

## **Meninges, blood and spinal cord**

### **Central nervous system**

1. Brain
2. Spinal cord

### **Peripheral Nervous system**

1. Mixed spinal nerves carrying
  - a. Sensory – info from body to CNS (afferents)
  - b. Motor – info from CNS to body (efferents)

### **Types of cells in CNS and PNS**

1. Neurons – signaling cells
2. Glial cells – supporting cells

### **Types of cells in the CNS**

1. Ependymal cells – CSF
2. Astrocytes – blood brain barrier
3. Neurons – signals
4. Microglia – immune
5. Oligodendrocytes – myelin

### **Types of cells in the PNS**

1. Lower motor neuron (efferents)
2. Sensory neuron (afferents)
3. Schwann cells – myelin
4. Blood – no blood barrier in PNS

### **Regeneration**

- CNS – very limited
- PNS – 1mm/day

### **Parts of CNS**

1. Cerebral cortex – thinking, memory, voluntary movement, sensory
2. Diencephalon – sensory/motor relay centre, autonomic function
3. Brainstem – autonomic functions and cranial nerves
4. Cerebellum – movement and balance
5. Spinal cord – motor output, sensory input, reflexes, interface with PNS

### **Meninges - 3 membranes that line the skull and vertebrae**

1. Dura mater
2. Arachnoid mater
3. Pia mater

Inward extensions of dura divide cranium into compartments

1. Falx cerebri (left and right)
2. Tentorium cerebelli (cerebellum and cerebrum)

Dural extensions restrict extreme movements of CNS leading to damage

1. Herniation
2. Coning

Meningeal artery – between dura and skull

- From external carotid artery

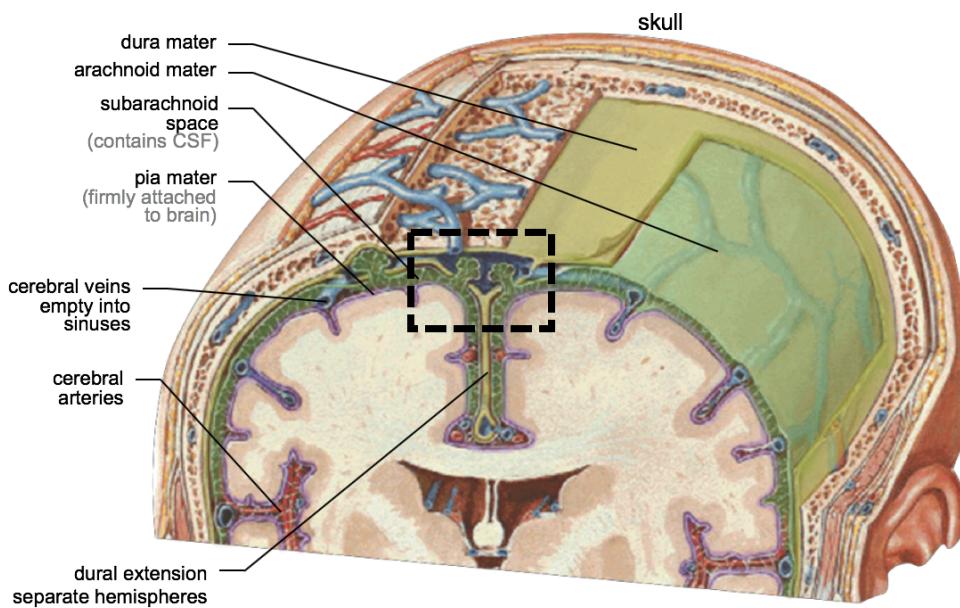
Cerebral vessels

- From internal carotid artery

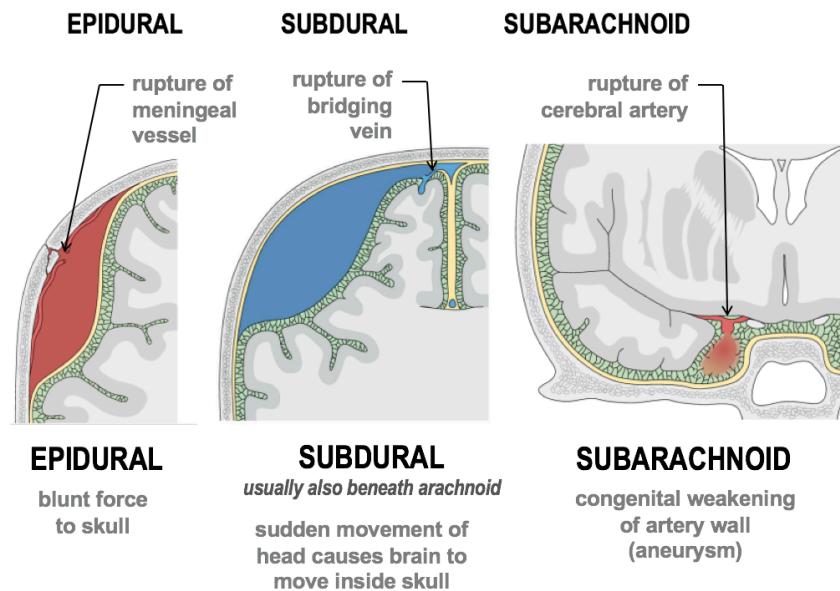
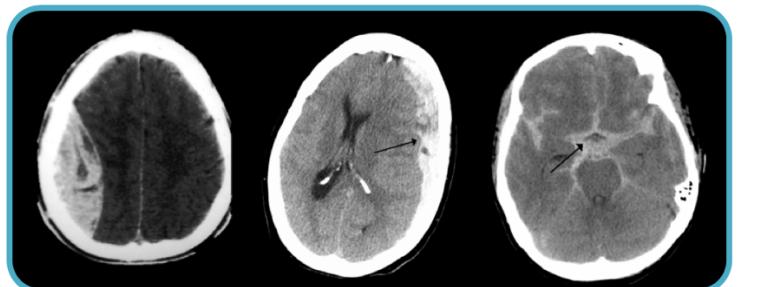
Meningeal nerves

