

# **Central Nervous System:**

## **Extra-Cerebral Functions**

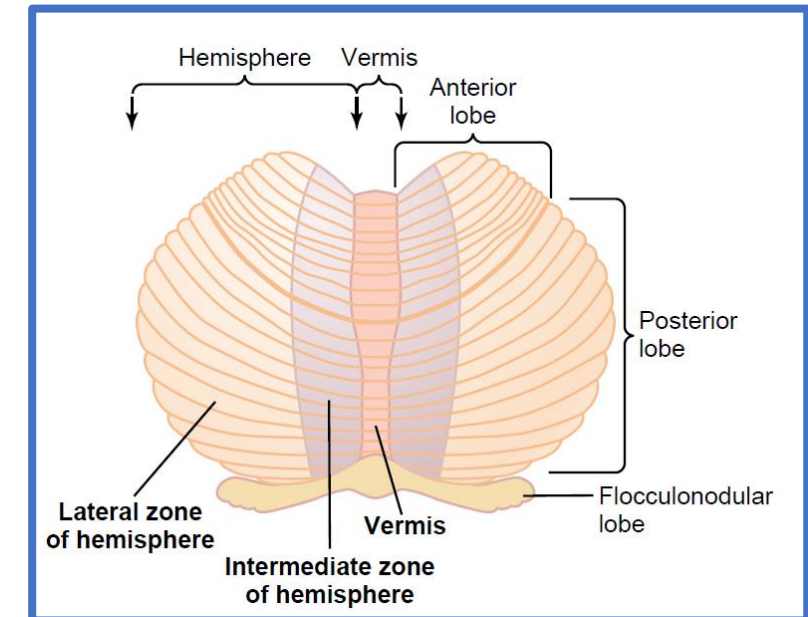
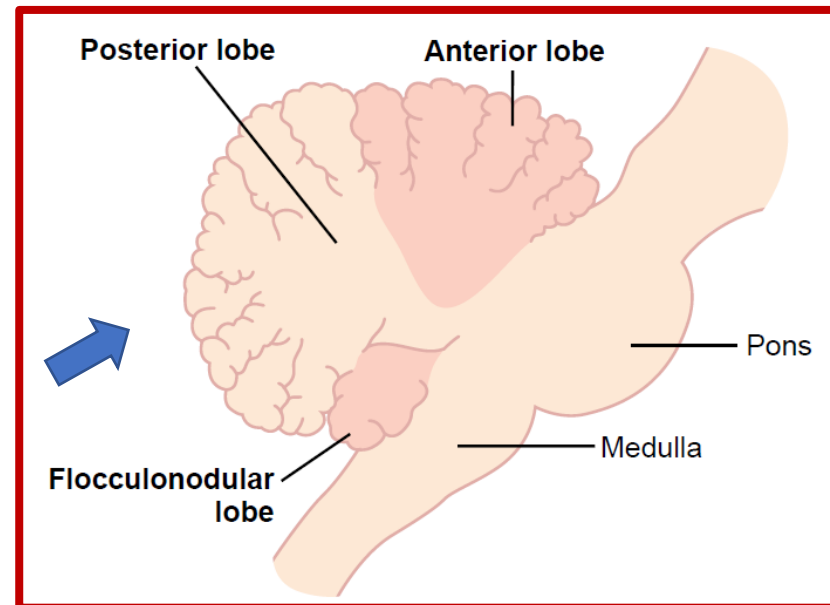
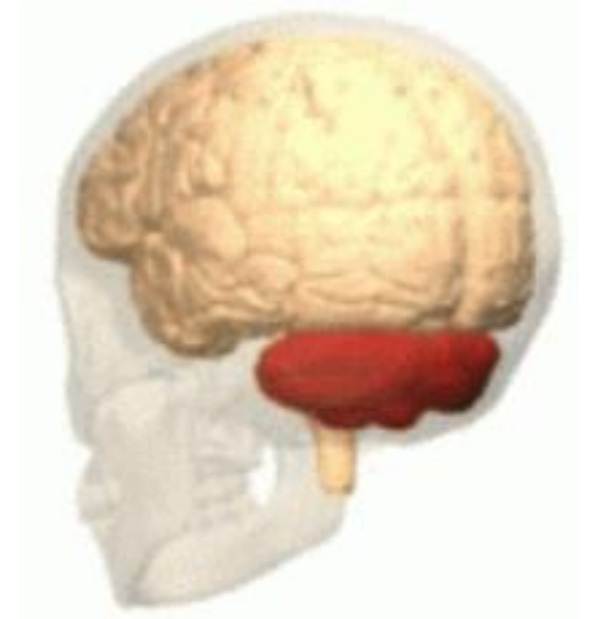
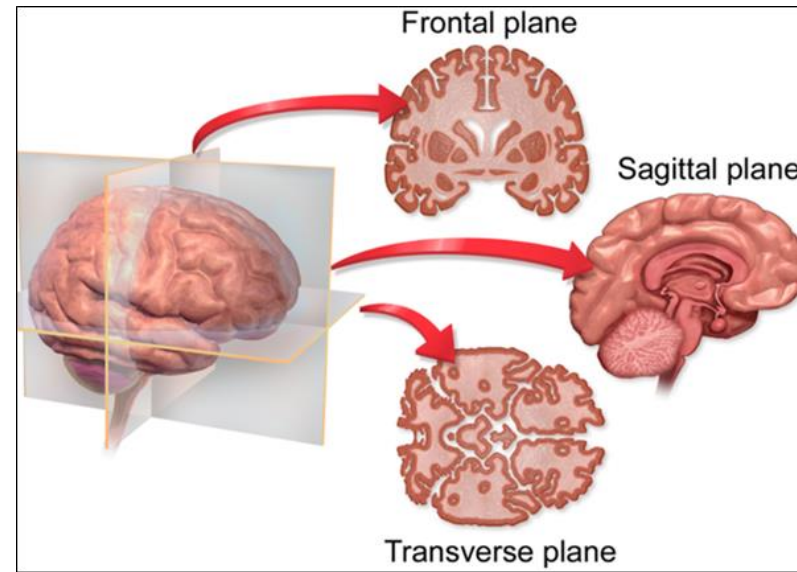
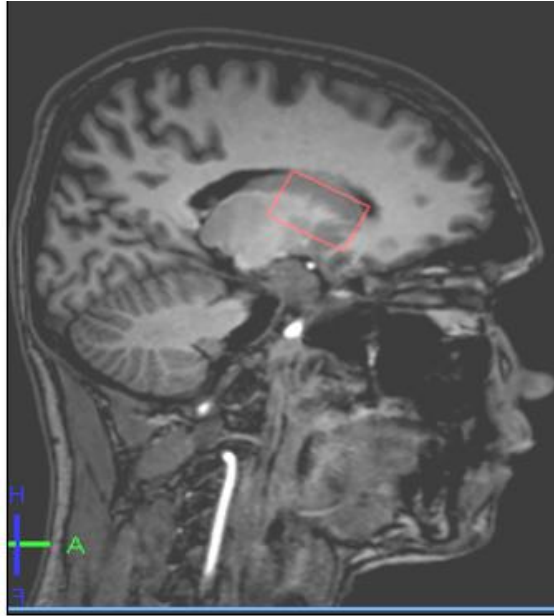
# **Extra-Cerebral Functions (outside Cerebrum):**

