



The Nervous System



Need for a Nervous System

- Reaction to stimuli (stimuli can be external and internal)
- Co-ordination of the various activities of the body

Central Nervous System

- Made up of the:
 - Brain
 - Spinal Cord

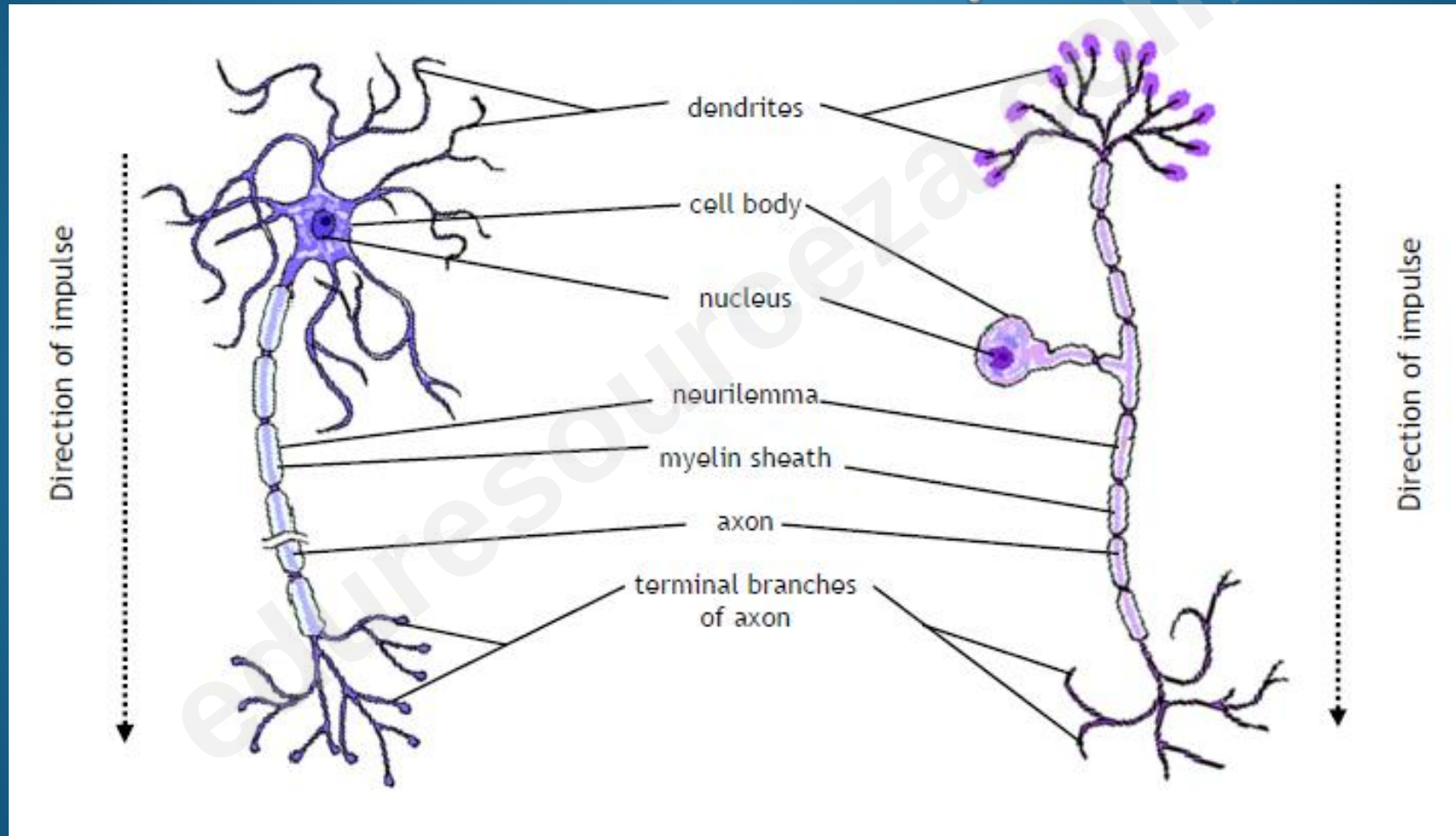
Peripheral Nervous System

- Made up of the spinal and cranial nerves
- Includes sensory neurons and motor neurons
- Enables the body to react to changes in the **external environment.**

Autonomic Nervous System

- Controls the **internal environment**.
- It controls such actions as sweating, and the heart and breathing rates.
- Made up of the:
 - Sympathetic Section
 - Initiates an action when required e.g. Increases the heartbeat
 - Parasympathetic Section
 - Slows down an action when required e.g. Decreases the heartbeat

