

Lab Exercise 9

Nervous Tissue

Brain

Cranial Nerves

Spinal Cord

Spinal Nerves

Textbook Reference: See Chapter 11 for histology of nerve tissue and spinal cord
See Chapter 12 for brain and spinal cord anatomy
See Chapter 13 for cranial nerves and spinal nerves

What you need to be able to do on the exam after completing this lab exercise:

Be able to identify nerve tissue and identifying features, such as nerve cell body, nucleolus, nucleolus, processes, supporting cell nuclei, etc.

Be able to identify the listed parts of the brain on the brain models.

Be able to identify the listed parts of the brain on the sheep brains.

Be able to identify the cranial nerves by name, Roman numeral, and function on the brain and brainstem models.

Be able to identify the listed parts of the spinal cord on the spinal cord models.

Be able to identify the listed parts of the spinal cord on the spinal cord microscope slides.

Be able to identify the listed plexuses and major spinal nerves on the nerve man model.

For a handy supplemental study guide, please print the “Nervous System Handout” under “Virtual Lab Nine” on the Virtual Lab website.

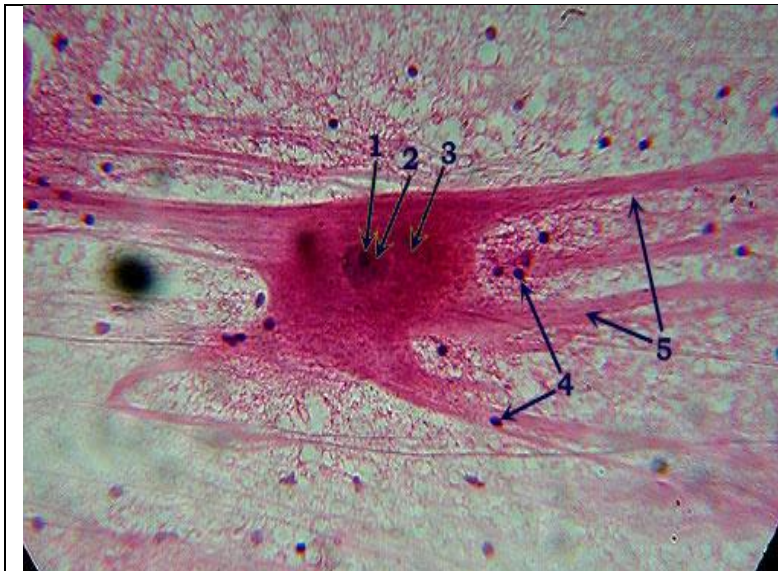
Nervous Tissue

Nervous tissue is composed of two major cell types: **supporting cells** and **neurons**.

Supporting cells are non-conducting cells that far outnumber the neurons and function to protect, support, and insulate the neurons.

Neurons are the large conducting cells of nervous tissue. They all have a **nucleus**-containing **cell body**, and their **cytoplasm** is drawn out into long extensions (**processes**). There are two types of neuron processes, **dendrites** and **axons**. Dendrites deliver the nerve impulse to the cell body and the axon carries the nerve impulse away from the cell body.

Nervous Tissue



Identification: Note the distinctive shape of neuron, with long processes (dendrites and/or axons, 5) extending out from the main cell body.

Features to Know: The large, irregularly shaped cell body (3) contains a darker nucleus (2), which contains an even darker-staining nucleolus (1). There are also numerous supporting (glial) cells, though only their small dark nuclei (4) are easily seen.

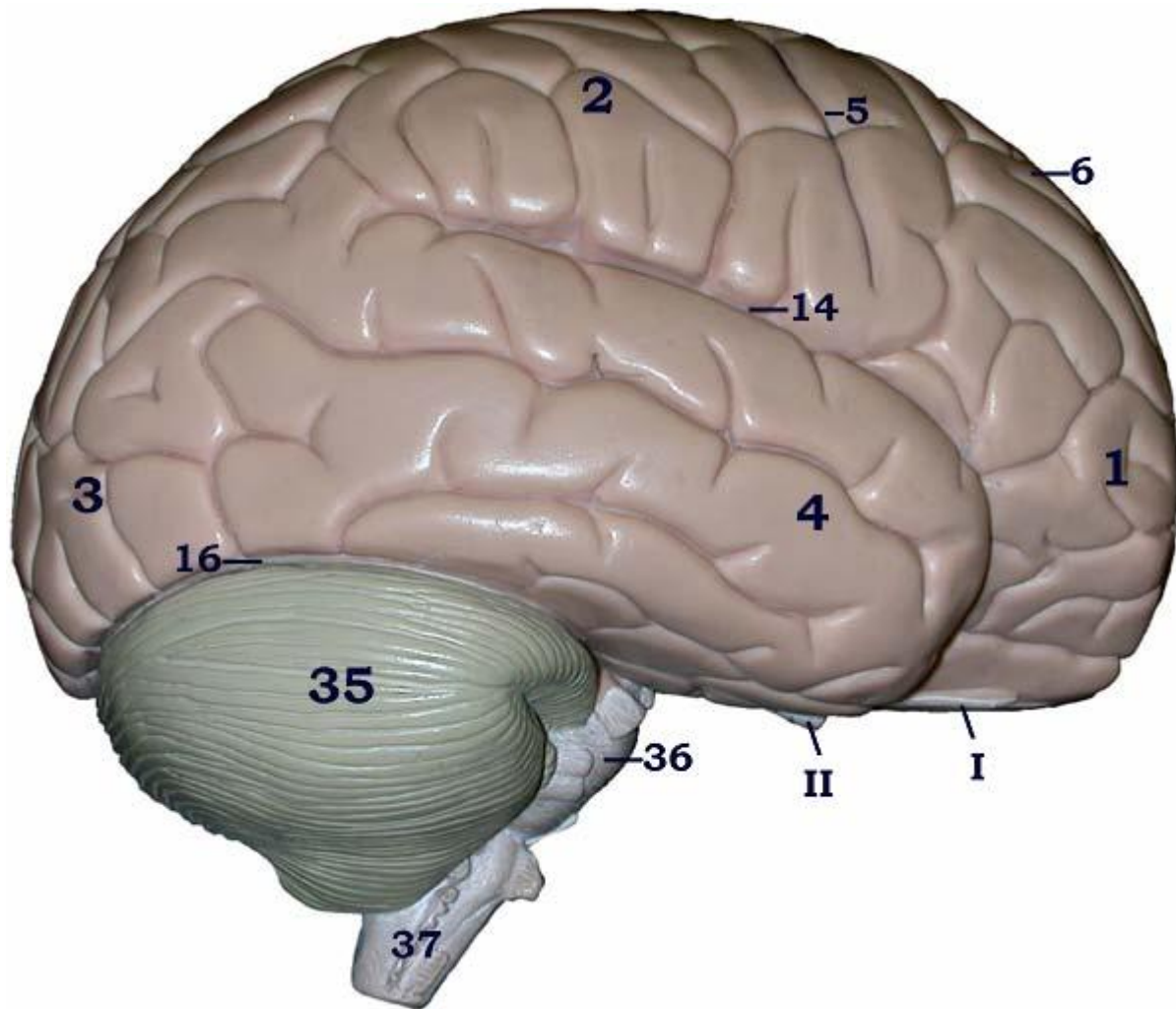
Identifying Nervous Tissue Under the Microscope

