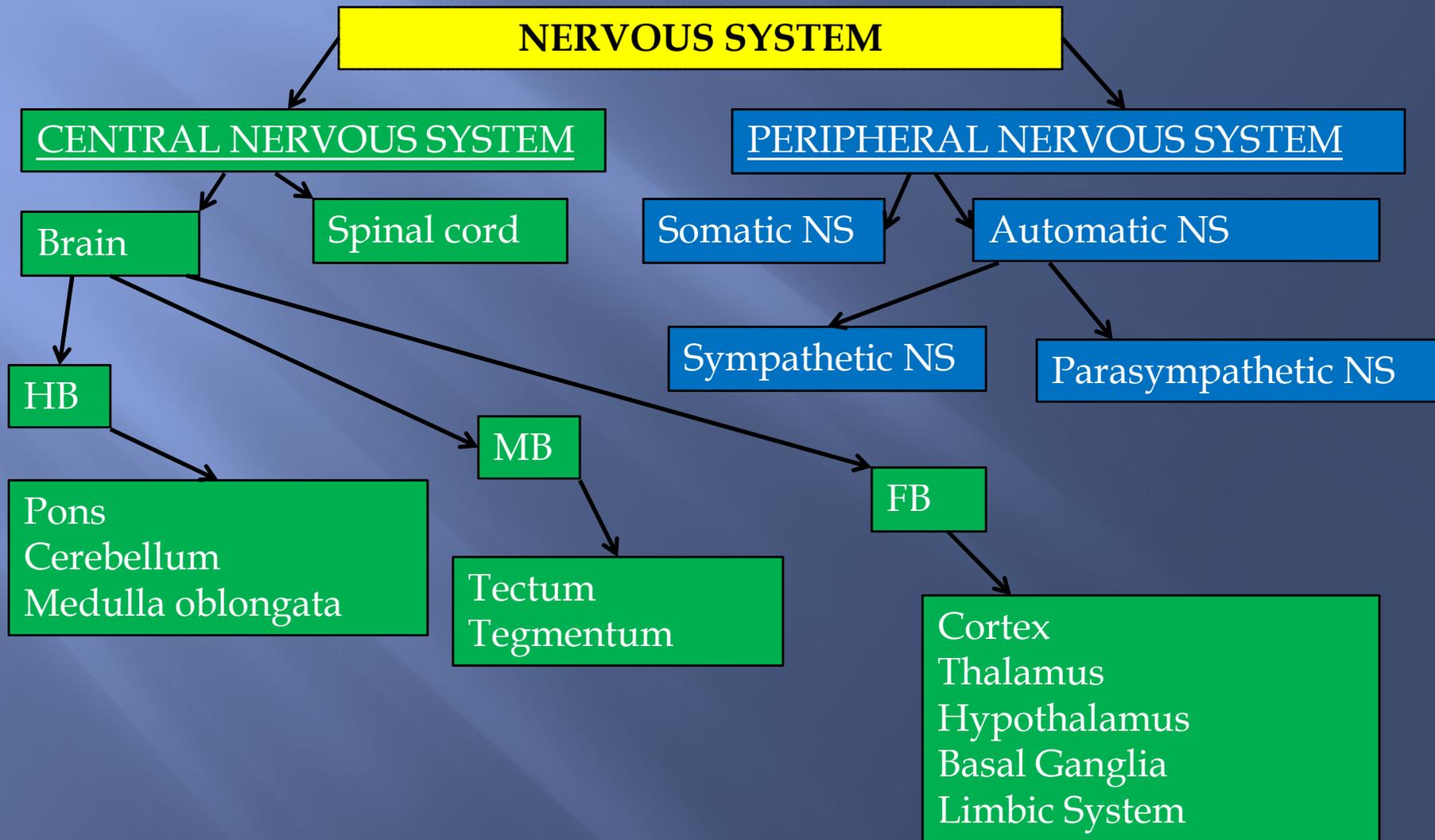
The image features five identical human figures arranged in a row, each showing the central nervous system. The brain is at the top, with the spinal cord running down the center of the back. Numerous nerves branch out from the spinal cord to the rest of the body. The background is a dark blue gradient with some light effects.