- From trigeminal CNV

\*cerebral veins empty into blood sinuses



## CT Scans

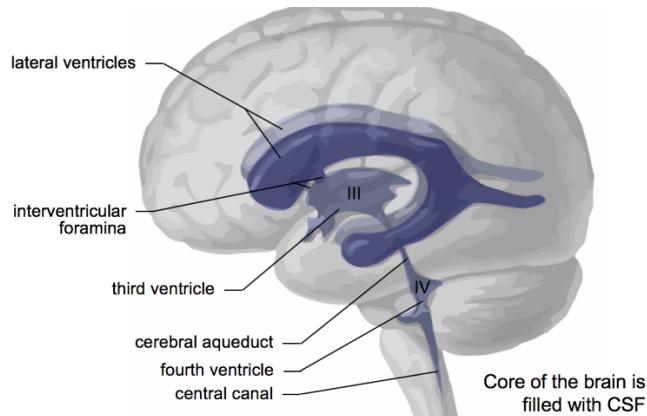


## Difference between brain and spinal cord

- Spinal cord is flexible
- There is epidural fat space between dura and bone

## Ventricles

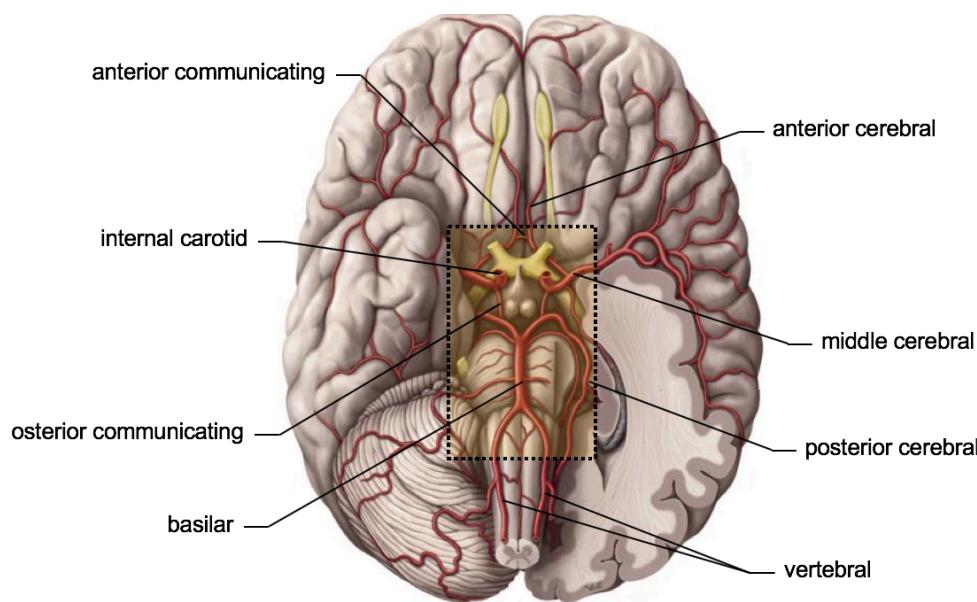
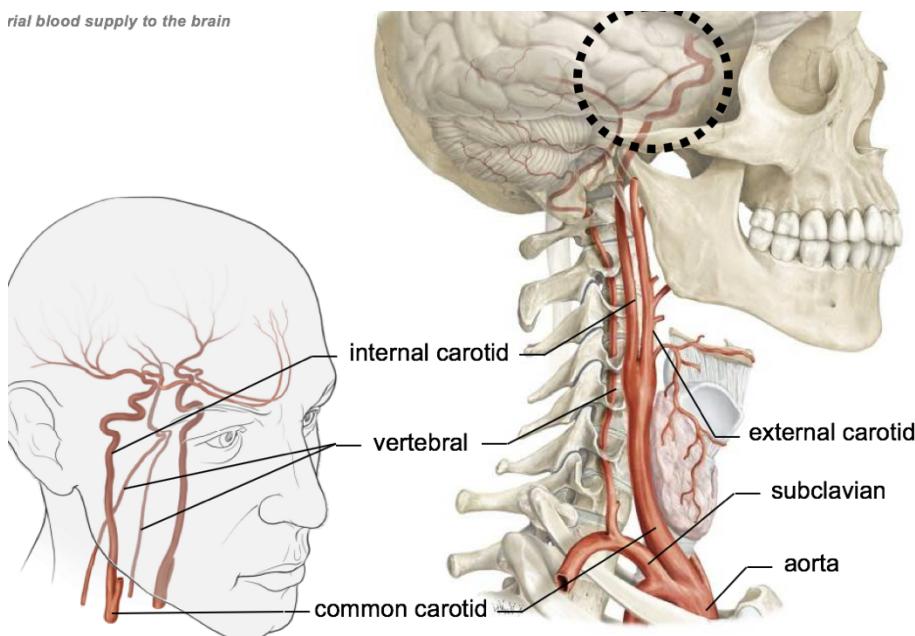
- Fluid filled inside brain

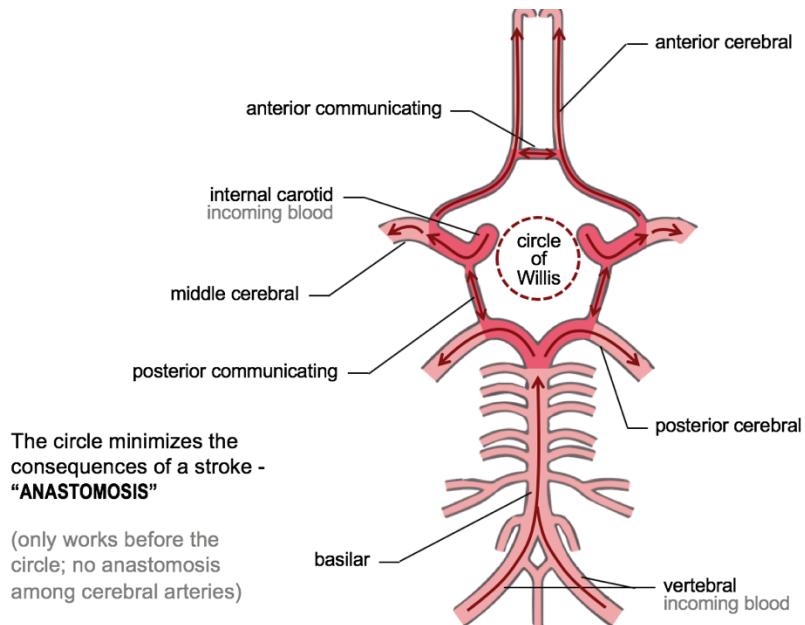


Where does CSF come from?

