

Brain Anatomy

PIAEM PREPARATORY COURSE 2015

IPK Bangsar
29 September 2015

Nervous System

- *CNS*

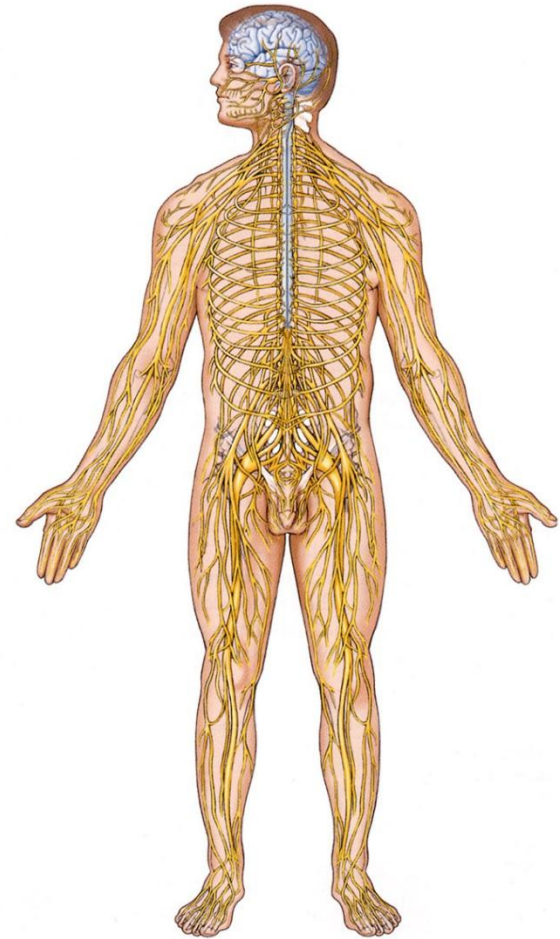
Brain

Spinal Cord

- *PNS*

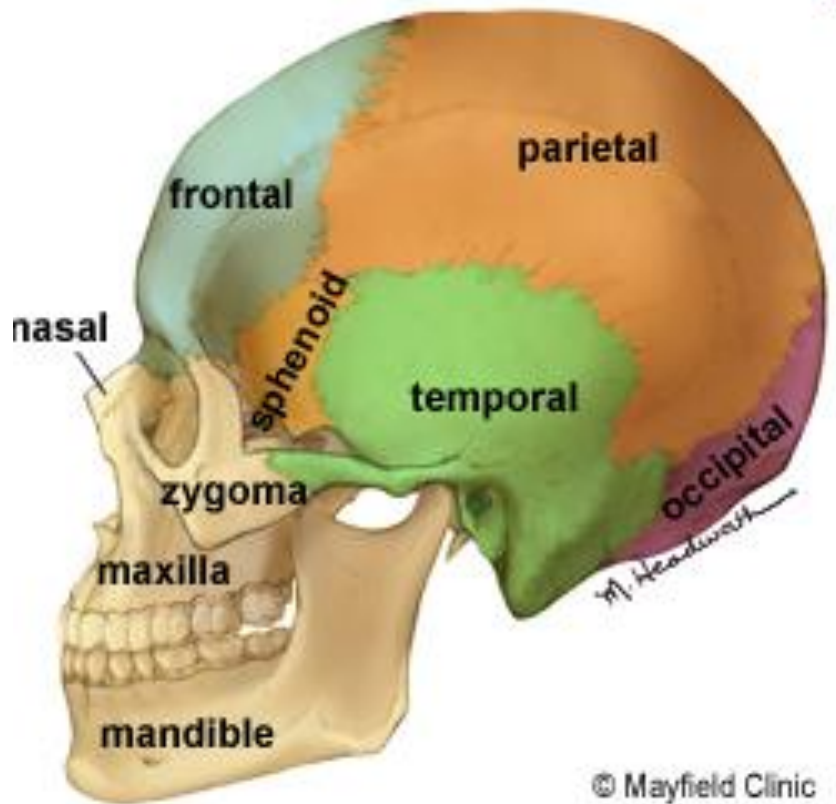
Peripheral Nerve

Cranial Nerve



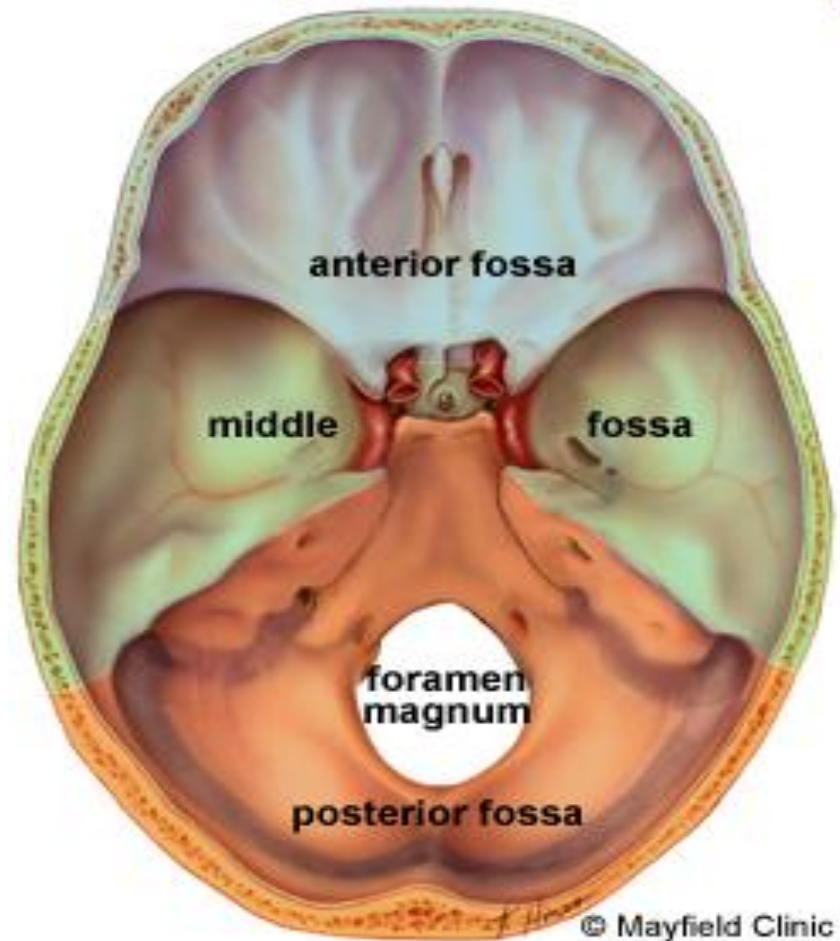
Skull Anatomy

- Eight bones form the skull and fourteen bones form the face



Base of Skull

