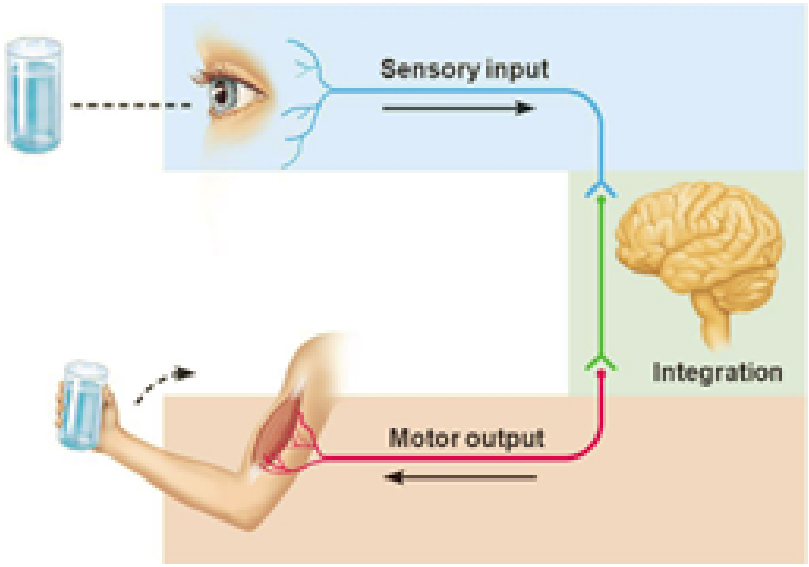
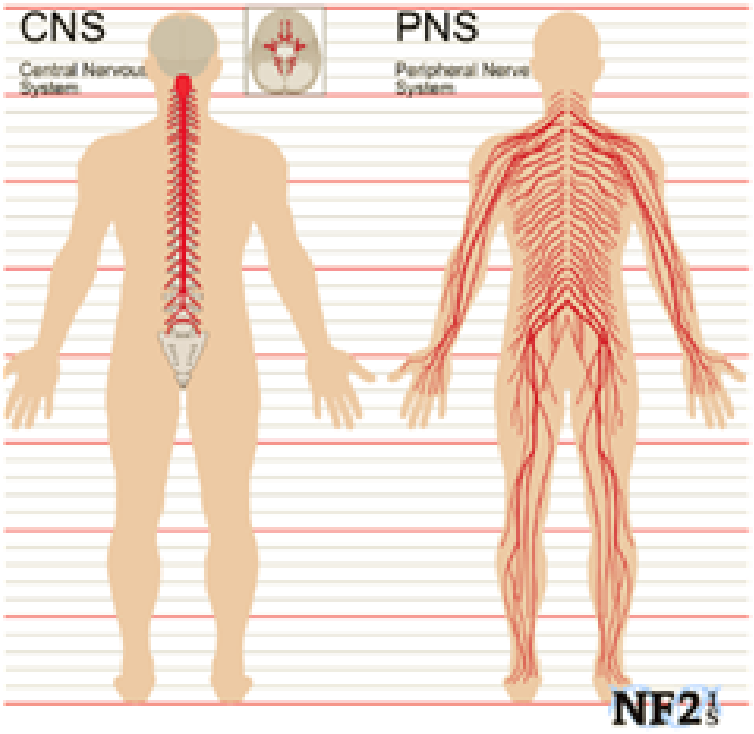
What I hope you learned from notes yesterday;

1. The nervous system keeps your body funtioning through receiving sensory information, integrating/understanding that information and responding to that information.





2. There are two divisions of the nervous system. The central nervous system includes the brain and spinal cord. The peripheral nervous system includes cranial and spinal nerves.

Meninges, Cerebrospinal Fluid and Spinal Cord

Cat Spinal Cord

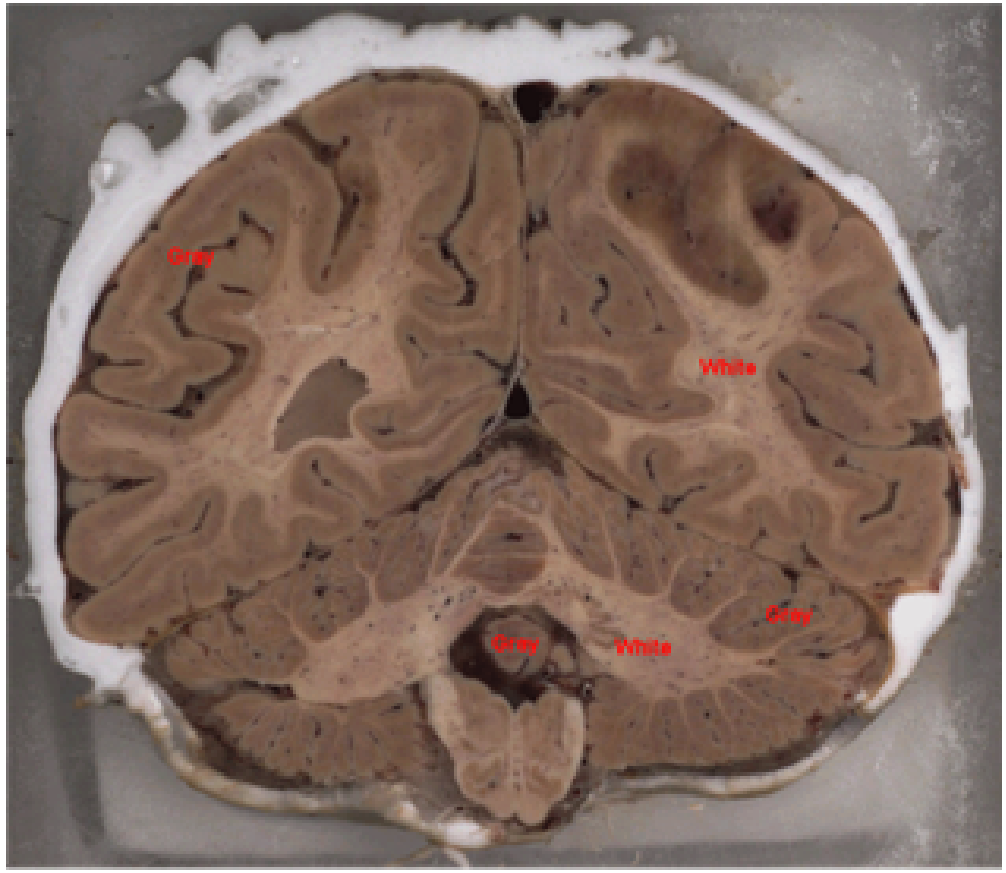
Central Nervous System

- gray matter - gray because it contains cell bodies and short non-myelinated fibers

- white matter - white because it contains myelinated axons that run together in bundles called 'tracts' (it is the myelin covering that gives the axons a shiny, white appearance)

Figure 16. Gray And White Matter

This shows normal gray-white matter differentiation. Myelinated regions (white matter) have a greater fat content than unmyelinated regions (gray matter). As a consequence, white matter is lower density and appears darker on CT. When ischemia renders this interface less discrete, the CT appearance is called loss of gray-white differentiation.