Motor and Sensory Neuron

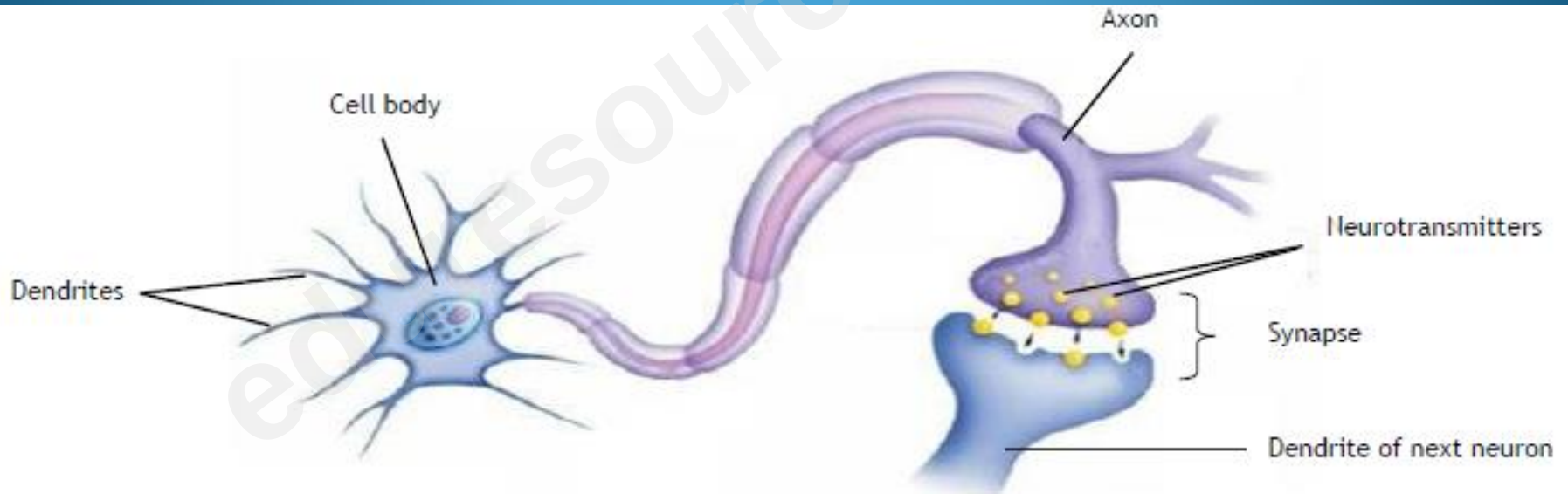


Motor neuron

Sensory neuron

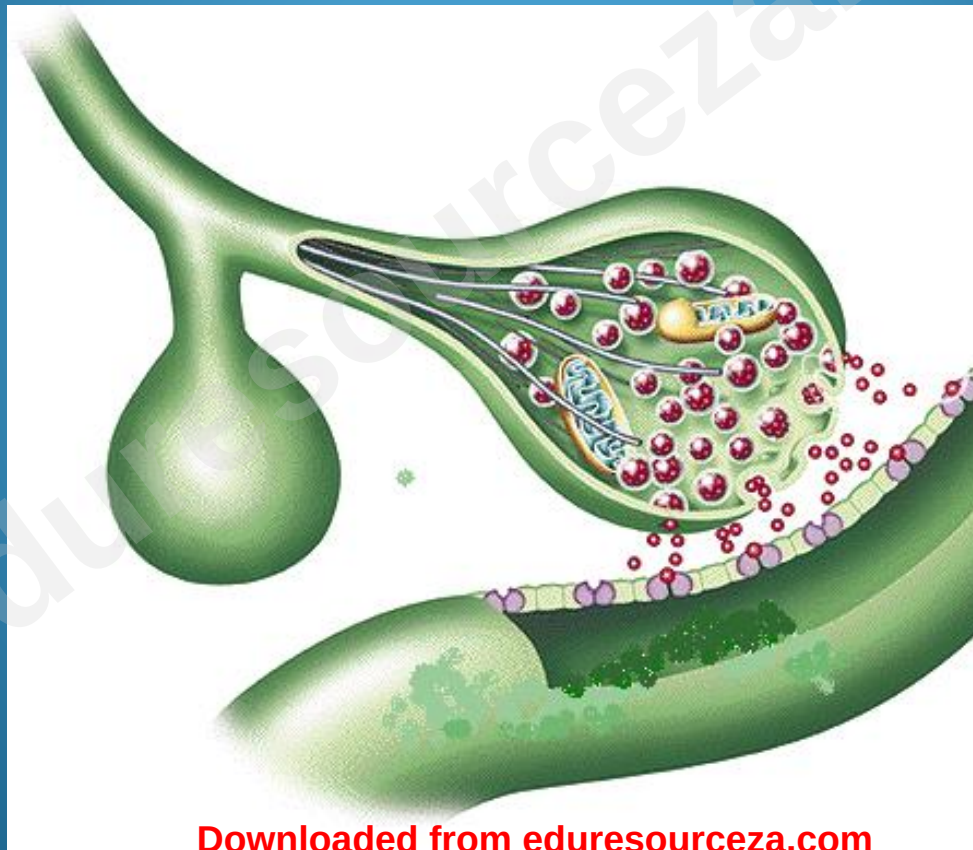
A Synapse

Microscopic gap between two neurons