The Nervous System

- The Nervous System is the master controlling and communicating system of the body.
- The Nervous System CONTROLS and COORDINATES ALL ESSENTIAL FUNCTIONS of the Human Body.
Function of the nervous system

**SENSORY FUNCTION:** Nervous system uses its millions of sensory to monitor changes occurring both inside and outside of the body. Those changes are called STIMULI, and the gathered information is called SENSORY INPUT.

**INTEGRATIVE FUNCTION:** The nervous system process and interprets the sensory input and makes decisions about what should be done at each moment—a process called INTEGRATION.

**MOTOR FUNCTION:** The nervous system then sends information to muscles, glands, and organs (effectors) so they can respond correctly, such as muscular or glandular secretions.
WHAT PARTS DO YOU KNOW THAT ARE IN THE NERVOUS SYSTEM?

• Brain
• Spinal Cord
• Peripheral Nerves
Central Nervous System (CNS)

• Contains the nerves of the brain and spinal cord
  - Function = coordinating center of incoming/outgoing information

• master of control and communication system of body
• Controls and coordinates all essential functions
How are neurons connected?

• Synapses!!
Types of Neurons

- **Sensory neurons**
  - Carry nerve impulses from a receptor to the CNS
  - Have long dendrites and short axons

- **Motor neurons**
  - Carry nerve impulses from the CNS to an effector (ex. muscle or gland)
  - Have short dendrites and long axons

- **Interneurons**
  - Found completely within the CNS
  - Provide a link within the CNS between sensory neurons and motor neurons
  - Have short dendrites and long or short axons
WHAT ARE NERVE CELLS?

- Neurons are similar to other cells in the body
  - Surrounded by cell membrane
  - Have a nucleus that contains genes
  - Contain cytoplasm, mitochondria and other organelles
  - Carry out basic cellular processes such as protein synthesis and ATP production
- Neurons are different by
  - Specialized extensions called dendrites and axons
  - Communicate with each other by electrochemical process
  - Contain some specialized structures (synapses) and chemicals (neurotransmitters)
Basic nerve cell structure
3 main types of nerve cells

- Sensory neurone
- Relay neurone
- Motor neurone
Sensory neurons

Carries impulses from receptors e.g. pain receptors in skin to the CNS (brain or spinal cord)
Relay neuron

Carries impulses from sensory nerves to motor nerves.
Motor neuron

Carries impulses from CNS to effector e.g. muscle to bring about movement or gland to bring about secretion of hormone e.g. ADH
Transmission of signals
Neurons

- Most neurons consist of a **cell body** and extensions called **dendrites** and **axons**.
- Cell Body contains the **nucleus**
- Dendrites carry impulses towards cell body
- Axons carry impulses away from the cell body
1. Vesicle with neurotransmitters inside

2. Vesicle fuses with membrane (exocytosis)

3. Neurotransmitters released into synapse

4. Neurotransmitter diffuses across synapse and binds with receptor on dendrite
The environment is everything outside the body.

The sense organs gather information from outside the body, then send the messages to the brain.
What do you think can change neurons and their connections?

- Accidents
- Drugs
- Alcohol
- Disease
Alcohol damages dendrites - can repair after abstinence

Alcohol blocks receptors and slows down transmission