- The inside of the skull is divided into three areas



Skull

Rigid box

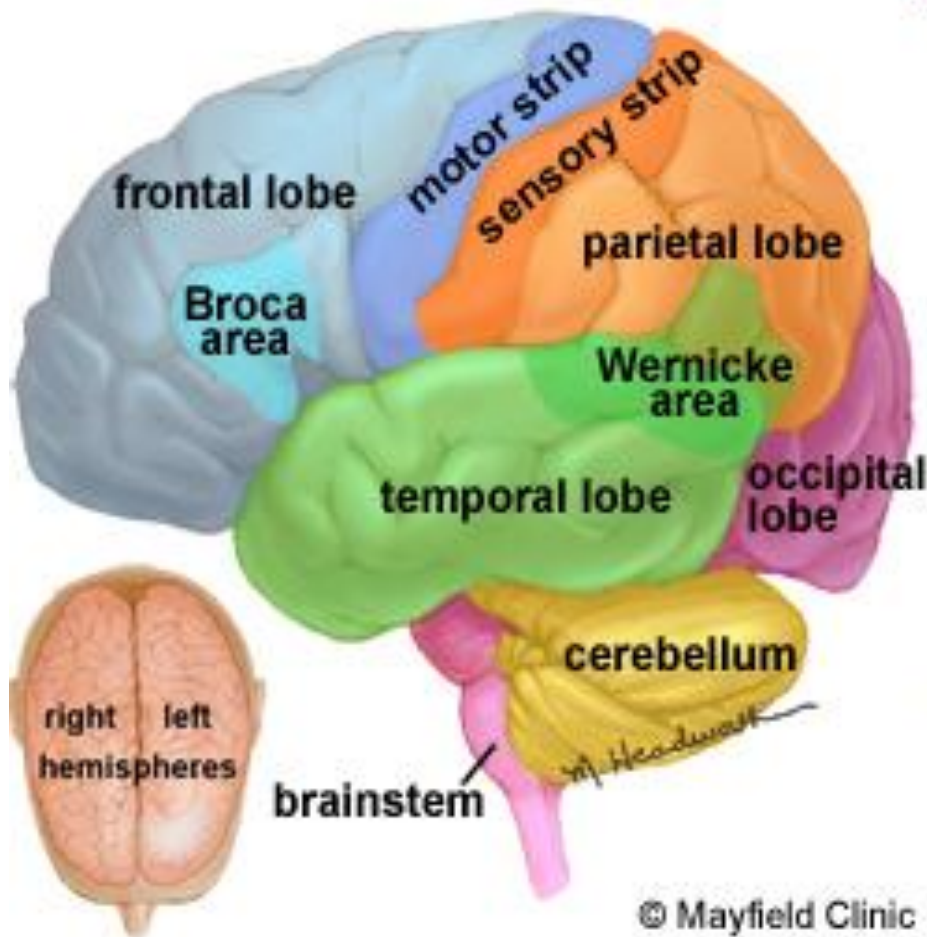
2 parts

-cranial vault

-base

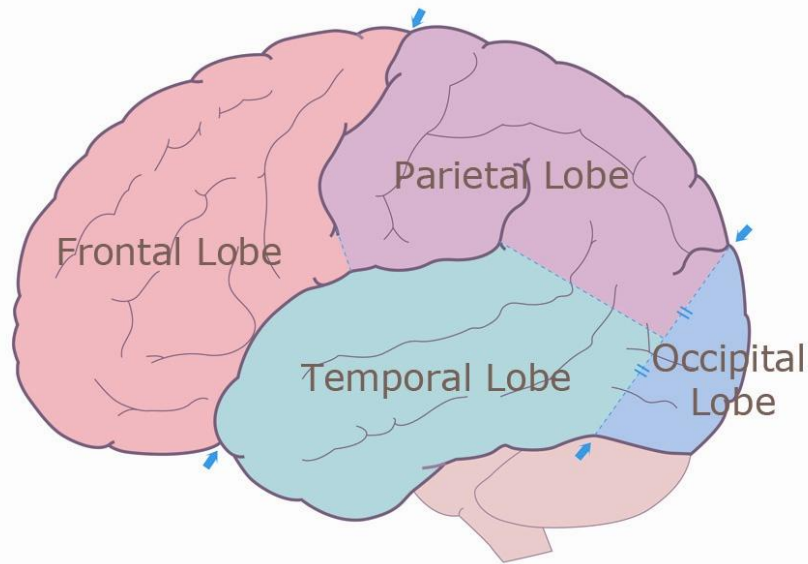


Brain



- The brain is composed of the cerebrum, cerebellum and brainstem

Lobes of the Cerebral Cortex



1. Frontal lobe

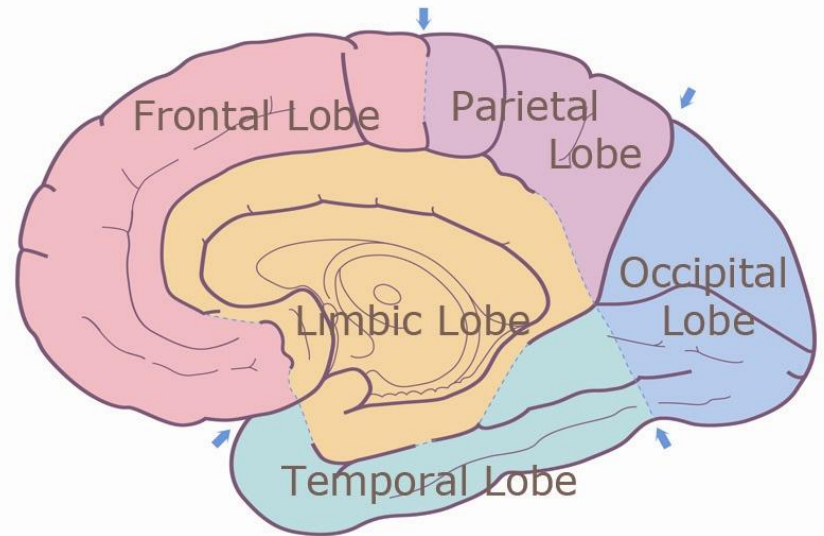
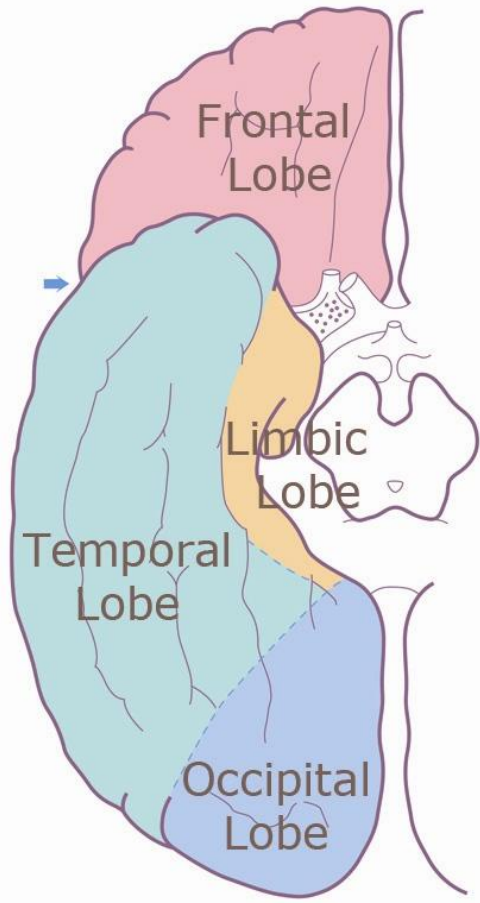
2. Parietal lobe

