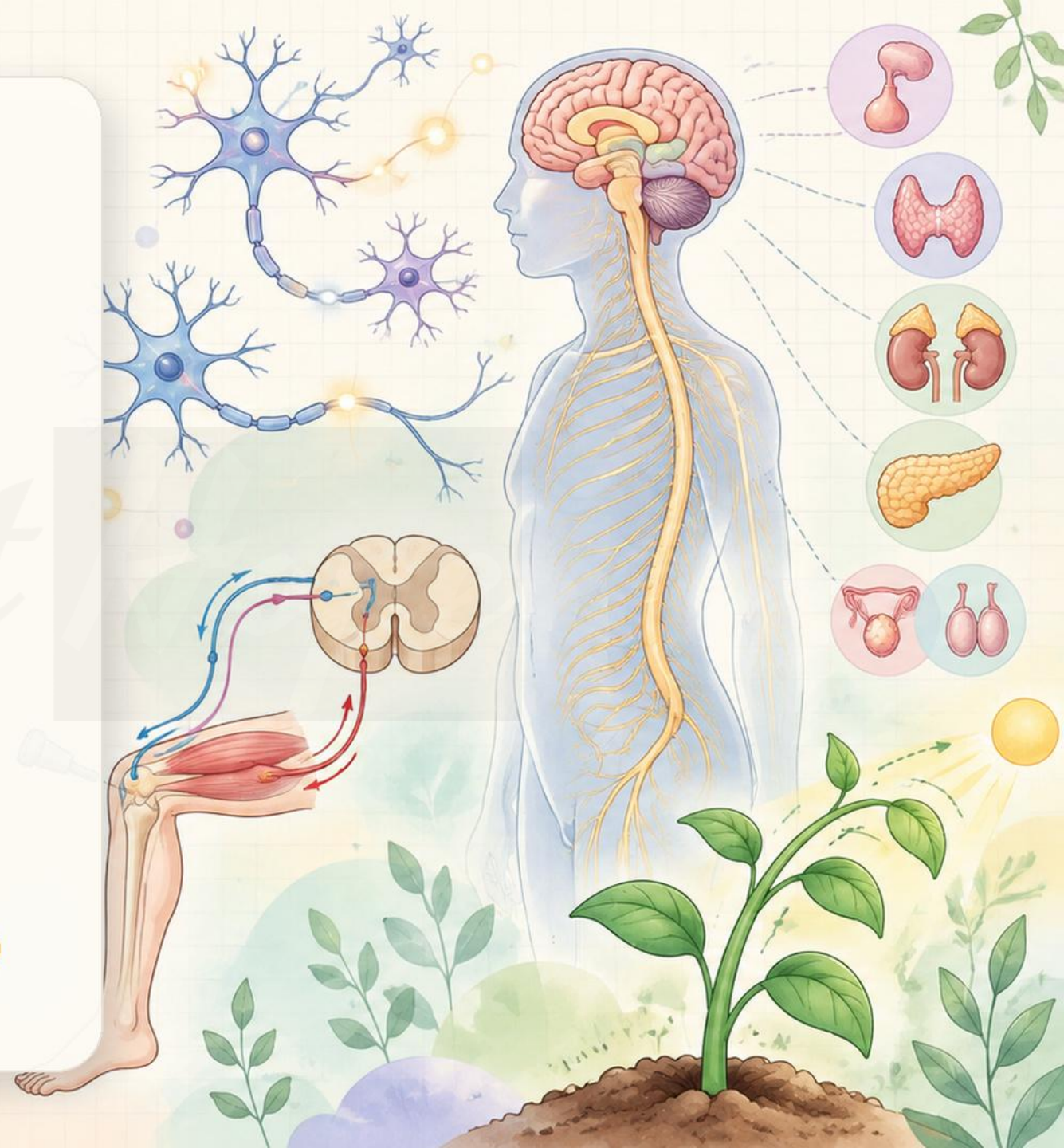


SCIENCE • CLASS 10

CHAPTER 6

Control and Coordination

CHAPTER NOTES



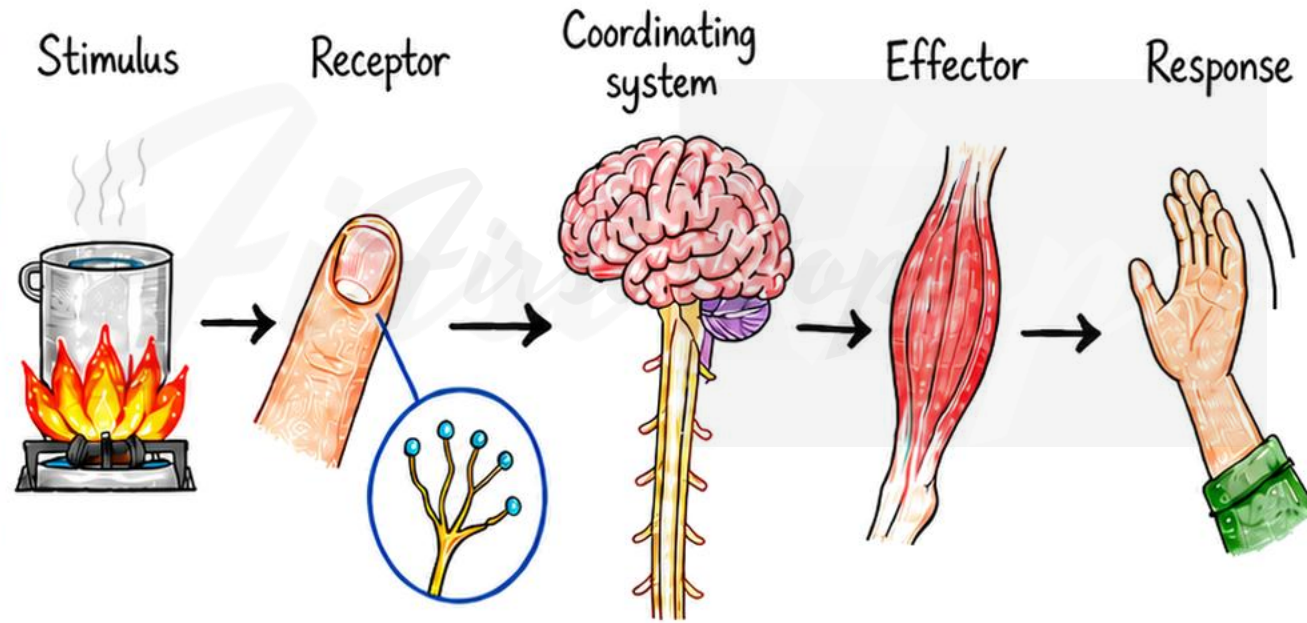
CONTROL AND COORDINATION

Living organisms detect changes and make suitable responses.

WHY IT IS NEEDED

- Stimulus = a change in the surroundings or inside the body
- Response = the action produced after detecting a stimulus
- The response must match the stimulus.
- Multicellular organisms use specialised systems to control and coordinate activities.

BASIC RESPONSE PATHWAY



TWO KINDS OF MOVEMENT

- **Growth movement**: germinating seedling pushes through soil.



- **Non-growth movement**: a child runs or a buffalo chews.



- **Animals**: nervous tissue + hormones + muscles/glands
- **Plants**: no nerves or muscles, but responses are still coordinated.



KEY IDEA: Control and coordination connect detection with the correct action.

NEURON: STRUCTURE AND NERVE IMPULSE

A neuron is a nerve cell specialised to transmit information.

RECEPTORS

Receptor = a specialised sensory ending or cell that detects a stimulus.