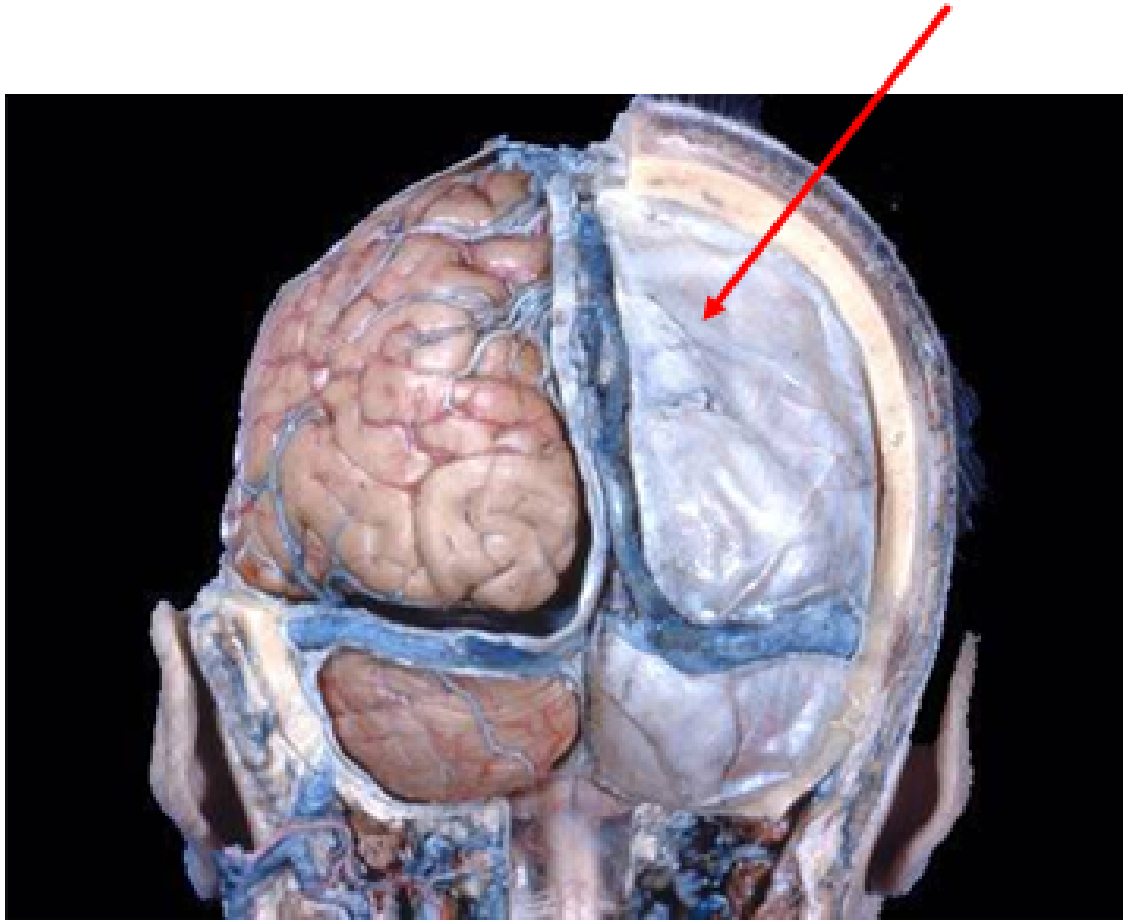


CNS Meninges

- Meninges - protective membranes that wrap both the spinal cord and brain

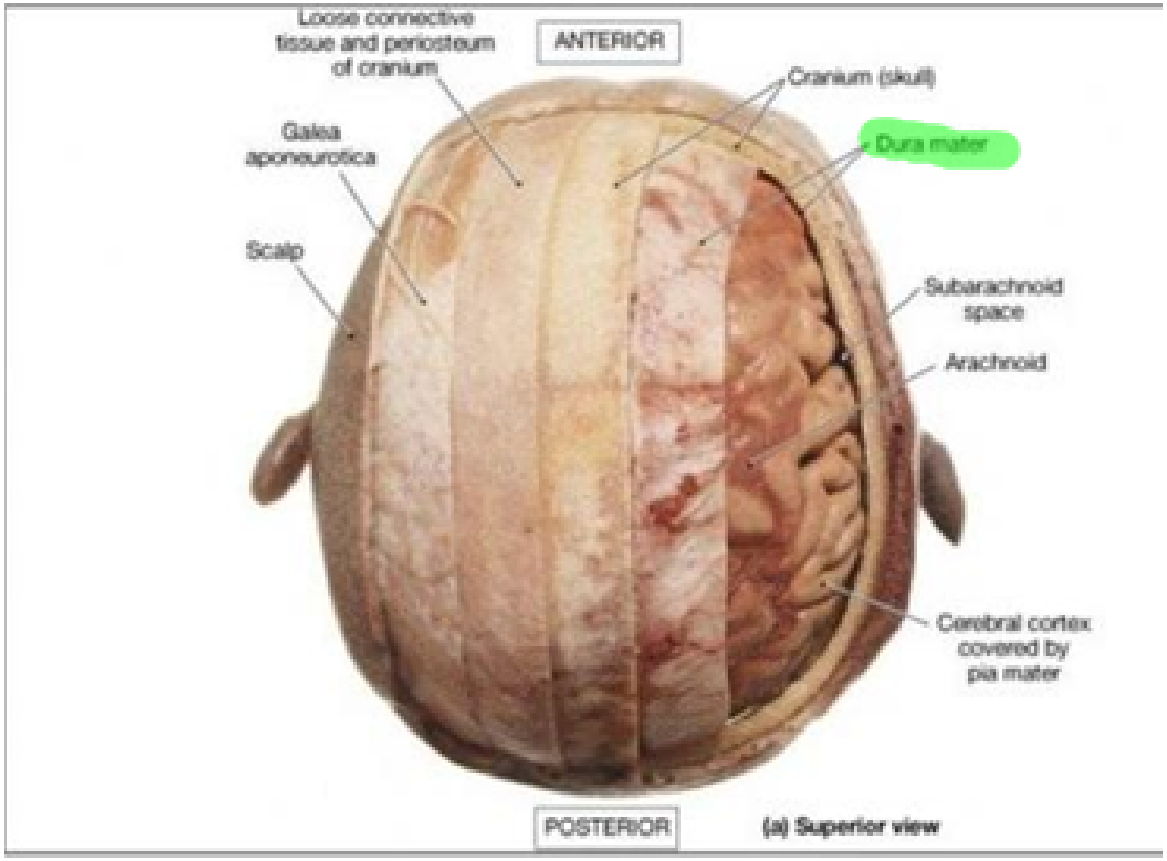
- There are 3 layers of meninges

- Meningitis is a bacterial infection resulting in swelling of the meninges)