- **Cerebellum**
- **Cranial Nerves**
- **Spinal Cord & Reflex Action**
- **Cerebrospinal Fluid**

**Part 1:**

**Cerebellum**

# Cerebellum





# Functions of Cerebellum

## ➤ Coordination of Movement:

The cerebellum controls the timing and pattern of muscle activation during movement.

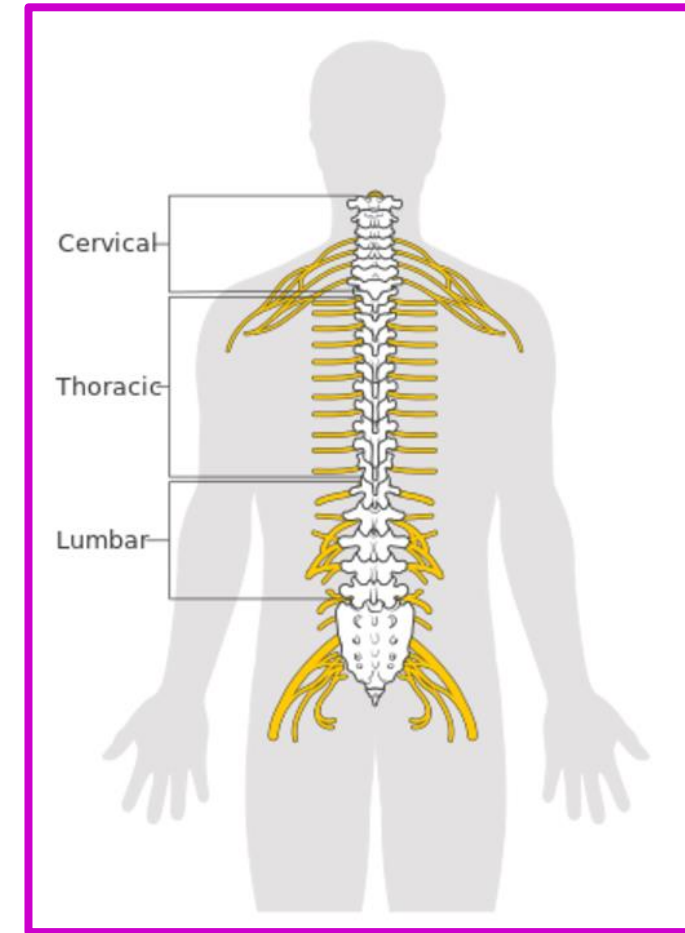
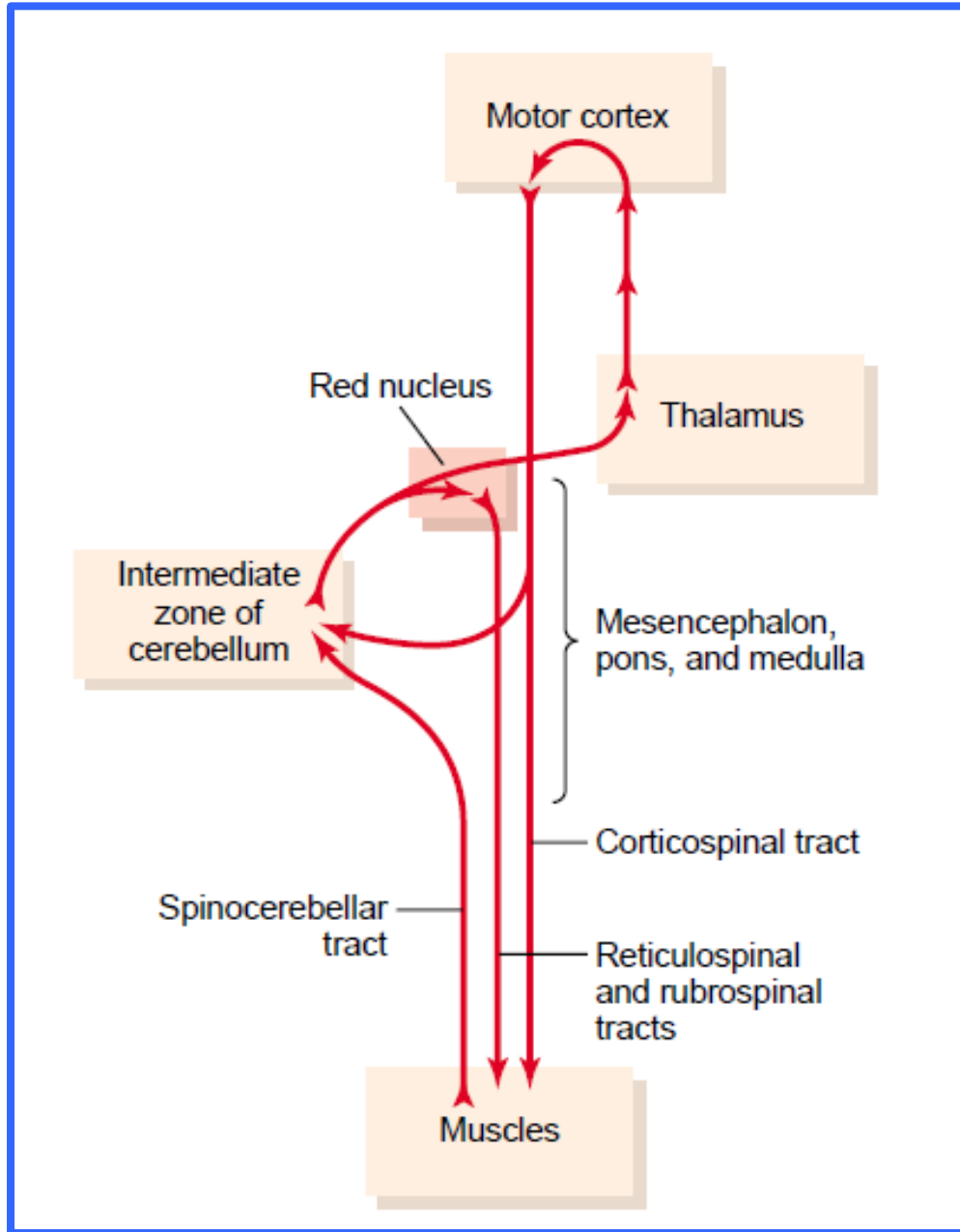
## ➤ Maintenance of Equilibrium:

In conjunction with the vestibular system

## ➤ Regulation of Muscle Tone:

Modulates spinal cord and brain stem mechanisms involved in postural control.

