



Introduction to the Nervous System

INTRODUCTION TO THE NERVOUS SYSTEM



Aim of the workbook

This workbook has been designed to direct you to key literature and electronic resources about the nervous system. It should be completed as an introduction to the structure and function of the nervous system; we will be returning to the nervous system during the course to consider it in more detail. As before, this work book has been designed to be completed electronically; if you'd like a copy that you can print out and fill in by hand, please let us know.

Learning Outcomes

On completion of this workbook, you will be able to:

- Describe the key structures and functions of the nervous system as a whole
- Be aware of the different functional classifications of the nervous systems and outline their functions.
- Describe a neurone and its function

It should take approximately 1 hour to complete this workbook.

Sections of the text are marked with icons which represent the task required, as follows:



Read Text



Access the internet resource

Write/draw the information required


Introduction.

The nervous system is the rapid communication system of the body. Information is carried around the body between the brain and spinal cord and the peripheral structures (such as your skin, muscles, heart, lungs, gut etc) in the form of electrical activity – nerve impulses or action potentials



Start by viewing this short film as an overview of the nervous system:

bsite <http://www.youtube.com/watch?v=dOYOdJG0E0s> and/or reading the following website:
<http://www.innerbody.com/image/nervov.html>

 Read about the general structure and function of the nervous system in an anatomy & physiology text book of your choice

The Nervous System is classified in a number of ways, each part having subdivisions.