Procedure:

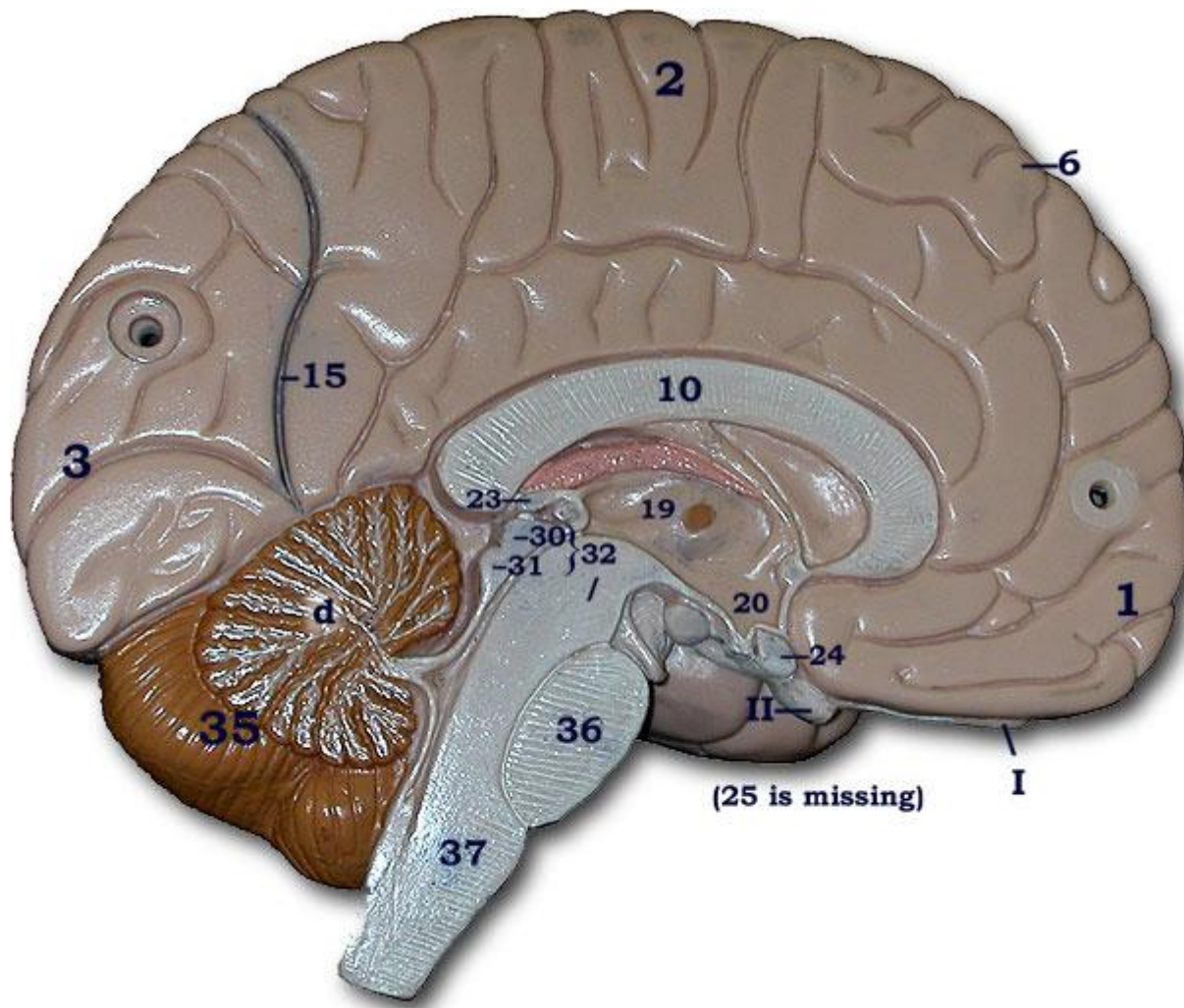
1. Place the **neuron smear** slide on the microscope and bring it into focus using the **scanning objective lens (4X)**.
2. Locate a large neuron and move it to the center of your field of view.
3. Switch to the **low power lens (10X)**, get the neuron into focus, and move it to the center of your field of view.
4. Note the **processes** extending from the **cell body**. On the slide, you cannot distinguish the dendrites from the axon. Also, note the small dark spots around the neuron cell bodies. These are the **supporting cell nuclei**.
4. Switch to the **high power lens (40X)** and get into focus using the fine adjustment knob **ONLY!**
5. Locate the nerve **cell body**. Identify the **nucleus** and the **nucleolus**. The nucleolus will stain very dark and the nucleus will appear as a lighter halo around it.
6. Make a drawing of a neuron in the space below and label the following: **cell body, nucleus, nucleolus, processes, and supporting cell nuclei**.

