

**South Kazakhstan  
State Pharmaceutical  
Academy**

**Foreign Languages Department**

**The theme: The Physiology of the  
nervous System**

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**Group: 202 «A» PH.**

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# Plan

I. Introduction

II. Main part

1. Organization of Peripheral Nervous System (PNS)

2. Organization of Central Nervous System (CNS)

III. Conclusion

IV. Literature

**Central nervous system (CNS)**

**Peripheral nervous system (PNS)**

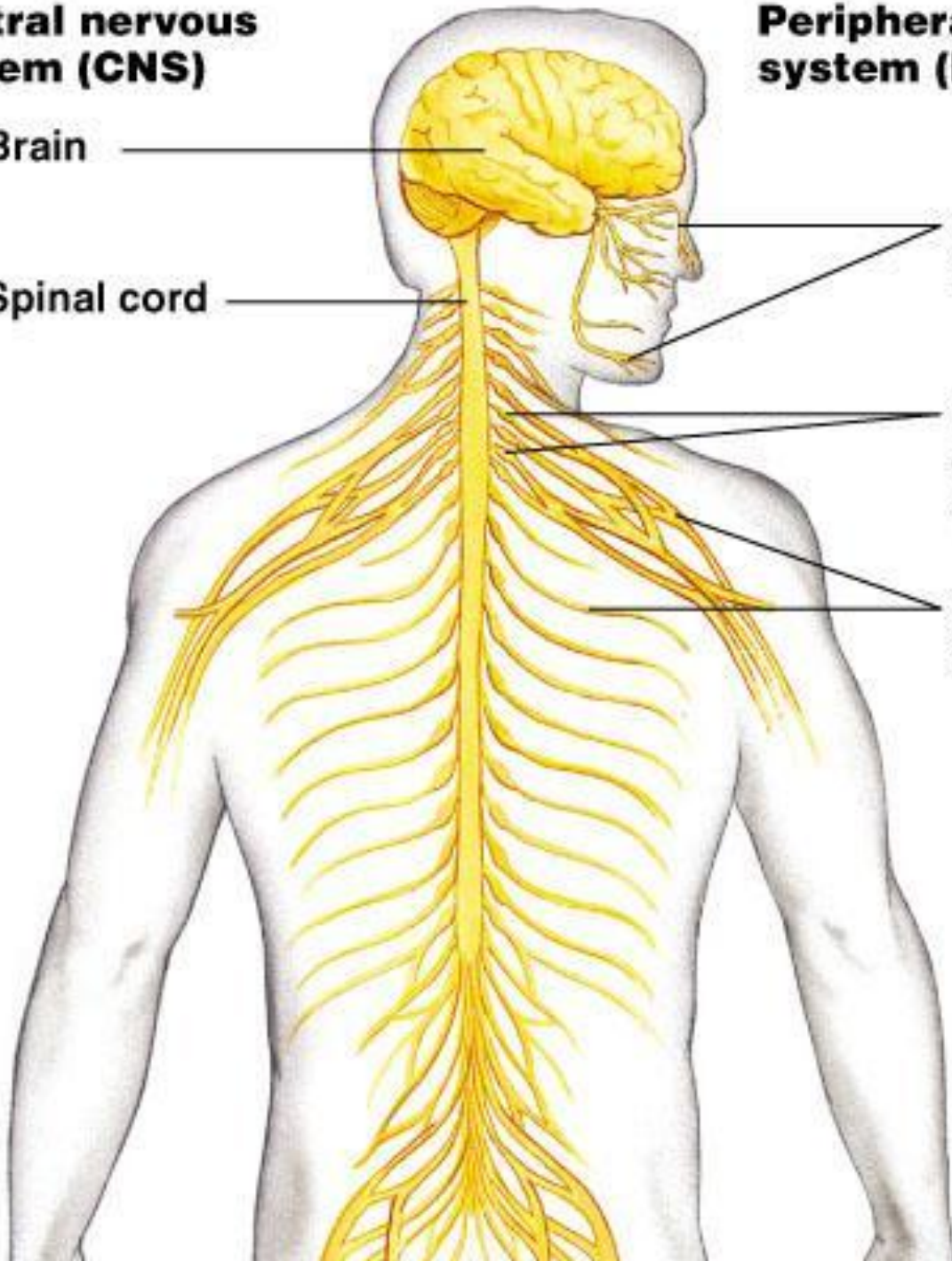
Brain