## Cerebellum: Connections & Mapping



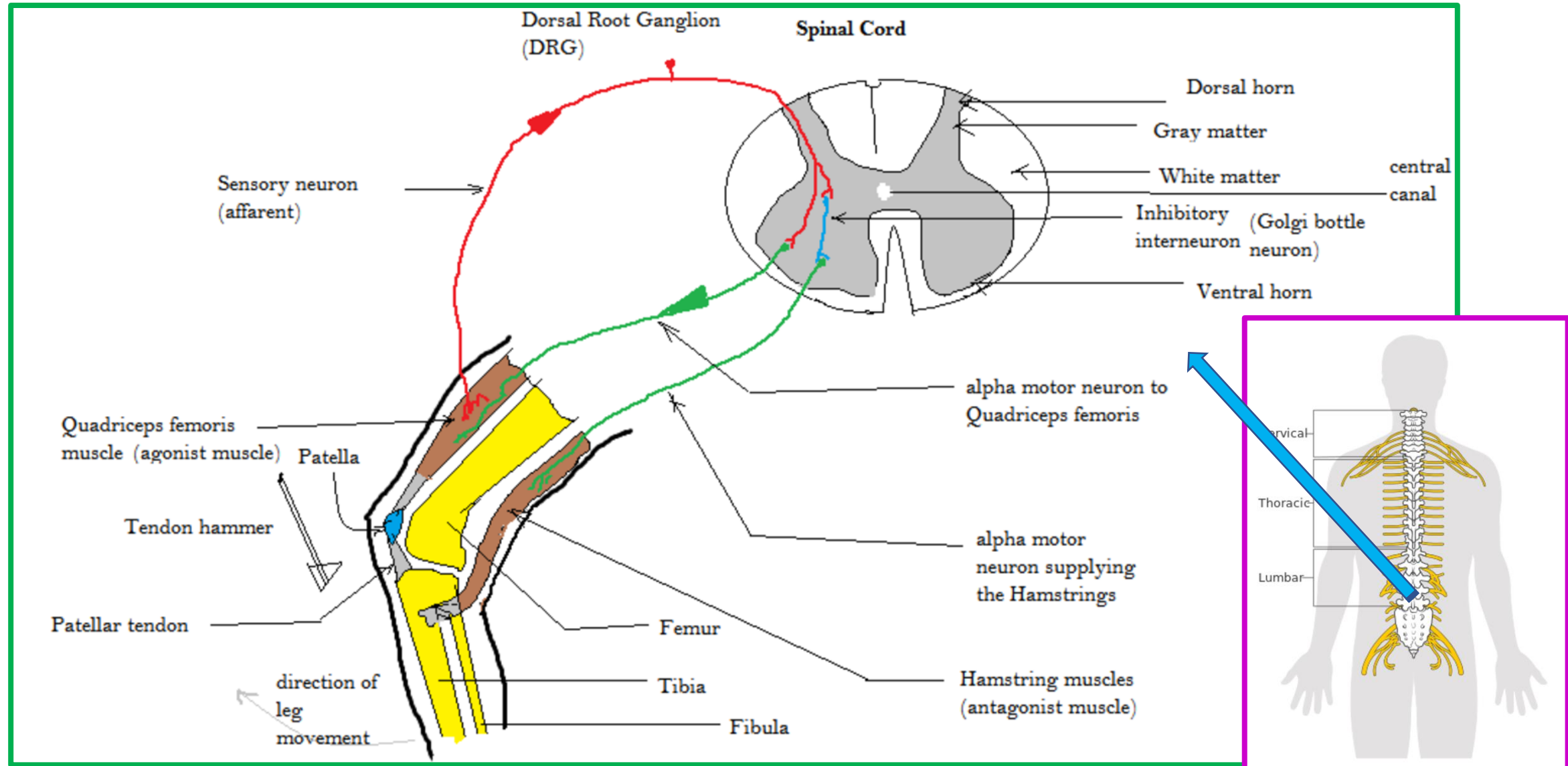
## **Part 2:**

# **Spinal Cord & Reflex Action**



# Spinal Cord:

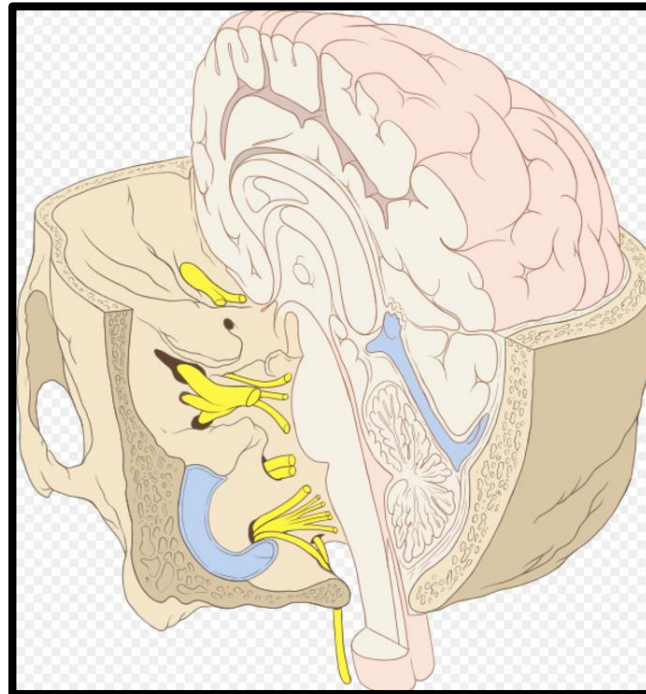
## Reflex Arc & Reflex Action



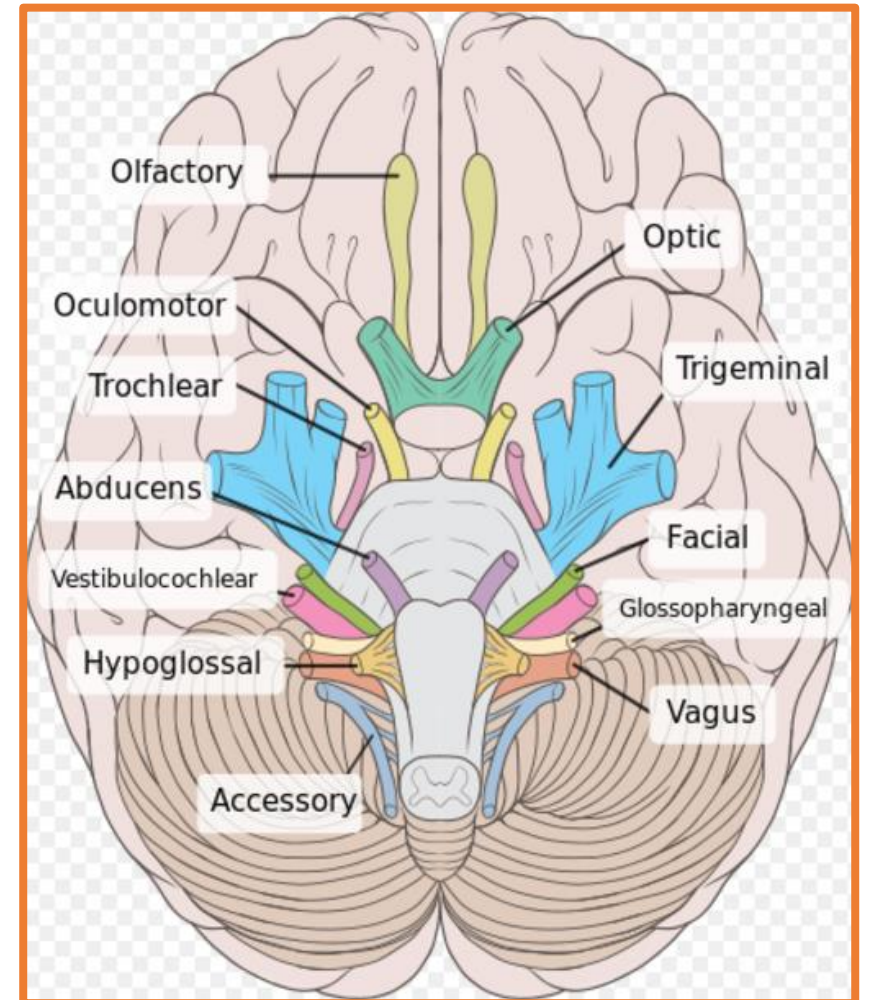
**Part 3:**

**Cranial Nerves**

# Cranial Nerves



## Undersurface of Brain



## Cranial nerves

CN 0 – Terminal  
CN I – Olfactory  
CN II – Optic  
CN III – Oculomotor  
CN IV – Trochlear  
CN V – Trigeminal  
CN VI – Abducens  
CN VII – Facial  
CN VIII – Vestibulocochlear  
CN IX – Glossopharyngeal  
CN X – Vagus  
CN XI – Accessory  
CN XII – Hypoglossal

## Function

Smell (I)  
Vision (II)  
Eye movement (III, IV, VI)  
Trigeminal nerve (V)  
Facial expression (VII)  
Hearing and balance (VIII)  
Oral sensation, taste, and salivation (IX)  
Vagus nerve (X)  
Shoulder elevation and head-turning (XI)  
Tongue movement (XII)