across which impulse travel



The Synapse

Uses neurotransmitters

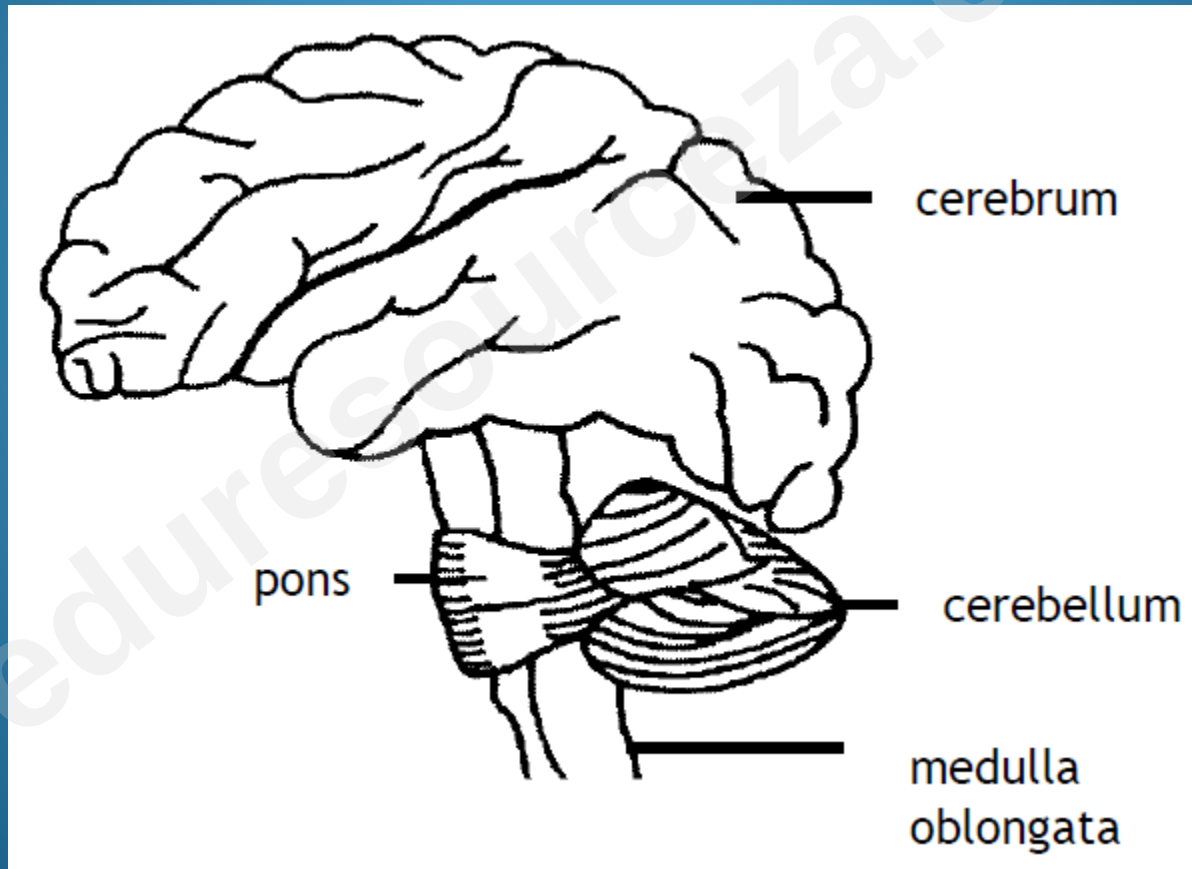


Mind the Gap

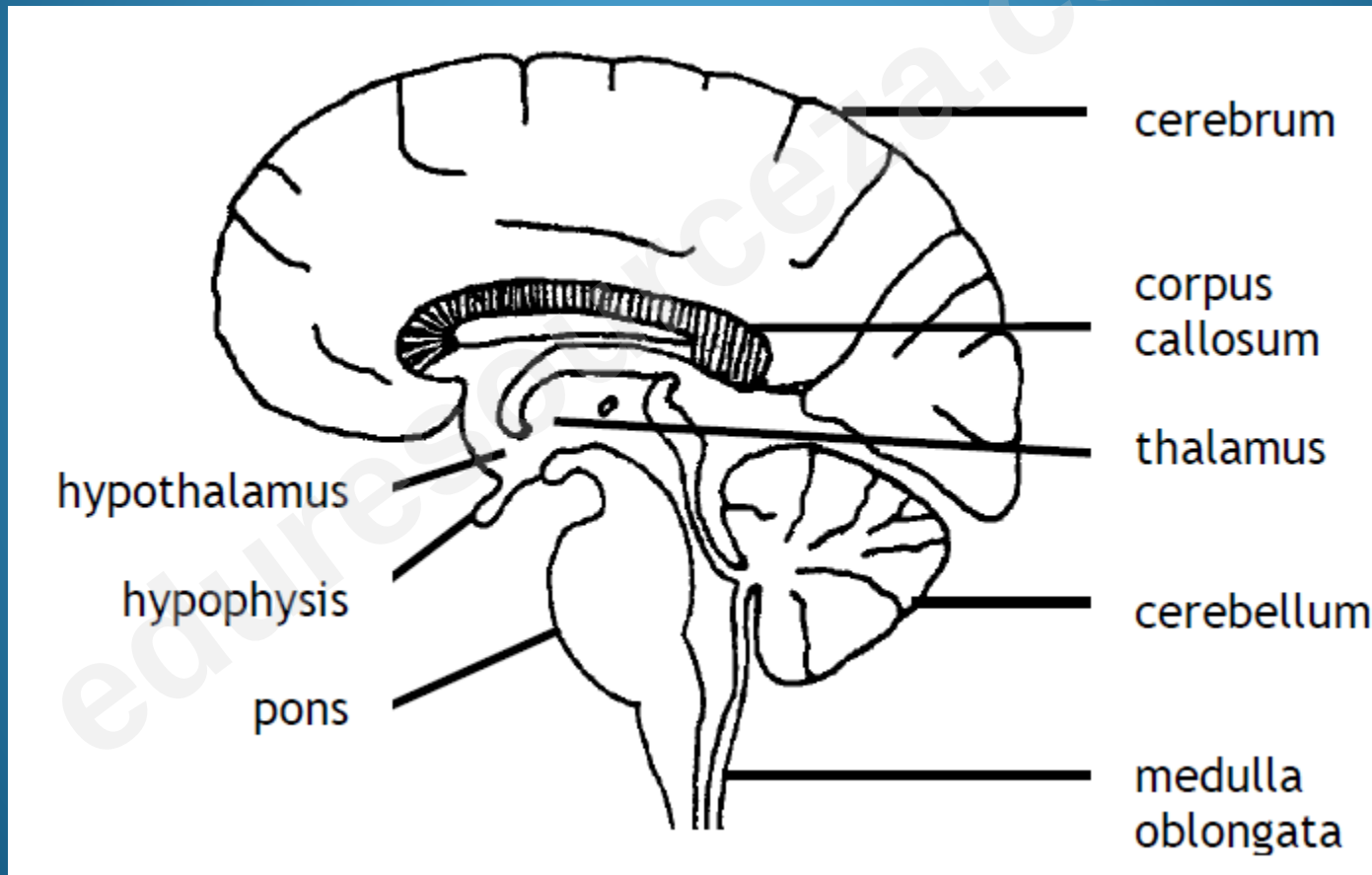
Three types of Neurons