Spinal cord

Cranial nerves


Ganglia outside CNS

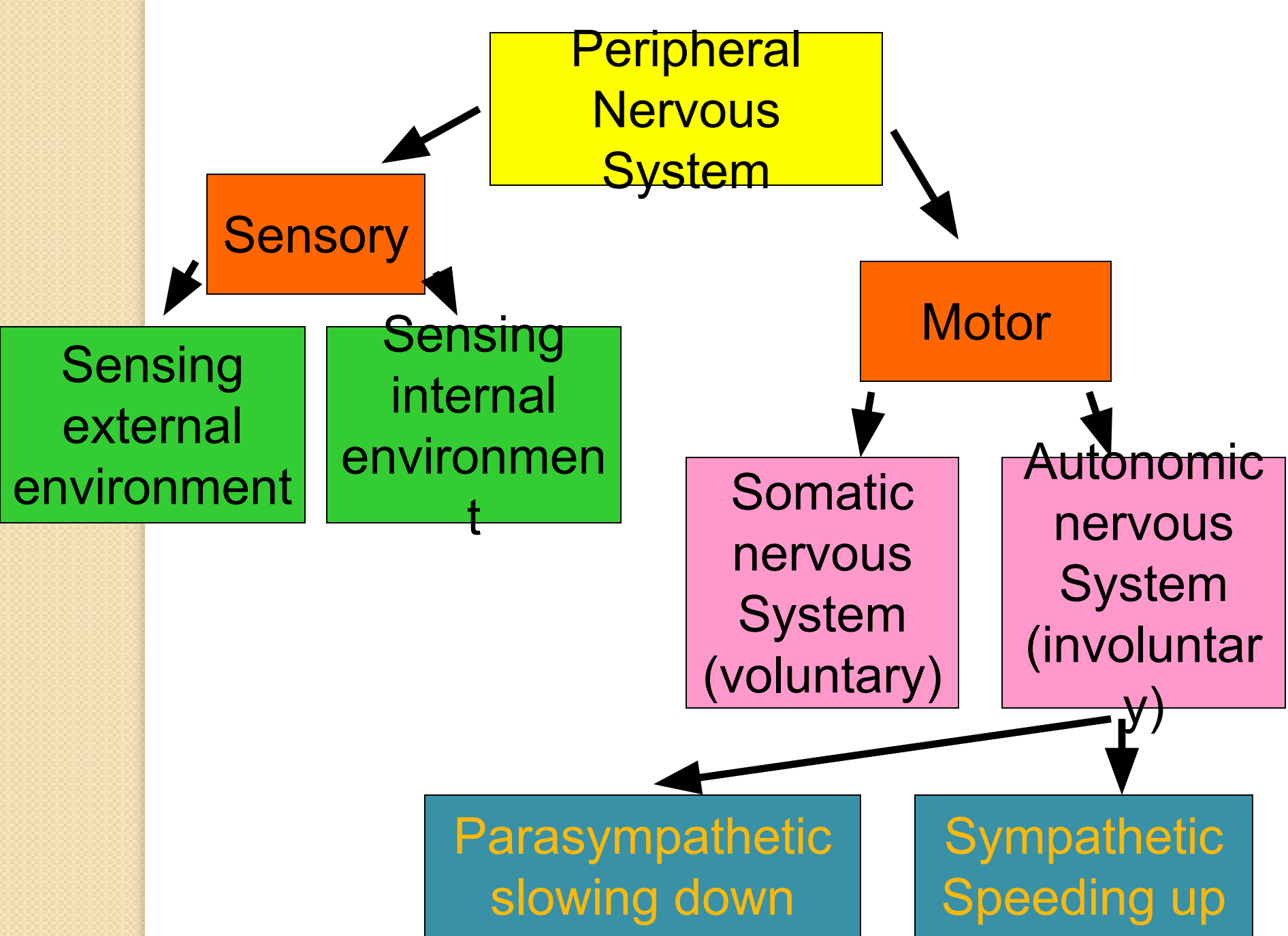
Spinal nerves





# Organization of Peripheral Nervous System (PNS)





Peripheral Nervous System

Sensory

Motor

Sensing external environment

Sensing internal environment

Somatic nervous System (voluntary)

Autonomic nervous System (involuntary)

Parasympathetic slowing down

Sympathetic Speeding up

This is a continuation  
of the previous flow  
chart

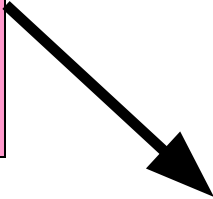
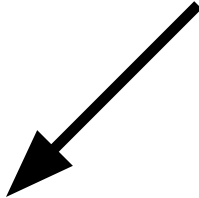
Autonomic  
nervous  
System  
(involuntary)