**Nerve Mnemonics:** Oh, Oh, Oh, To Touch And Feel Very Good Velvet ... Ah, Heaven

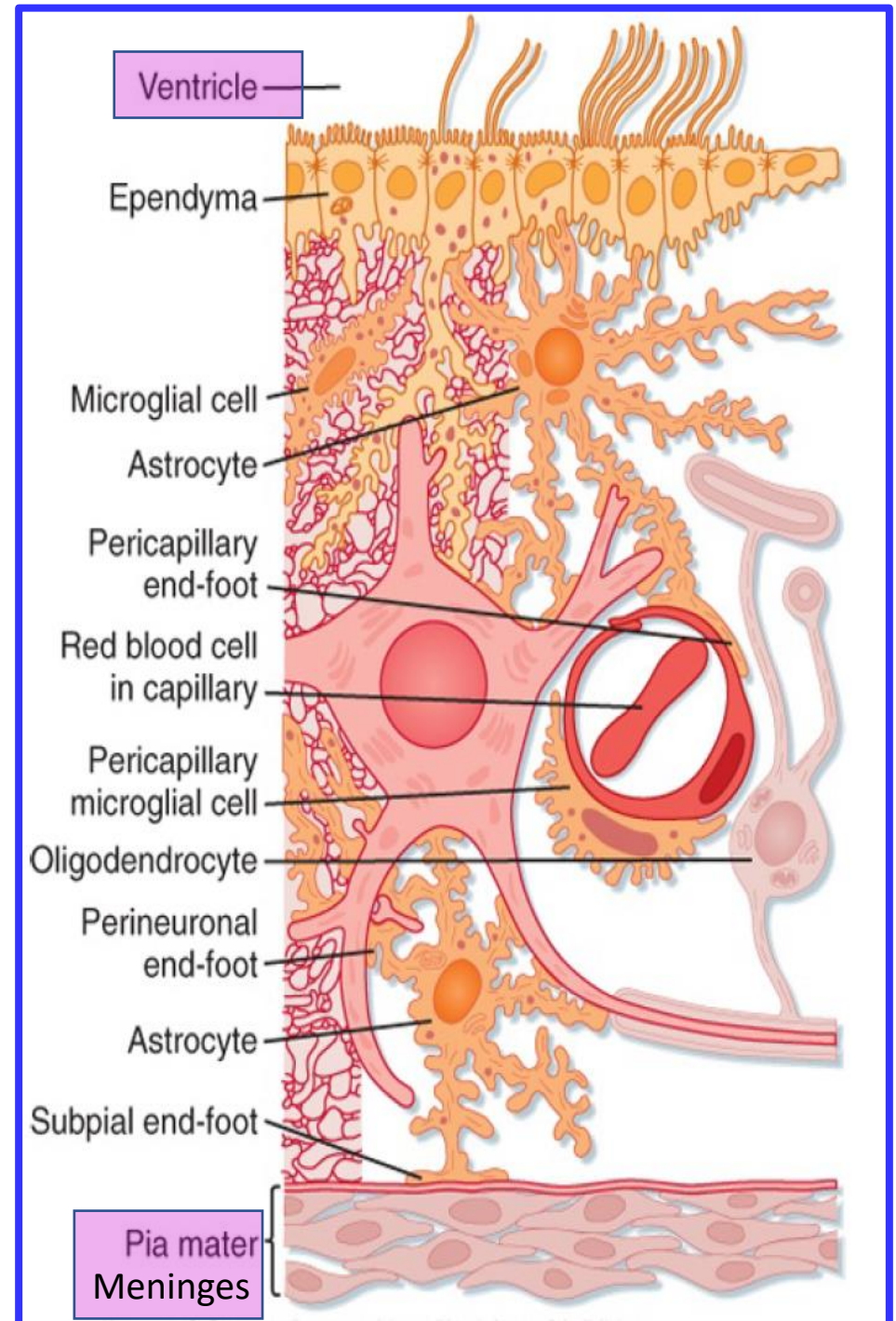