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The Brain



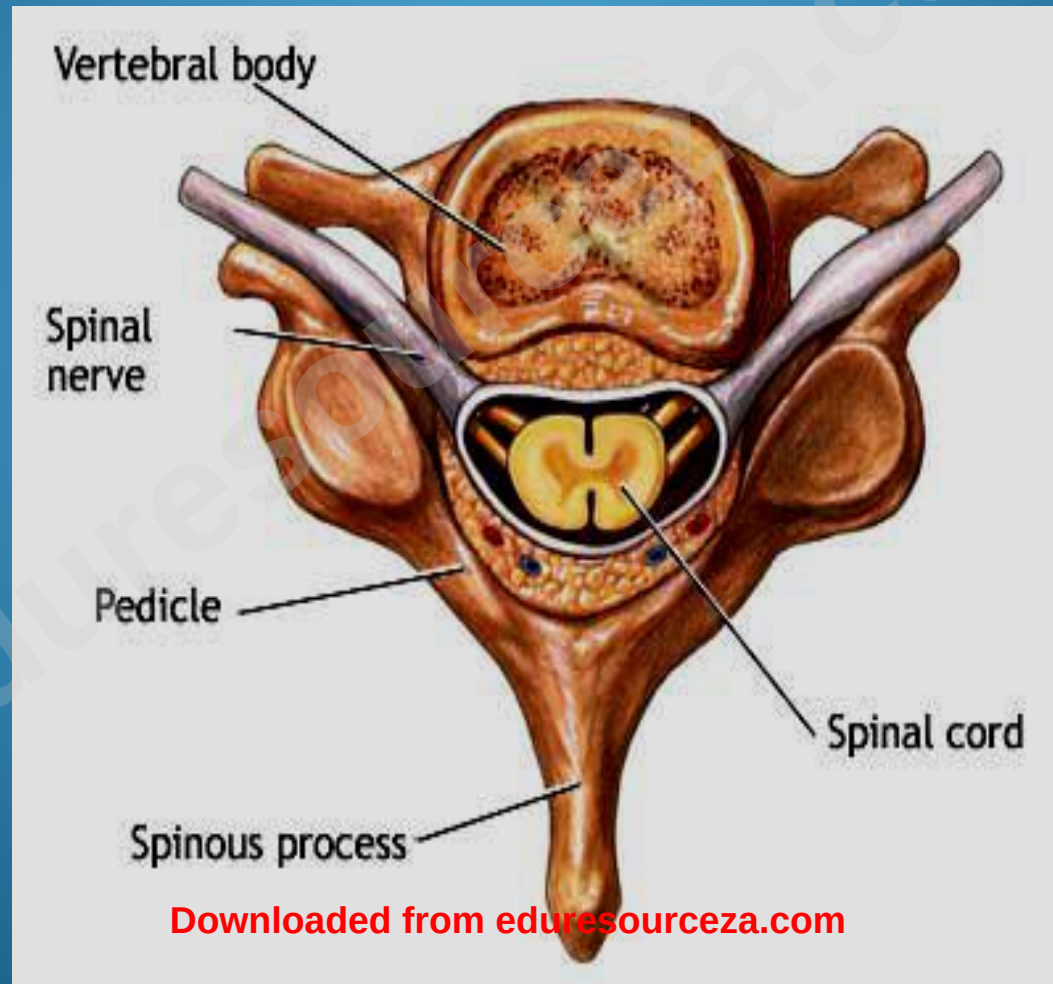
The Brain



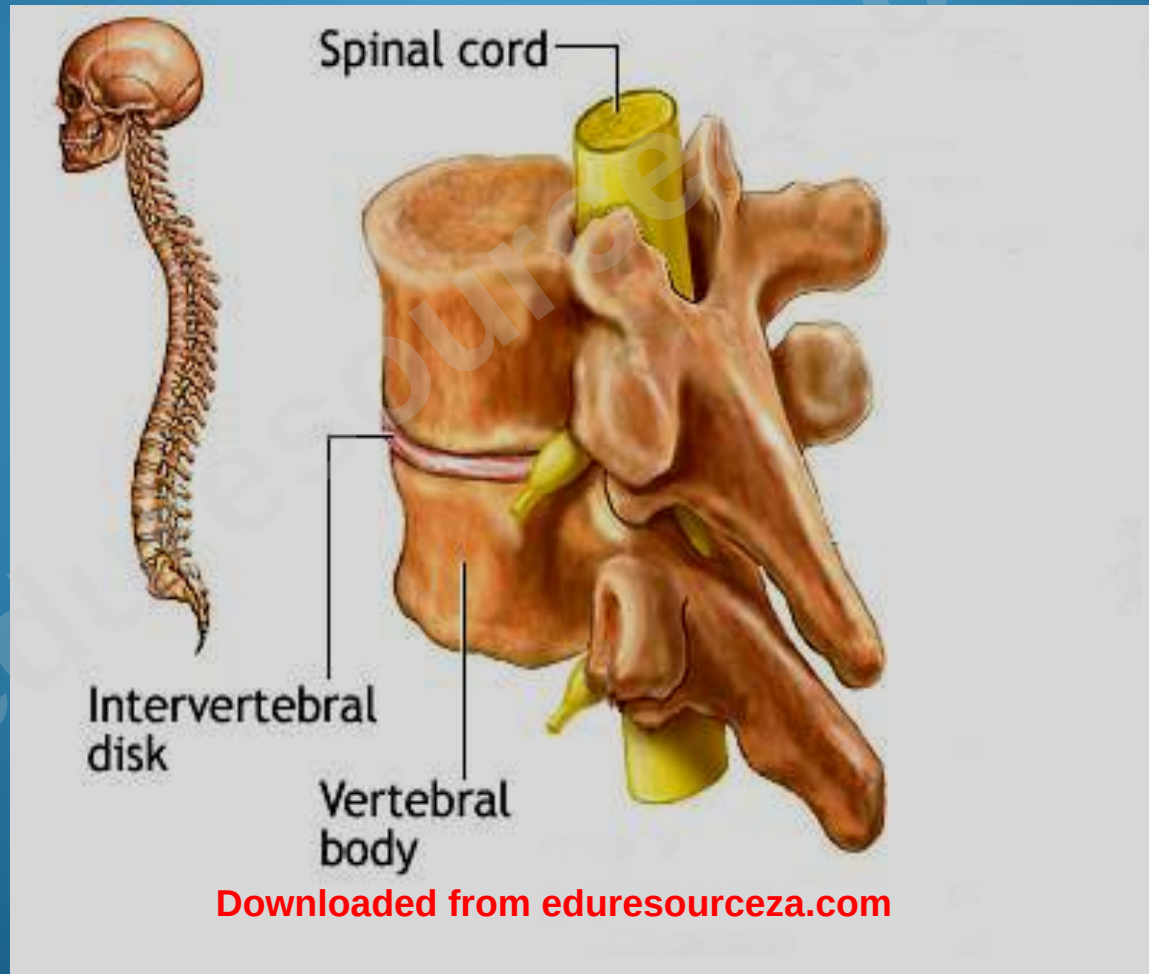
Which Part of the Brain?