3. Temporal Lobe

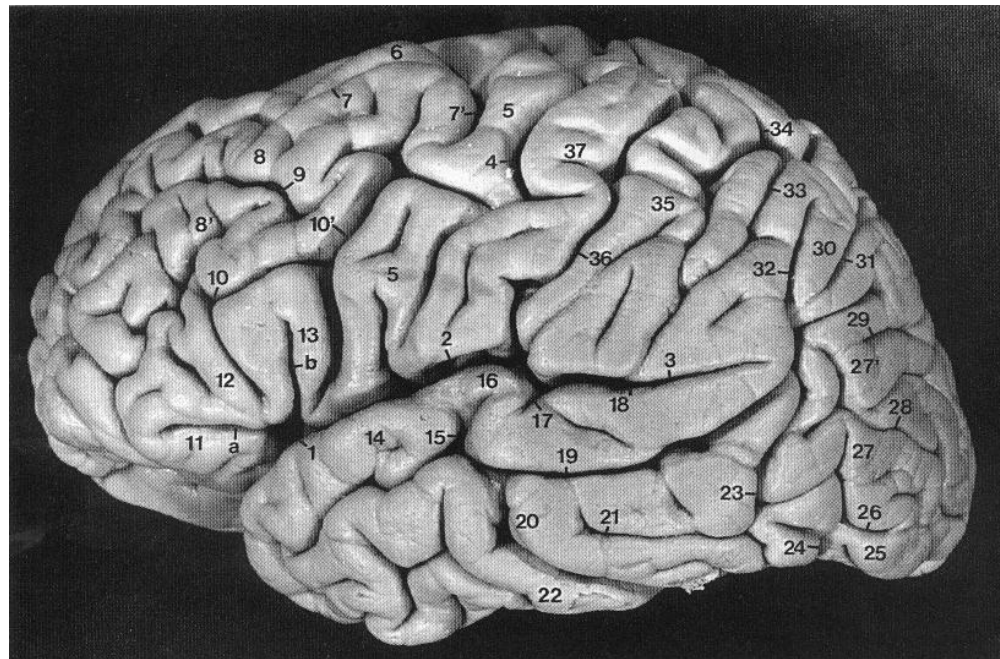
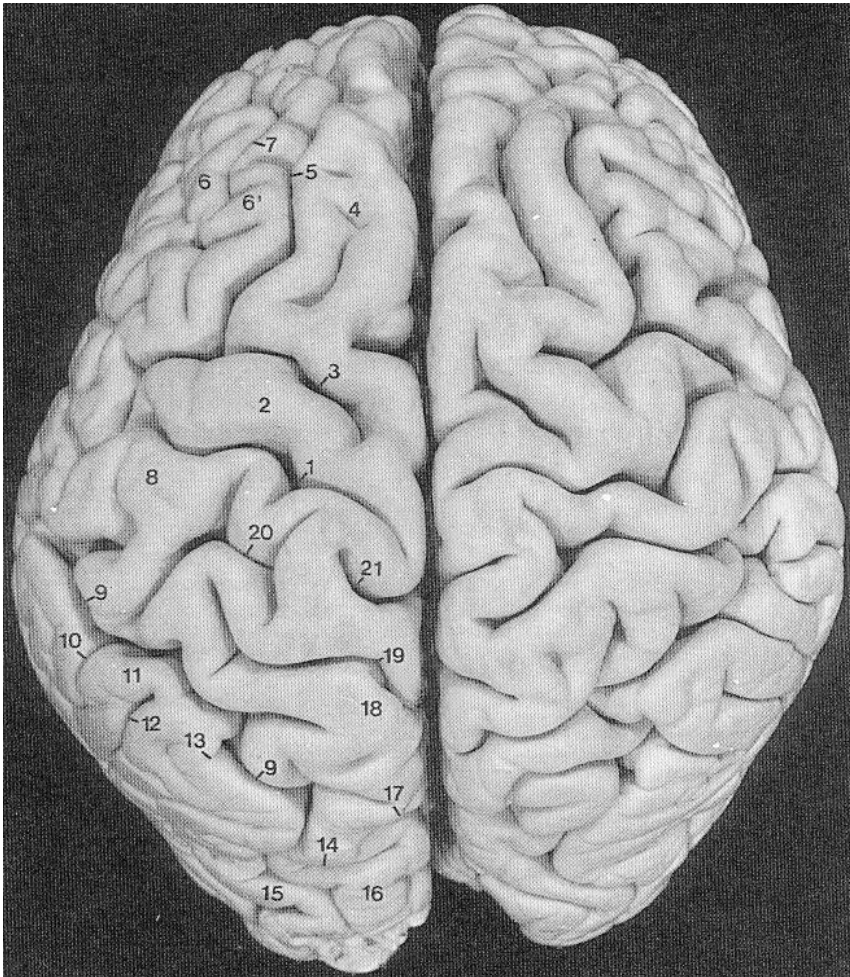
4. Occipital lobe