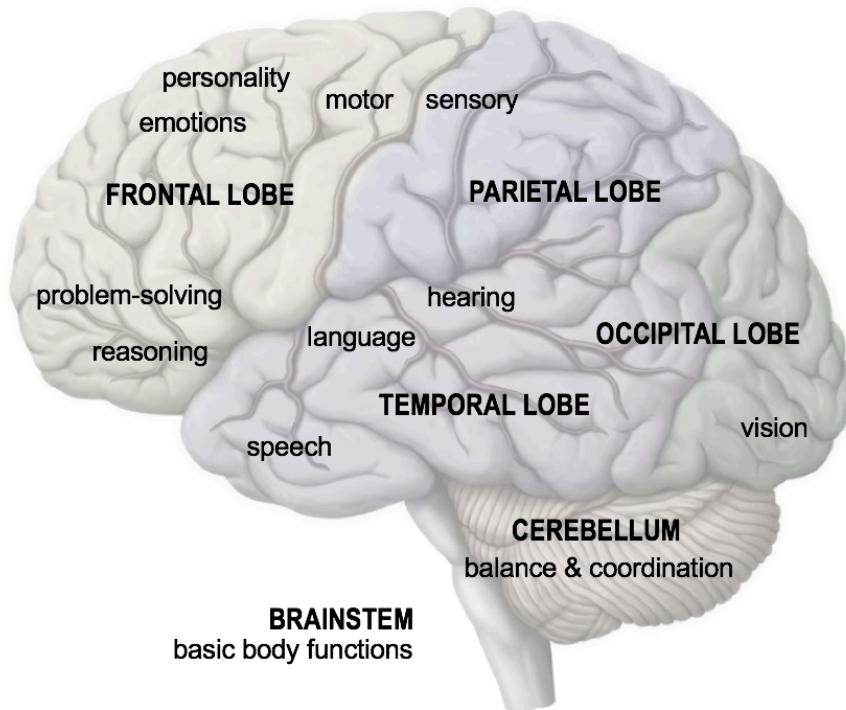
- From blood
- CSF produced in the lateral, 3<sup>rd</sup>, and 4<sup>th</sup> ventricles by ependymal cells of the choroid plexus
- Leak from ventricular system to subarachnoid space through foramina and through thin roof of 4<sup>th</sup> ventricle
- CSF drains from subarachnoid space into venous blood
- Arachnoid granulations transfer CSF from the subarachnoid space to the superior sagittal sinus.

