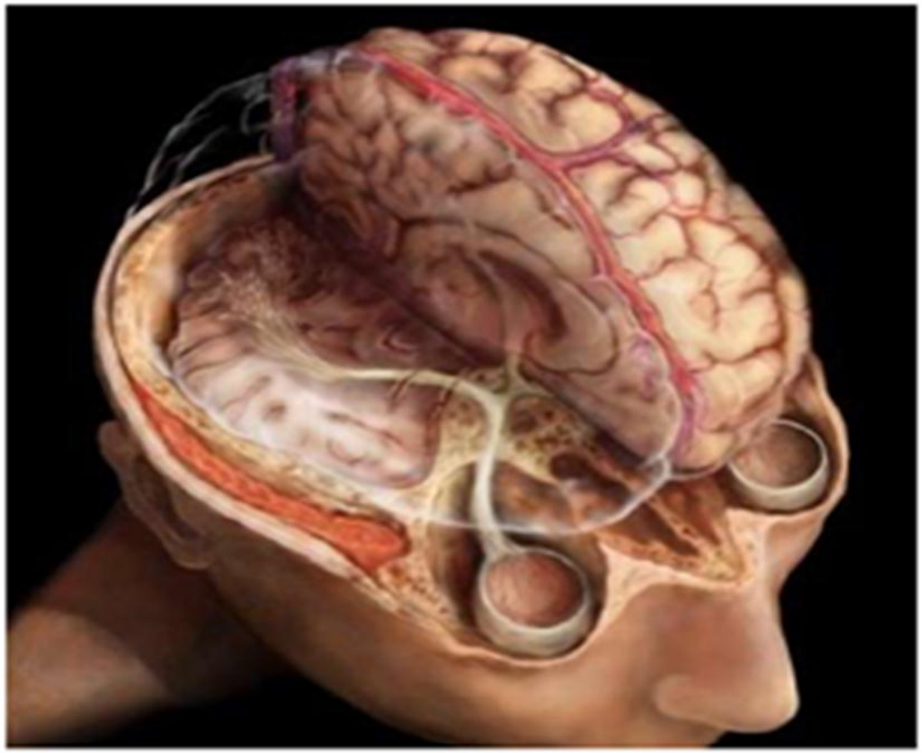
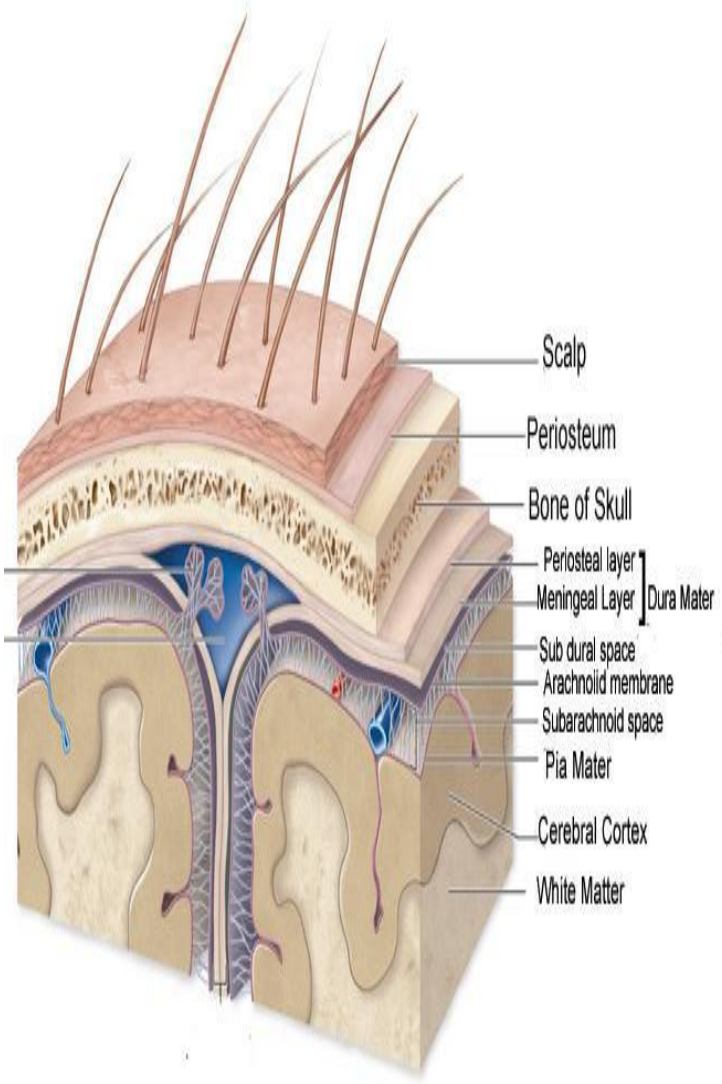
Meninges Dr nawal Alshannan