Parasympathetic  
Slowing down

Sympathetic  
Speeding up

Rest and  
Digest

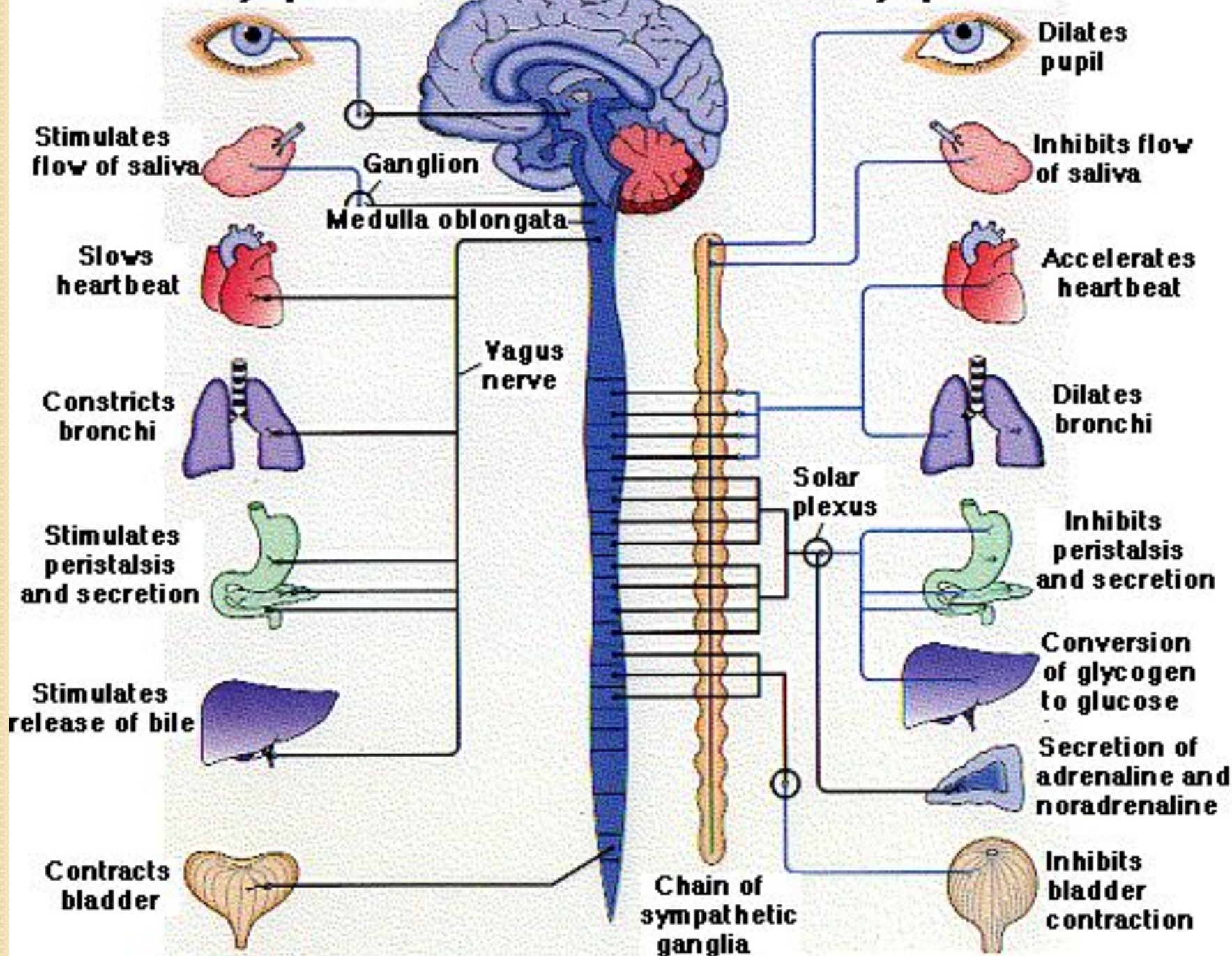
Fight or  
Flight







# Parasympathetic

# Sympathetic

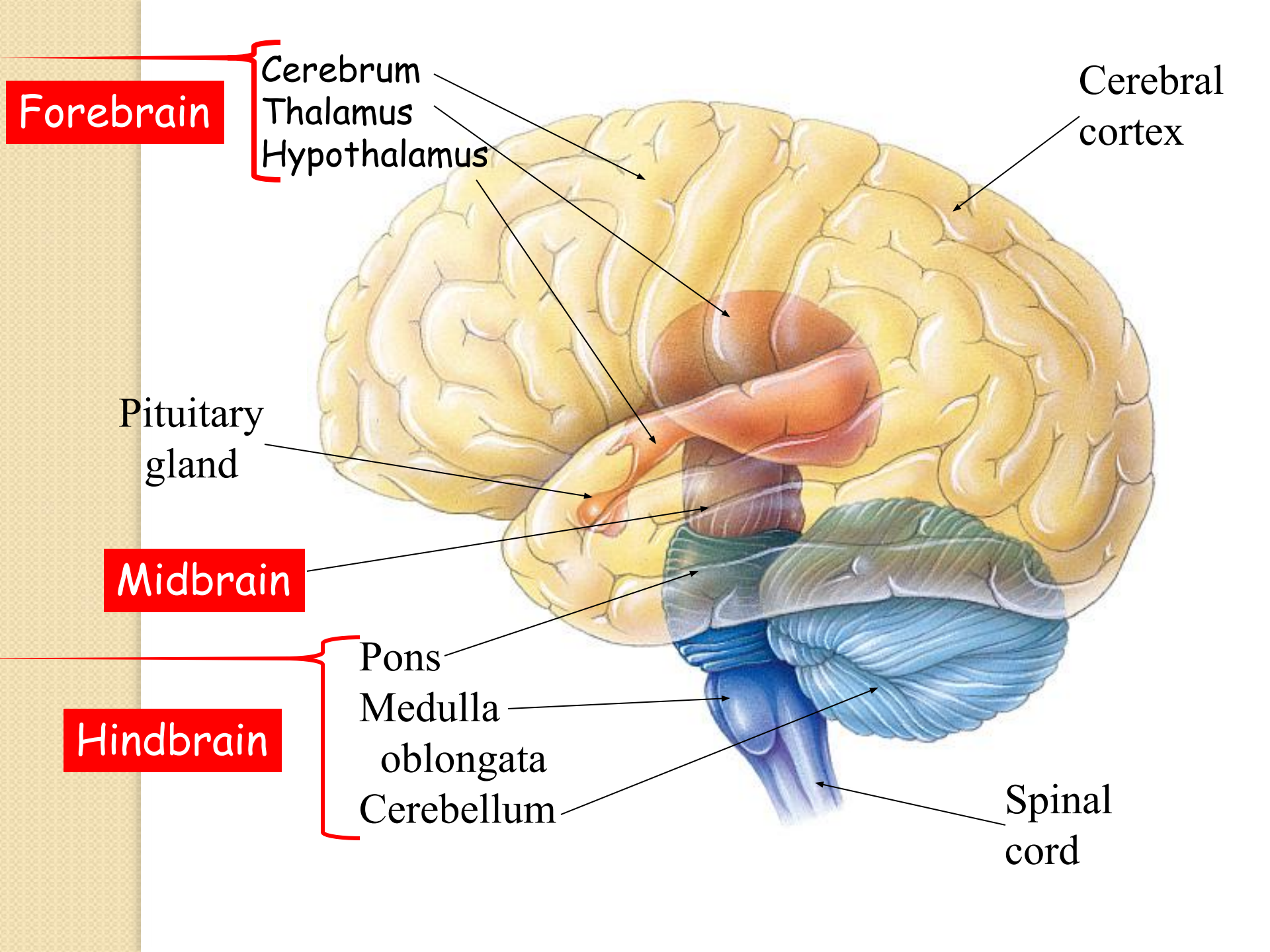




# Organization of Central Nervous System (CNS)







**Forebrain**

- Cerebrum
- Thalamus
- Hypothalamus

Cerebral cortex

Pituitary gland

**Midbrain**

**Hindbrain**

- Pons
- Medulla oblongata