# CENTRAL NERVOUS SYSTEM STRUCTURE AND FUNCTION

# ORGANISATION OF THE NERVOUS SYSTEM



# THE CENTRAL NERVOUS SYSTEM

1. The brain and spinal cord are protected bones :

**BRAIN** – Skull

Cerebral Fluid

Blood-brain barrier

**SPINAL CORD** – Vertebrae + 3 membranes :

- Dura mater

- Arachnoid

- Pia mater

2. The brain and spinal cord are made up of two almost identical halves. The nerve tracts and structures found in one half will also be found in the other half.

# THE SPINAL CORD

## SPINAL NERVES :

1. Spinal cord acts like a cable, connecting the brain to parts of the body.
2. The spinal cord is made up of bundles of axons covered with myelin.
3. Where the axons leave the spine cord they form nerves, there 30 pairs of nerves on each side.
4. Each nerve divides into a motor and sensory root.
  - Sensory root: conveys sensory information to the brain. Sensory information is received from the sensory receptors in the skin , skeletal muscles, tendons, joints and internal organs of the body.
  - Motor root: conveys information from the brain to the muscles and glands in the body

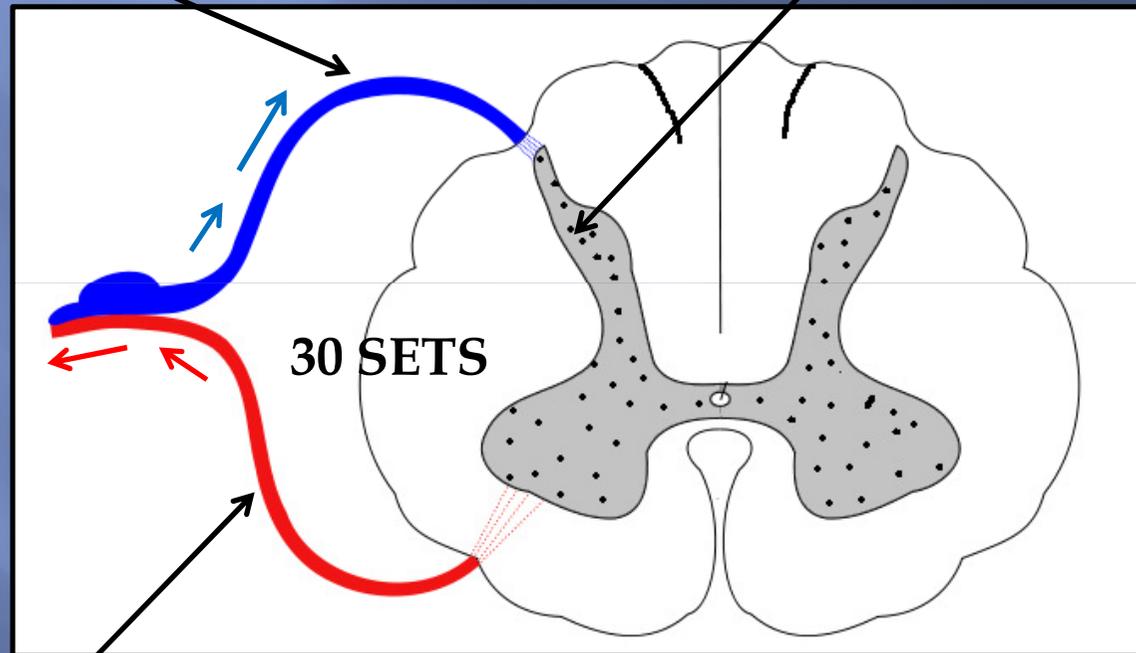
## REFLEXES:

The spinal cord also produces basic forms of behaviour. These are stereotyped responses that follow immediately after a certain stimulus.

# THE SPINAL CORD

Sensory fibres

Interneurons relay messages to the motor fibres

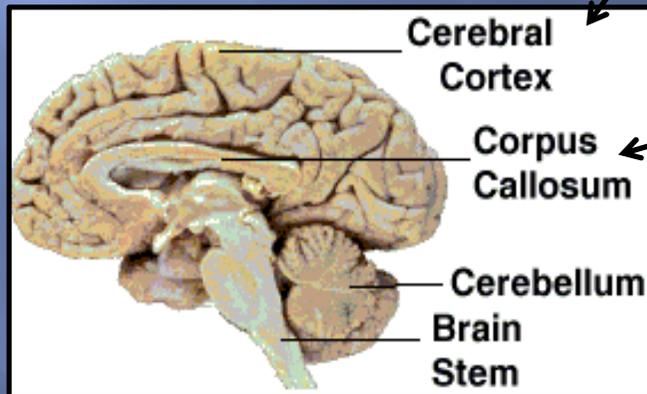


Motor fibres

# THE BRAIN

1. An extremely complex organ.
2. An estimation of 10 billion neurons, and any one of them may have thousands of connections to other neurons in the brain.
3. The brain is richly supplied with blood vessels that carry oxygen and glucose to the brain and transport waste products like carbon dioxide from the brain.