CNS Meninges - Dura Mater

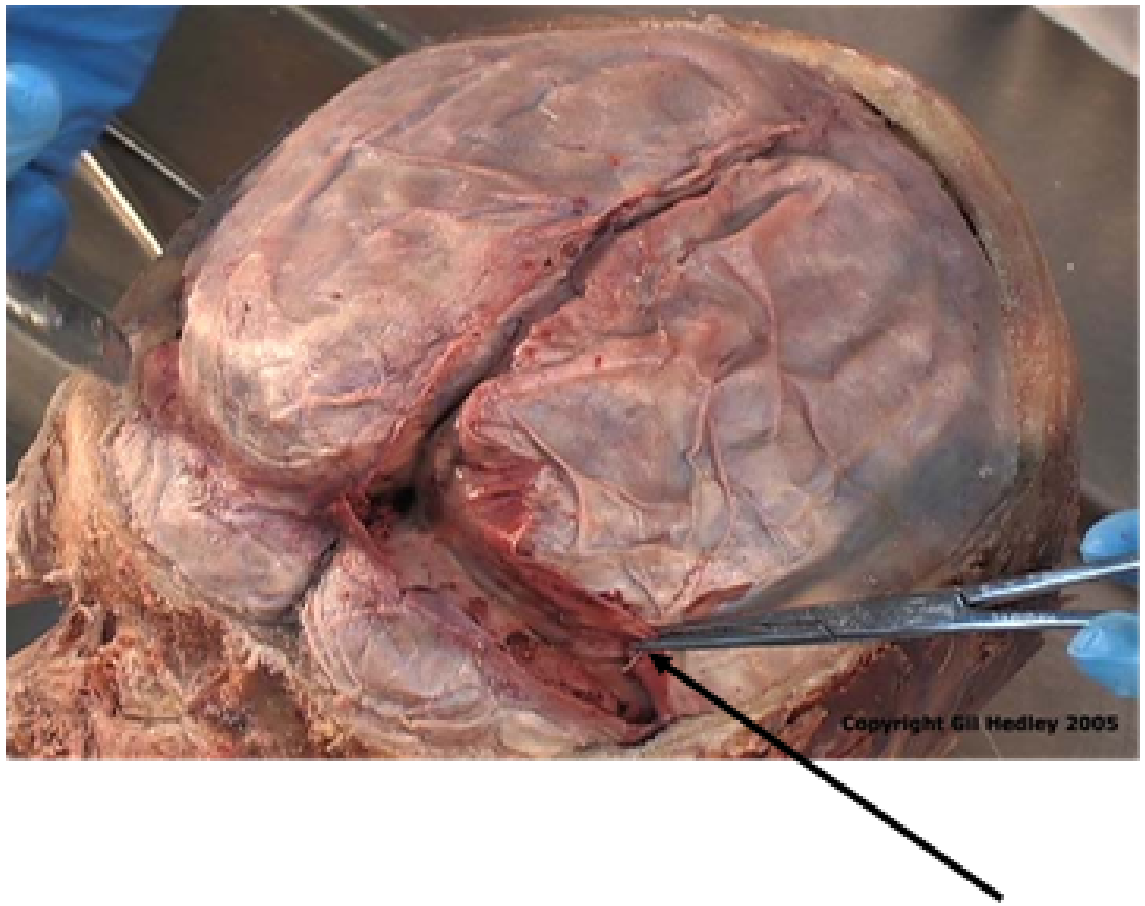
- outermost layer of the meninges
- a tough, white fibrous connective tissue
- lies next to the skull and vertebrae



CNS Meninges - Dura Mater

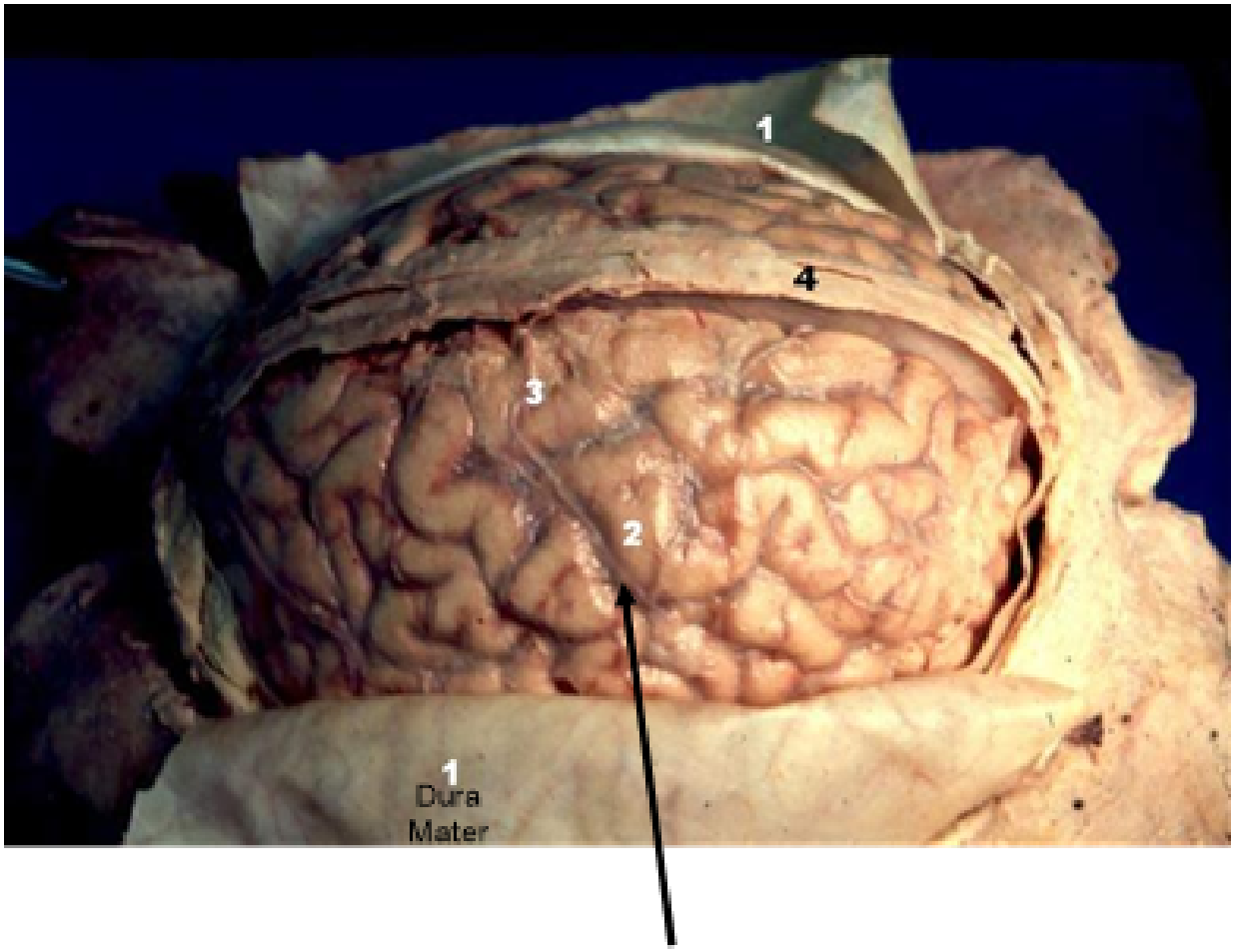
- made of two separate layers that are fused together