The Brain

****Know the following parts of the human brain on the brain models in the lab.**



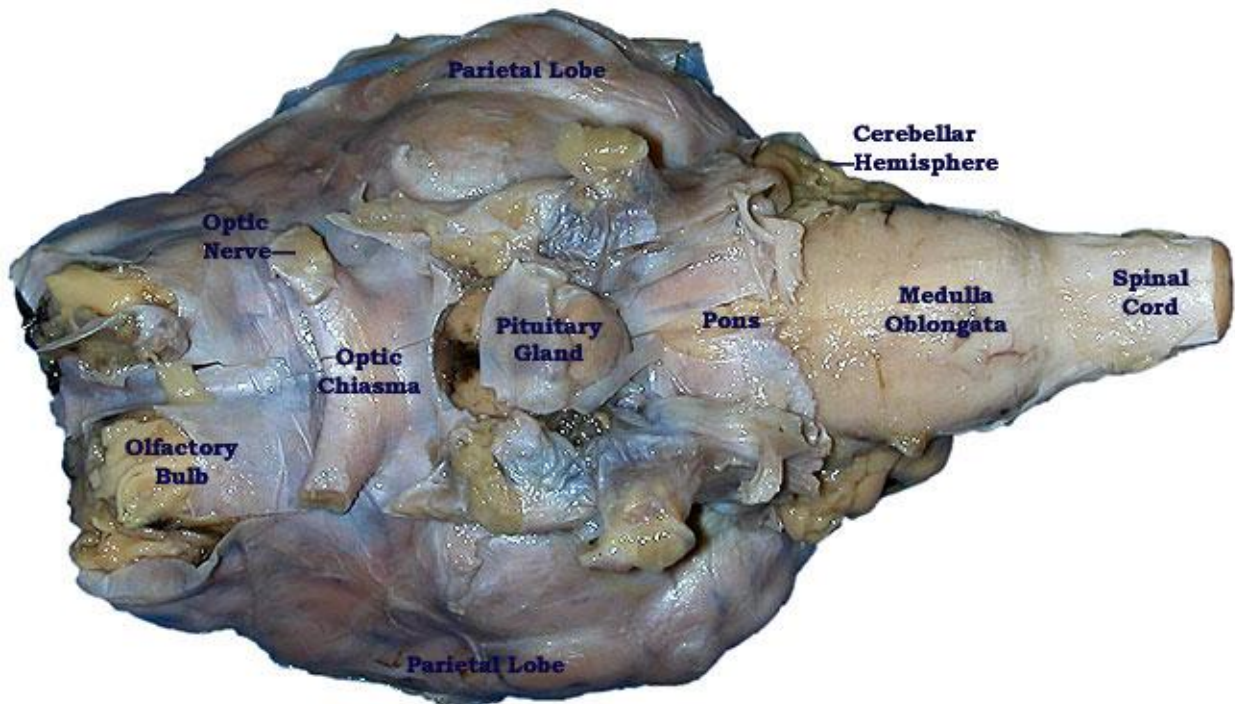
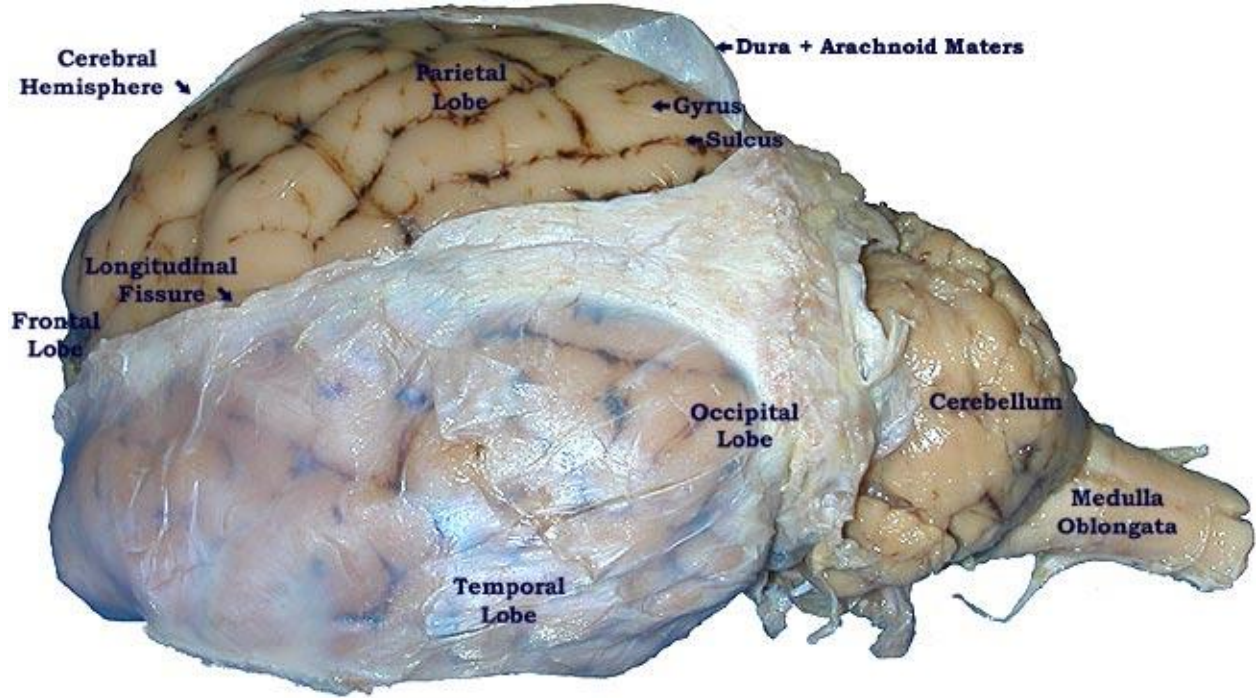
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|-------------------|------------------------|-----------------------|-----------------|
| 1. Frontal lobe | 5. Central sulcus | 35. Cerebellum | II. Optic nerve |
| 2. Parietal lobe | 6. Gyrus | 36. Pons | |
| 3. Occipital lobe | 14. Lateral sulcus | 37. Medulla Oblongata | |
| 4. Temporal lobe | 16. Transverse fissure | I. Olfactory nerve | |