•Fissures  
•Tissue- made up mostly of cell bodies

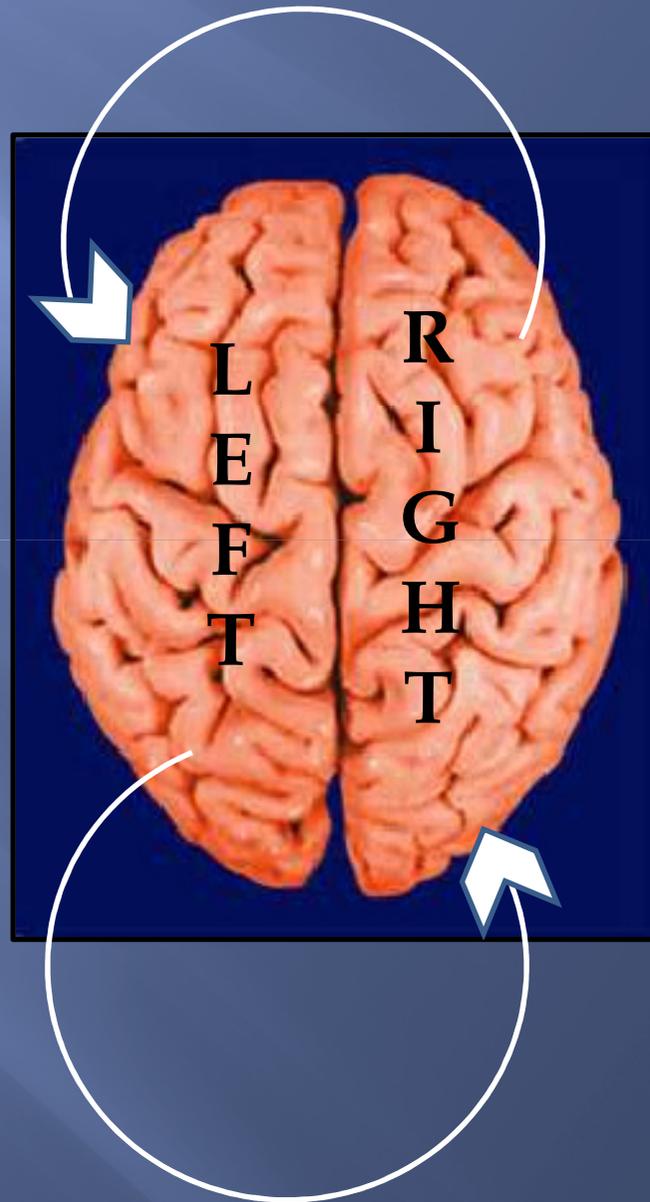


Connects the 2 cerebral halves.  
Allows the right and left hemispheres to communicate.

## CONTRALATERAL CONTROL

### LEFT

- Logical organisation
- Analysis of information
- Processing information sequentially
- logical

