Normal cell of CNS

Red: important.
Black: in male|female slides.
Gray: notes|extra.

Editing file

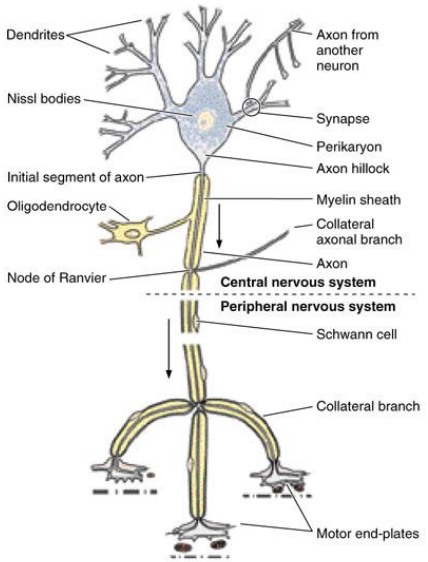
➢ OBJECTIVES

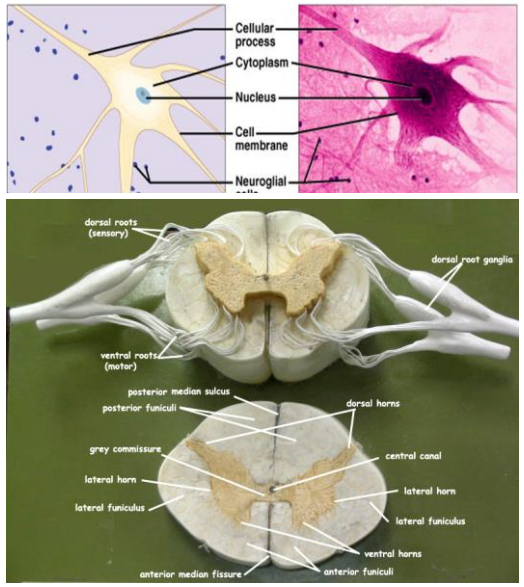
- Describe the microscopic structure and the function of:
- Neurons:
  - Cell body (perikaryon).
  - Processes: An axon and dendrites.
- Neuroglia:
  - Astrocytes.
  - Oligodendrocytes.
  - Microglia.
  - Ependymal cells.

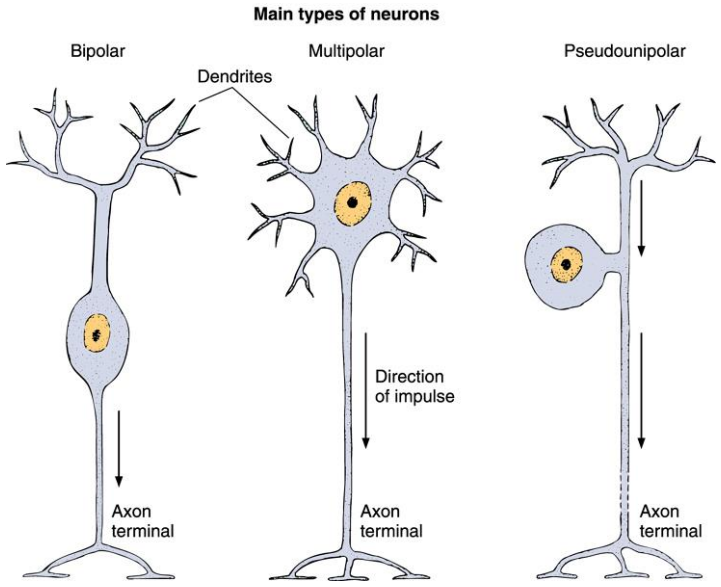
➢ NEURON

- **Components:**
  - **Cell body (Perikaryon)**
  - **Processes :**
    - **An axon: only one**
    - **Dendrites: one or more**
- **We can differentiate between the axon & the dendrite by Nissl bodies**
- **Axons don't contain nissl bodies**

- **Types:**
  - **Pseudounipolar neurons.**
  - **Bipolar neurons.**
  - **Multipolar neurons.**

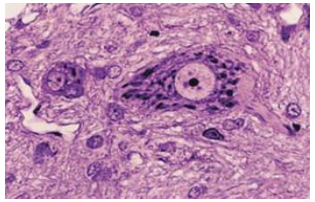
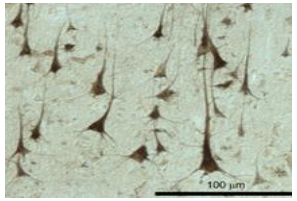
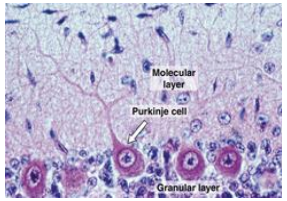