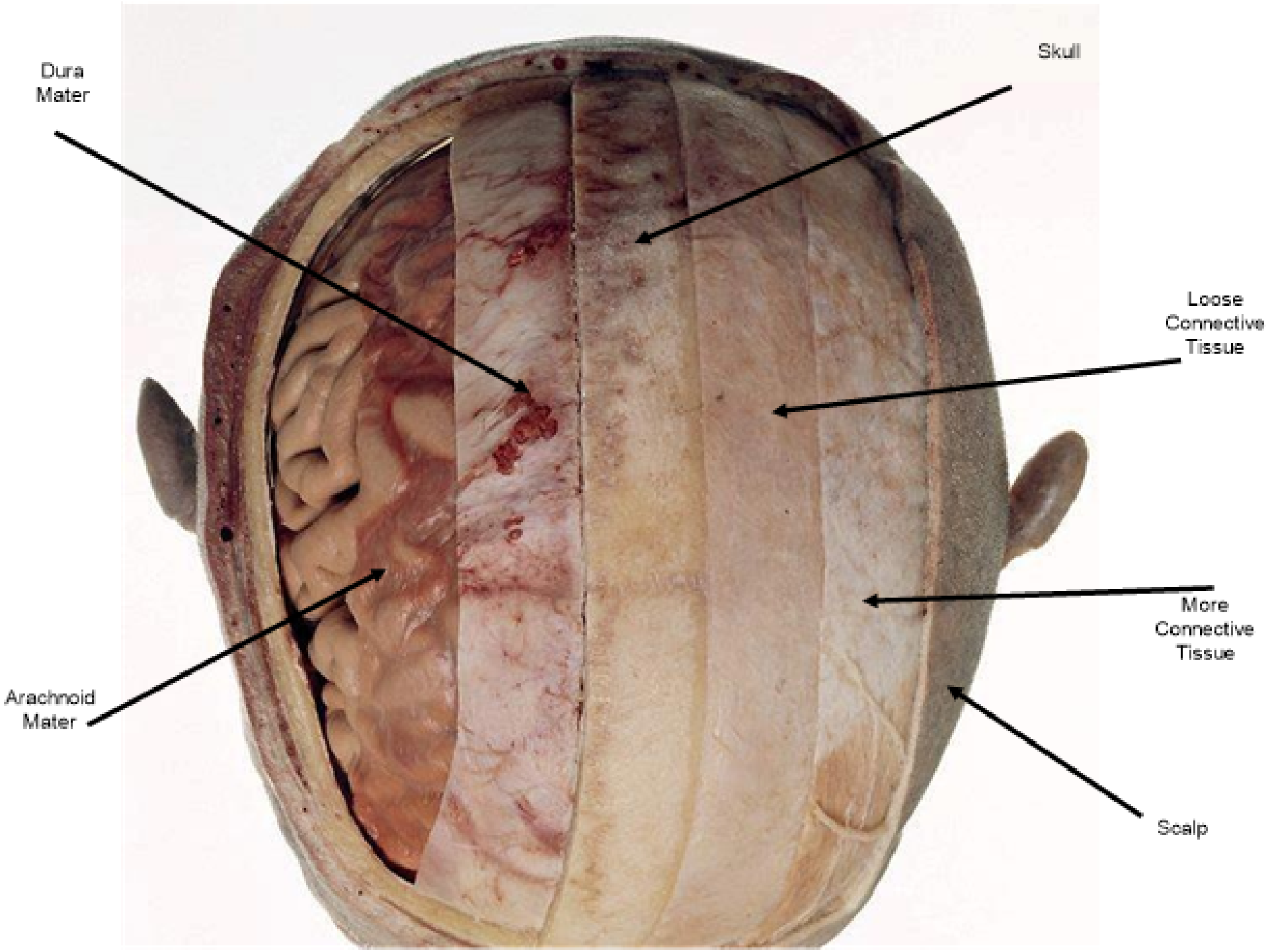
- In some places the two layers separate to form the dural venus sinuses that collect venous blood and excess cerebrospinal fluid returning both to the cardiovascular system