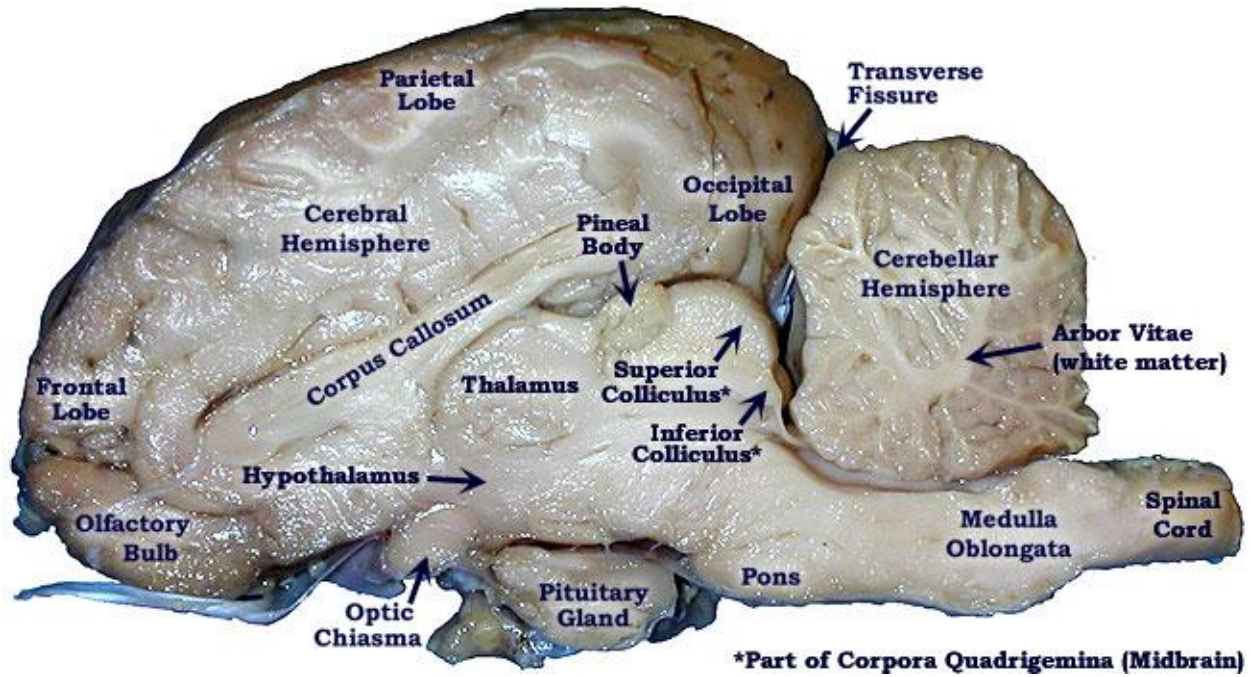


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|------------------------------|--|-----------------------|
| 1. Frontal lobe | 20. Hypothalamus | 35. Cerebellum |
| 2. Parietal lobe | 23. Pineal gland | 35d. Arbor vitae |
| 3. Occipital lobe | 24. Optic Chiasma | 36. Pons |
| 6. Gyrus | 30. Superior colliculus
of Corpora quadrigemina | 37. Medulla oblongata |
| 10. Corpus callosum | 31. Inferior colliculus
Of Corpora quadrigemina | I. Olfactory nerve |
| 15. Parieto-occipital sulcus | 32. Midbrain (includes 30 & 31) | II. Optic nerve |
| 19. Thalamus | | |

Sheep Brain

****Know the following parts of the sheep brain on the sheep brains in the lab.**





Cranial Nerves

There are 12 pairs of cranial nerves that branch from the brain.