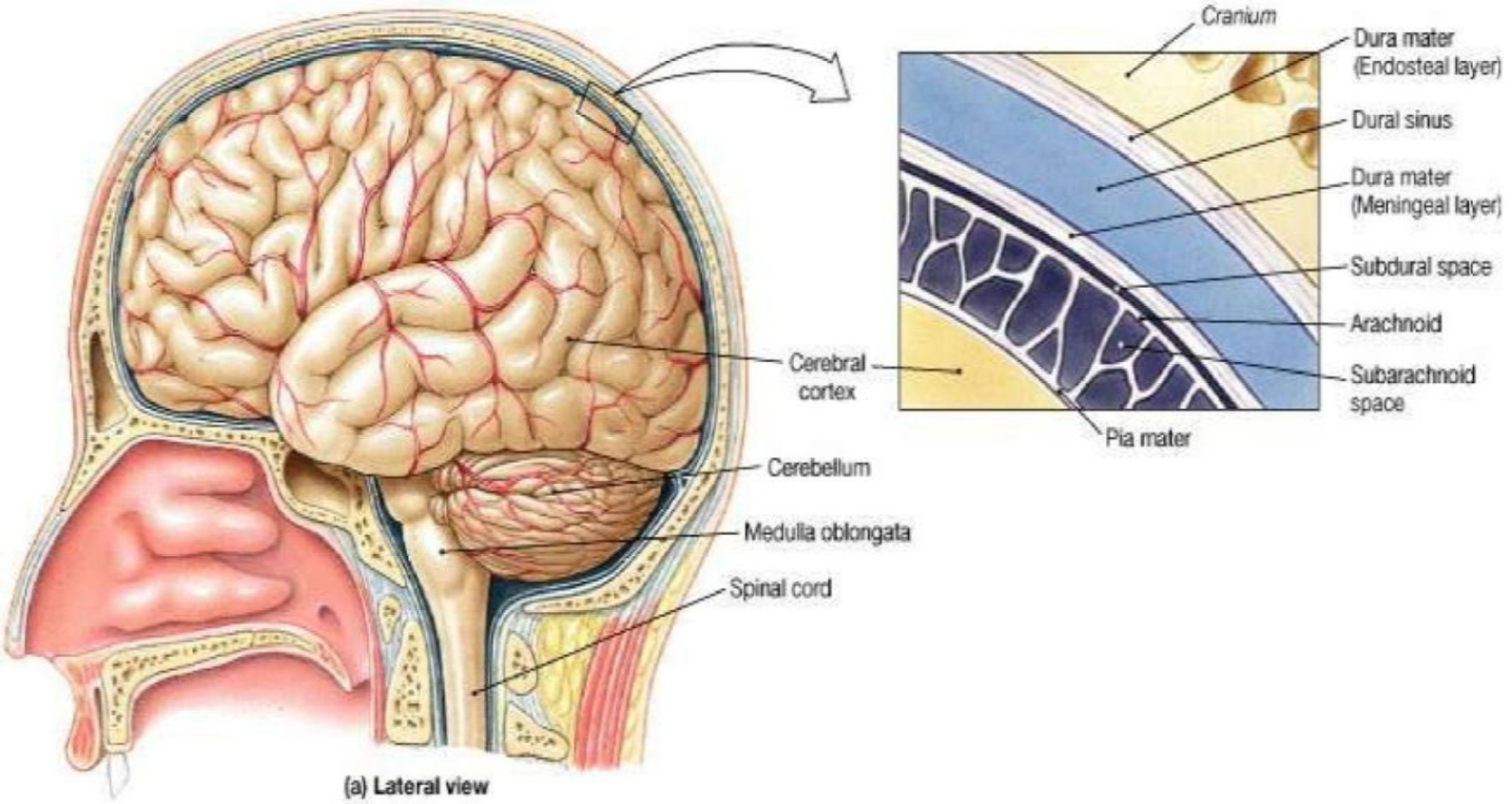


MENINGES

latin ward means membrane meninx

- **are membranes covering the brain and spinal cord**
- **Consist of three membranes**:
- **1. The dura mater**,
- strong- tough mother
- **2.The arachnoid mater**
  spidery = hold blood vessels
- **3.The pia mater**
- delicate membrane




Cranium
Dura mater
(Endosteal layer)
Dural sinus
Dura mater
(Meningeal layer)
Subdural space
Arachnoid
Subarachnoid
space
Pia mater
Cerebral
cortex
Cerebellum
Medulla oblongata
Spinal cord
(a) Lateral view

Dura mater

- Outermost layer
- Thick dense inelastic membrane
- It surrounds and supports the dural sinuses
- Dura mater has **two** layers = Bilaminar

• 1. The **superficial** layer, which serves as the skull's inner periosteum; (**periosteal layer**)