- Cerebellum

Spinal cord

Frontal Lobe

Parietal Lobe

- Frontal Association
- Speech
- Motor Cortex

- Taste
- Speech
- Reading

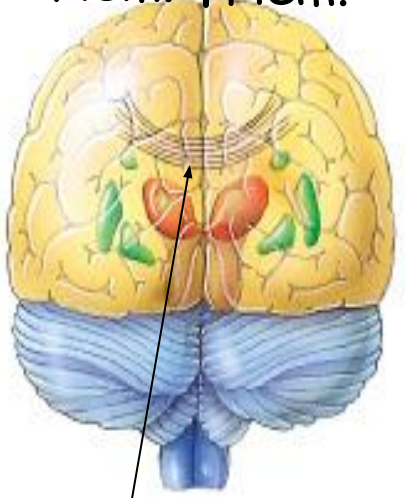
- Smell
- Auditory Association
- Hearing

- Vision
- Visual Association

Temporal Lobe

Occipital Lobe

Left Hem. | Right Hem.



Corpus Callosum

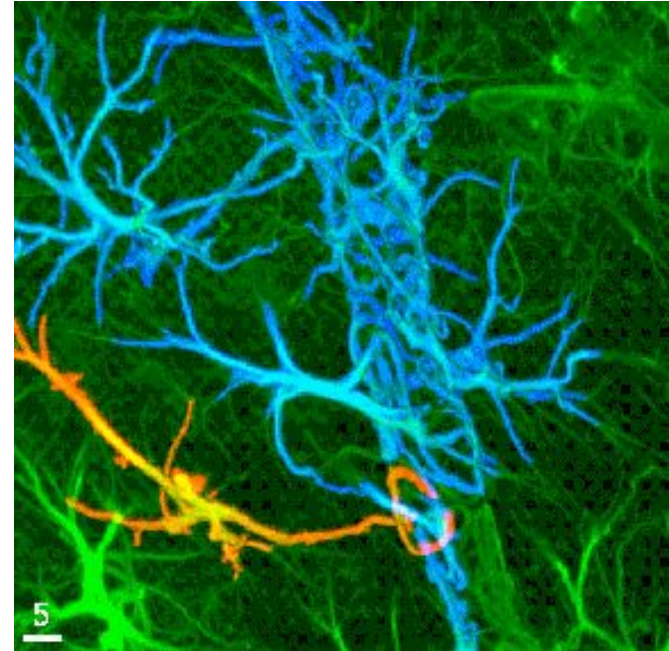
On your notes you need to have the left picture and labels