****Know the 12 pairs of cranial nerves by name, Roman numeral, and function on the brainstem models and brain models.**

<u>Cranial Nerve</u>	<u>Function</u>
(I) Olfactory Nerve	Sense of smell
(II) Optic Nerve	Sense of vision
(III) Oculomotor Nerve	Superior, inferior and medial movement of the eye
(IV) Trochlear Nerve	Movement of the eye
(V) Trigeminal Nerve	Sensations of pain, touch, and temperature; chewing
(VI) Abducens Nerve	Lateral movement of the eye
(VII) Facial Nerve	Facial expression, secretion of saliva and tears, sense of taste
(VIII) Vestibulocochlear Nerve	Sense of hearing and balance
(IX) Glossopharyngeal Nerve	Sense of taste, secretion of saliva
(X) Vagus Nerve	Contraction and relaxation of smooth muscle, sensory reception of supplied visceral organs
(XI) Accessory Nerve	Swallowing, movement of the head
(XII) Hypoglossal Nerve	Movement of the tongue

Mnemonics for memorizing cranial nerves:

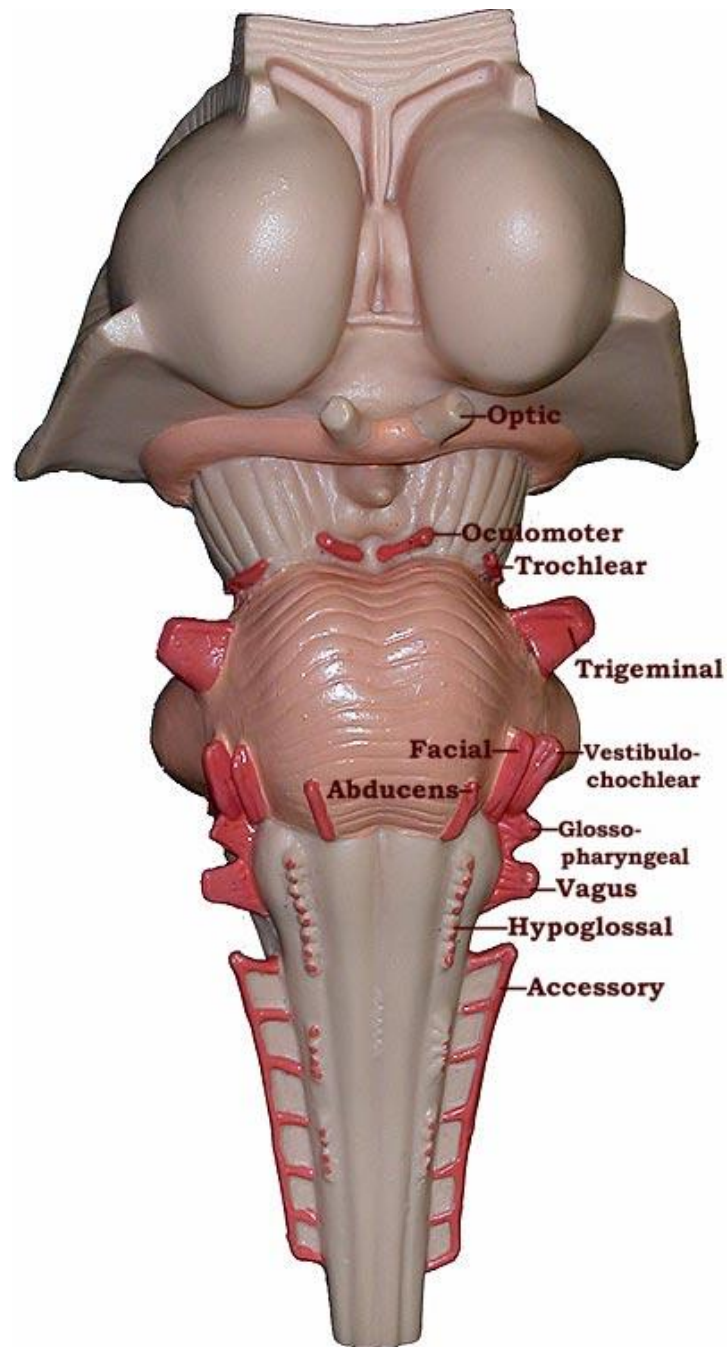
“On Occasion Our Trusty Truck Acts Funny Very Good Vehicle Any How”

“On Old Olympus’ Towering Tops A Friendly Viking Grew Vines And Hops”