- Co-ordination of voluntary movements e.g. Walking and running
 - Maintaining muscles tone, balance and equilibrium
-
- It contains the reflex centres responsible for breathing, regulation of the heart beat, dilation and constriction of blood vessels, salivation and swallowing i.e. it is responsible for all the involuntary actions.
 - It conducts impulses from the spinal cord to the higher parts of the brain, and vice versa.
 - Impulses cross-over from one side to the other as they pass through the medulla so that nerves from the left side of the brain control the right side of the body and vice versa.
-
- It controls all voluntary actions
 - It receives and interprets all sensations viz. sight, hearing, smell, taste and touch
 - It controls all the higher thought processes such as memory, judgment and reasoning

The Spinal Cord



The Spinal Cord

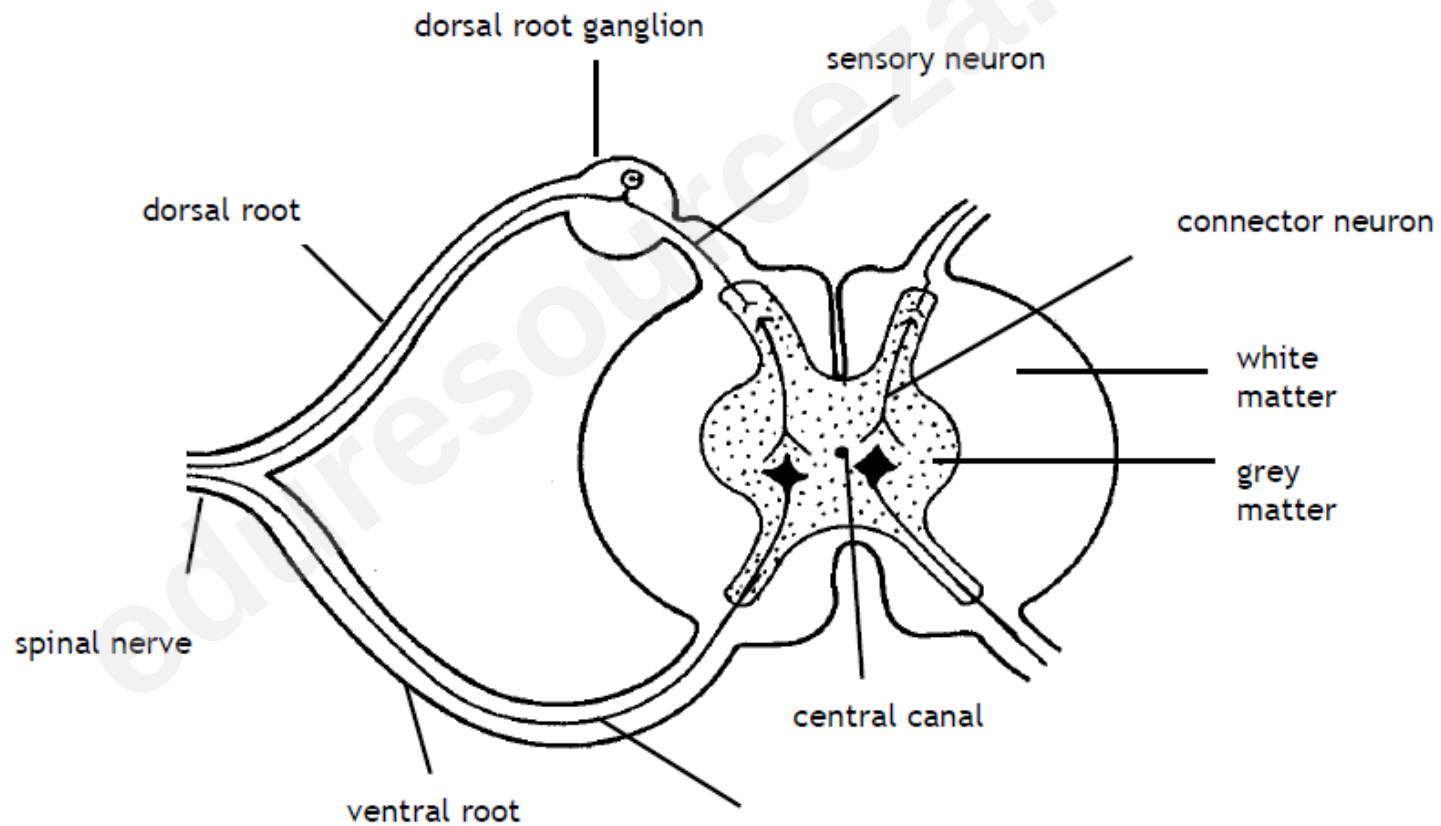


The Spinal Cord

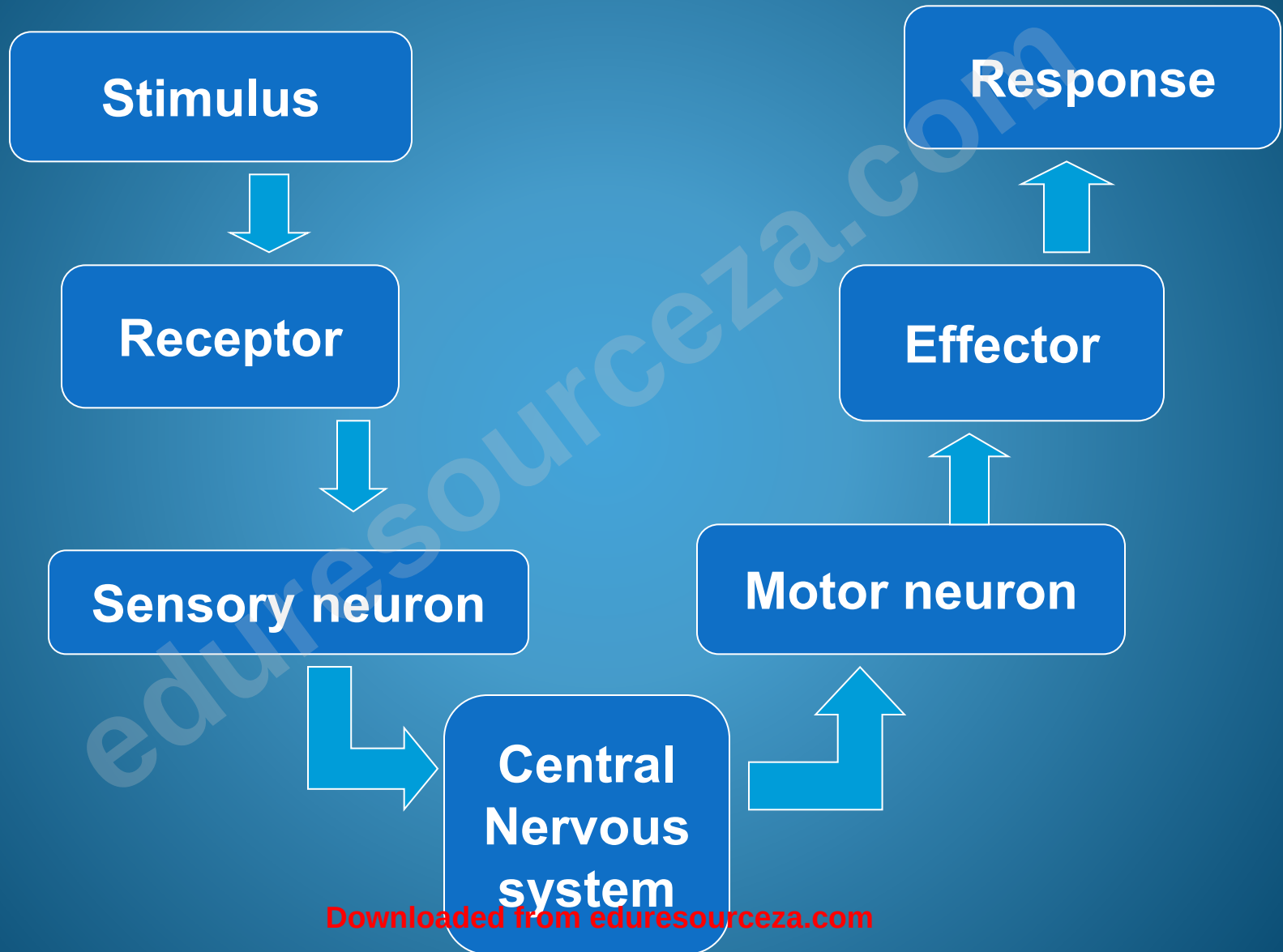
FUNCTIONS OF THE SPINAL CORD

- Relays impulses between brain and the receptors and effectors
- Serves as the centre for reflex actions e.g. blinking, sneezing, knee jerk

Spinal Cord



How does our nervous system work then?



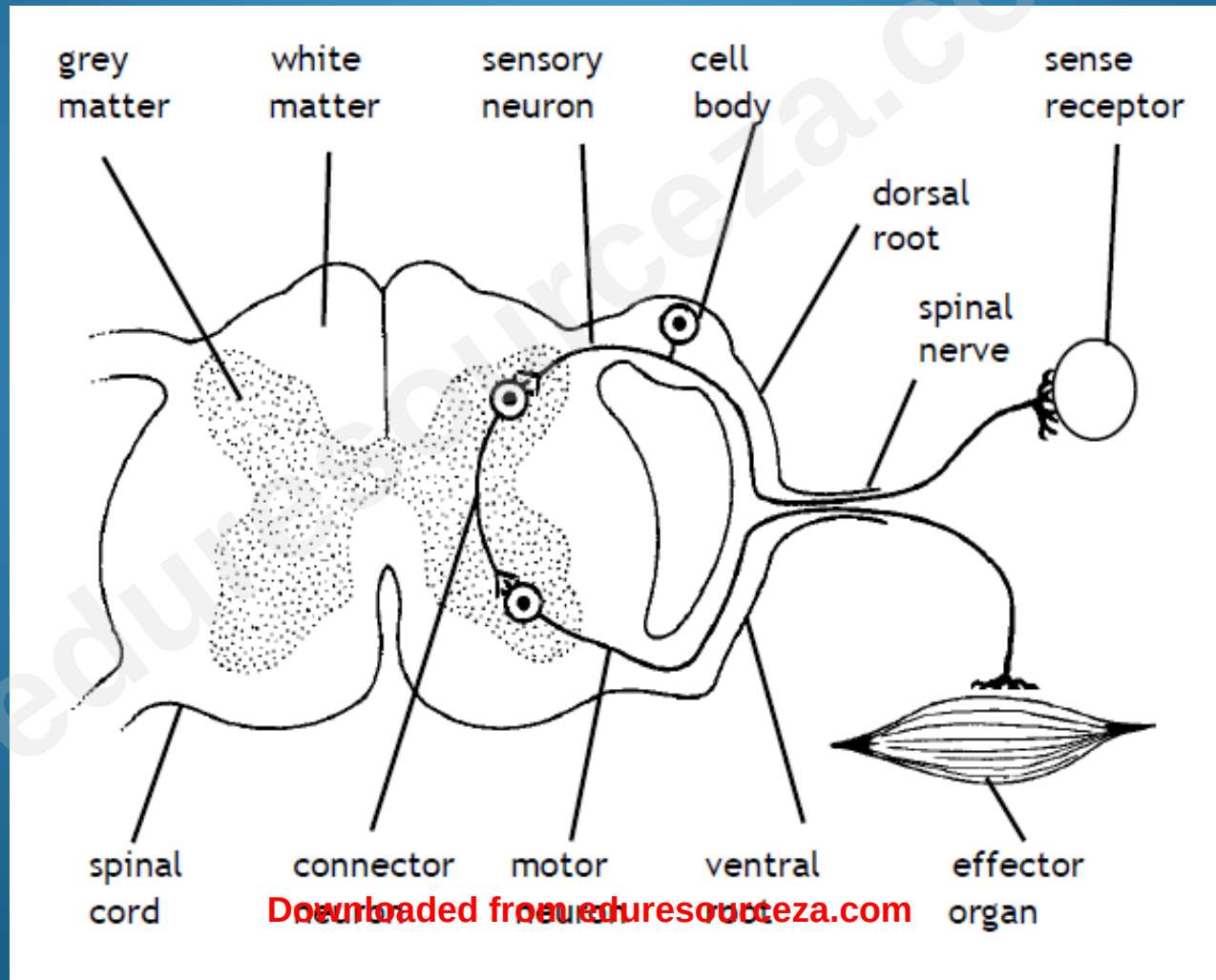
Reacting without thinking

- Sometimes a stimulus requires an immediate response.
- This is called a **reflex action**.
- It is an **involuntary** response and we do it without thinking.
- These **automatic responses** do not have to be learned.
- They can be very important in **preventing injury** to ourselves.