2. The **deep** layer; (**meningeal layer**)

= dura mater proper

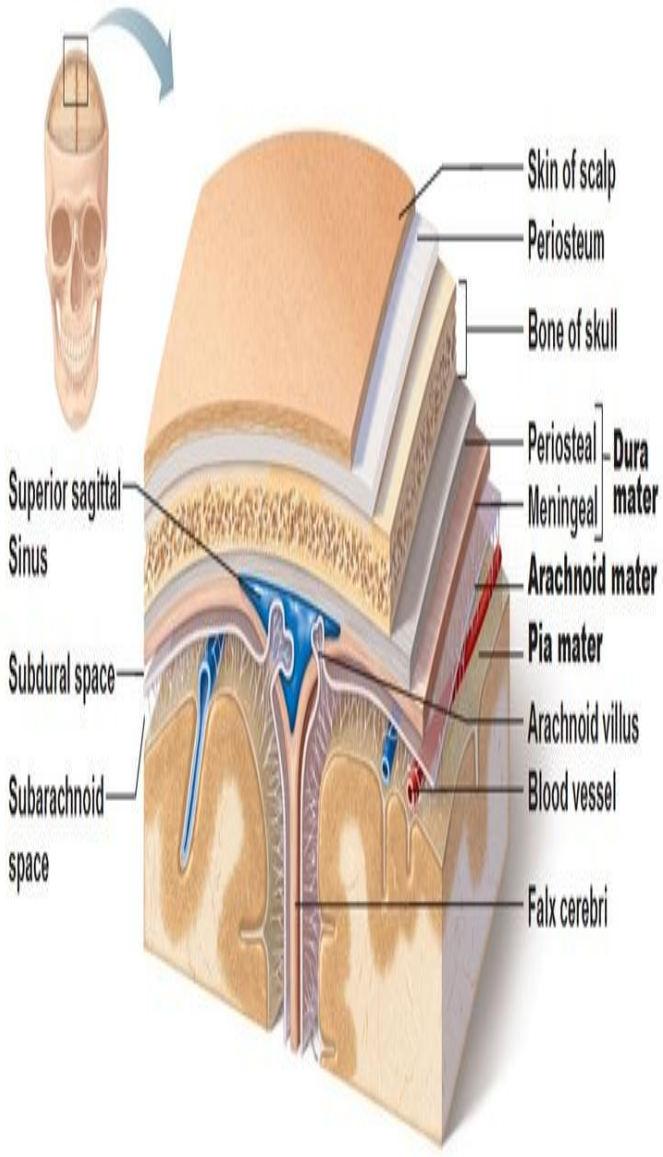
- Continuous through the foramen magnum

- with the dura mater of the spinal cord.

- The two layers are closely united except

- along certain lines, where they separate

- to form **venous sinuses**

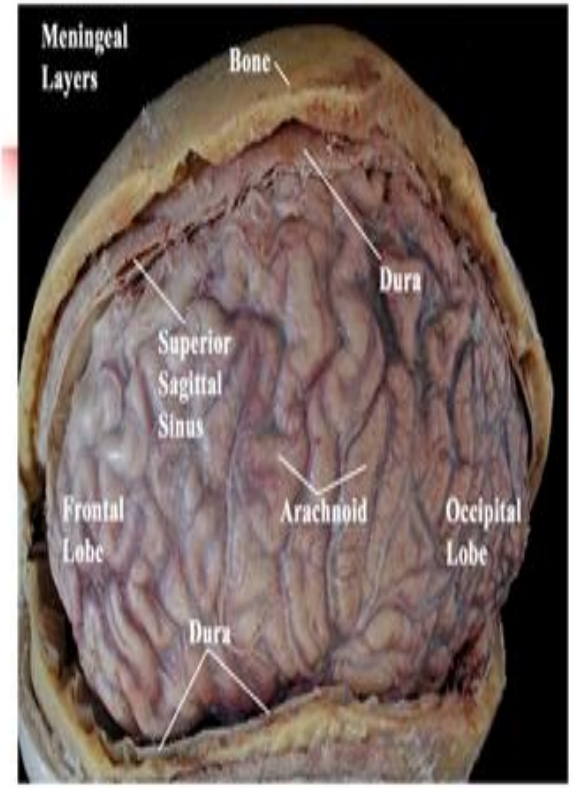


Folds of dura mater

- The **meningeal** layer Folded inwards as **4 septa** between part of the brain
-