*rial blood supply to the brain*



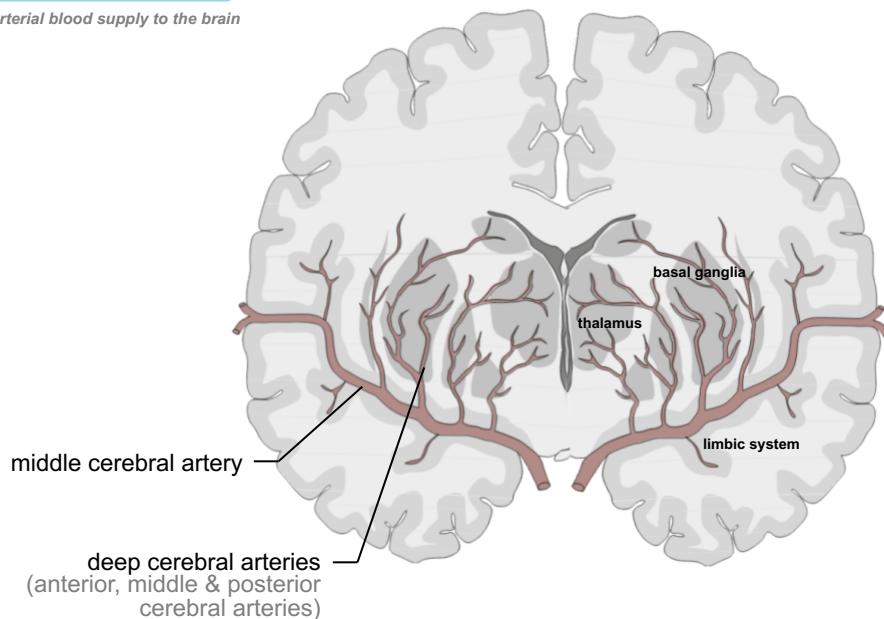


Minimizes consequences of stroke because it can go either way

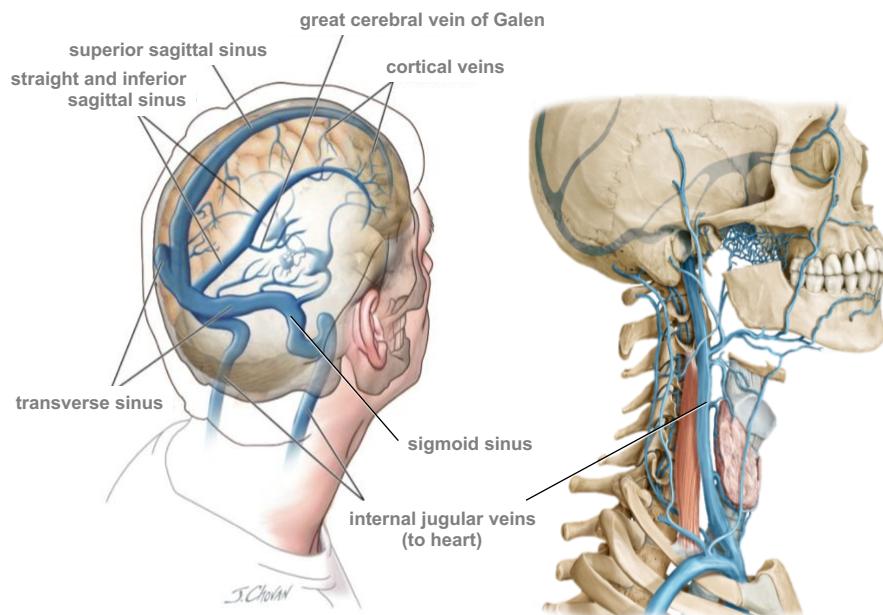


## BLOOD SUPPLY

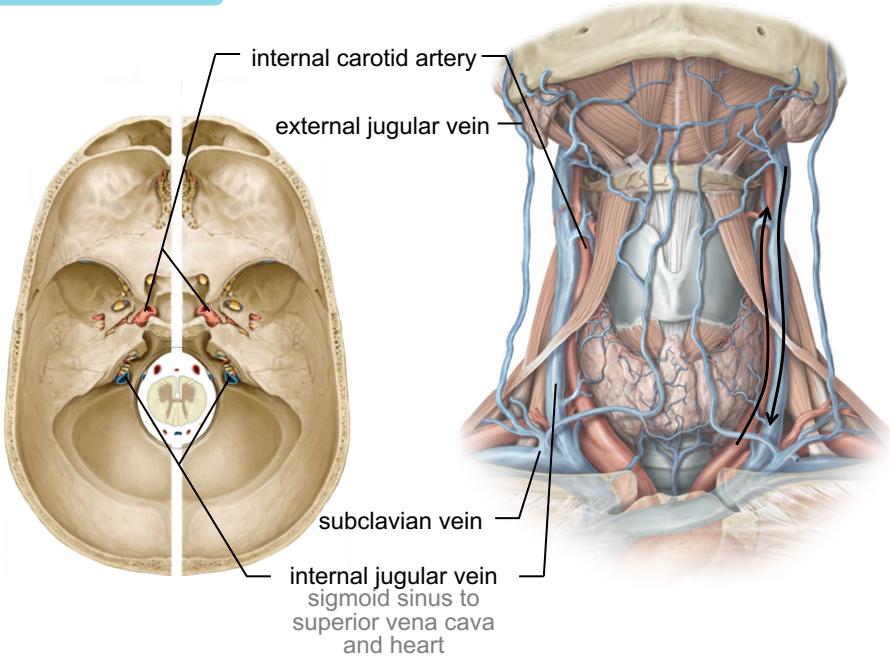
Arterial blood supply to the brain



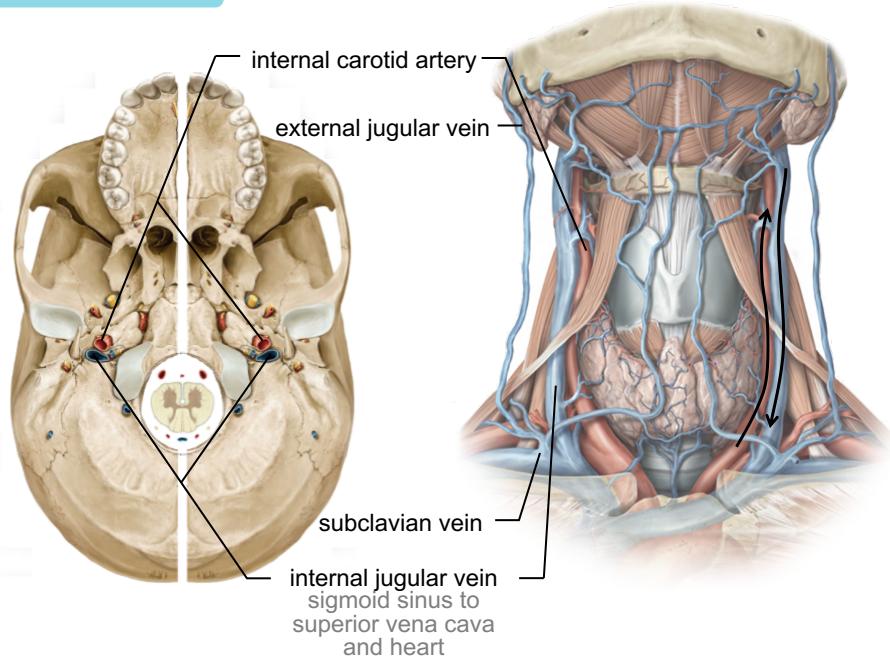