5. *Limbic lobe*

Limbic Lobe



Cerebrum

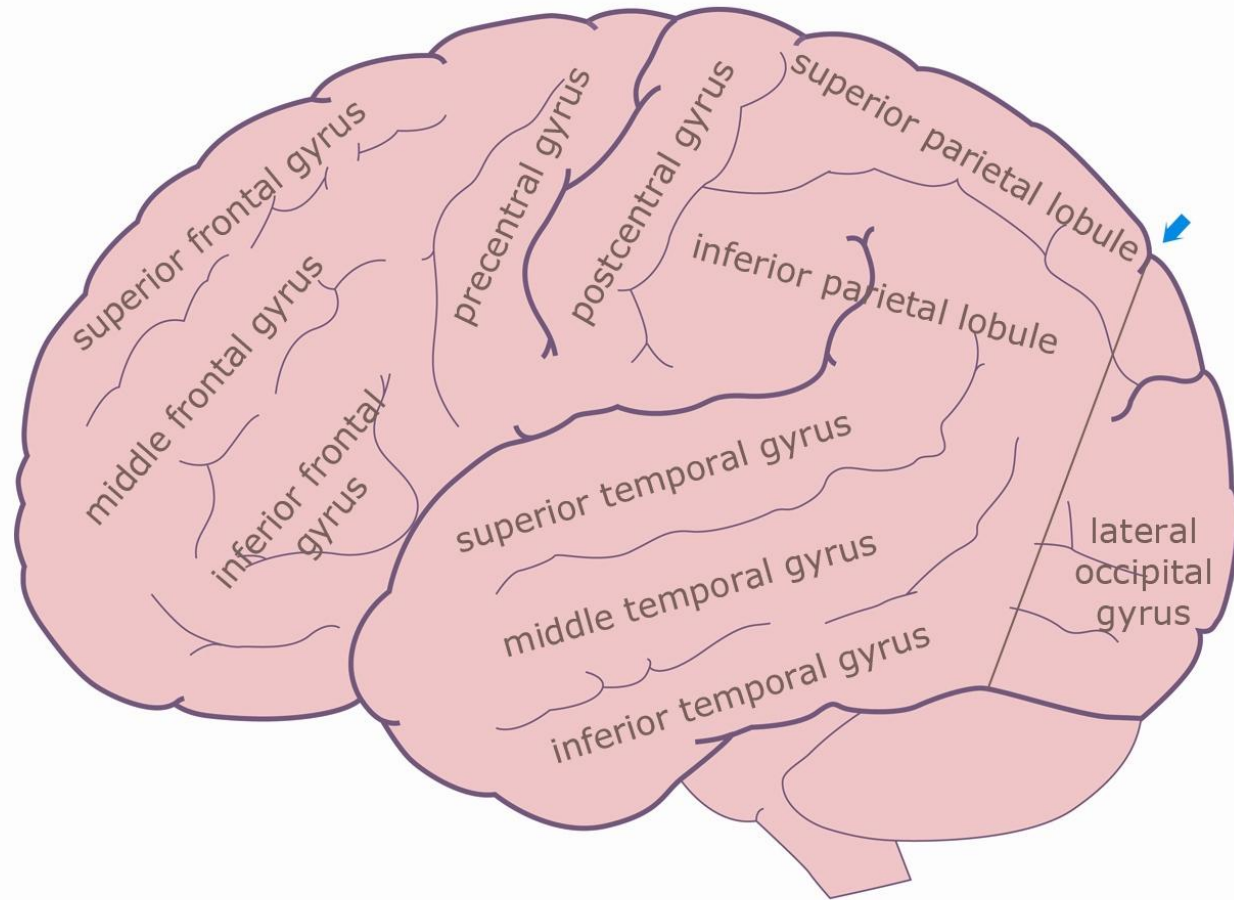


Cerebrum

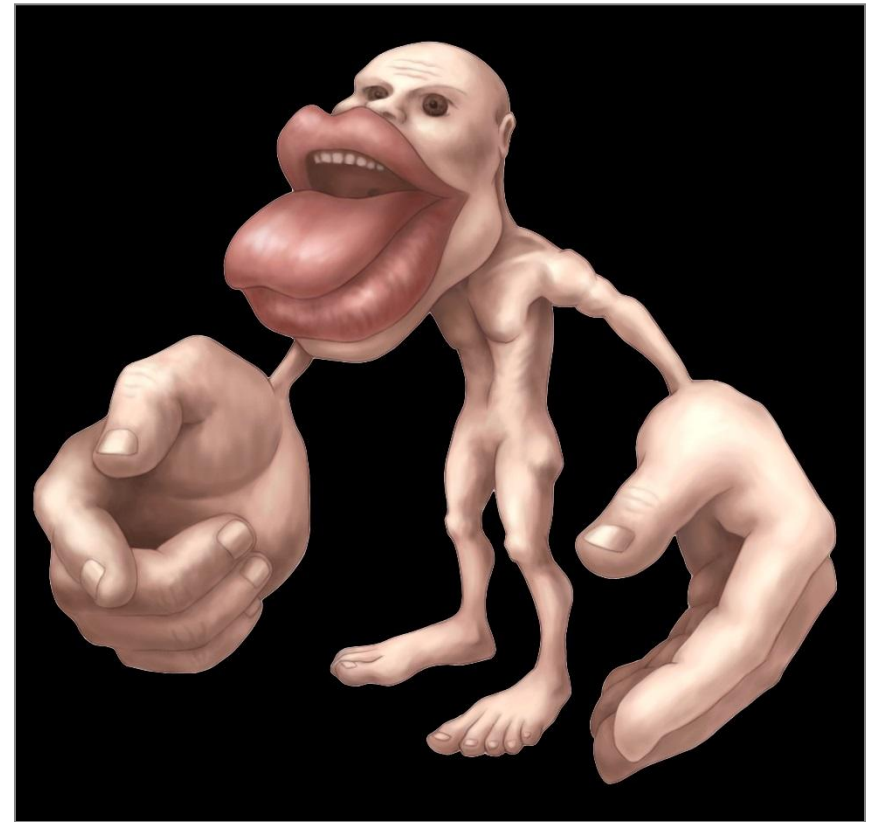
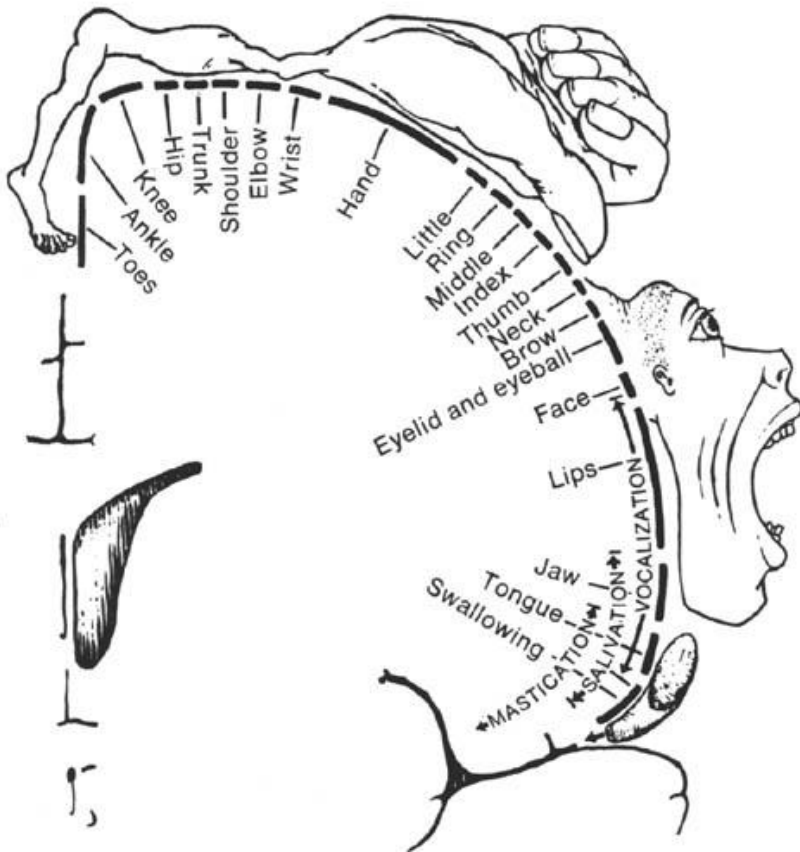
- The surface of the cerebrum has a folded appearance called the cortex



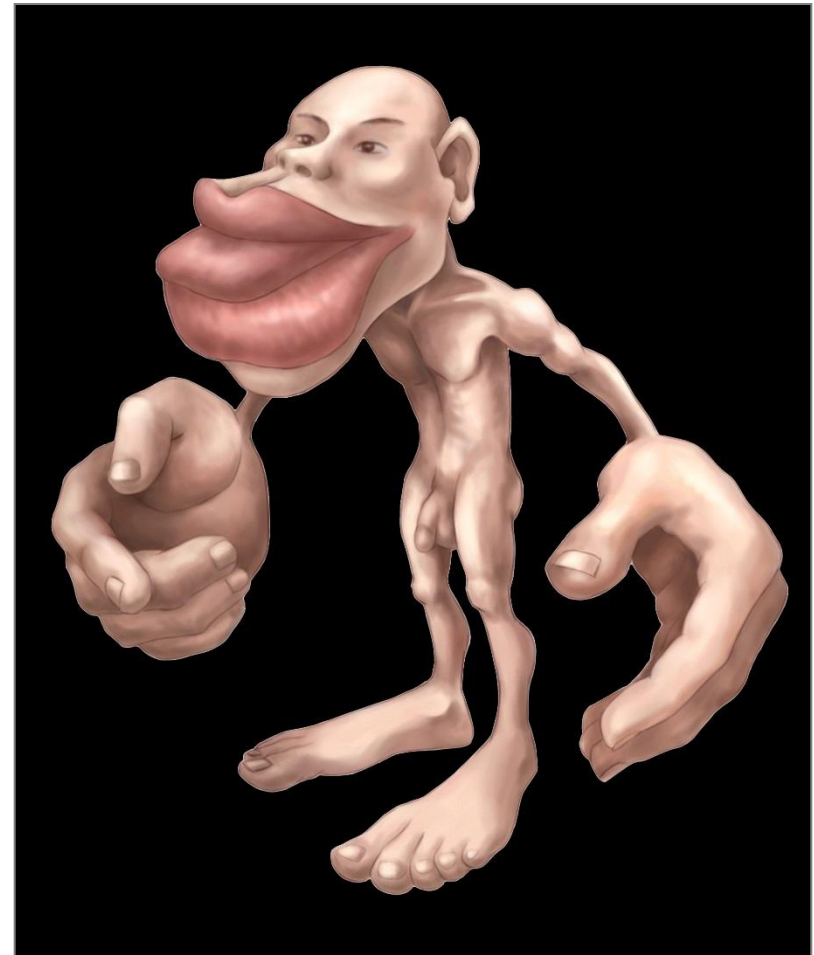
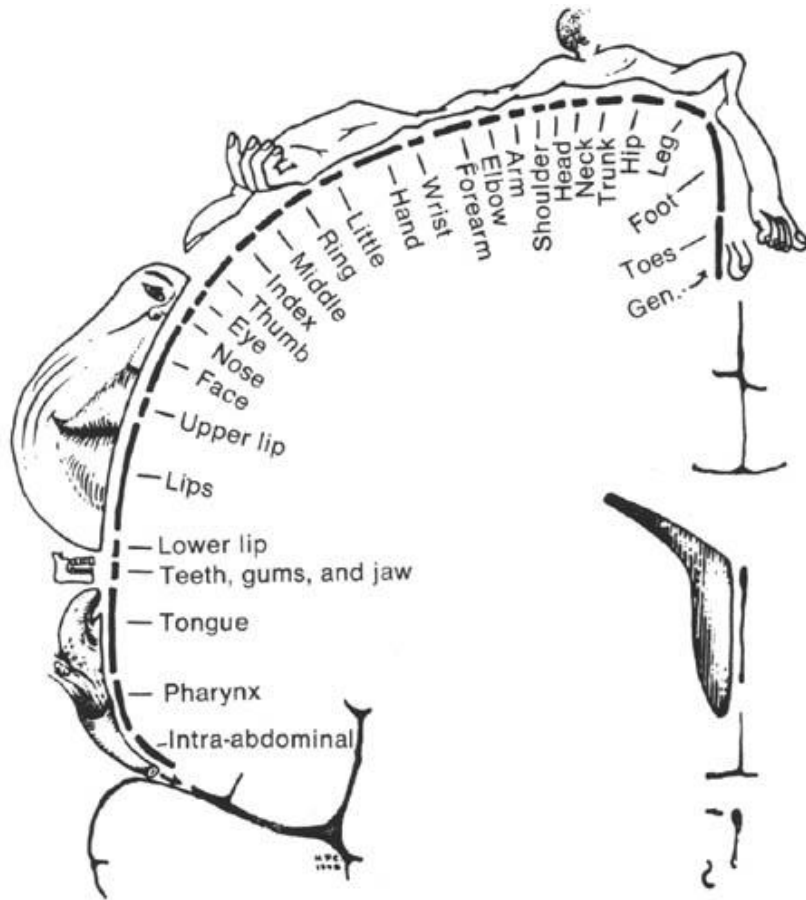
Gyri of the Cerebral Cortex