These septi incompletely separate the brain into freely communicating parts

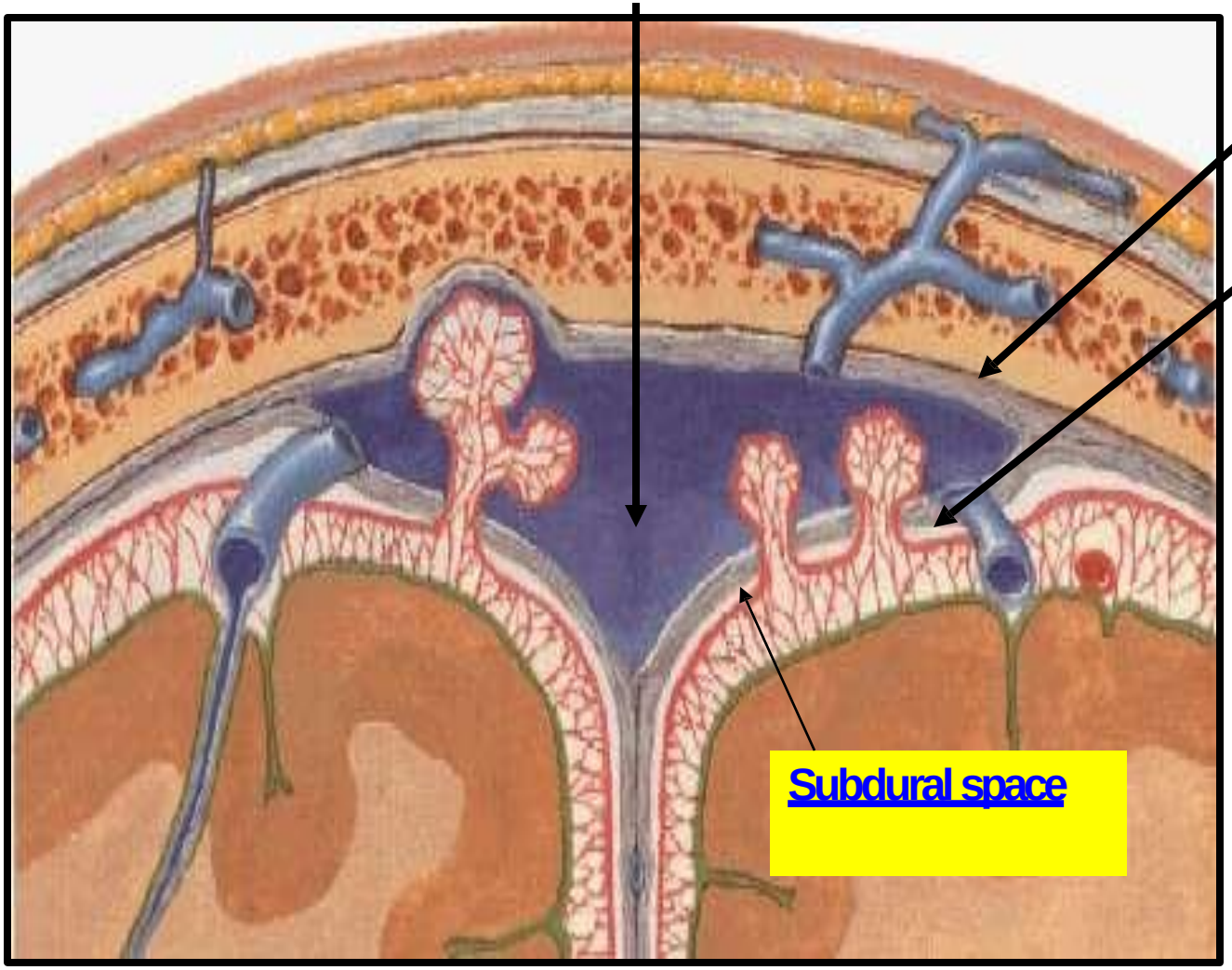
The function of these septa is to **restrict** the rotatory displacement of the brain