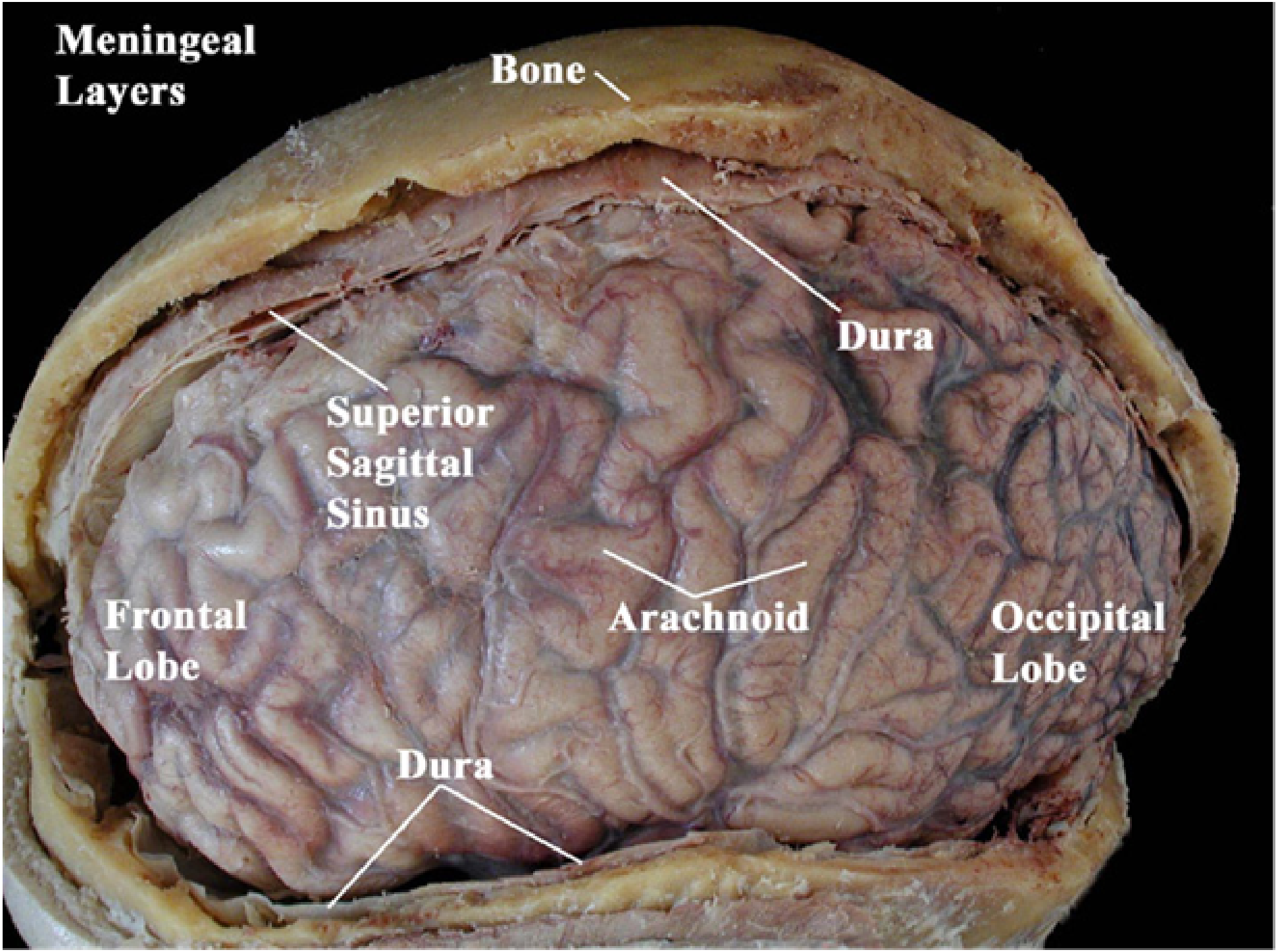


CNS Meninges - Arachnoid Mater

- deep to the dura mater
- consists of spider-web-like connective tissue

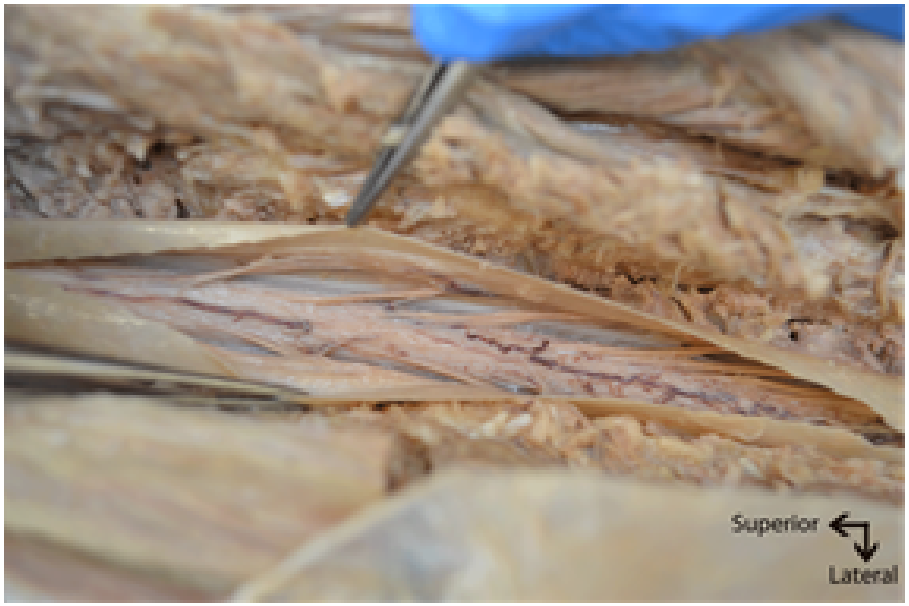


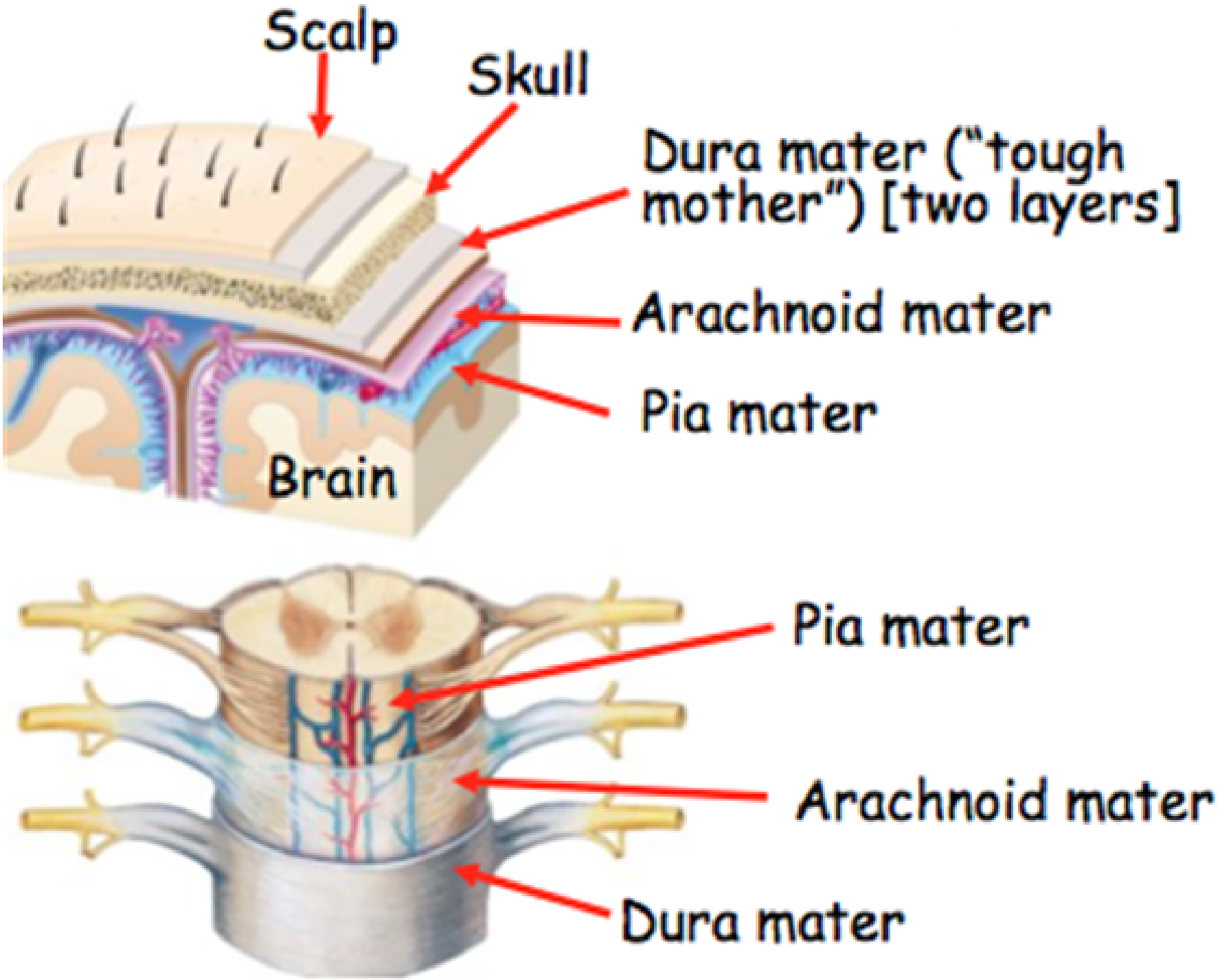

Dura Mater
Skull
Loose Connective Tissue
More Connective Tissue
Arachnoid Mater
Scalp


Meningeal Layers
Bone
Dura
Superior Sagittal Sinus
Frontal Lobe
Arachnoid
Occipital Lobe
Dura

CNS Meninges - Pia Mater

- deepest meninges
- very thin
- closely follows the contours of the brain and spinal cord




Scalp
Skull
Dura mater ("tough mother") [two layers]
Arachnoid mater
Pia mater
Brain
Pia mater
Arachnoid mater
Dura mater

CNS Meninges

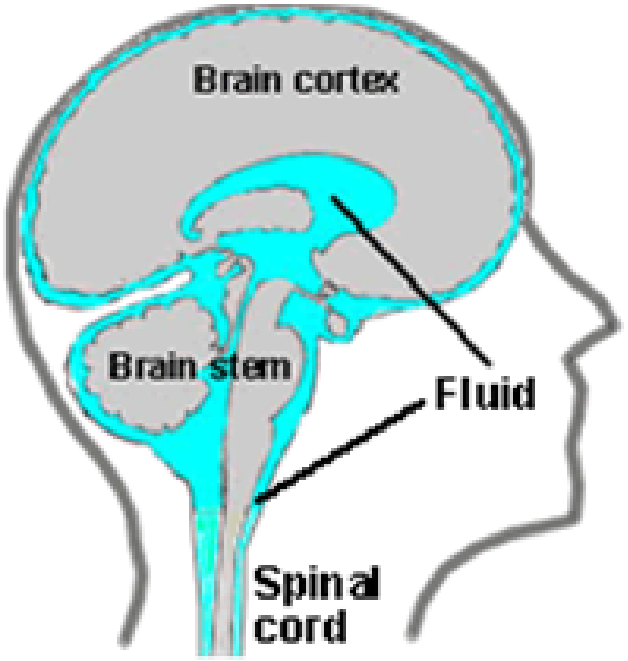
Good example of Dura Mater and shows some Dural Venous Sinuses.

http://www.youtube.com/watch?v=1liTxUxT9xQ

CNS Cerebrospinal Fluid

- Fills the space between the arachnoid mater and the pia mater (the space is called subarachnoid space)

