

## Lec . 5 Biology

### Central Nervous System ( CNS )

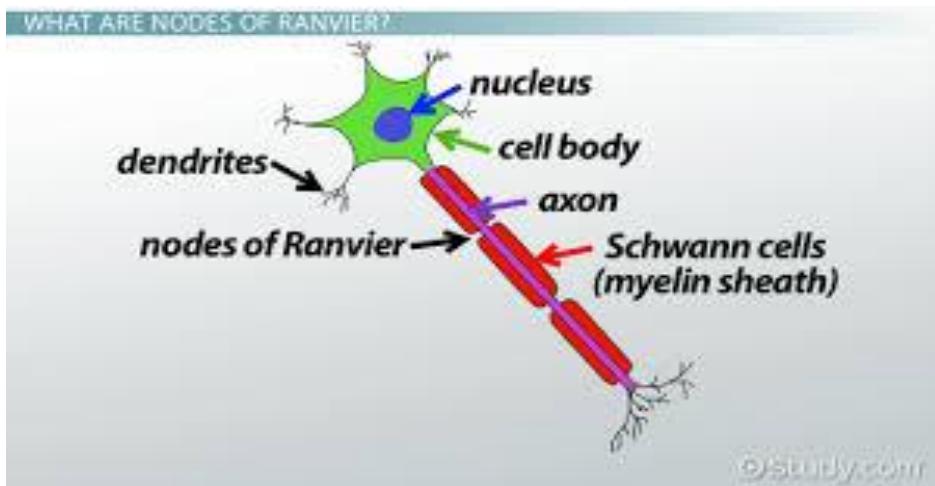
**1 - CNS consist of Brain and spinal cord :**

**2 – Brain include (Cerebrum , Midbrain , Cerebellum )**

**3 – Brain housed in cranial cavity with in skull .**

**4 – Spinal cord housed in spinal or vertebral canal with in vertebrates ( start from the base of skull till the end of vertebral canal ).**

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## Cells of Nervous System

**1 - Neurons(nerve cells) 2 - Glial cells 3 - Schwann cell**

**1 - Nerve cell :** compose , cell body , axon , dendrites .

**Cell body of Nerve cell contain :** nucleus , mitochondria , Golgi complex

Also contain Nissl granules ( rough endoplasmic reticulum and free ribosomes ) making protein synthesis .

**Axon :** It arises from the cell body , first area of axon called axon hillock . Distally the axon branched forming axon terminals . These make synaptic connections with another neurons , contain various transmitter which is released into synapses of neurons .

**Axon is insulated ( covered) Schwann cell** facilitates rapid transmission of action potential along the axon .

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**Dendrites** : These processes extend from the body of cell to outward . They transmire signals received from other neurons .

## **2 - Glial Cells :**

**A - Astrocytes      B – Oligodendrocytes      C – Microglia**

**D - Ependymal cells .**

These cells present within brain and spinal cord , supportive cells .