Superior sagittal sinus

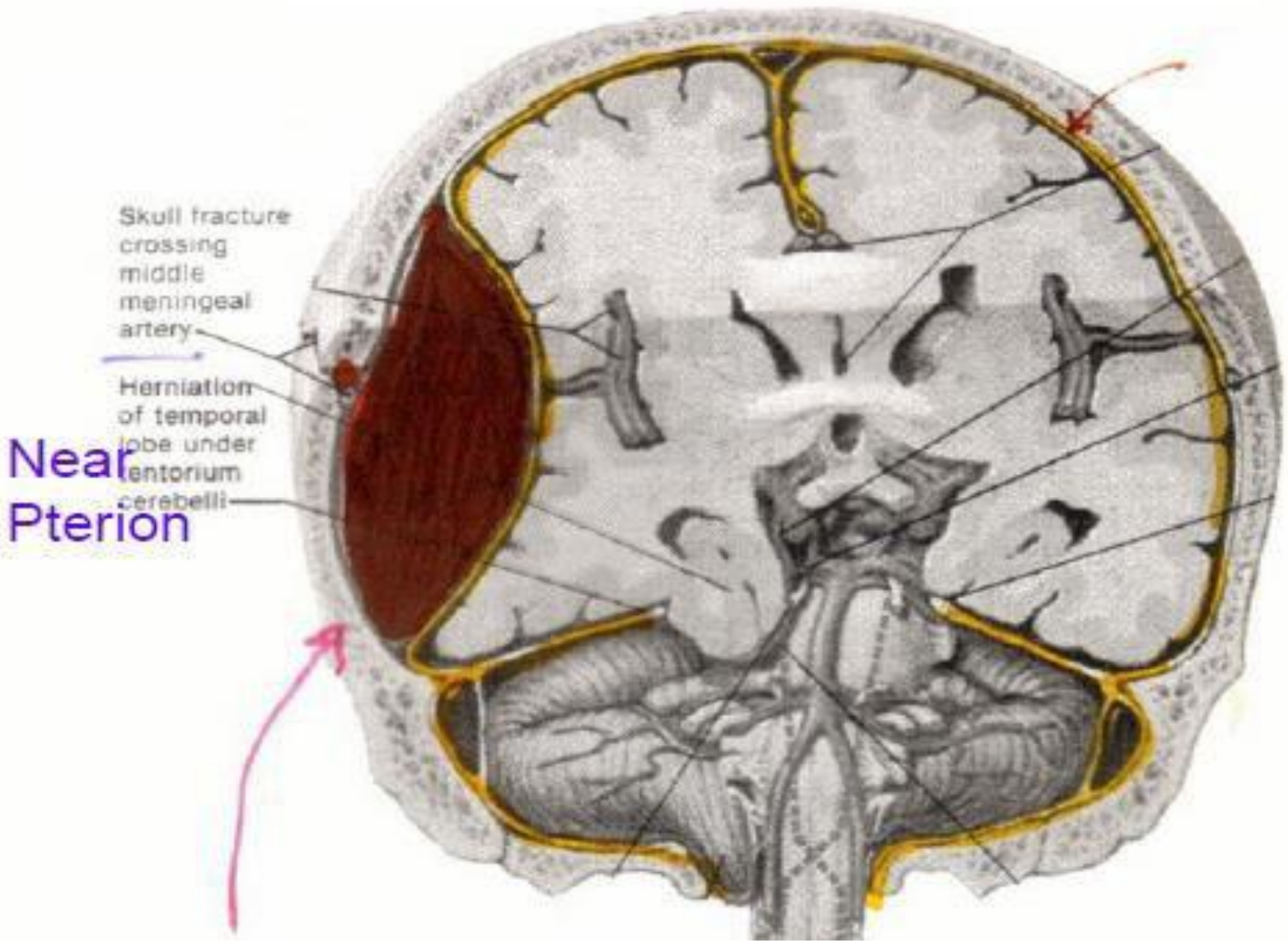
)Dural venous sinus(

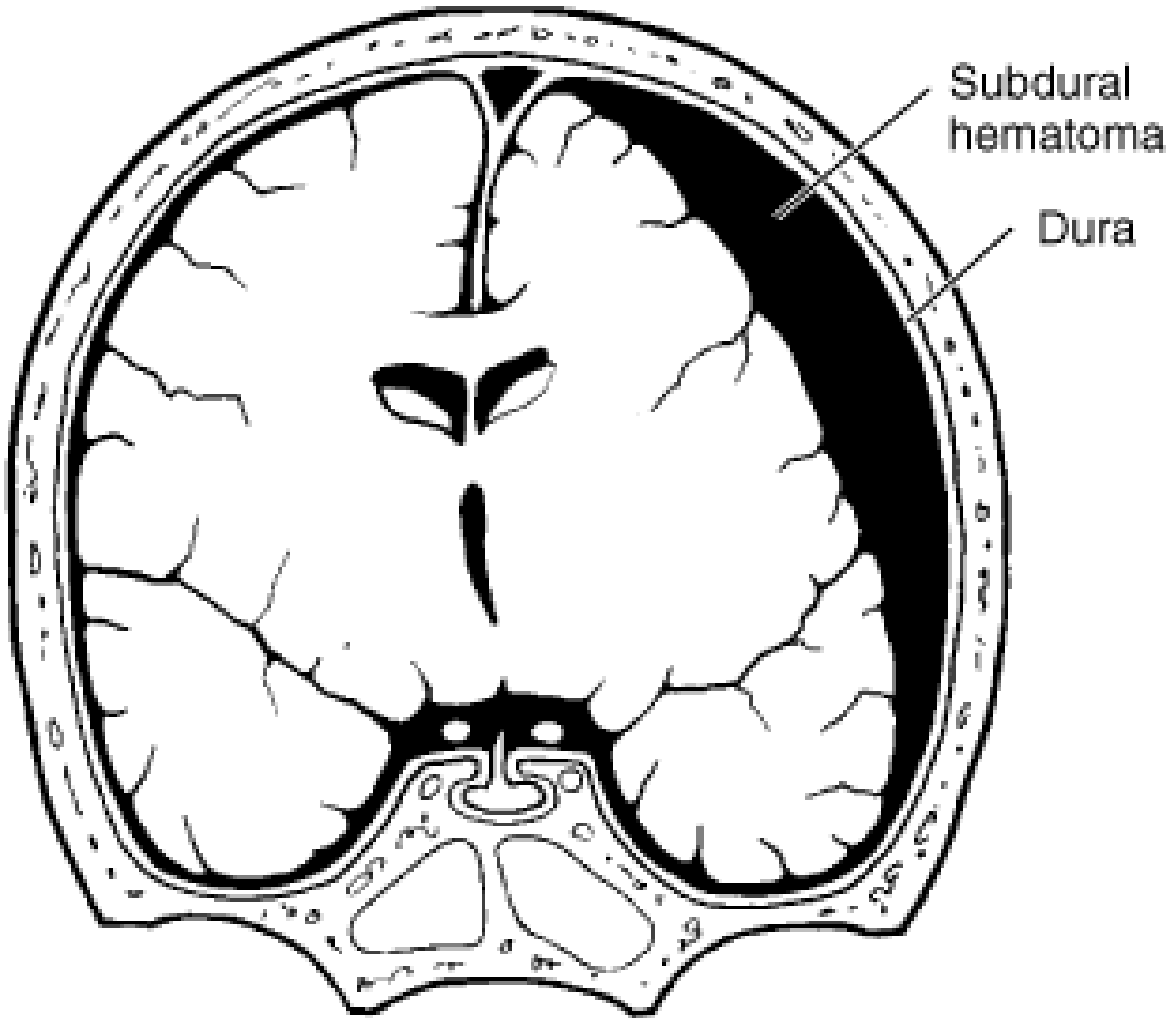
Dura mater



Coronal section of the upper part of the head

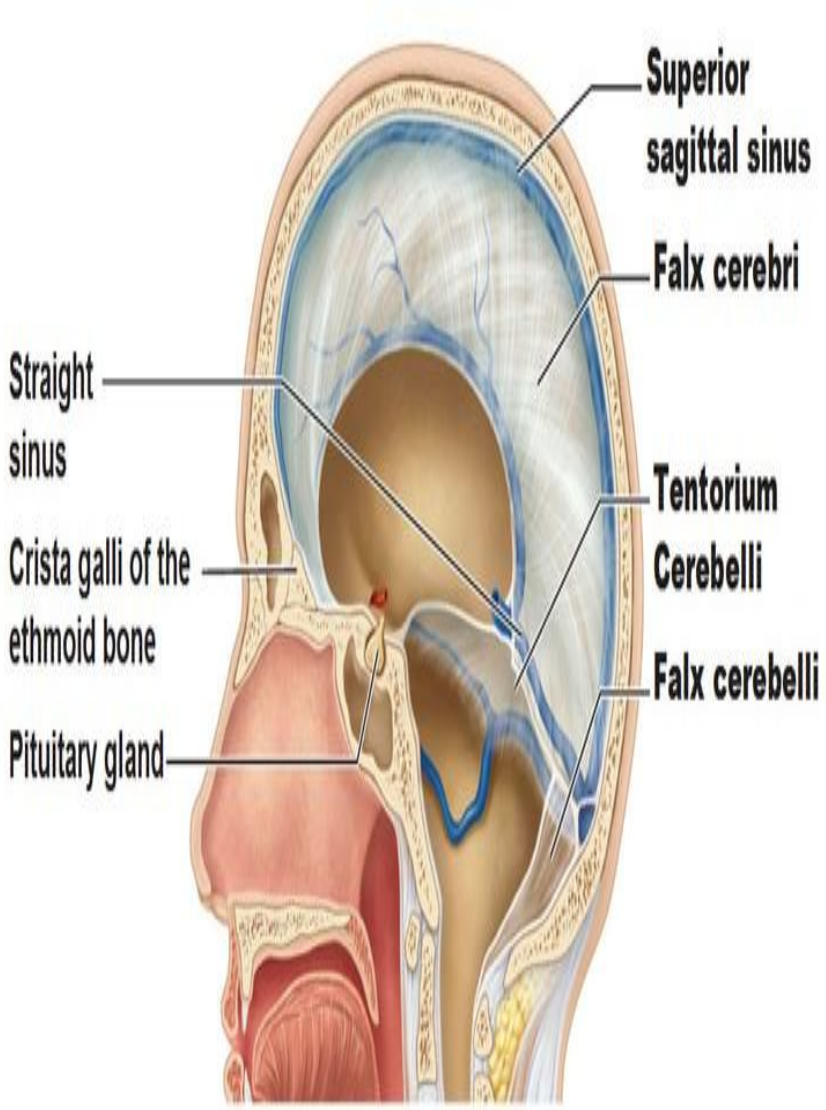
EPIDURAL HEMATOMA

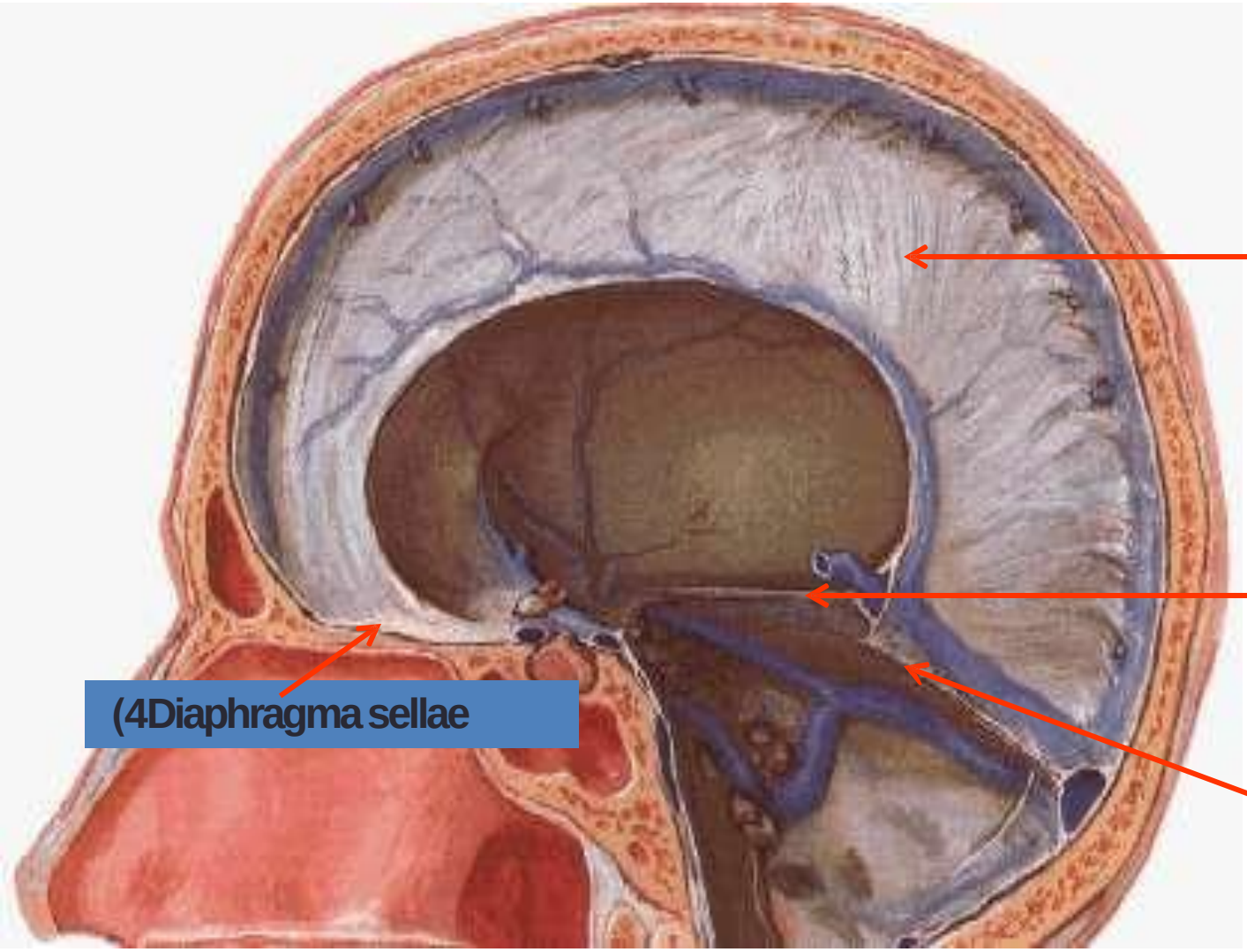