Motor Homunculus



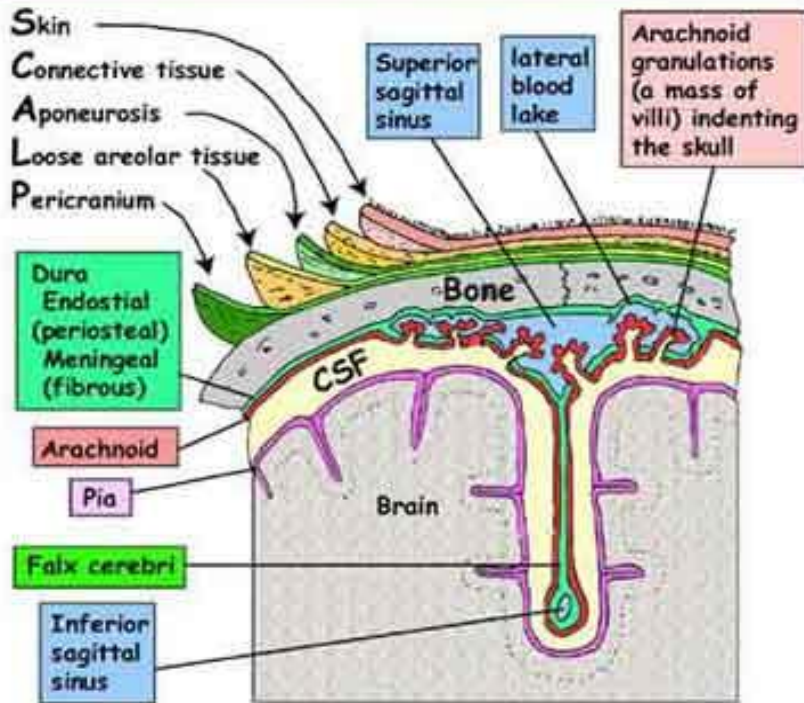
Sensory Homunculus



Scalp

CORONAL SECTION OF SKULL, SCALP & MENINGES IN MIDLINE

To show layers of scalp, meninges and falx cerebri



CEREBROSPINAL FLUID

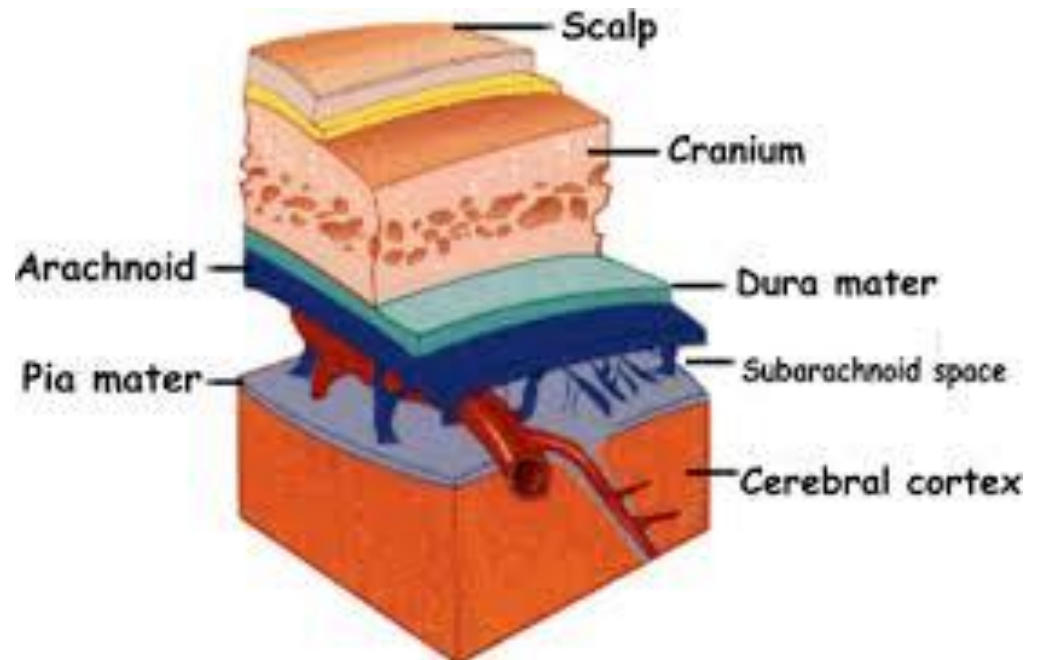
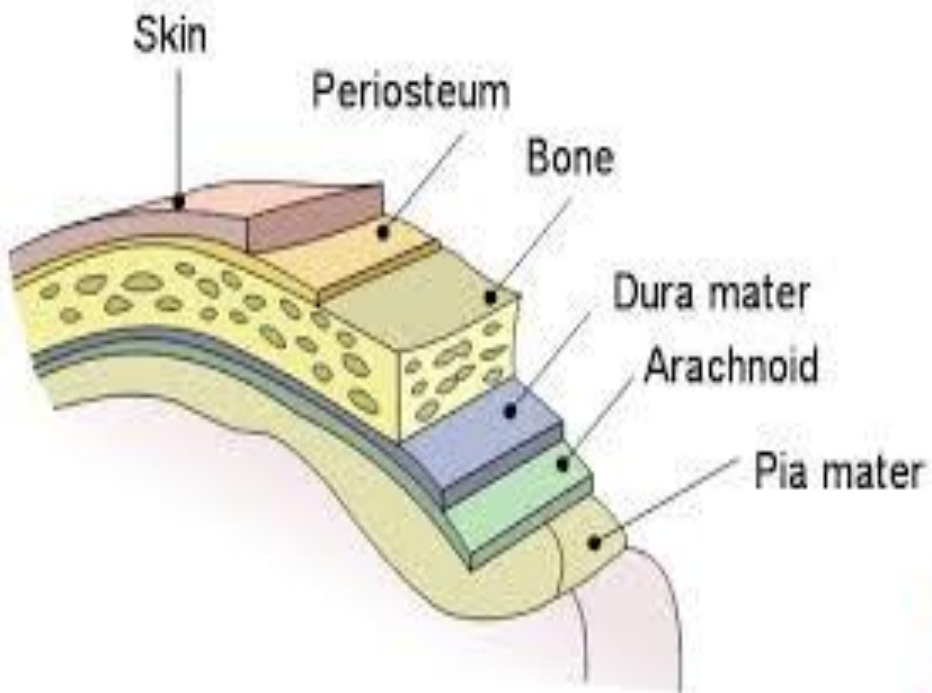
- 130ml - 30ml in ventricles, 75ml in spinal system, 25ml in cranium
- Turn over - 500ml per day from choroid plexus to 4th ventricle to subarachnoid space to arachnoid villi
- Pressure - 130mm of water
- Function - Brain floats in it, some metabolic change, effectively reduces weight of brain from 1500g to 50g