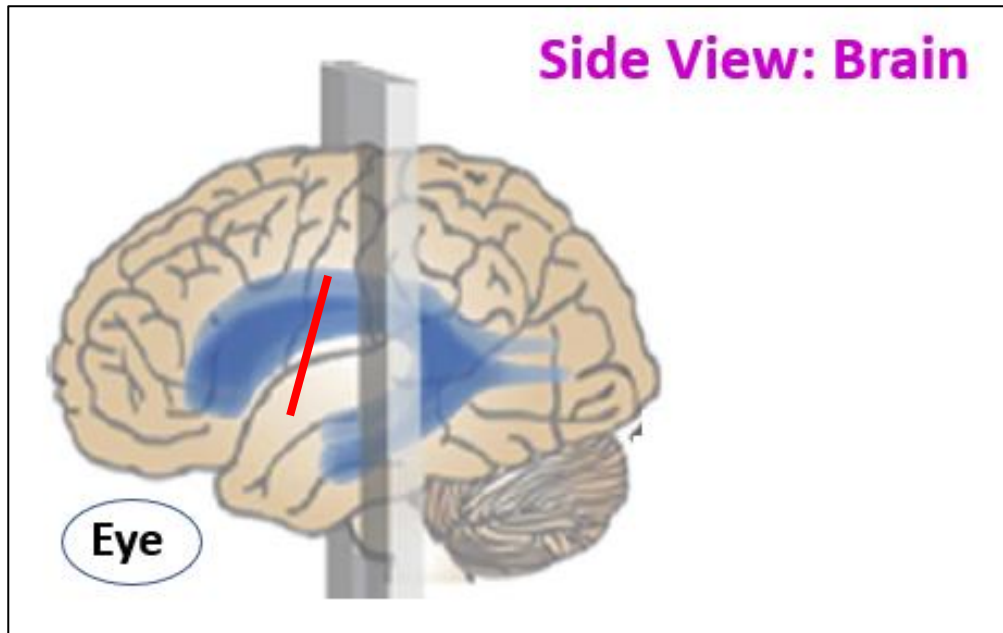
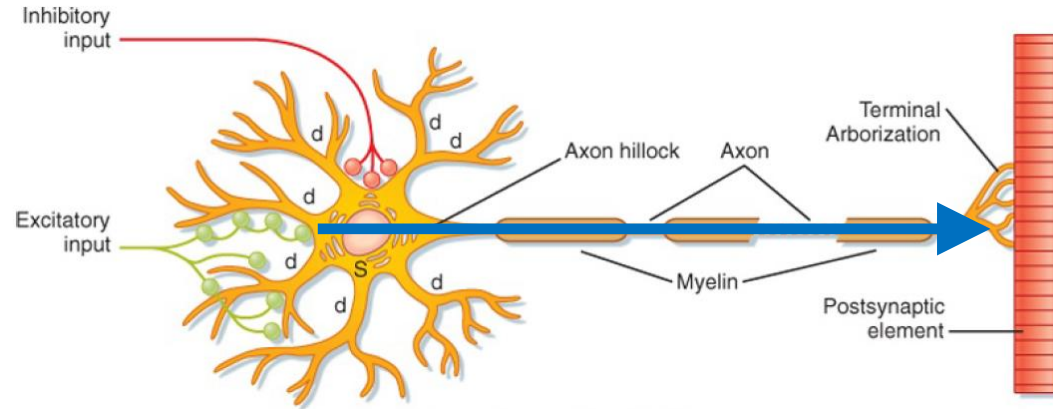
## **Part 4:**