- Fills brain ventricles and the central canal of the spinal cord



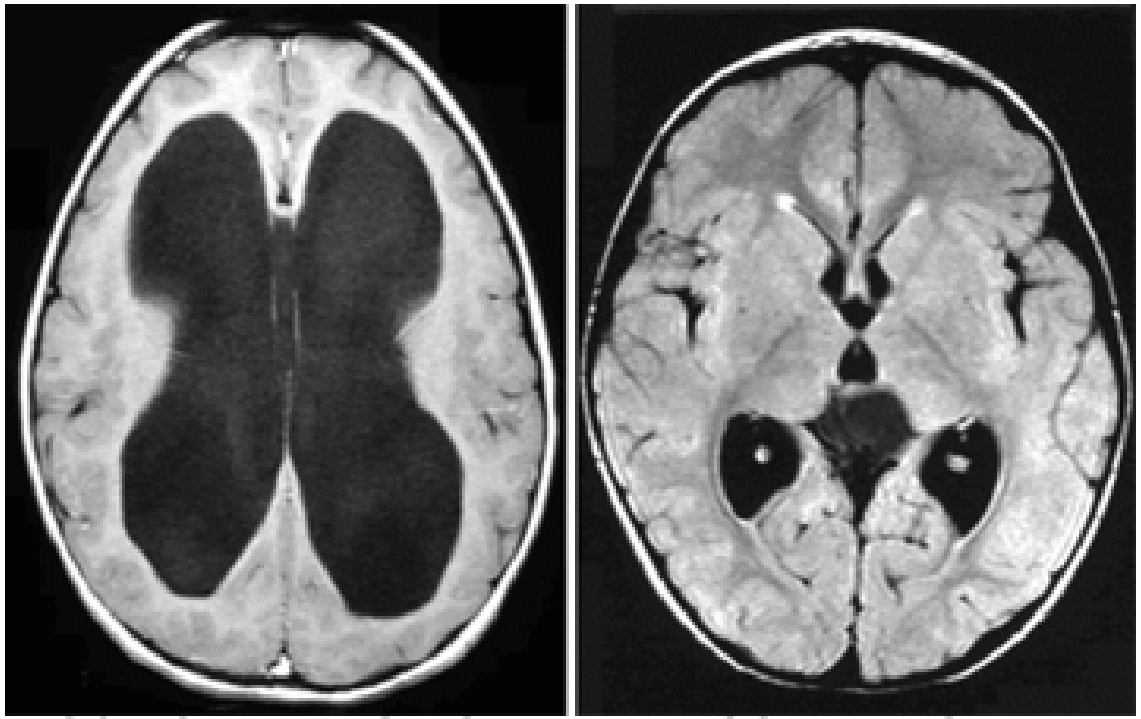
CNS Cerebrospinal Fluid

- Clear tissue fluid (similar to blood plasma) that forms protective cushion around and within the CNS

- Produced by ependymal cells

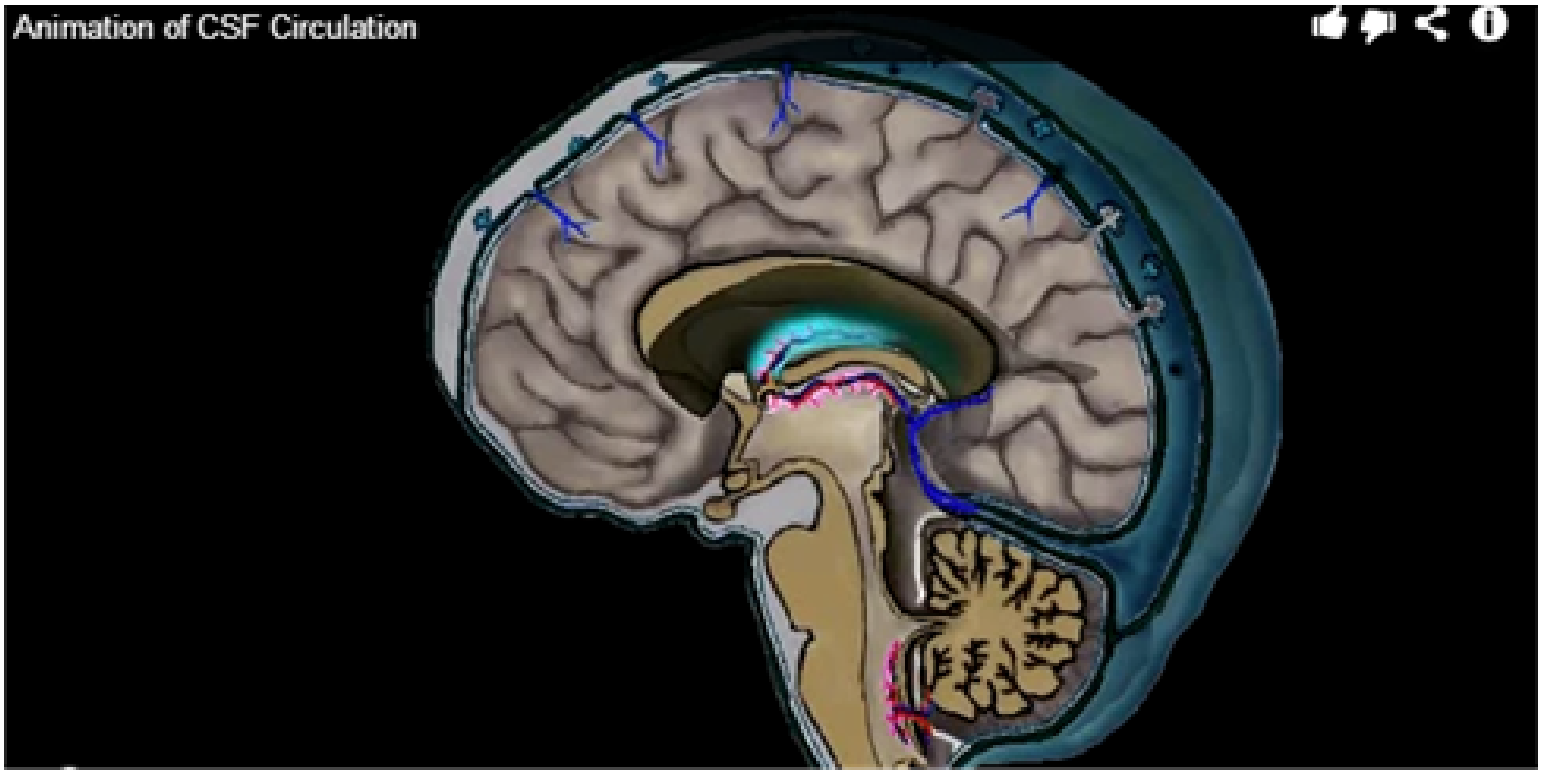
CNS Cerebrospinal Fluid

- Normally excess drains into the dural venous sinuses, but blockages can occur (hydrocephalus - "water on the brain" brain enlargment due to CSP accumulation)