Brainstem Model

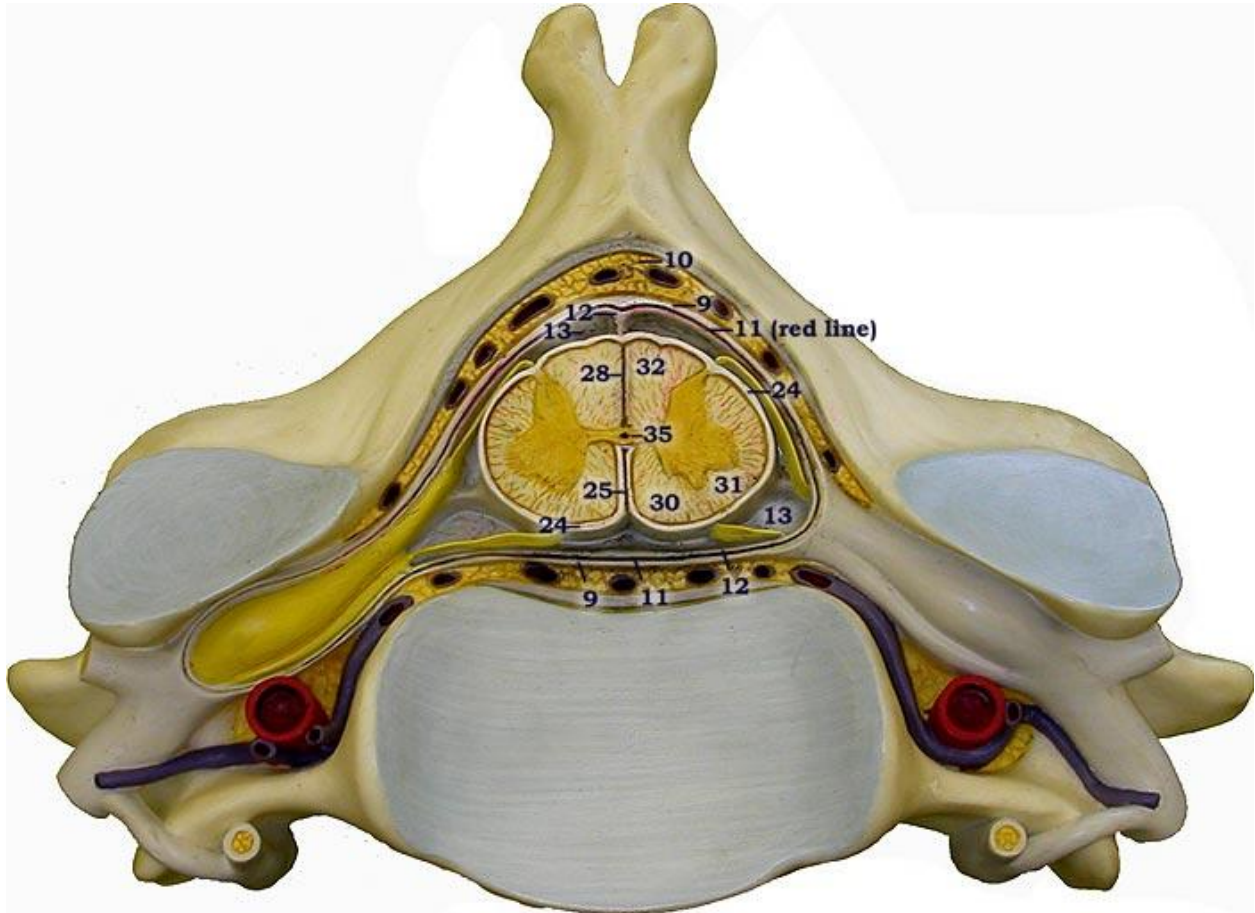
****Know the cranial nerves by name, Roman numeral, and function on the brainstem models**

The olfactory nerves lie on the anterior inferior surface of the brain and are not present on the brainstem models.