Subdural
hematoma
Dura

Dura mater: Falx cerebri

- **Sickle** shaped **double** layer of dura mater, lying between cerebral hemispheres
- Attached anteriorly to **crista galli**
- Attached posteriorly to **tentorium cerebelli**
- Has a free **inferior** concave border that contains **inferior sagittal sinus**
- **Upper** convex margin encloses **superior sagittal sinus**





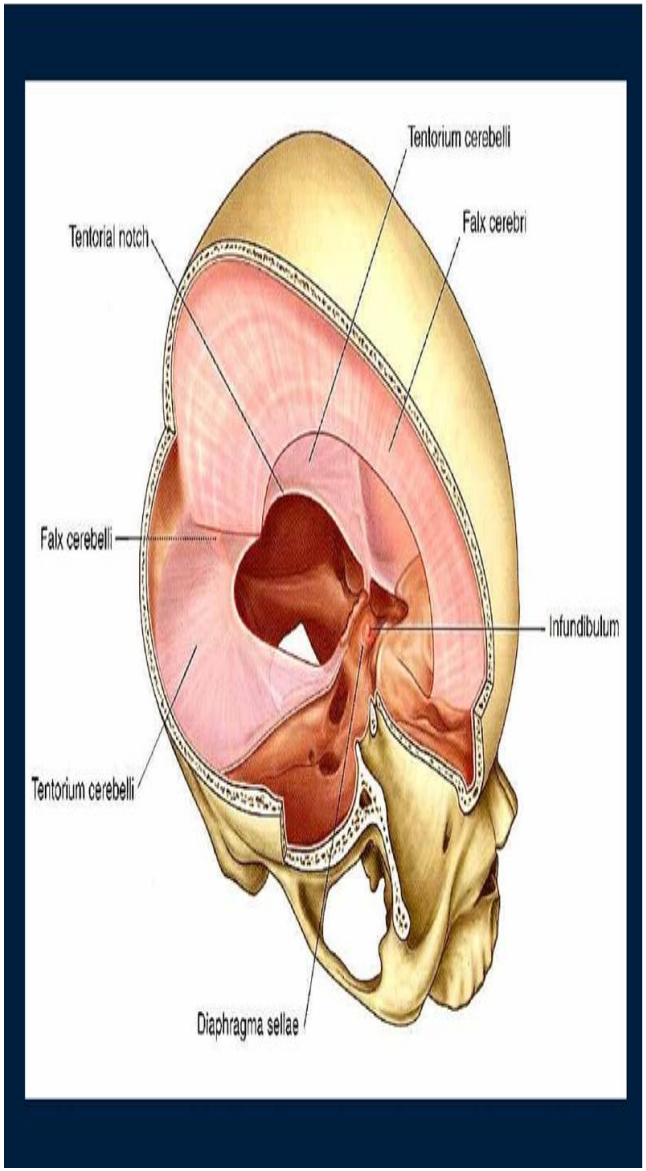
Sagittal section showing the duramater

Falx cerebelli

is a small, **sickle**-shaped fold of dura mater that is attached to the **internal occipital crest**