# **Cerebro-spinal Fluid**

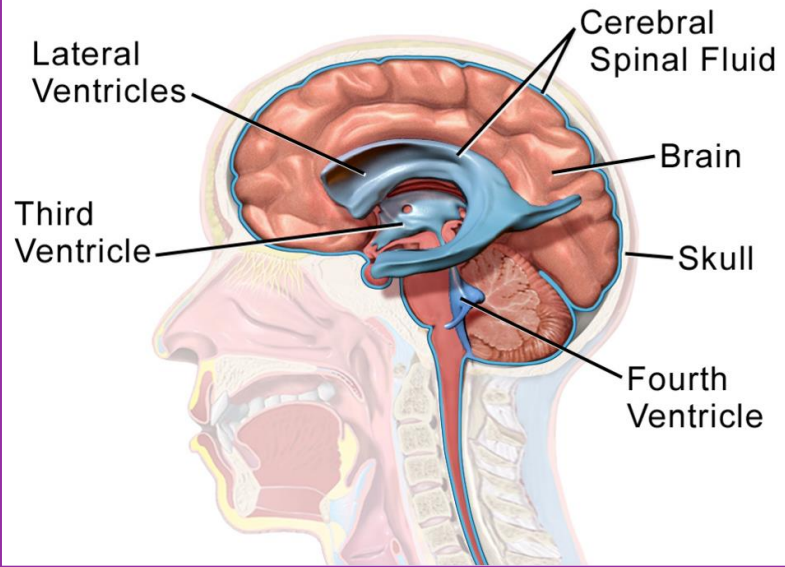


# Recap.

## Neuron & Other Cells in Brain Tissue

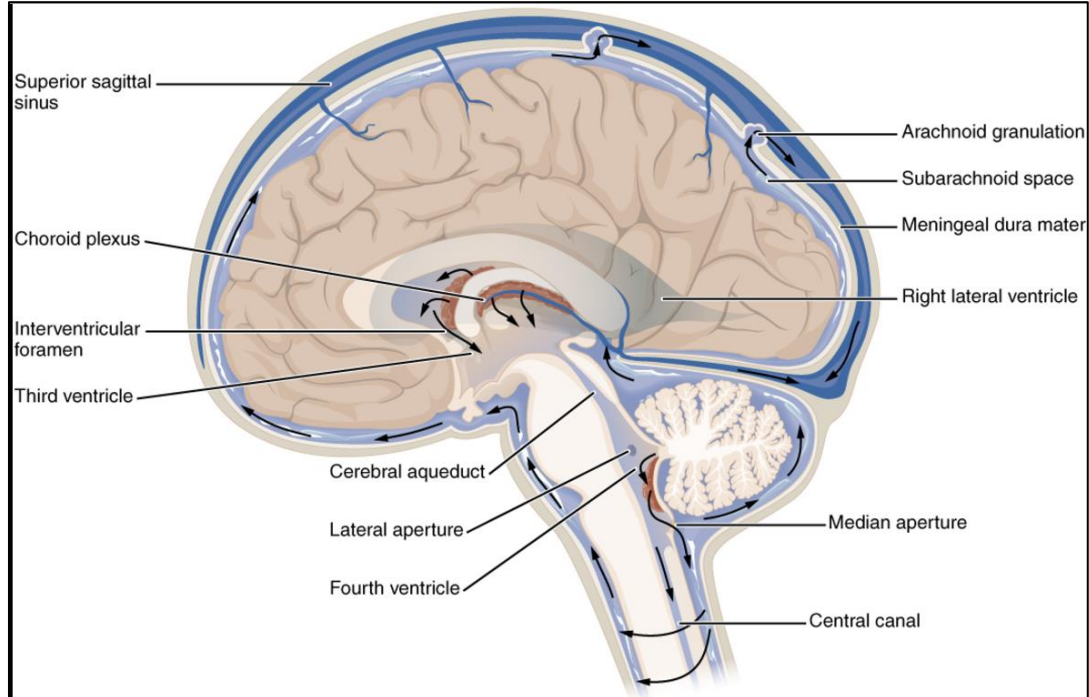


## CSF System



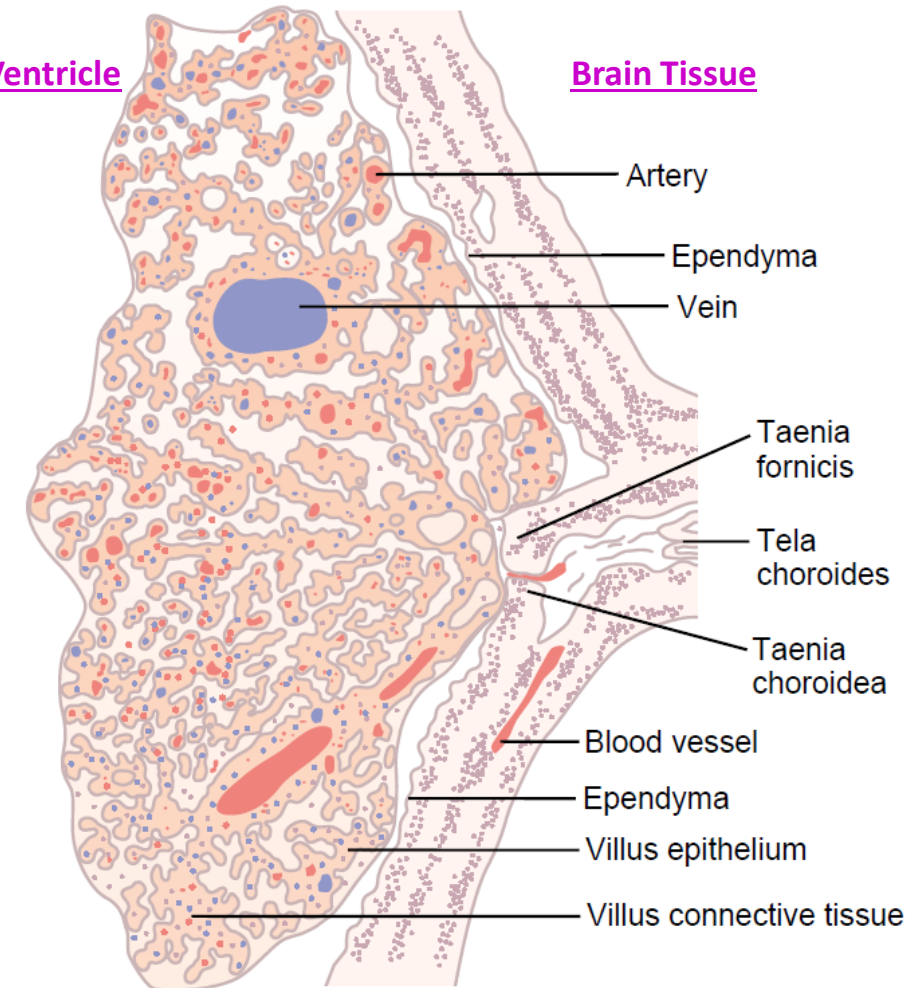
## Liquid Circulation in Brain:

## Cerebro-Spinal Fluid (CSF) Flow & Secretion



Ventricle

Brain Tissue



# Functions of CSF

## **Buoyancy:**

Brain exists in neutral buoyancy, that allows the brain to avoid injury by its weight.

## **Protection:**

CSF protects brain from injury when hit, by providing a shock absorber.

## **Prevention of brain ischemia:**

By adaptively increasing CSF outflow, intracranial pressure lessens letting blood flow

## **Clearing waste:**

CSF helps removal of brain's wastes and is critical in brain's lymphatic system.