# Nervous Tissue

## Glial Cells

- 90% of CNS
- Structural framework
- Fatty Myelin sheath
- Phagocytosis
- Cerebrospinal fluid circulation



**Table 9-1 SUPPORTING CELLS OF NERVE TISSUE: THE NEUROGLIA**

Type of Cell	Location	Function
Astrocytes	Brain and spinal cord	Anchor neurons to blood capillaries; control the flow of ions around neurons; may aid neurons in impulse conduction
Ependymal cells	Line cavities in brain and spinal cord	Help form and circulate cerebrospinal fluid
Microglia	Brain and spinal cord	Phagocytize invading microorganisms and dead nerve tissue
Oligodendrocytes	Brain and spinal cord	Provide insulating coverings around CNS axons, forming a myelin sheath
Schwann cells	Large nerves of the peripheral nervous system	Provide insulating coverings around large PNS axons



# Structure of Single Neuron




# 3 types of Neurons

Sensory Neurons – neurons that carry **incoming** information from the sense to the CNS

Interneurons – CNS neurons that internally communicate and intervene **between** the sensory inputs and motor outputs

Motor Neurons – Carry **outgoing** information from the CNS to muscle and glands



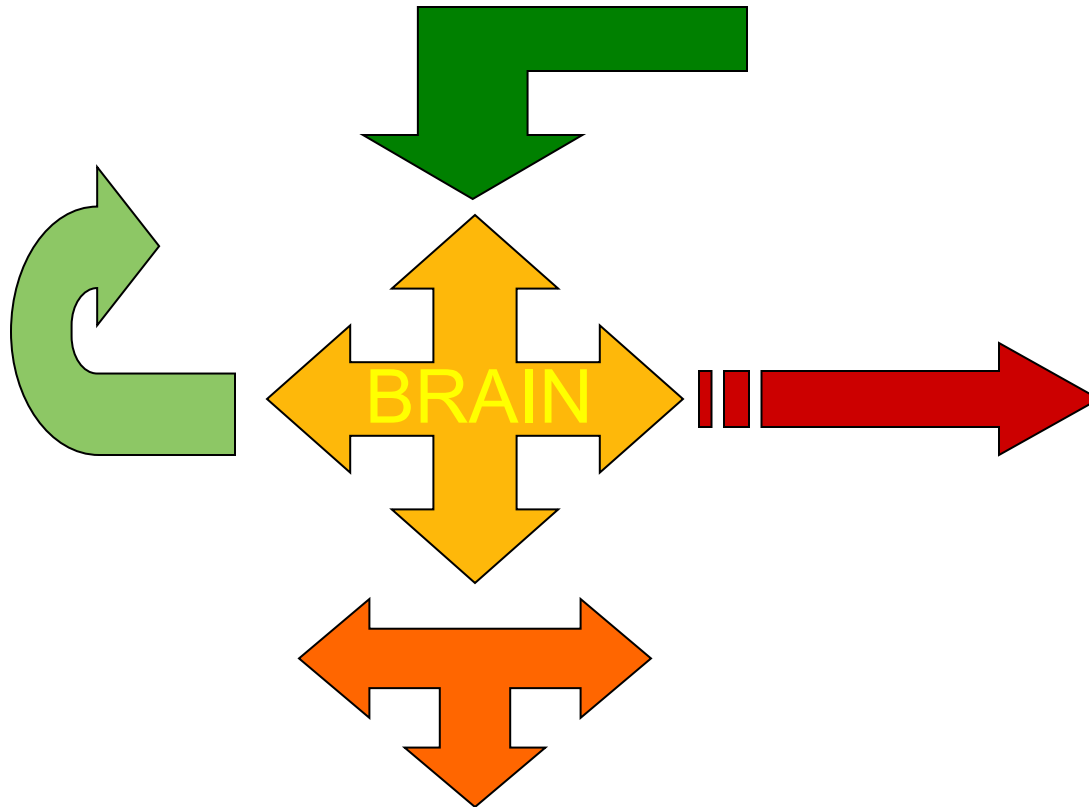
How do cells detect and respond to changes in their internal and external environment to successfully survive and maintain homeostasis?