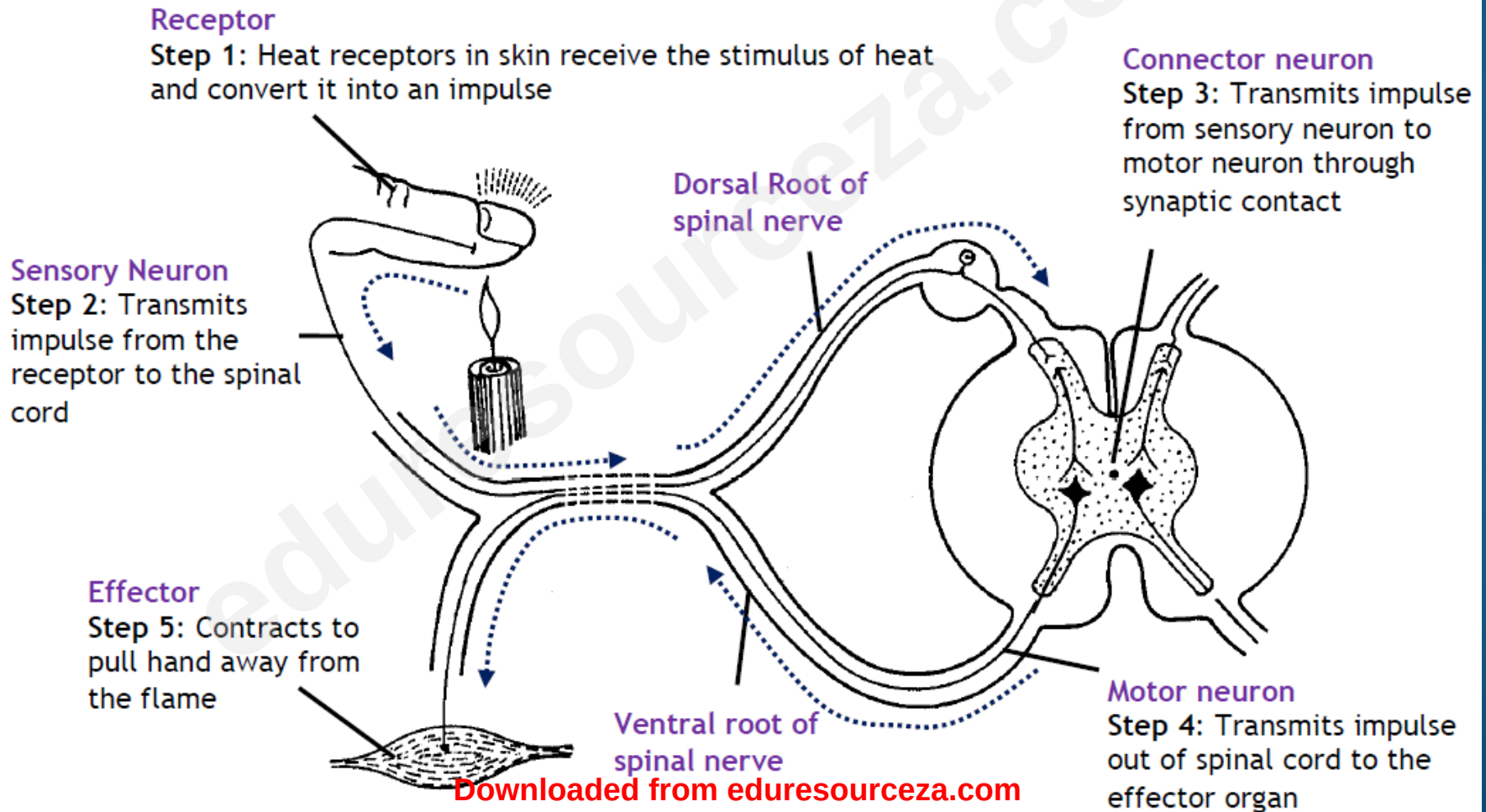
THE REFLEX ACTION AND REFLEX ARC

- Reflex action – is a rapid, automatic response to a stimulus received from a sense organ
- Reflex Arc – refers to the path taken by an impulse during a reflex action
 - Sense organ → Spinal Cord → Effector