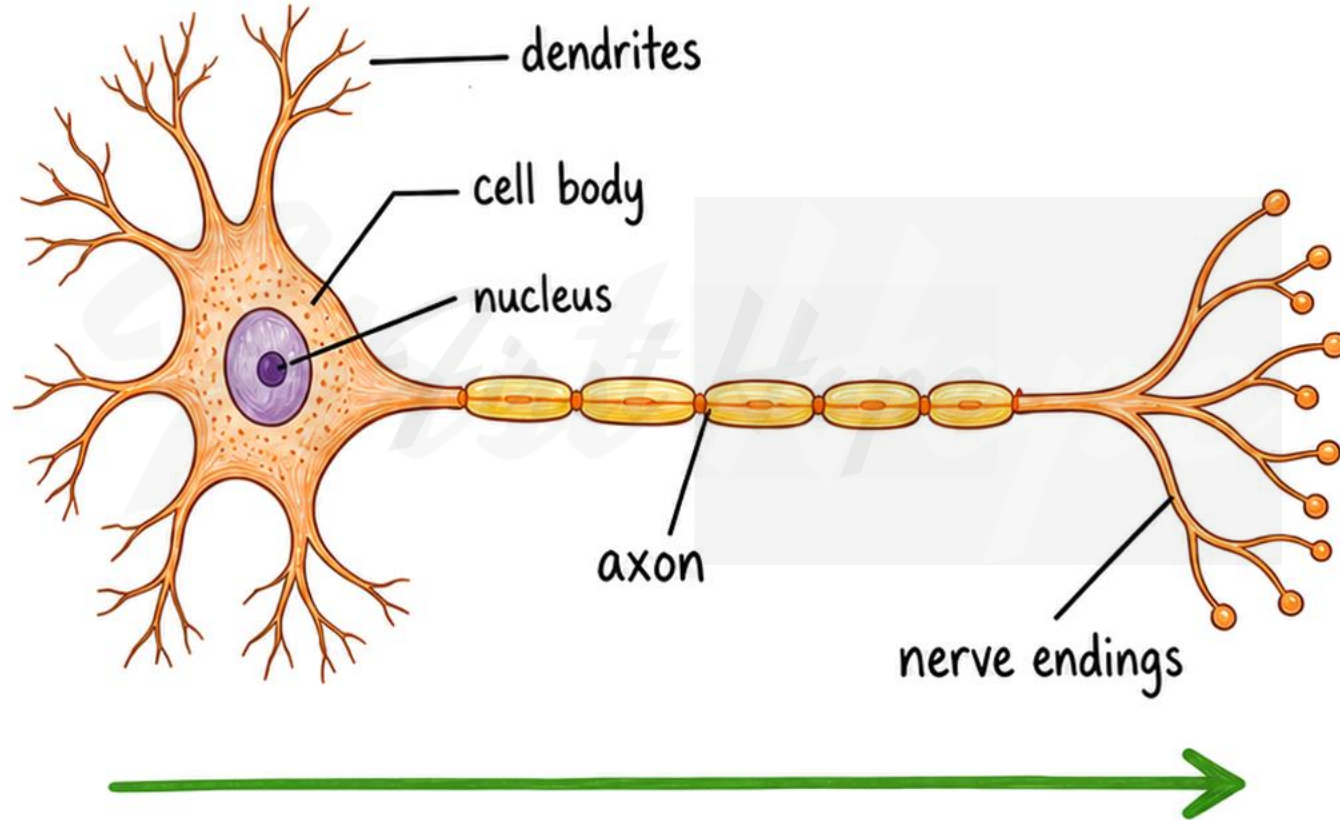
Gustatory receptors detect taste.



Olfactory receptors detect smell.



Sense organs also detect light, sound, touch and temperature.



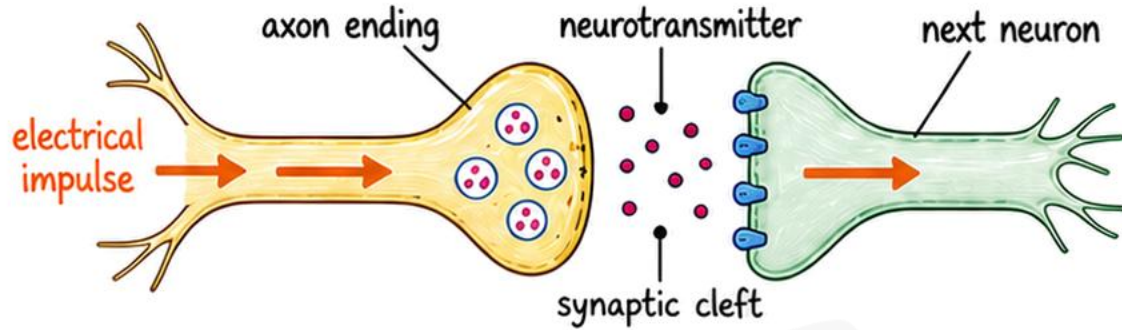
IMPULSE DIRECTION

- ① Dendrites receive information.
- ② The cell body passes it onward.
- ③ An electrical impulse travels along the axon.
- ④ The impulse reaches the nerve endings.

KEY IDEA: Dendrites receive; the axon carries; nerve endings pass the message onward.