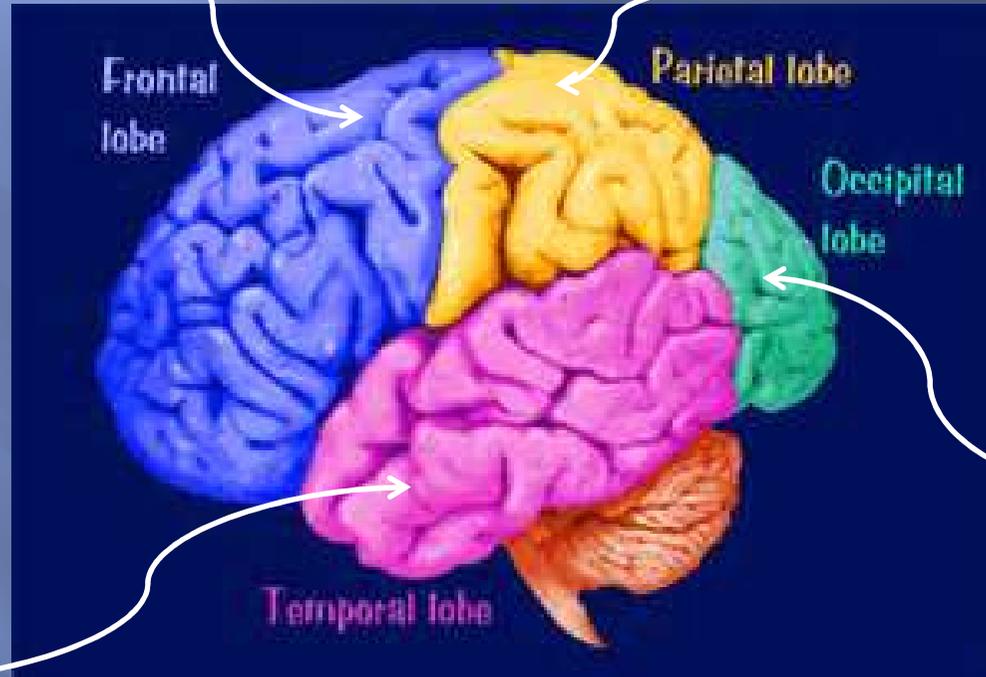


### RIGHT

- Process information holistically
- More creative: spatial and non-verbal abilities.

# LOBES OF THE BRAIN

Regulate complex mental activities + behaviours



Bodily sensations :  
•touch  
•Temperature  
•Pleasure + pain

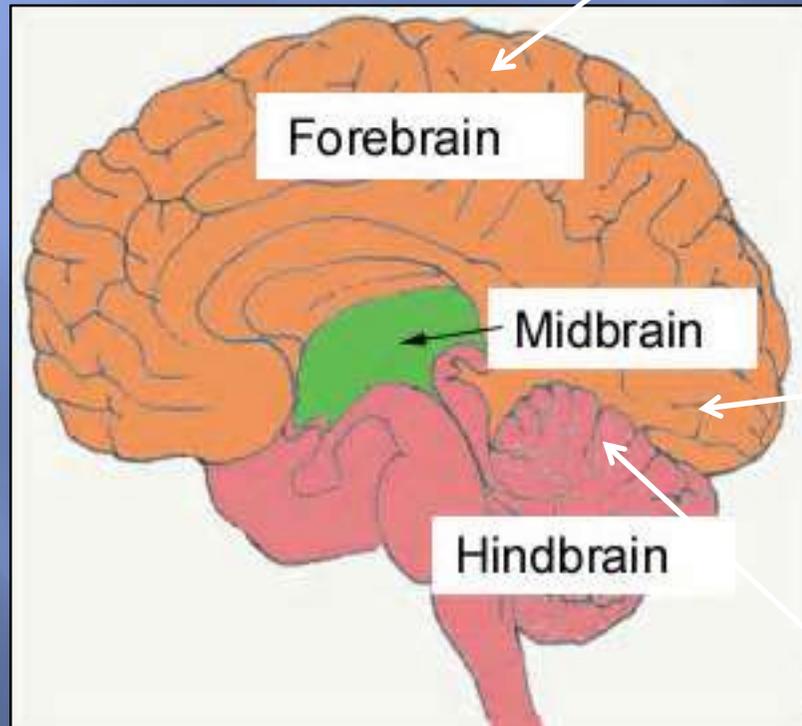
Primarily the visual area of the cortex

Perception of sound



<http://www.interactive-biology.com/1818/the-4-lobes-of-the-cerebrum-and-their-functions-episode-25/>

# STRUCTURES OF THE BRAIN



**FOREBRAIN**  
Thalamus  
Hypothalamus  
Cortex  
Basal ganglia  
Limbic system



**Brain functions are organised Hierarchically**

**MIDBRAIN**  
Tectum  
Tegmentum

**HINDBRAIN**  
Medulla oblongata  
Pons  
cerebellum

	STRUCTURE		FUNCTION
B R A I N	HINDBRAIN	PONS	Bridge between Medulla and other brain structures. Regulates sleep and wakefulness.
		CEREBELLUM	Co-ordinate motor movement : regulating posture, balancing muscle tone/ co-ordination. ( sequence).
		MEDULLA OBLONGATA	Reflex centres for processes the ensure survival : breathing/heart rate. <b>Pyramids</b> : brains contralateral control of muscles. <b>Reticular formation</b> : stimulates the brain,active and alert and prevents over-stimulation.

	STRUCTURE		FUNCTION
B R A I N	MIDBRAIN	TECTUM	Reflex centre for vision ( blink/pupil size) reflex centre for hearing ( adjust to volume/ startle response to sound).
		TEGMENTUM	Regulation of motor movement.