Injuries are common

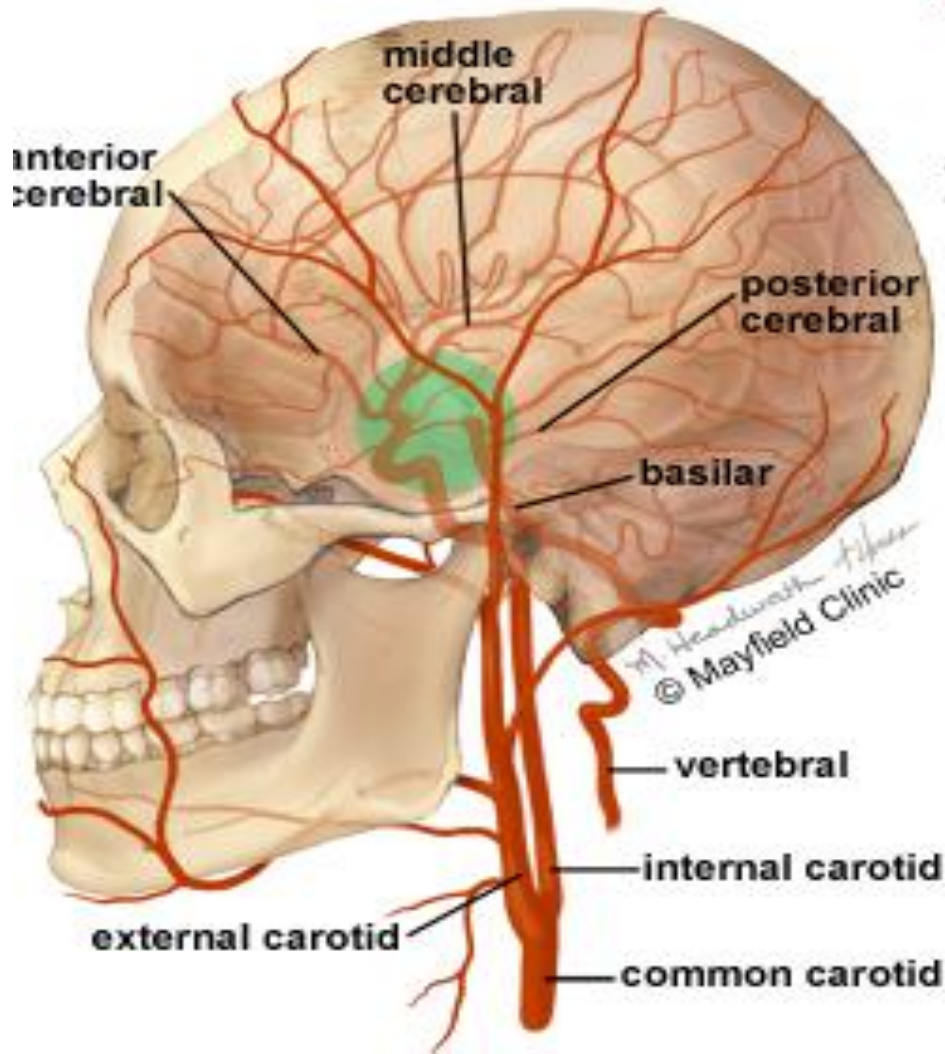
Vascular tissue profuse bleeding

Areolar tissue potential space for blood to accumulate.

Meninges

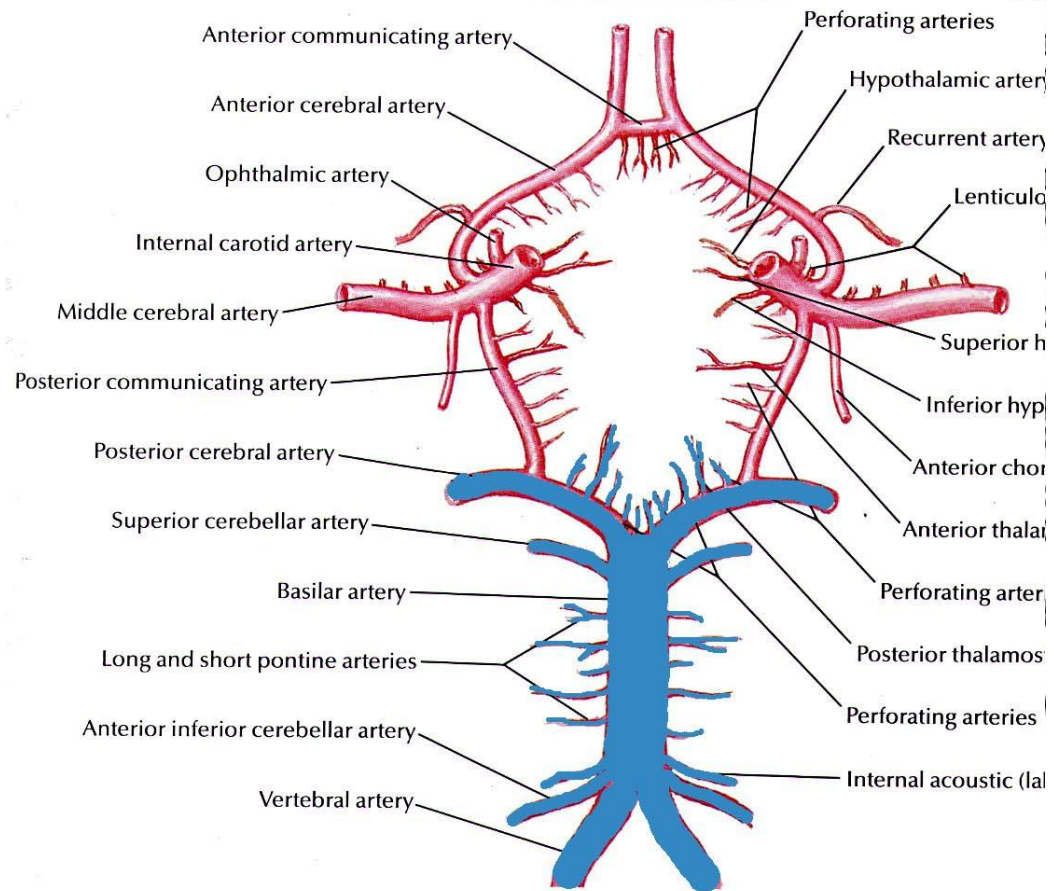
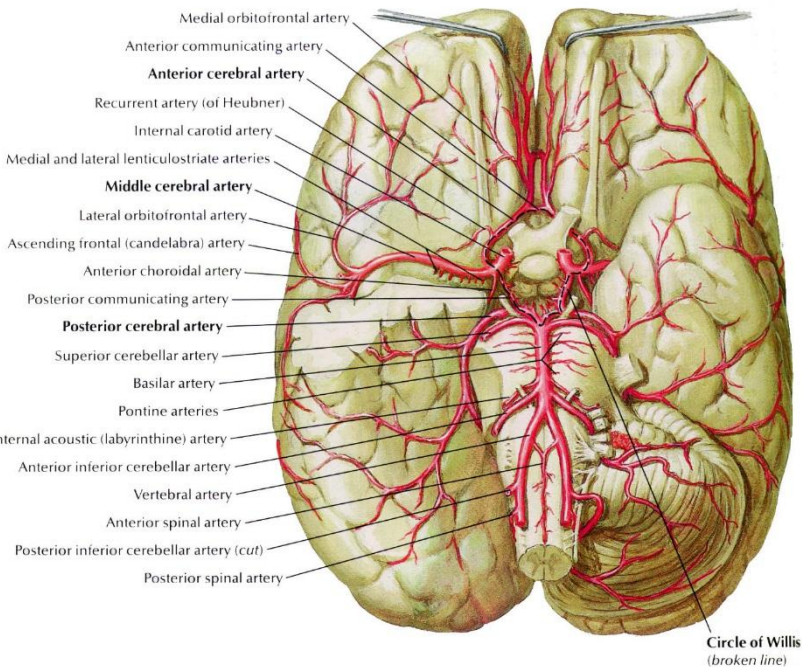