**3 - Schwann Cell** : It is a cell surround the axon facilitate rapid transmission along the axon .

**Node of Ranvier** : present in axon .

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## **Meninges :**

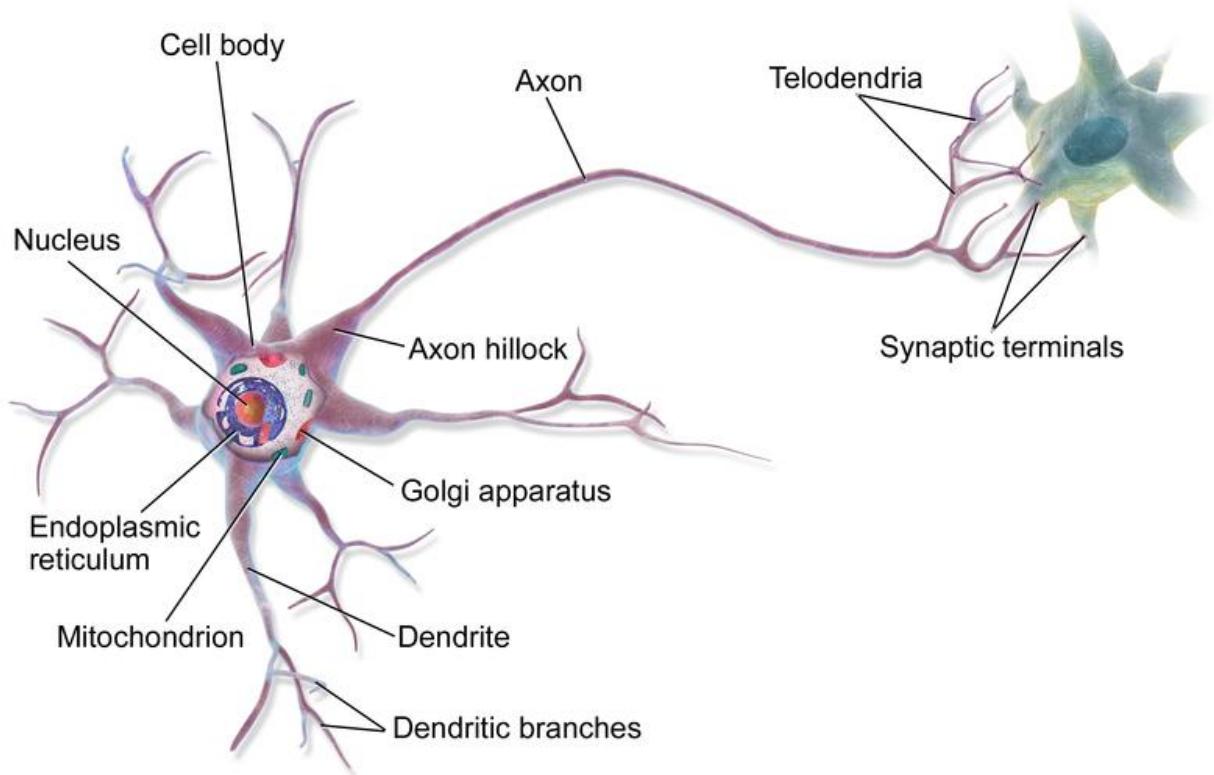
Three layers protect brain and spinal cord ( barrier ) from neurotoxic ( drugs and chemicals ) commonly found in food :

**1 - Dura mater** : (tough mother ) sac like , outer layer , lined skull and vertebratae , fibroelastic layer , without blood vessels .

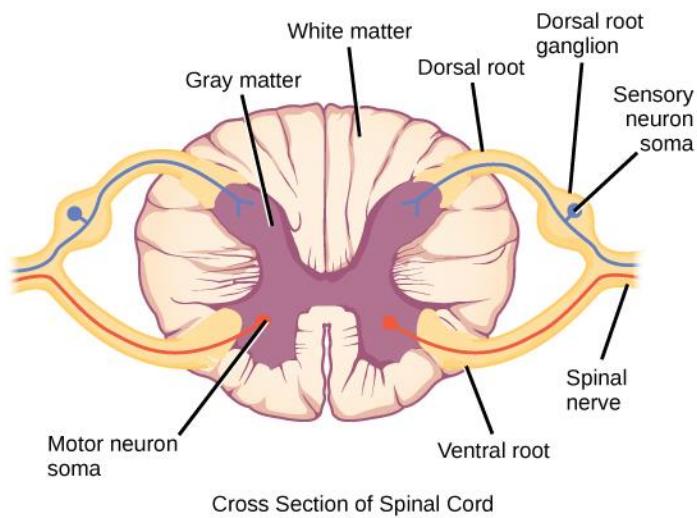
**2 - Arachnoid mater** : Middle layer , so named arachnoid because the membrane like spider web . Arachnoid barrier layer , it is a cushions of the CNS .

**3 - Pia mater** : ( Tender mother ) it is very delicate membrane , it envelope firmly adhere to the surface of the brain and spinal cord . Pia mater is pierced by blood vessels and its capillaries nourish the brain and spinal cord by diffusion

**Synapses : Communication between two nerve cells .**



**Nerve cell ( Neuron )**

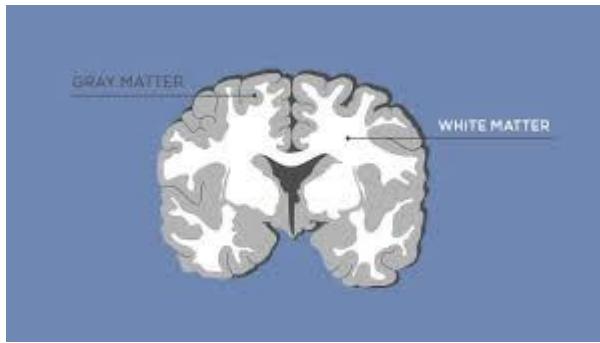


**spinal cord**

**Cross section of**

**Synapses : Communication between two nerve cells .**

**White matter and gray matter in brain :**



**White matter and gray matter in spinal cord**

**Cross section of brain and spinal cord appear two colors :**

**Grey matter :** is a major component of CNS consist of neuronal cell bodies , .

**White matter :** White color due to whiteness of myelin sheath .

**Quiz :** Write 10 points about Circulatory System ( Heart and Blood Vessels ?