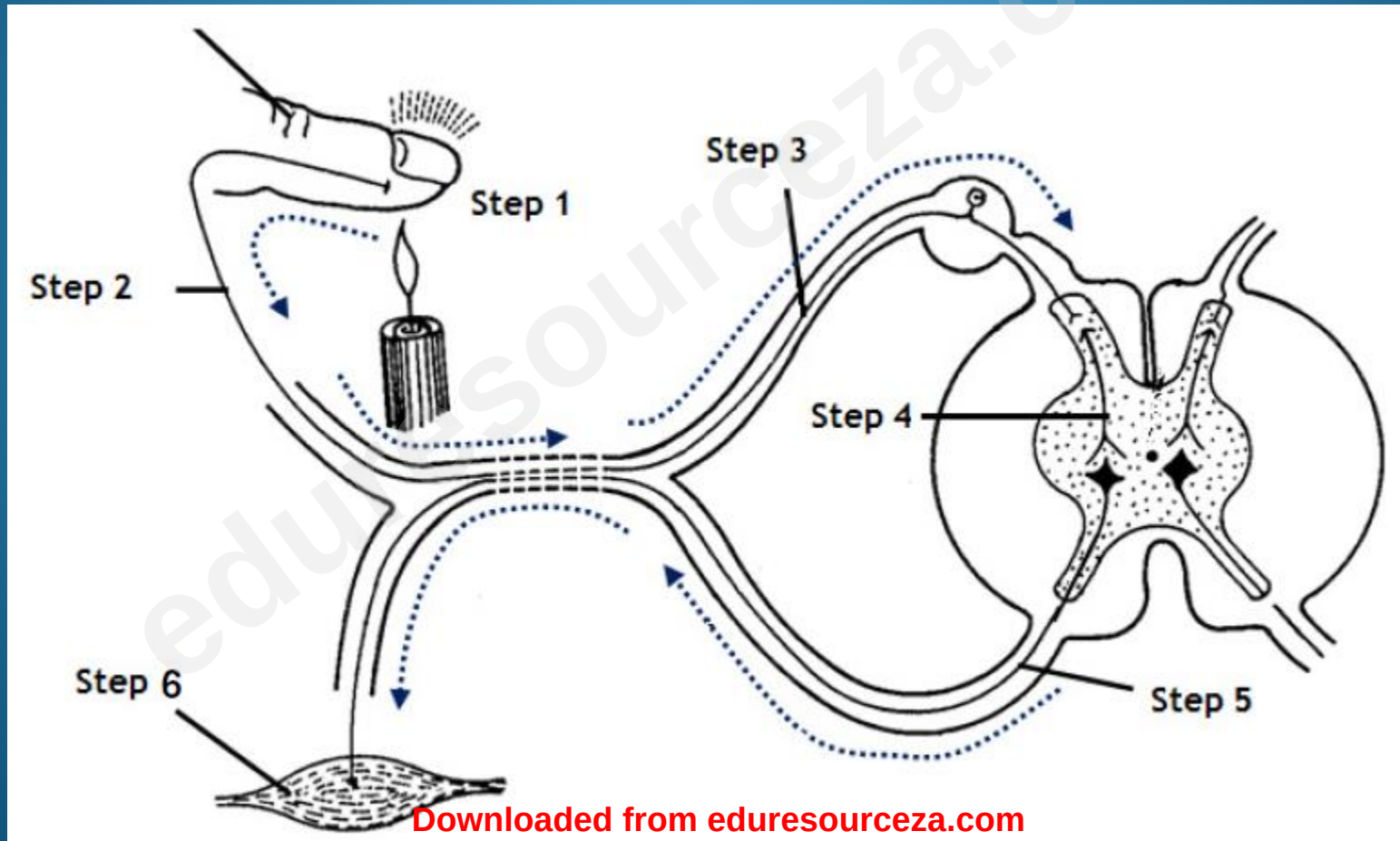
The Reflex Action



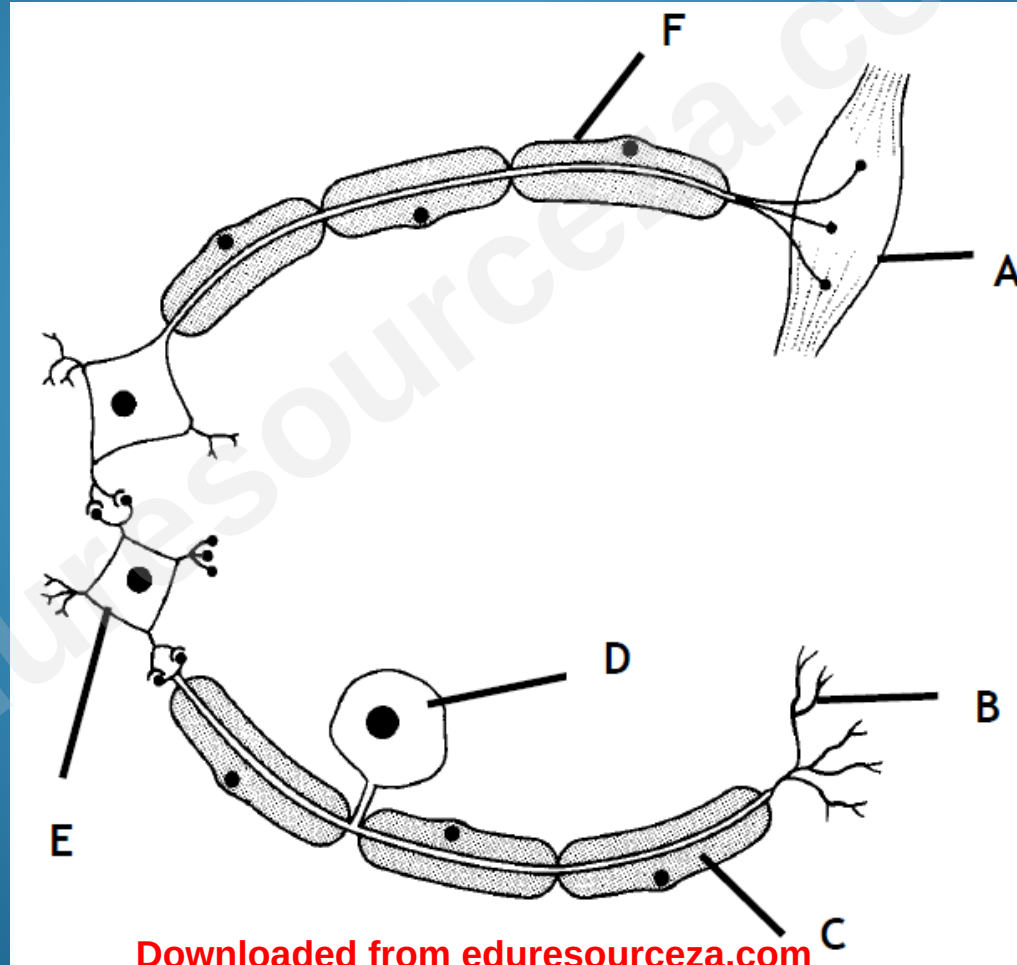
The Reflex Action



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Activity — ULS (Caps) — Page 115

1. What is a reflex arc?
2. Provide labels for the parts A and D.
3. Name the neurons represented by C, E and F respectively.
4. Name the structure that part B will attach to.
5. What is a synapse?
6. How many synapses are represented in the drawing?
7. Name the structure in which neuron E is located.
8. Name the nerve through which neurons C and F pass.

Activity — QB — Page 48-50

- Brain
- Reflex Action