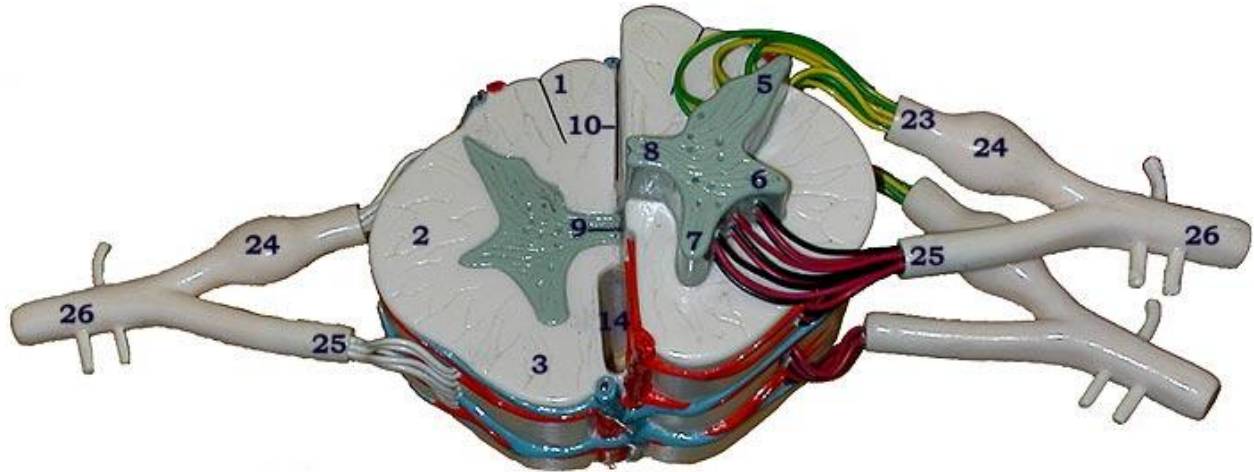


Spinal Cord

****Know the following parts of the spinal on the spinal cord models in the lab.**



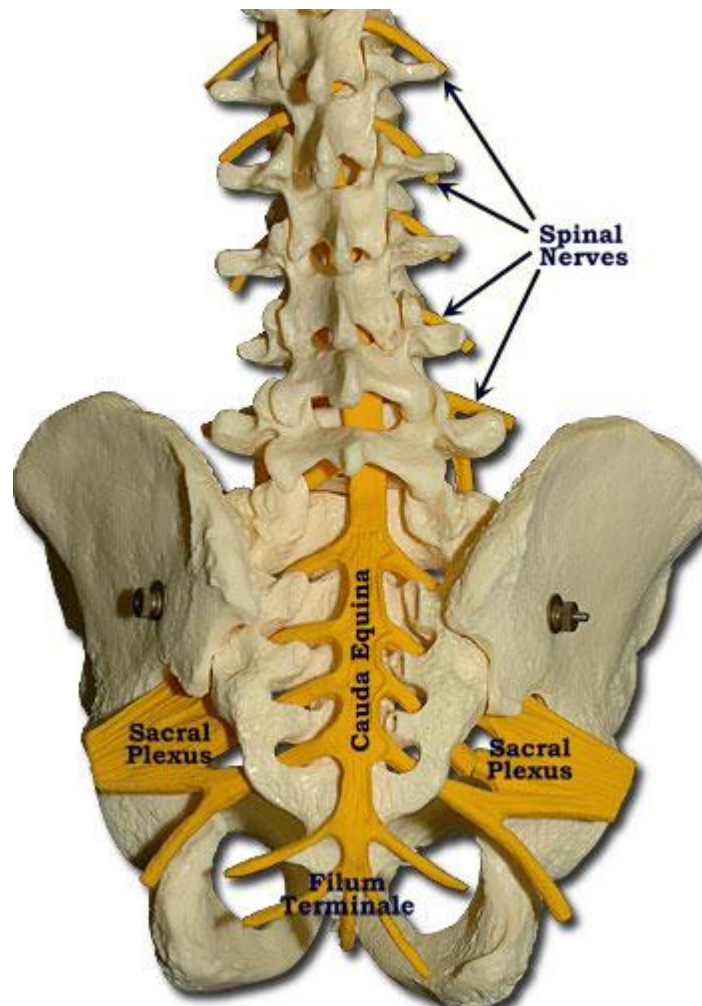
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|------------------------|-----------------------------|
| 9. Dura mater | 25. Anterior median fissure |
| 10. Epidural space | 28. Posterior median sulcus |
| 11. Subdural space | 30. Anterior funiculus |
| 12. Arachnoid | 31. Lateral funiculus |
| 13. Subarachnoid space | 32. Posterior funiculus |
| 24. Pia mater | 35. Central canal |



- | | |
|-------------------------|-----------------------------|
| 1. Posterior funiculus* | 9. Central canal |
| 2. Lateral funiculus* | 10. Posterior median sulcus |
| 3. Anterior funiculus* | 14. Anterior median fissure |
| 5. Posterior horn** | 23. Dorsal root |
| 6. Lateral horn** | 24. Dorsal root ganglion |
| 7. Anterior horn** | 25. Ventral root |
| 8. Gray commissure** | 26. Spinal nerve |