1)

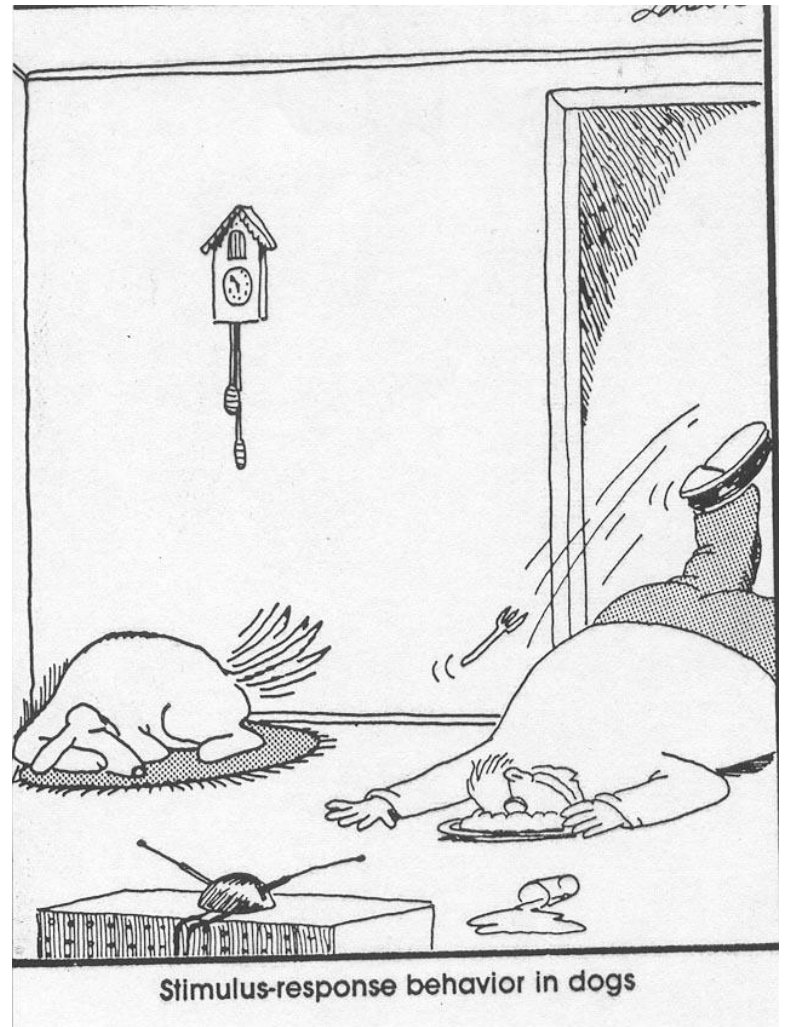
**Detection** of signals from the outside environment or detection of deviation (change) from homeostasis from the internal environment.



2) Integration of multiple signals from outside and inside to produce appropriate response.







3) Response to counteract stimulus being detected.

Draw your own picture to represent RESPONSE

- 1) **Detection** of signals from outside environment or detection of deviation (change) from homeostasis from internal environment.
- 2) **Integration** of multiple signals from outside and inside to produce appropriate response.
- 3) **Response** to counteract stimulus being detected

**System builds a Reflex Arc**

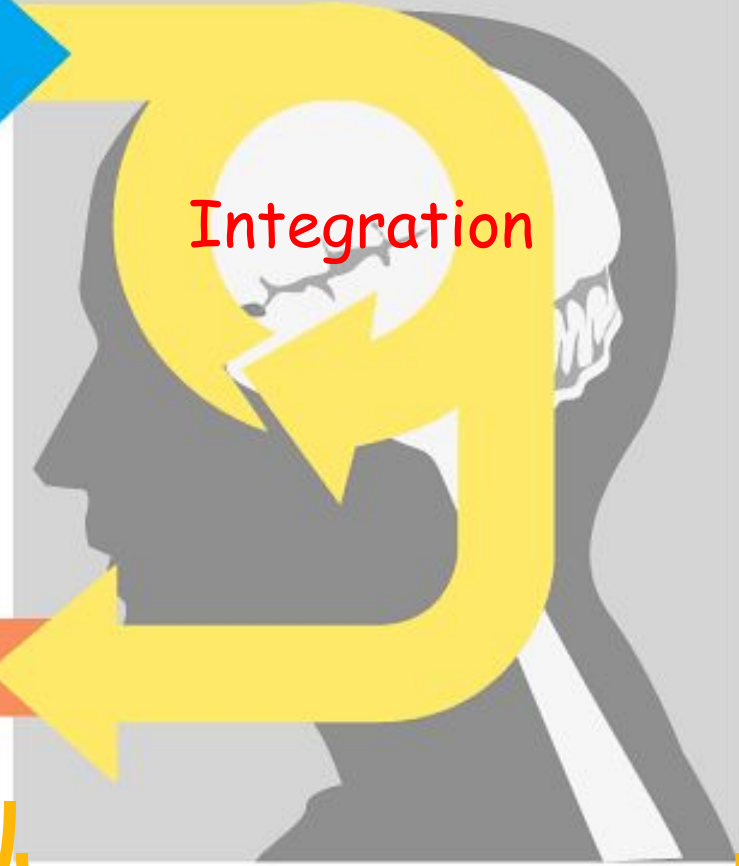
# Sensor Receptor (Detection)