B  
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STRUCTURE		FUNCTION
FOREBRAIN	BASAL GANGLIA	3x groups of neurons that regulate slow, smooth movements.
	LIMBIC SYSTEM	<p><b>Hippocampus</b> :(memory)  <b>amygdala</b> :(fear + anger as well as relaxsation) <b>septum</b>:( pleasure + reward) <b>limbic cortex</b> : regulate motivated behaviour, emotions and memory)            Evalutaes experiences as positive or negative, links with memory and assists to adapt to similar situations.</p>
	THALMUS	Relay station for sensory information
	HYPOTHALAMUS	Regulating the internal environment of the body/ states of sleep and wakefulness/ emotions.

# GENERAL PRINCIPLES OF BRAIN FUNCTIONING

## HIERARCHICAL FUNCTIONING :

- More complex or higher structures control lower structures.
- Higher structures also depend on input from lower structures – feedback loop

## SPECIFICITY AND PLASTICITY:

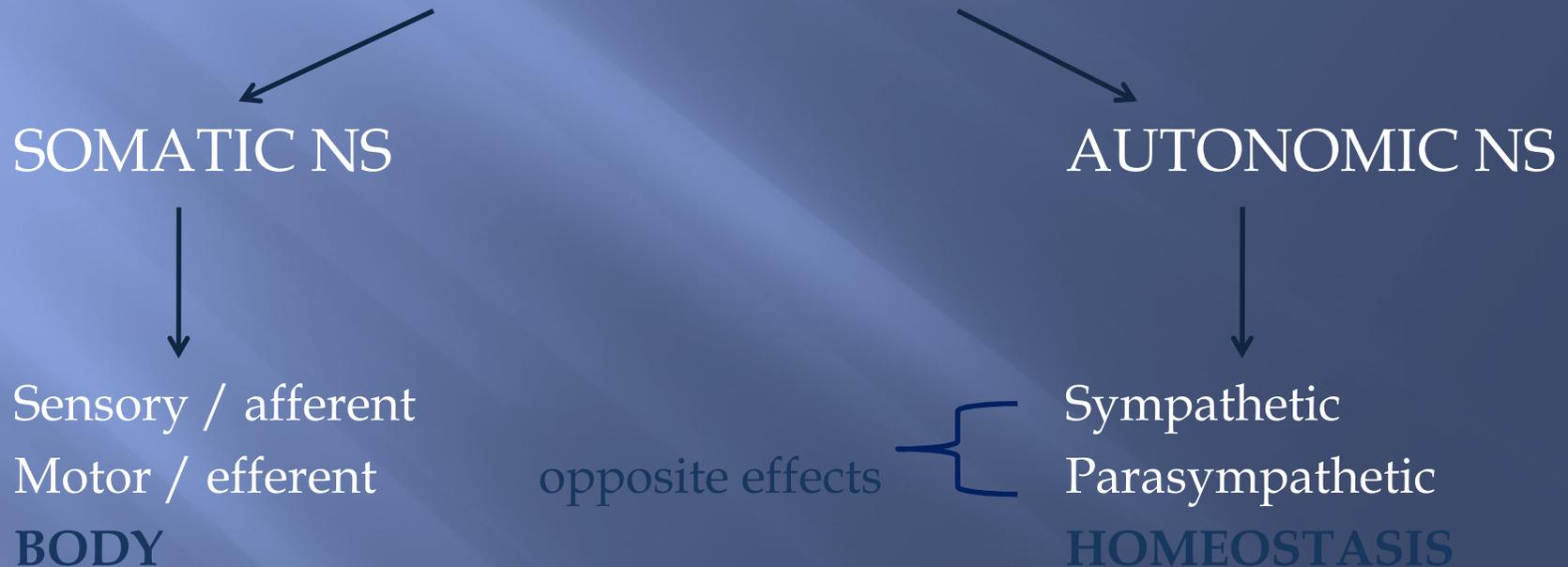
- Brain functioning is both specific and plastic.
- Certain structures may be connected in specific ways, but the brain is also capable of form new connections.

## LATERLISATION OF FUNCTIONS:

- The location of functions predominantly in one hemisphere.

# PERIPHERAL NERVOUS SYSTEM

## PERIPHERAL NERVOUS SYSTEM



<http://www.interactive-biology.com/2679/063-the-divisions-of-the-nervous-system/>