SYNAPSE AND NEUROMUSCULAR JUNCTION

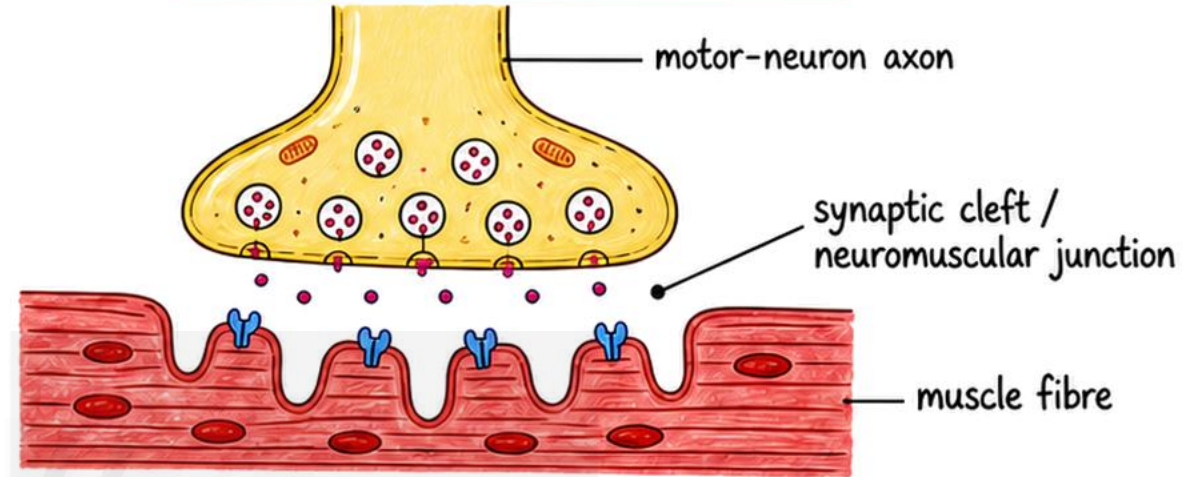
AT A SYNAPSE



1. Electrical impulse reaches the axon ending.
2. Neurotransmitter is released.
3. It diffuses across the synaptic cleft.
4. It starts a new electrical signal in the next cell.

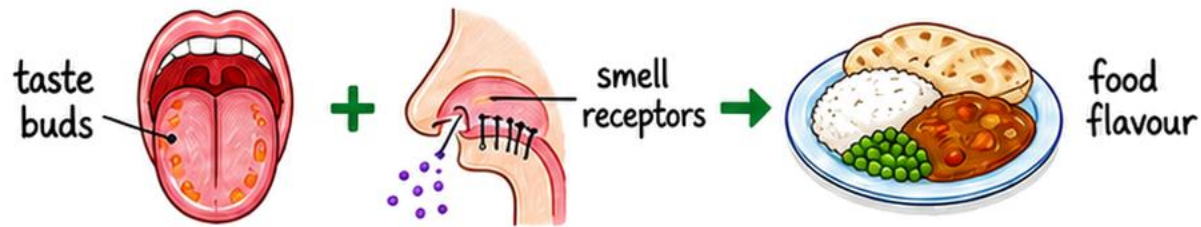
electrical signal → chemical signal → electrical signal

NEUROMUSCULAR JUNCTION



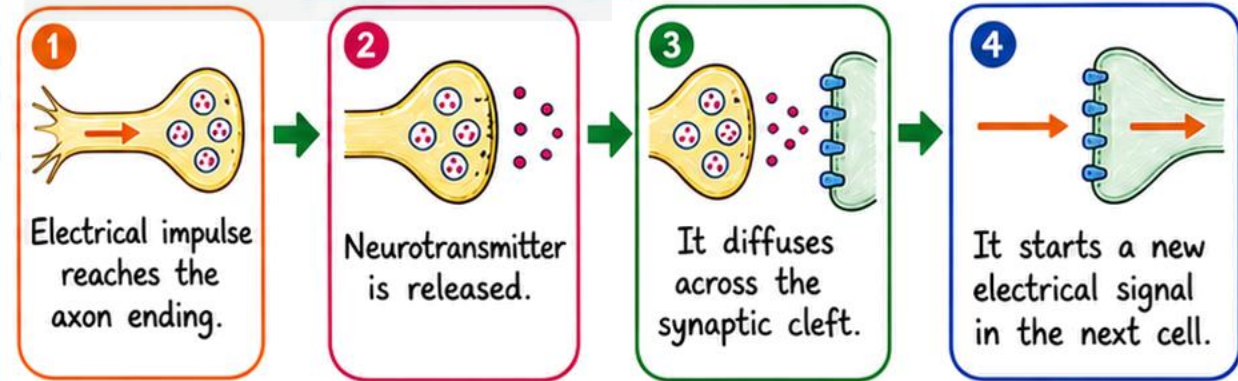
A synapse can pass the message from a neuron to an effector such as a muscle.

TASTE + SMELL = FLAVOUR



- Basic taste such as sweetness is still detected, but the full flavour becomes weaker.

KEY SEQUENCE



KEY IDEA: Synapses convert an electrical message to a chemical message and back to an electrical one.