Sensory Input



Integration



# Effector (Response)



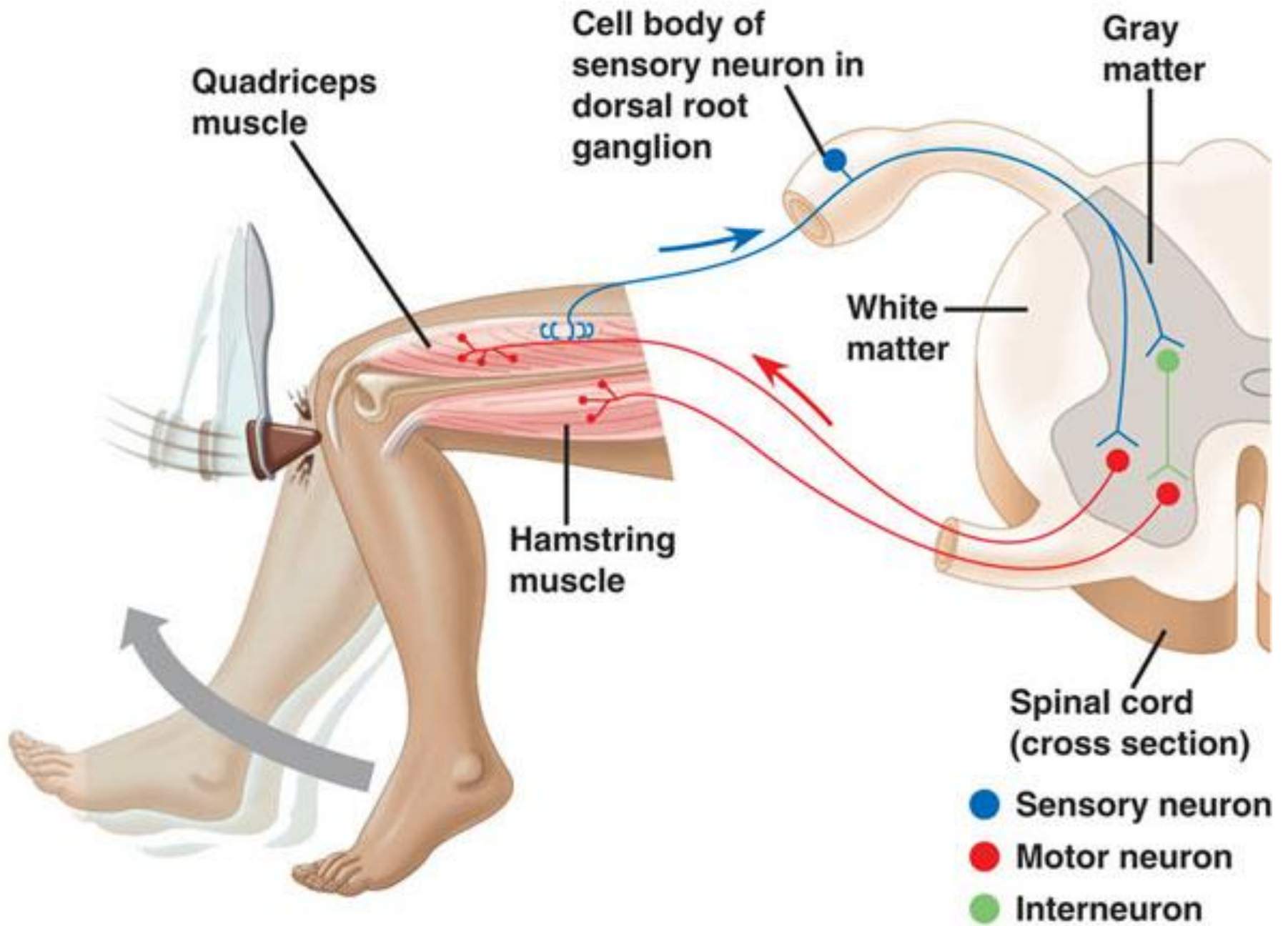
Motor Output



Peripheral Nervous  
System (PNS)

Central Nervous  
System (CNS)