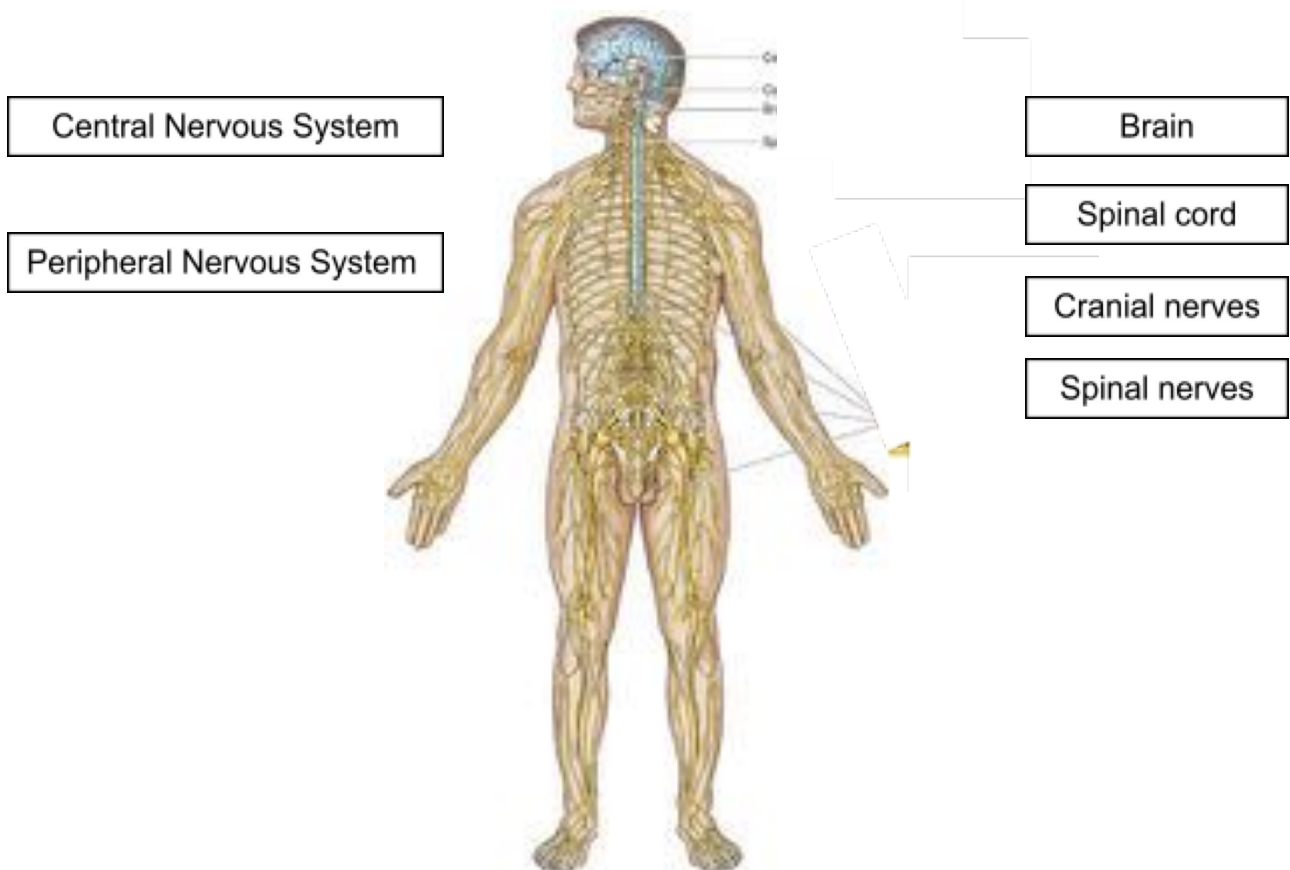
❖ Central Nervous System

- Brain
- Spinal Cord

❖ Peripheral Nervous System

- Cranial Nerves
- Spinal Nerves

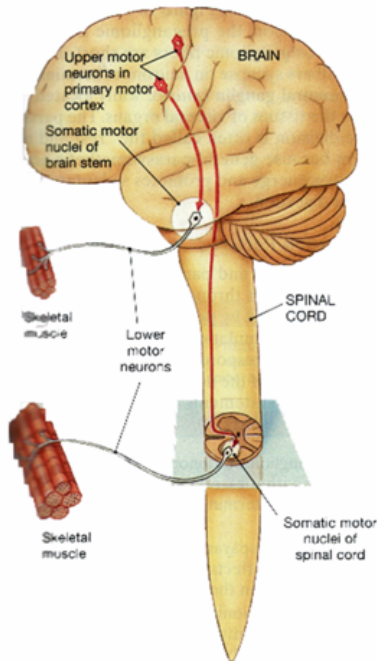
Identify the central and peripheral nervous systems, the brain, the spinal cord, and the cranial and spinal nerves on the diagram below



The nervous system is also divided functionally and anatomically into:

- ❖ Voluntary nervous system
- ❖ Autonomic nervous system

1. The Voluntary Nervous System



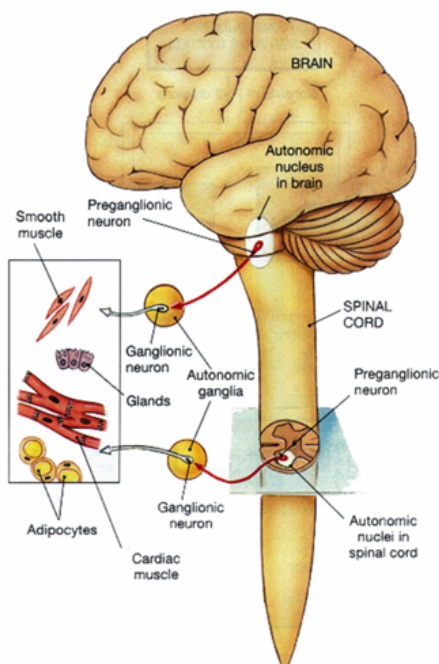
- Also known as the **SOMATIC** nervous system
- Efferent neurones (leaving the brain and spinal cord) control the **SKELETAL MUSCLES** to bring about voluntary movement and maintenance of posture (maintaining muscle tone)
- Control is **CONSCIOUS** – you are aware of ordering an action and can control it.

2. The Autonomic Nervous System



Begin by watching this overview of the autonomic nervous system:

<http://www.youtube.com/watch?v=YFYRosjcVuU>



- Also known as the **VISCERAL** nervous system
- Controls the **VISCERAL FUNCTIONS** – ie. walls of organs such as gut, heart, bladder and the activities of glands
- Control is **UNCONSCIOUS - INVOLUNTARY** – you are **NOT** aware of ordering an action and **CANNOT** directly control it

The function of the autonomic nervous system is to maintain homeostasis by controlling the activity of our internal organs such as:

- Heart beat regulation
- Control of digestion
- Smooth muscle contraction
- Control of glandular secretions

Though influencing:

- Cardiac muscle
- Smooth muscle
- Glandular epithelial tissue

The autonomic nervous system is divided into:

- Sympathetic nervous system (SNS)
- Parasympathetic nervous system (PNS)

Sympathetic Nervous System Actions:

- Raises the body's preparedness for action
- Increases heart rate and breathing,
- Stimulates sweat glands
- Decreases gastrointestinal tract motility & secretions
- Dilates pupils

Parasympathetic Nervous System Actions:

- Returns body to slower rate (helps you to relax)
- Slows the heart and breathing
- Constricts pupils
- Increases gastrointestinal tract motility & secretions

Identify whether the following actions would be brought about by the voluntary, sympathetic or parasympathetic nervous systems:

1. Kicking a football:

2. Digesting your lunch

3. Increasing blood pressure

4. Talking

5. Reacting to a stressful situation

6. Slowing heart rate

7. Increasing breathing rate

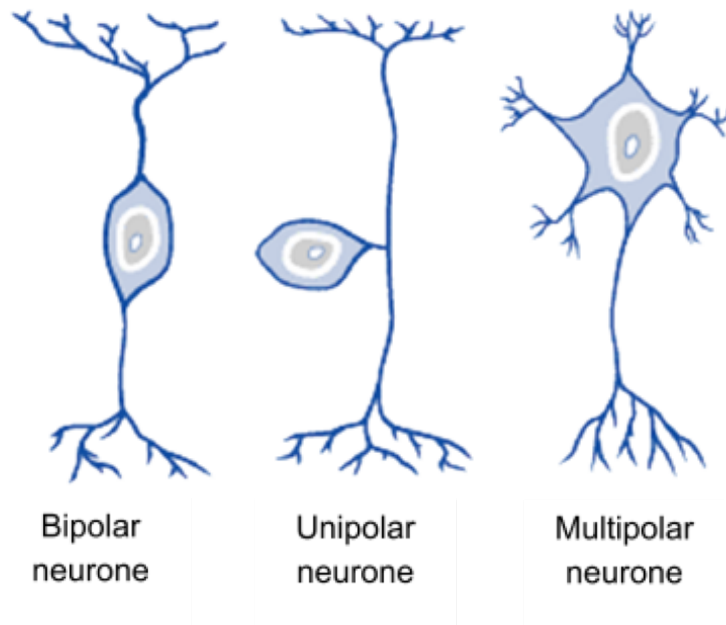
8. Increasing muscle blood flow

9. Preventing indigestion

10. Blinking

NEURONES

These are highly specialised cells capable of transmitting electrical impulses. Neurones can take a number of shapes and sizes but are largely classified as below:



Unipolar neurones:

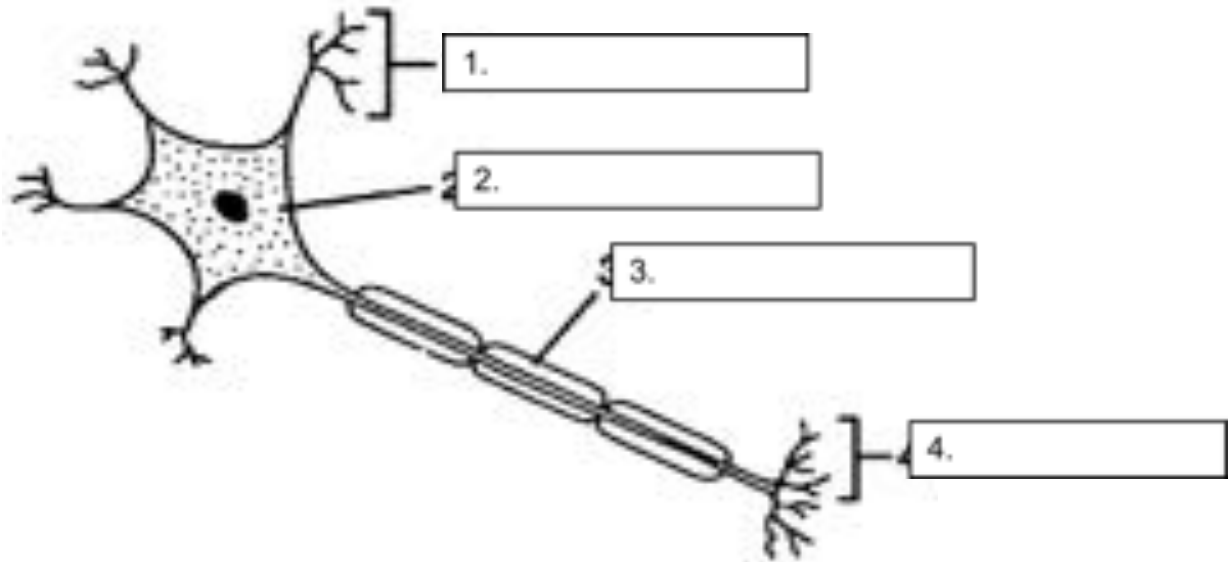
- 1 axon, 1 dendrite,
- The axon and dendrite are continuous, they are connected at the same point (pole) on the cell body.
- Generally function as SENSORY nerve cells.

Bipolar neurones:

- 1 axon, 1 dendrite,
- Connected at opposite points (poles) on the cell body.
- Relatively rare within the nervous system, they generally function as relay nerve cells within the special sense organs (eyes, ears, taste buds etc).

Multipolar neurones:

- 1 axon, many dendrites,
- Connected at all points (poles) on the cell body.
- Relays information from the CNS to the periphery
- Generally function as MOTOR nerve cells




Label the structures 1-4

On the diagram identify the 'axon' using this arrow:



What surrounds the axon?

What are the functions of these layers?

 For a general overview of the nervous system which looks at functions in a bit more detail try this: http://kidshealth.org/parent/general/body_basics/brain_nervous_system.html#

Impact of Nervous System Dysfunction on Normal Life

The following links give the experiences of people who have experienced or are living with disease affecting their nervous systems.

 <https://www.youtube.com/watch?v=283uzGiDOVg> (young person who experienced a stroke)

 <https://www.youtube.com/watch?v=jCuLt0fu0Wo> (person living with multiple sclerosis)