HISTOLOGY TEAM 437

➢ NEURON

<table>
<tr><th>Unipolar (Pseudounipolar) neuron (rounded neuron)</th><th>Bipolar Neuron (spindle-shaped neuron)</th><th colspan="3">Multipolar neuron</th></tr>
<tr><td>Has one process only, that divides into two branches; one acts as a dendrite and the other as an axon.</td><td>Has two processes (one arising from each pole of the cell body). One of them is the dendrite and the other is the axon.</td><td colspan="3">Has one axon and multiple dendrites.</td></tr>
<tr><td colspan="2">Example</td><td colspan="3">Types</td></tr>
<tr><td>Mesencephalic nucleus of trigeminal nerve and dorsal root (spinal) ganglion.</td><td>Retina & olfactory epithelium.
ear</td><td rowspan="2">Stellate neuron: commonest type. Distributed in most areas of CNS; Example: anterior horn cells of the spinal cord</td><td rowspan="2">Pyramidal neurons: Distributed in motor area 4 of the cerebral cortex</td><td rowspan="2">Pyriform neurons: Pear-shaped, e.g. Purkinje cells of cerebellar cortex</td></tr>
<tr><td colspan="2">under microscope you can differentiate between unipolar and multipolar by outline of the cell :
- if it regular so it unipolar
- if it not regular so it multipolar</td></tr>
<tr><td colspan="2"></td><td>  </td><td>  </td><td> 
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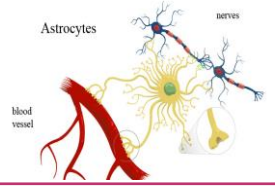
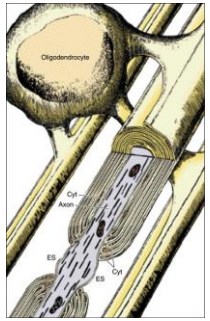
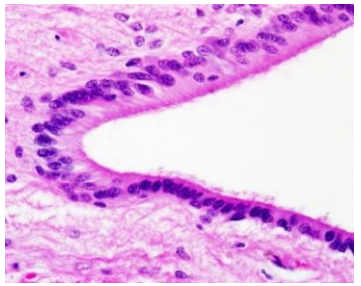
</table>

➢ NEURON

CELL BODY (Perikaryon)	**NUCLEUS**	Single, usually central, rounded and vesicular with prominent nucleolus.
	CYTOPLASM Its main components include:	**1-Nissl bodies**: are basophilic patches of rER and free ribosomes in the cell body and bases of wide dendrites.
		2- Neurofilaments: are intermediate filaments which are bundled together to form neurofibrils. Are found in the cell body, axon and dendrites.
		3- Microtubles: are found in the cell body, axon and dendrites.
		4- Golgi apparatus: surrounds the nucleus all around.
		5- Mitochondria: are numerous.
		6- Centriole: Most adult neurons have only one rudimentary centriole, so they cannot divide.
		7- Some fat and glycogen granules.
		8- Pigments: Lipofuscin pigments (in old age). Melanin pigments (in neurons of substantia nigra of the midbrain).-

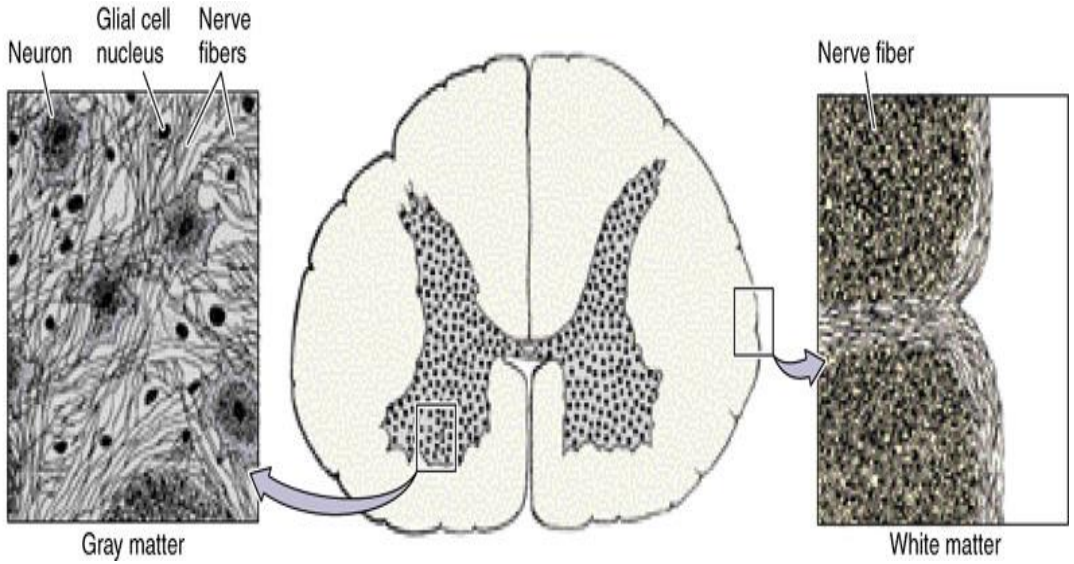
*The neuron is more active because the nucleus is open face and bigger
*Nissl bodies exists in cell body and dendrites and its not in axon
*Cardiac muscle and neurons cannot divide