Blood supply

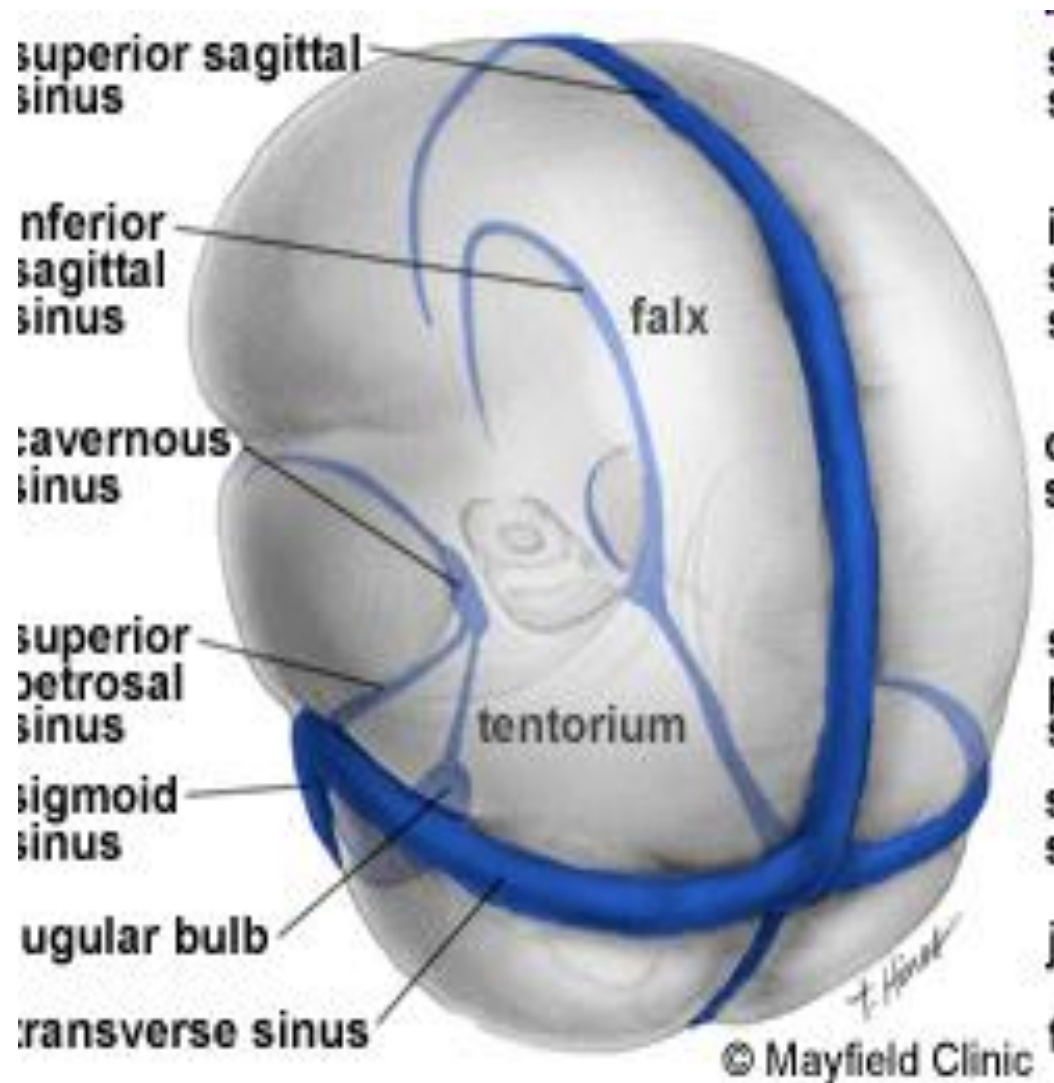


- The brain's anterior circulation is fed by the internal carotid arteries and the posterior circulation is fed by the vertebral arteries

Circle of Willis



Venous circulation



Intracranial Pressure (ICP)

10 mmHg = Normal

> 20 mmHg = Abnormal

↑ ICP

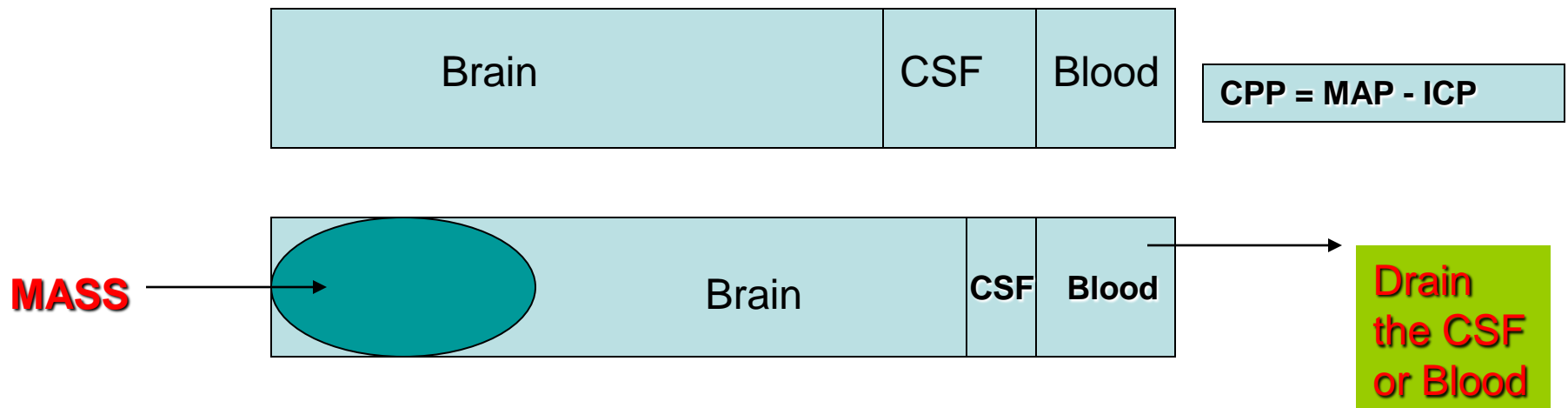
> 40 mmHg = Severe

↓ Brain function

↓ outcome

Concept in Head Injury (Monro-Kellie Doctrine)

- **Skull is rigid box with a fixed volume**
- **Brain (1400 g), CSF (75 ml) and Volume of the Blood (75 ml)**
- **To maintain normal ICP need a constant maintenance of each volume in skull**



Cerebral Perfusion Pressure (CPP)

	MAP – ICP = CPP		
Normal	90	10	80
Cushing's Response	100	20	80
Hypotension	50	20	30

RADIOGRAPHIC EVALUATION

CT SCANS IN TRAUMA

An unenhanced (i.e. non-contrast) presenting after trauma or with a new neurological symptom

GOLD STANDARD

WHAT TO LOOK FOR ?