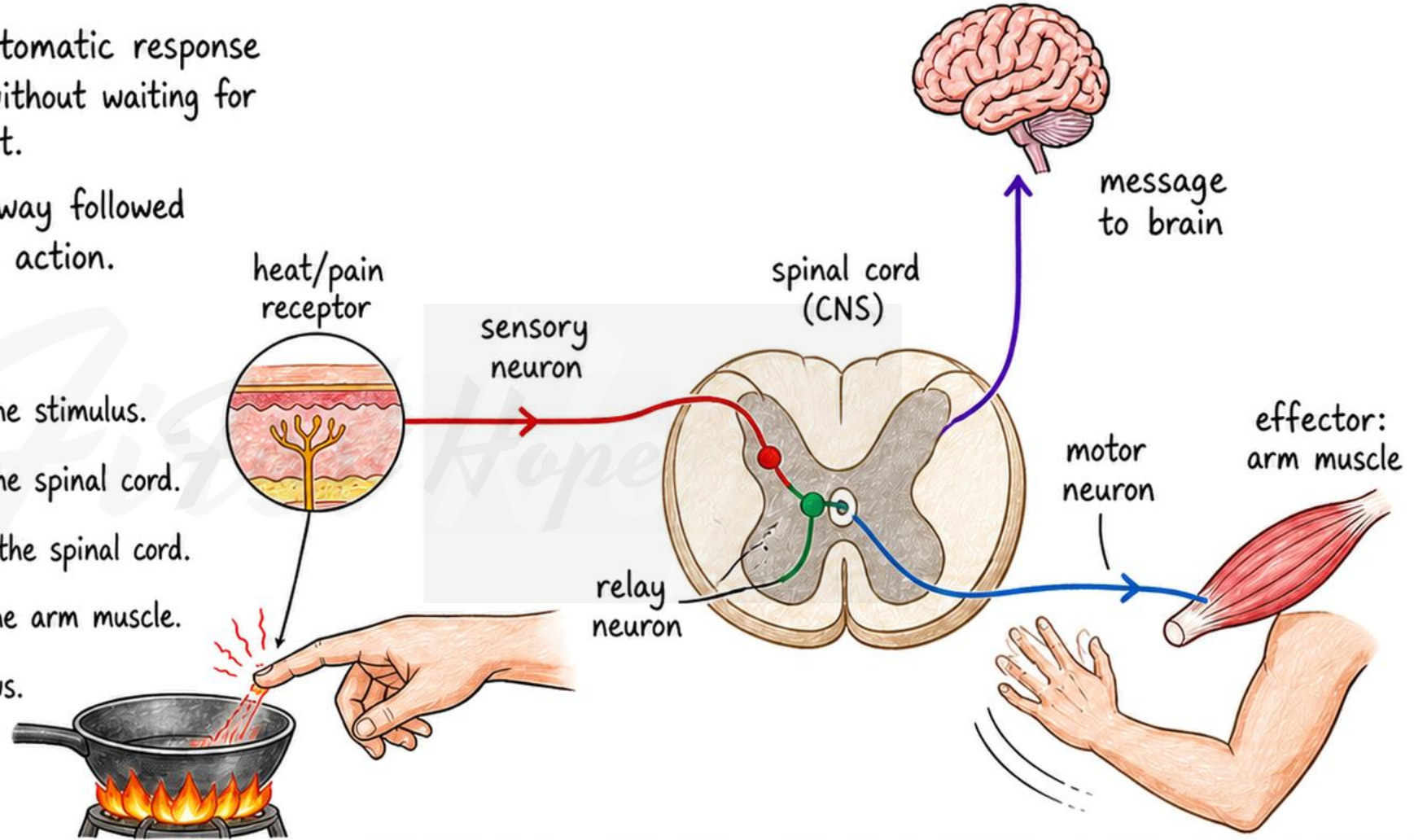
REFLEX ACTION AND REFLEX ARC

REFLEX ACTION = a rapid, automatic response to a stimulus, without waiting for conscious thought.

REFLEX ARC = the neural pathway followed during a reflex action.

WITHDRAWAL REFLEX

- ① Heat or pain receptor in skin detects the stimulus.
- ② Sensory neuron carries the impulse to the spinal cord.
- ③ Relay neuron passes the impulse inside the spinal cord.
- ④ Motor neuron carries the command to the arm muscle.
- ⑤ Muscle contracts and the hand withdraws.
- ⑥ A message also travels to the brain.



KEY IDEA: The spinal reflex pathway gives a quick protective response; the brain is informed too.

* - Reflex action is automatic; voluntary action is consciously chosen.

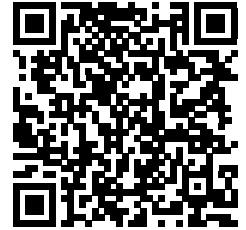


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