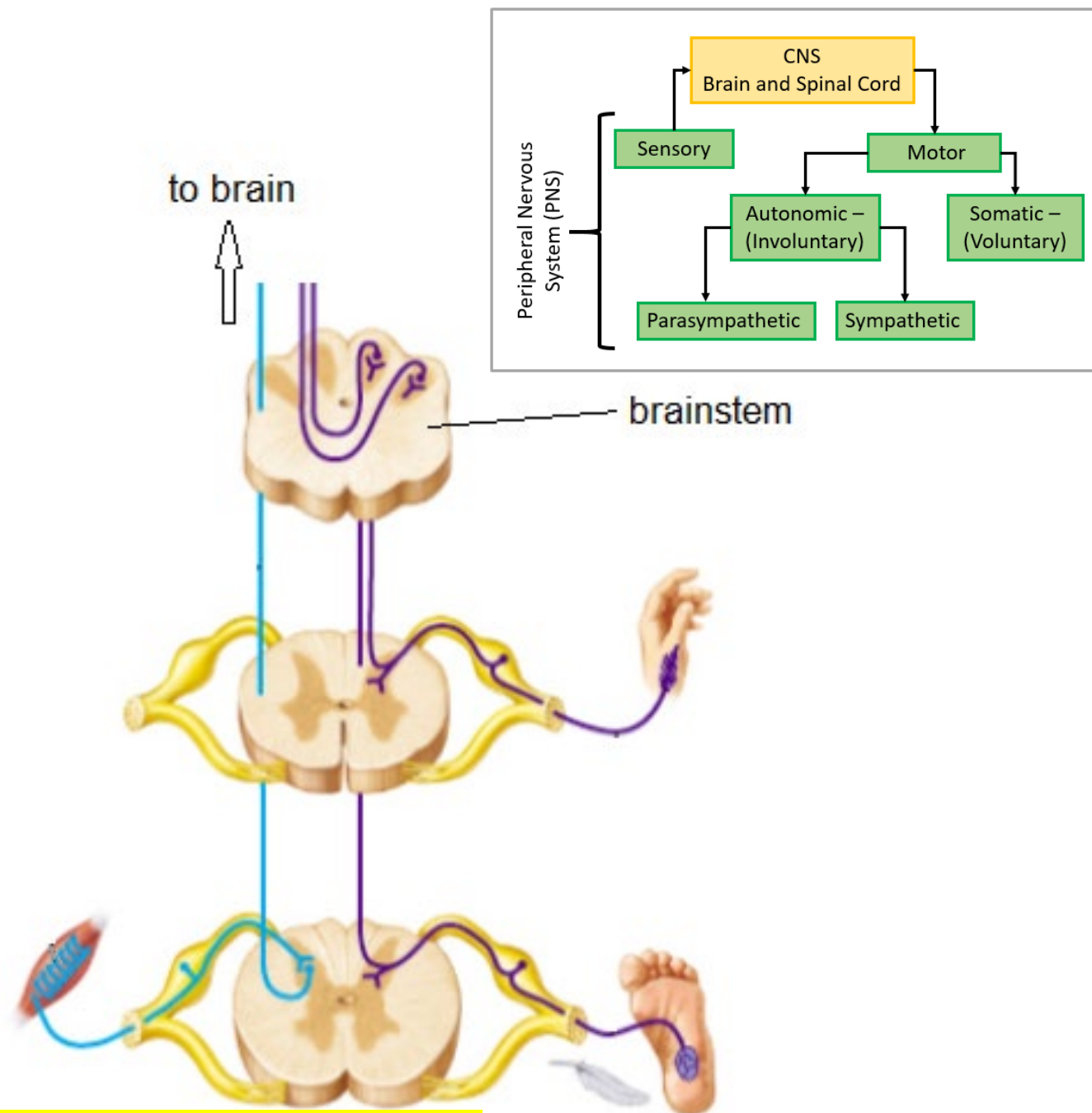
Learning Aim: List different sensors in the body, where they are located and what they sense.

Some examples of how receptors work at a membrane level...