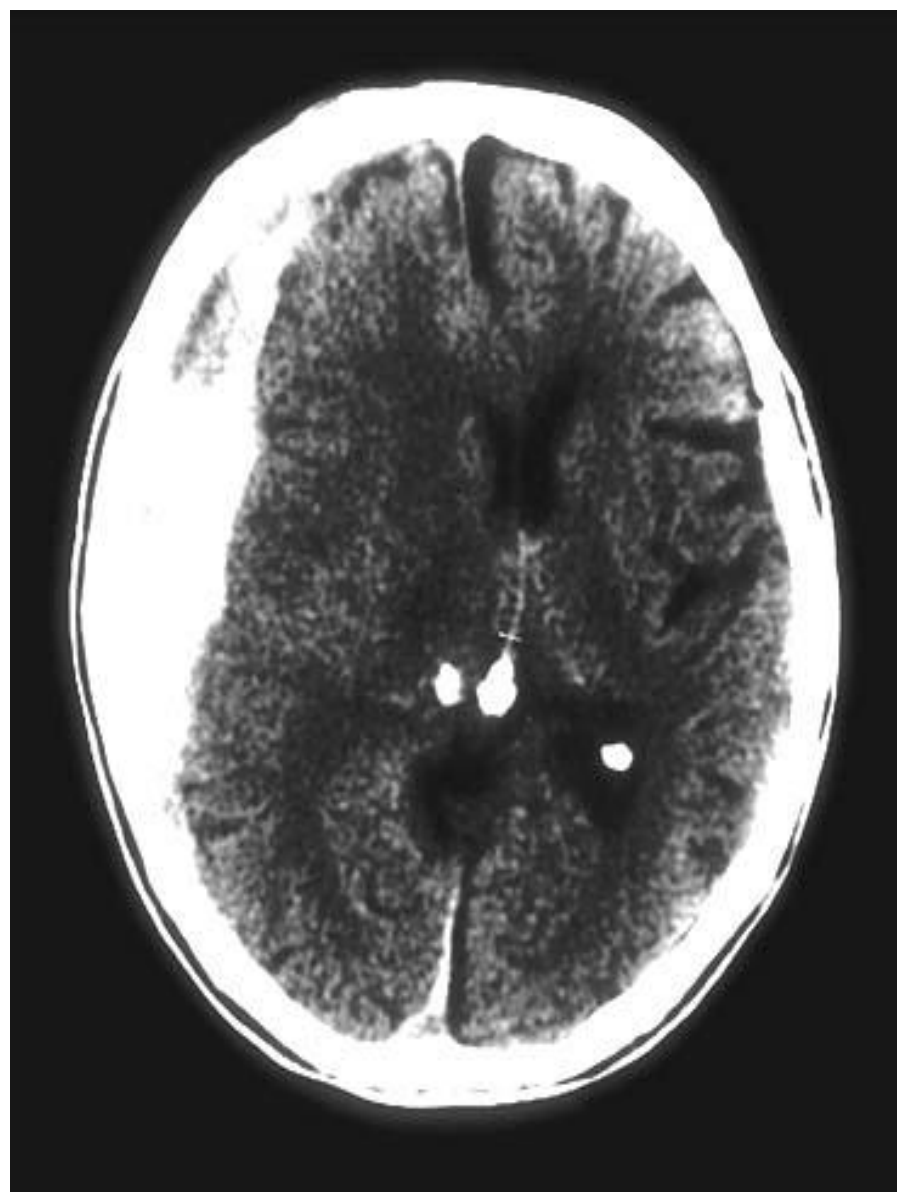
The main emergent conditions to rule out:

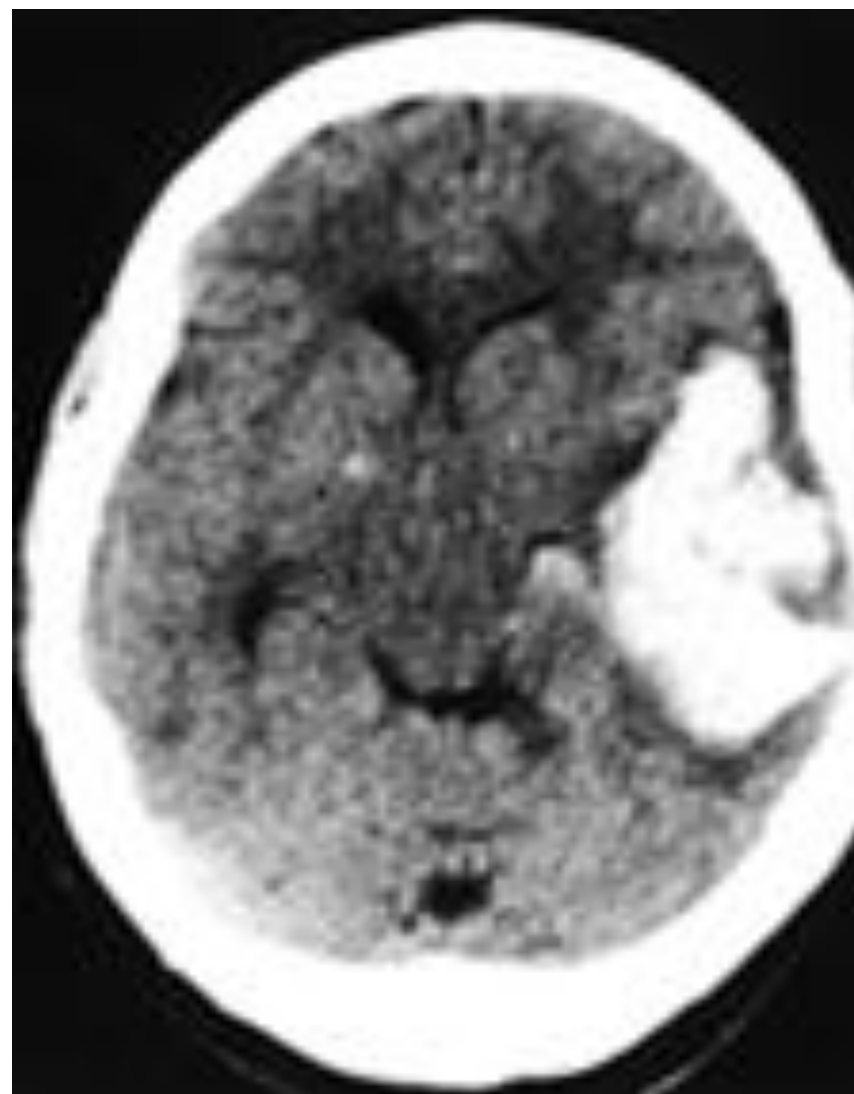
1. **Extradural hematoma (EDH):**

biconvex

2. **Subdural hematoma (SDH):** crescentic,
and due to venous bleeding.

3. Subarachnoid blood (SAH): high density spread thinly over convexity and filling sulci or basal cisterns.
4. Intracerebral hemorrhage (ICH): increased density in brain parenchyma
5. Hemorrhagic contusion: high density areas within brain parenchyma adjacent to bony prominences Less well defined than ICH
6. Intraventricular hemorrhage: present in ~ 10% of severe head injuries





Question