Hydrocephalus Normal

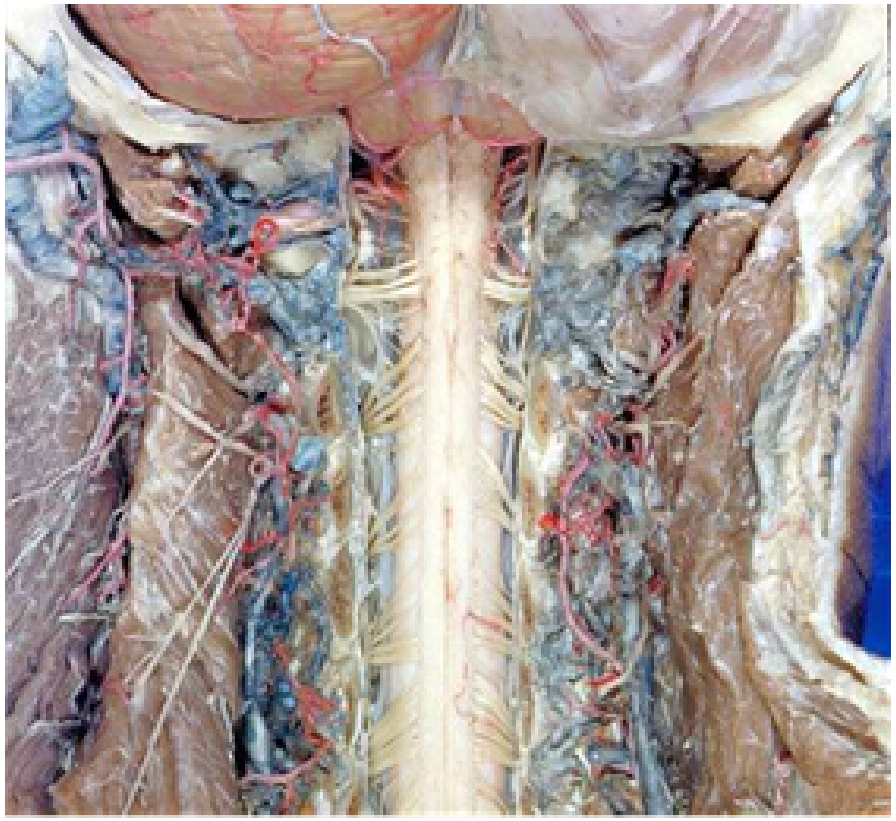
CNS Cerebrospinal Fluid



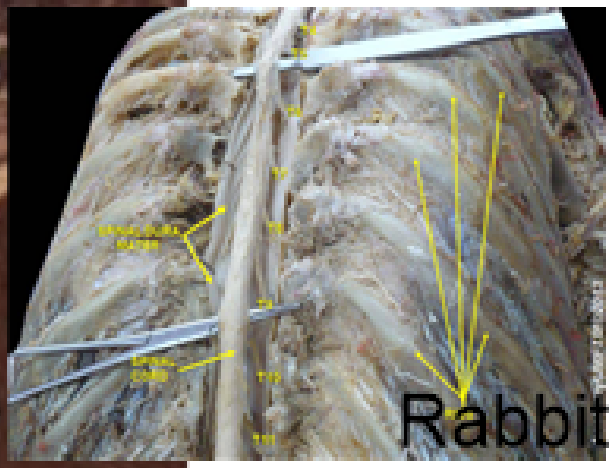
http://www.youtube.com/watch?v=JCf273U0ktc

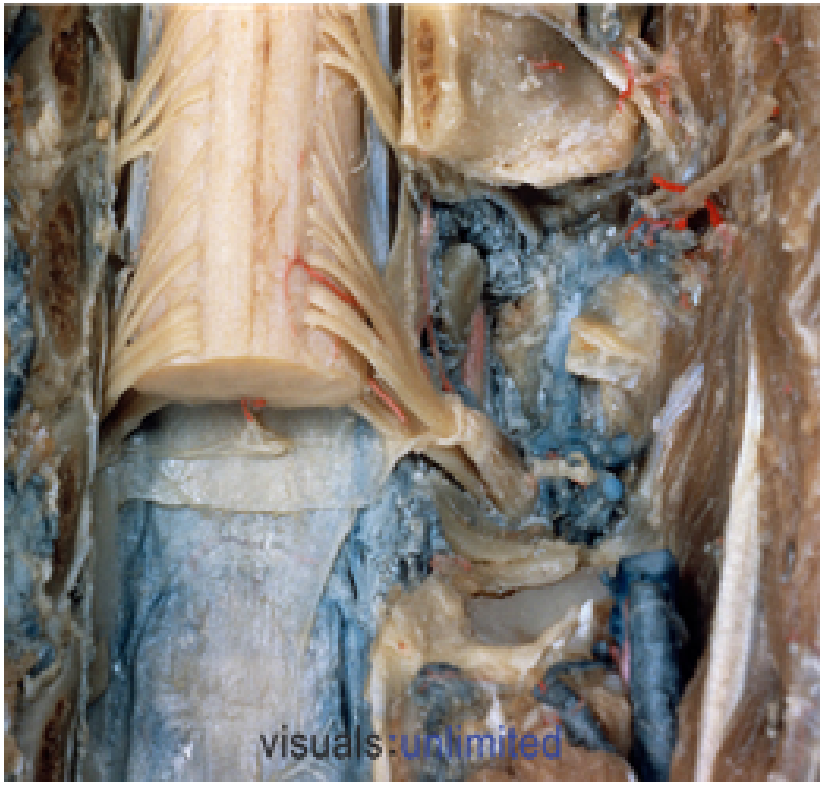
CNS The Spinal Cord

- Cylinder of nervous tissue
- Begins at the base of the brain and exteds through the foramen magnum
- Protected by the vertebral column and ends at the first lumbar vertebrae



Cervical Spinal Cord





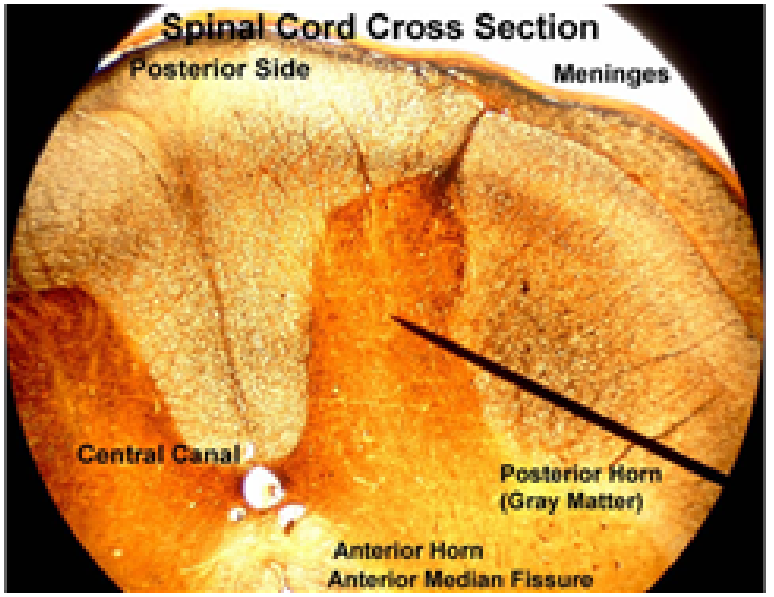
CNS The Spinal Cord Structure

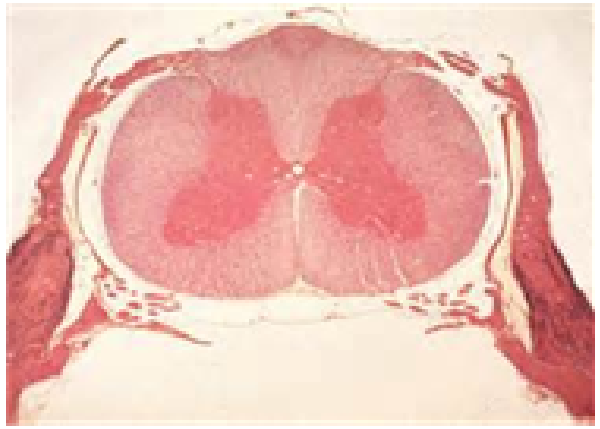
CNS The Spinal Cord Structure

- Consists of central canal, gray matter and white matter

- Contains CSF

- Gray matter is centrally located and shaped like the letter 'H', and contains portions of sensory and motor neurons