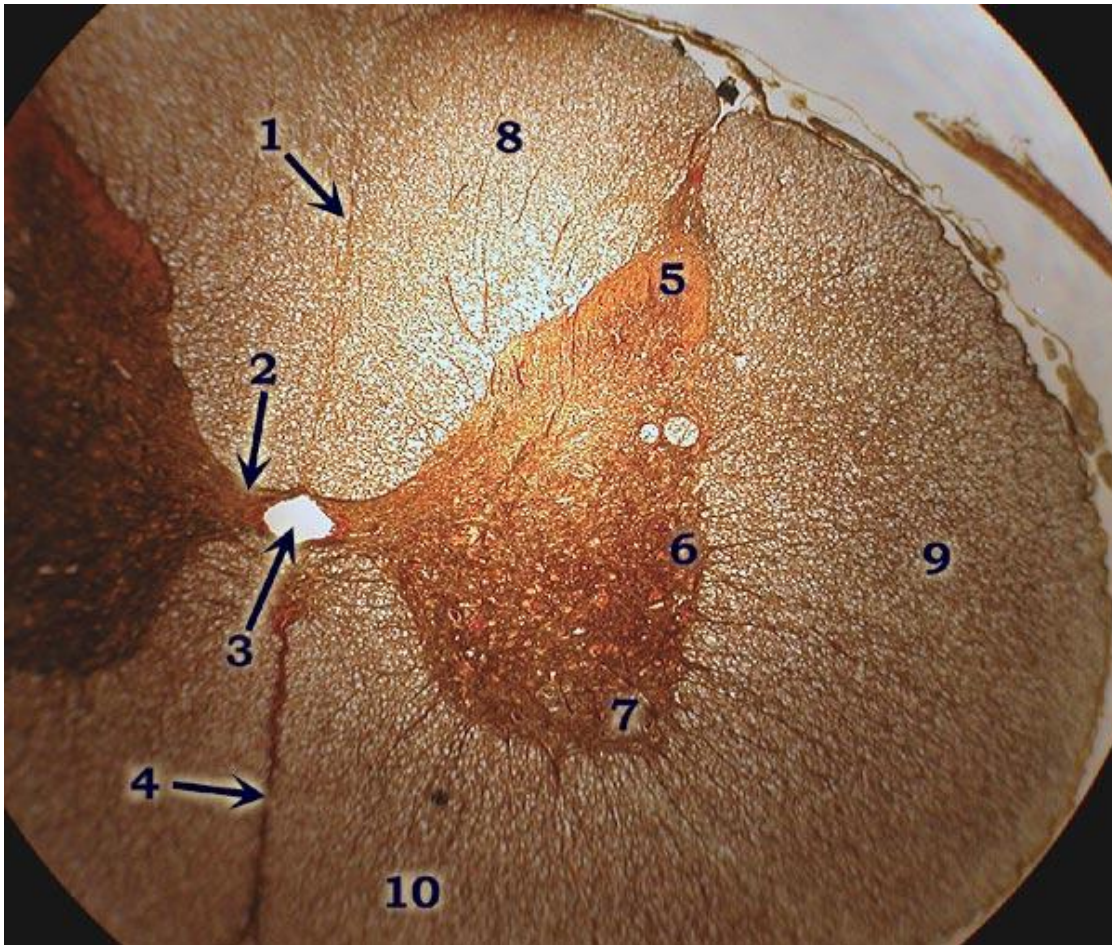
*White Matter
 ** Gray Matter

****Know the following parts of the spinal cord on the hanging spinal cord model.**



Spinal Cord

**** Know the following parts of the spinal cord on the spinal cord microscope slide.**



Structures:

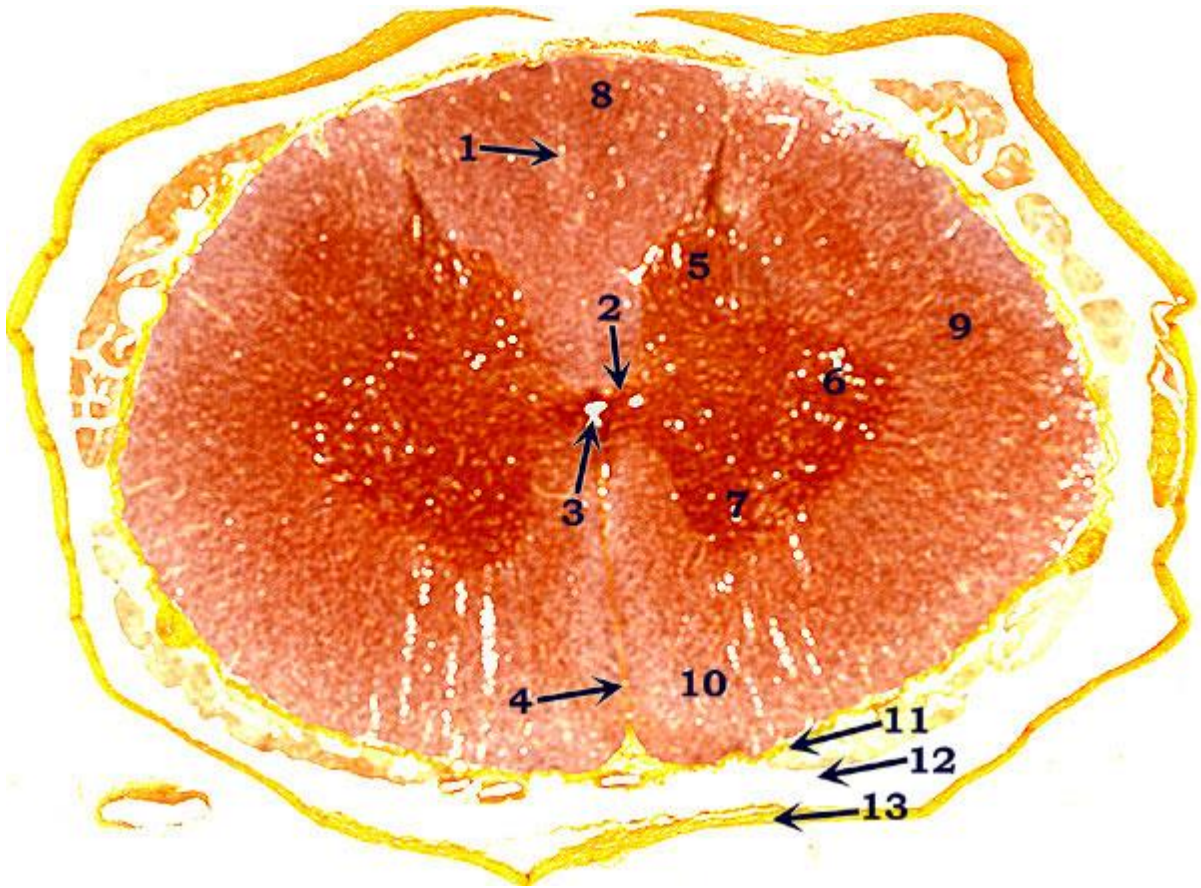
1. Posterior Median Sulcus
2. Gray Commissure
3. Central Canal
4. Anterior Median Fissure

White Matter:

8. Posterior Funiculus
9. Lateral Funiculus
10. Anterior Funiculus

Gray Matter:

5. Posterior Horn
6. Lateral Horn
7. Anterior Horn



Structures:

1. Posterior Median Sulcus
2. Gray Commissure
3. Central Canal
4. Anterior Median Fissure

Gray Matter:

5. Posterior Horn
6. Lateral Horn
7. Anterior Horn

White Matter:

8. Posterior Funiculus
9. Lateral Funiculus
10. Anterior Funiculus

Optional Features:

11. Pia Mater
12. Subarachnoid Space
13. Dura & Arachnoid Maters

Spinal Nerves

****Know the following plexuses and spinal nerves on the nerve man model.**