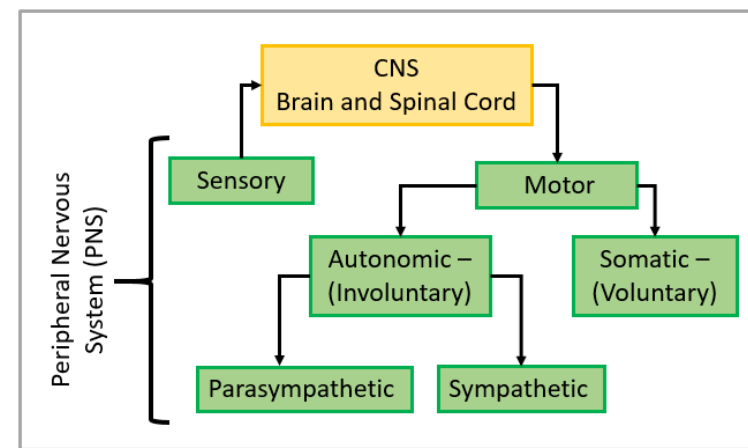
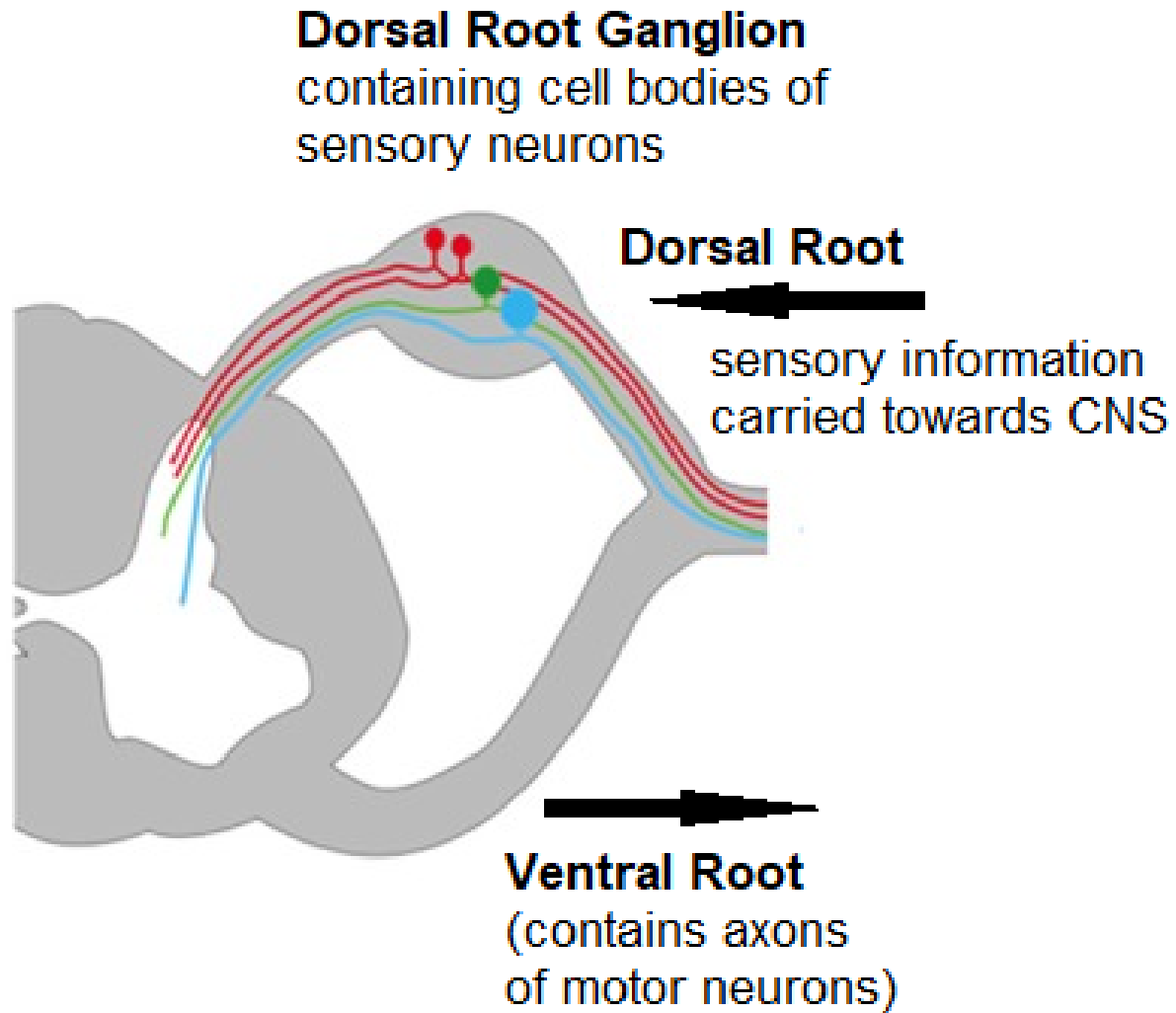
Sensory neurons

- Stimulated by sense organs/receptors
- Bundled into nerves
 - Some nerves contain only sensory fibres
 - Other (mixed) nerves contain some sensory fibres, but also motor fibres
- Carry signals to spinal cord (spinal nerves) or base of brain (cranial nerves)
 - Sensory neurons enter via dorsal root of spinal cord
 - Cell bodies of sensory neurons are located in dorsal root ganglion
- Spinal cord relays information to brain
- Information provided about body's current state and functions



Learning Aim: Describe the organisation of sensory neurons and their pathway into the spinal cord.

Sensory neurons



Learning Aim: Describe the organisation of sensory neurons and their pathway into the spinal cord.