➢ NEUROGLIA

DEFINITION:	Are group of cells that act as the supportive tissue of CNS.			
	Astrocytes	**Oligodendrocytes**	**Microglia**	**Ependyma cells**
DESCRIBE	Commonest type of neuroglia cells. They are found in both the grey and white matter. They are star-shaped cells with numerous long processes.	Branching cells with few, short processes. They are distributed in the grey and white matter of CNS.	Spindle-shaped cells with branching processes raise from each pole of the cell. Distributed in the white matter &grey of CNS ,are rich in lysosomes.	simple columnar epithelial cells (partially ciliated) lining the brain ventricles and the central canal of spinal cord
FUNCTION	- Repair of injury of CNS tissue (gliosis). -Supportive & nutritive functions to the neurons, Participate in the formation of blood-brain barrier. 	Formation of myelin sheath in the CNS. Insulation of nerve fibers. 	Their main function is phagocytosis Same as macrophage 	Formation & circulation of CSF 

➢ TYPES OF NERVE FIBERS IN CNS

- **Unmyelinated without neurilemmal sheath (in grey matter).**
- **Myelinated without neurilemmal sheath (in white matter).**
- neurilemmal sheath is formed by Schwann cell
- Schwann cell produce myelin sheath for nerves out CNS
- Oligodendrocytes produce myelin sheath for nerves in CNS



➢ QUESTIONS:

Q1: In a neuron, which of the following is a **basophilic structure**?

a) Nissel bodies b) Smooth endoplasmic reticulum c) Lysosomes d) Neurofilaments

Q2: Which of the following cells may **have cilia**?

a) Astrocytes b) Ependyma c) Microglia d) Oligodendrocytes

Q3: Which of them structure related to **Neurons**?

a) Astrocytes b) Nasal sinuses c) Cell body d) Ependyma

Q4: **How many** processes in the **axon** of Neuron?

a) Four b) Three c) Two d) One

Q5: The **function** of **Astrocytes** is?

a) Repair injury of CNS tissue b) Supportive & nutritive to the neurons

c) Participate in the formation of BBB d) All of them

1- A
2- B
3- C
4- D
5- D

HISTOLOGY TEAM 437

Q6: **Insulation of nerve fibers** is the function of?

a) Astrocytes b) Ependyma c) Microglia d) Oligodendrocytes

Q7: Where we can find **fibrous astrocytes**?

a) White matter of CNS b) Grey matter of CNS

c) White matter of Spinal cord d) Grey matter of spinal cord

Q8: What is the **commonest** type of **neuroglia cells**?

a) Astrocytes b) Ependyma c) Microglia d) Oligodendrocytes

Q9: **Distributed** of **Pyramidal neurons**?

a) Motor area 4 of cerebral cortex b) Motor area 4 of cerebral cortex

c) Sensory area 3 of cerebral cortex d) Sensory area 3 of cerebral cortex

Q10: What is the component of **Neuron** inside cytoplasm of cell body **cannot divide**?

a) Golgi apparatus b) Mitochondria c) Centrioles d) Pigments

6- D
7- A
8- A
9- B
10- C

Team members :

Hussain Alkharboush
Tareq Allhaidan
Ebtesam Almutairi
Marwah Alkhalil
Rinad Alghoraiby

Team leaders :

Khalid Fayez Alshehri
Rawan Mohammad Alharbi

Twitter.com/Histology437
HistologyTeam437@gmail.com