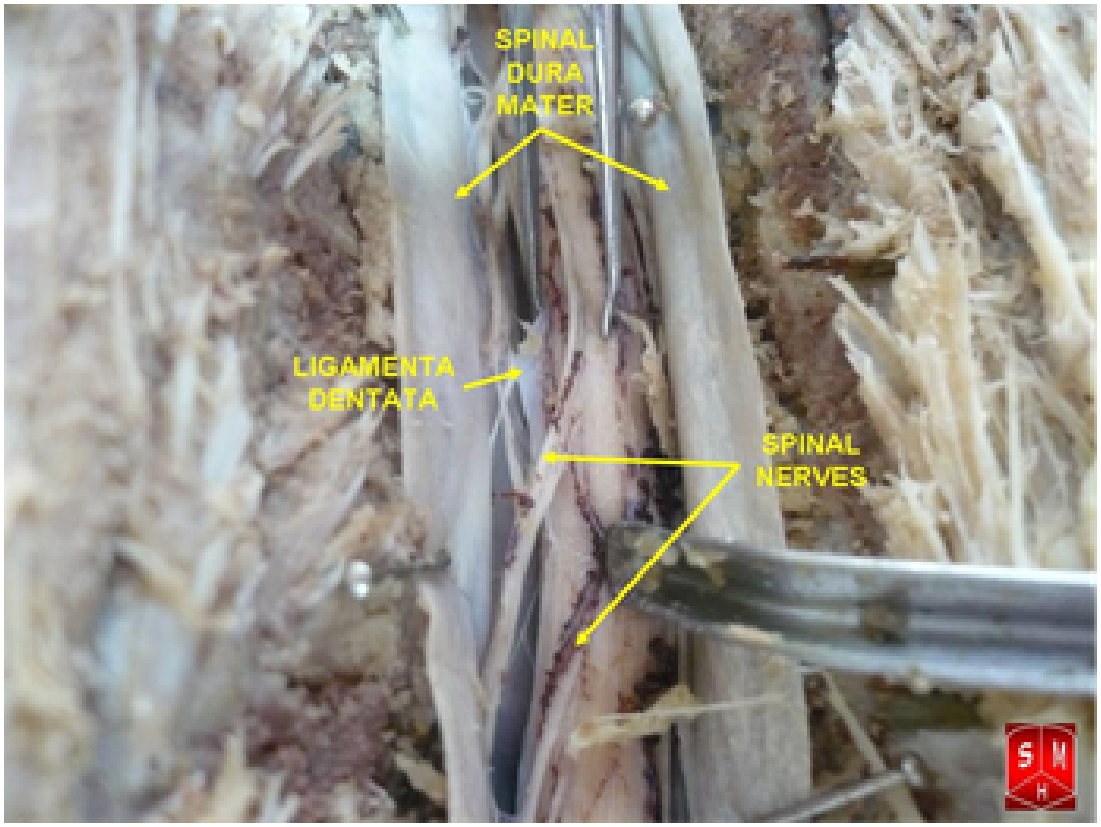
CNS The Spinal Cord Structure

- White matter contains ascending tracts (take information to the brain)

- White matter also contains descending tracts (take information from the brain) - these tracts generally cross just after they enter and exit the brain...that is why the left brain controls the right side of the body and the right brain controls the left side of the body

CNS The Spinal Cord Function

- Provides a means of communication between brain and peripheral nerves that leave the cord

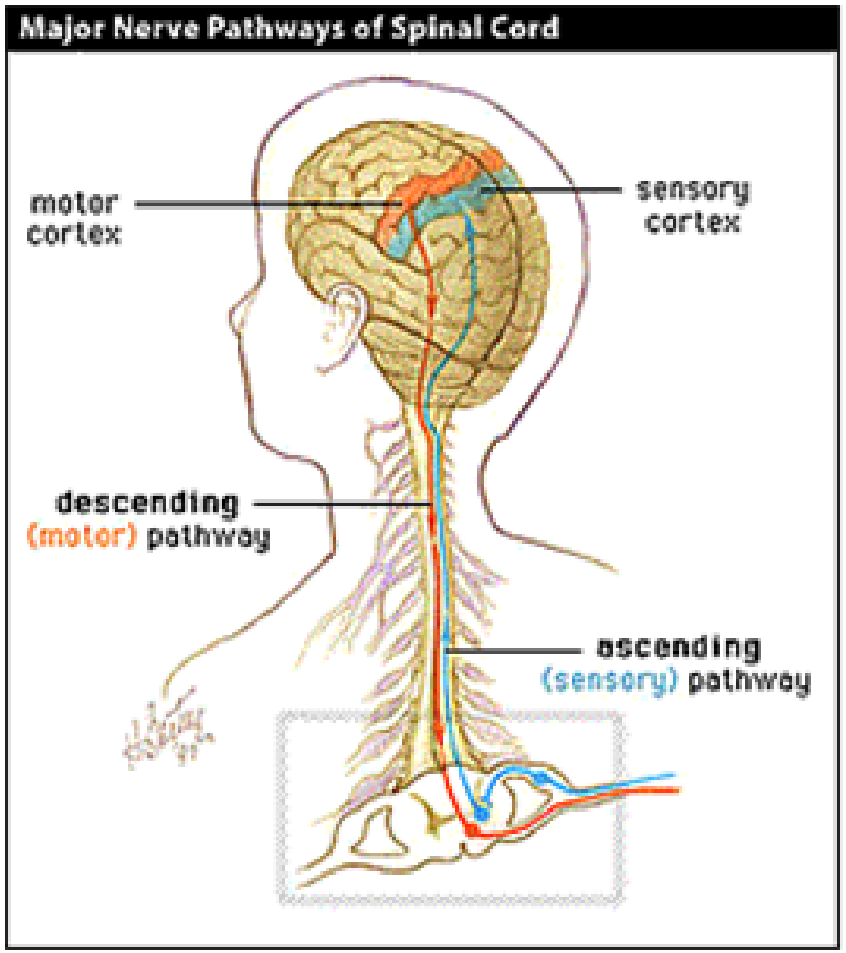


.Lets talk about touching a stove -

1. You touch a hot stove - sensory receptors generate action potentials that travel by way of sensory nerve axons to the spinal cord

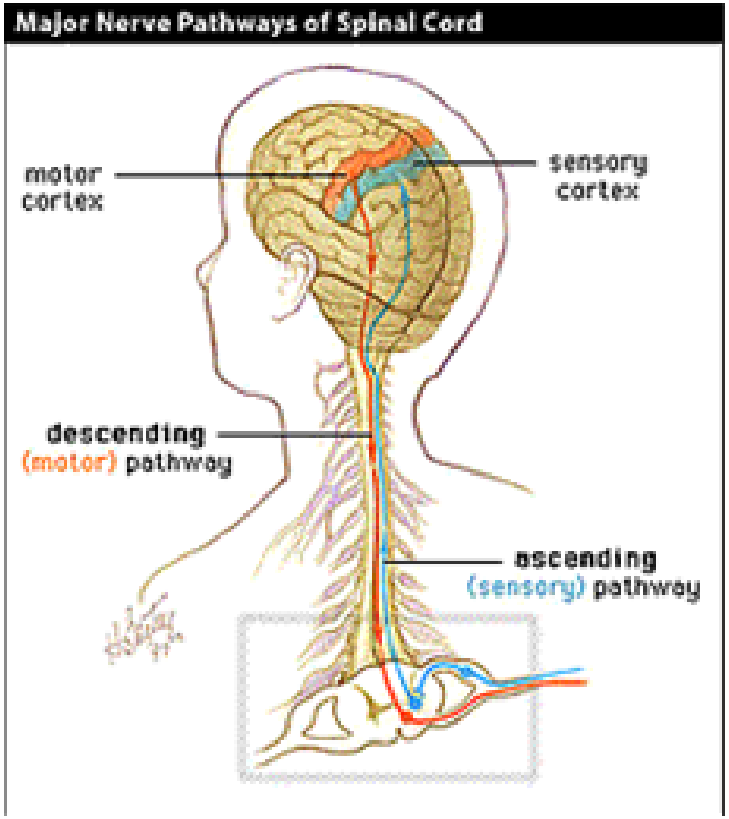
.Lets talk about touching a stove -

2. Ascending tracts carries the information to the sensory area of the brain



.Lets talk about touching a stove -

3. Action potentials orginating in the motor control area of the brain pass down one of several descending tracts to the spinal cord and out to your muscles by way of motor nerve axons



.Lets talk about touching a stove -

4. You move your hand off of the hot stove

CNS The Spinal Cord Function