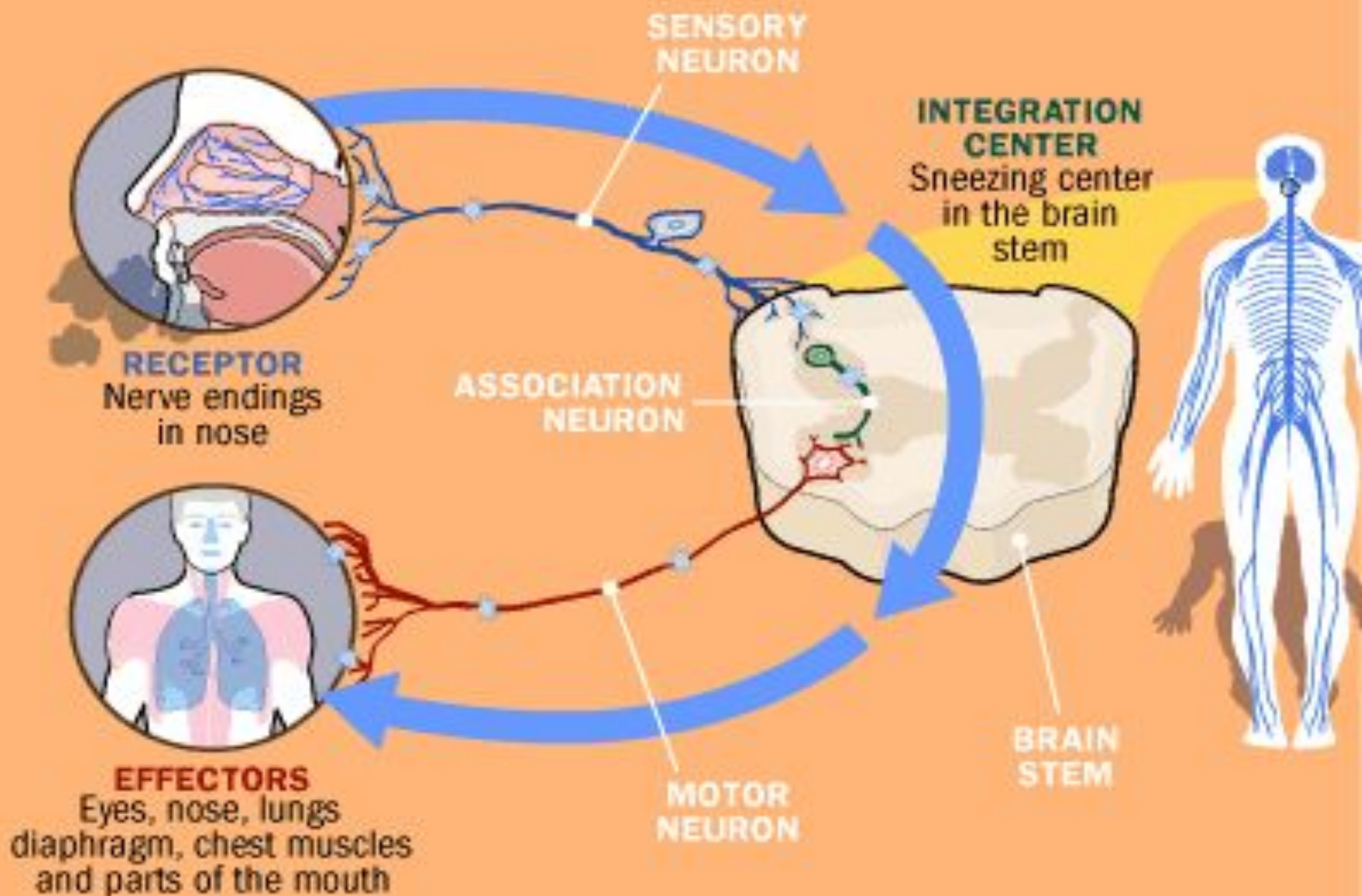






# The Sneeze Reflex Arc

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- **DEPOLARIZED** = Inside the membrane becomes more positive than outside.
- This causes a **THRESHOLD** to be **REACHED** and an impulse (**ACTION POTENTIAL**) begins in the second cell.
- After the neurotransmitter relays its message it is rapidly **REMOVED** or **DESTROYED**, thus halting its effect.
- The molecules of the neurotransmitter may be broken down by **ENZYMES**, taken up again by the axon terminal and recycled, or they may simply diffuse away.
- **NERVE GAS** prevents enzymes from breaking down neurotransmitters, as a result muscles in the respiratory and nervous system become paralyzed.

# Chemical Influences

- How might stimulants work?  
(Amphetamines, caffeine, nicotine)
  - Increase synaptic transmission □ increased energy/mood, decreased appetite.
    - Increased irritability and anxiety
- How might depressants work? (Alcohol, anti-anxiety drugs, heroin)
  - Inhibition of impulses (blocking receptors of NT)
    - Can result in depression

[Animations](#)

# CONCLUSION

NEUROTRANSMITTER is a chemical substance that is used by one neuron to signal another. The impulse is changed from an Electrical Impulse to a Chemical Impulse (Electrochemical Impulses).



# Literature

- А.М.Маслова,З.И.Вайнтейн,Л.С. Плебейская. Учебник.Москва.ГЭОТАР-Медиа.2013
- [www.google.ru](http://www.google.ru)
- Беленкова С.А. Human Body, Shymkent 2010.