## VENOUS DRAINAGE



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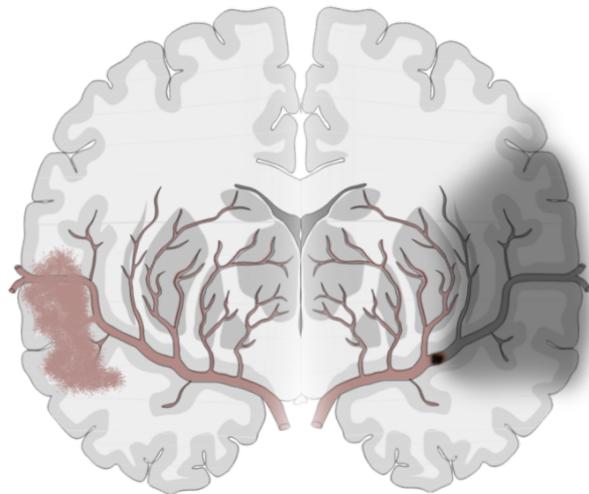


## VENOUS DRAINAGE



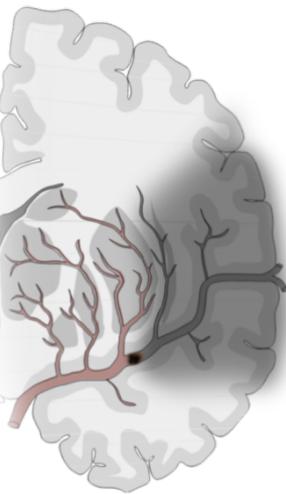
## BLOOD SUPPLY

### HEMORRHAGIC STROKE



hemorrhage/blood leaks  
into brain tissue

### ISCHEMIC STROKE



clot stops blood supply  
to an area of the brain