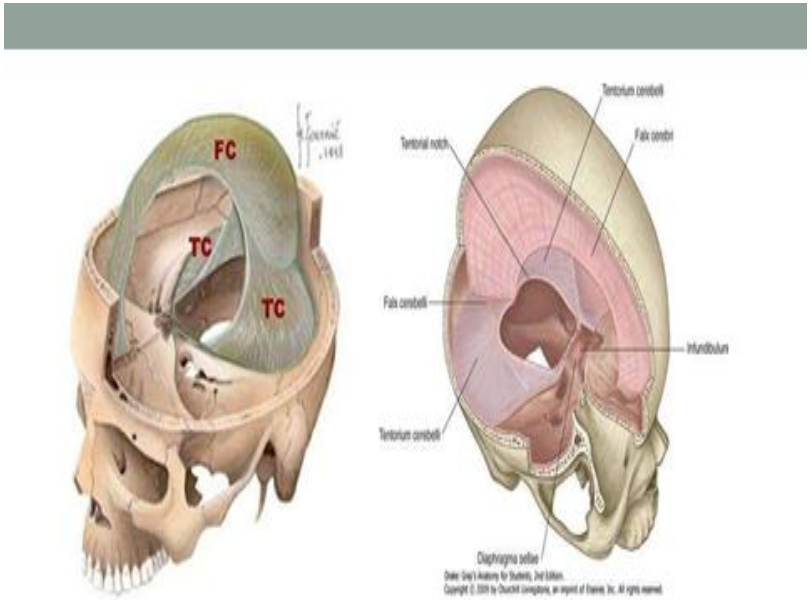
projects forward **between** the two cerebellar hemispheres.

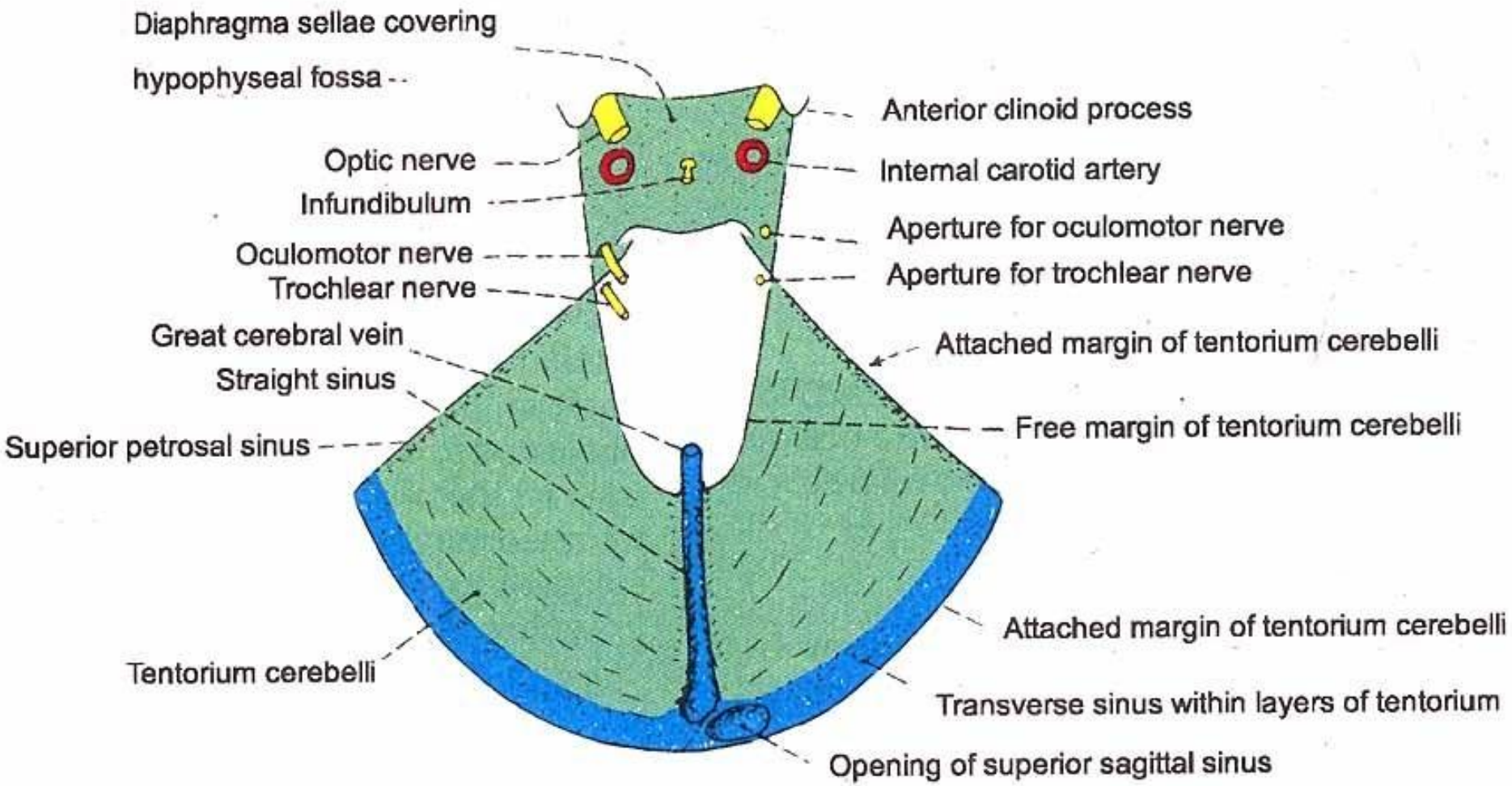
• Its **posterior** fixed margin contains the **occipital** sinus



Tentorium cerebelli

- Crescentic fold of dura mater
- Supports occipital lobes of cerebrum and **covers** cerebellum
- **External** convex border encloses **transverse sinus** posteriorly
- and **superior petrosal sinus** anteriorly



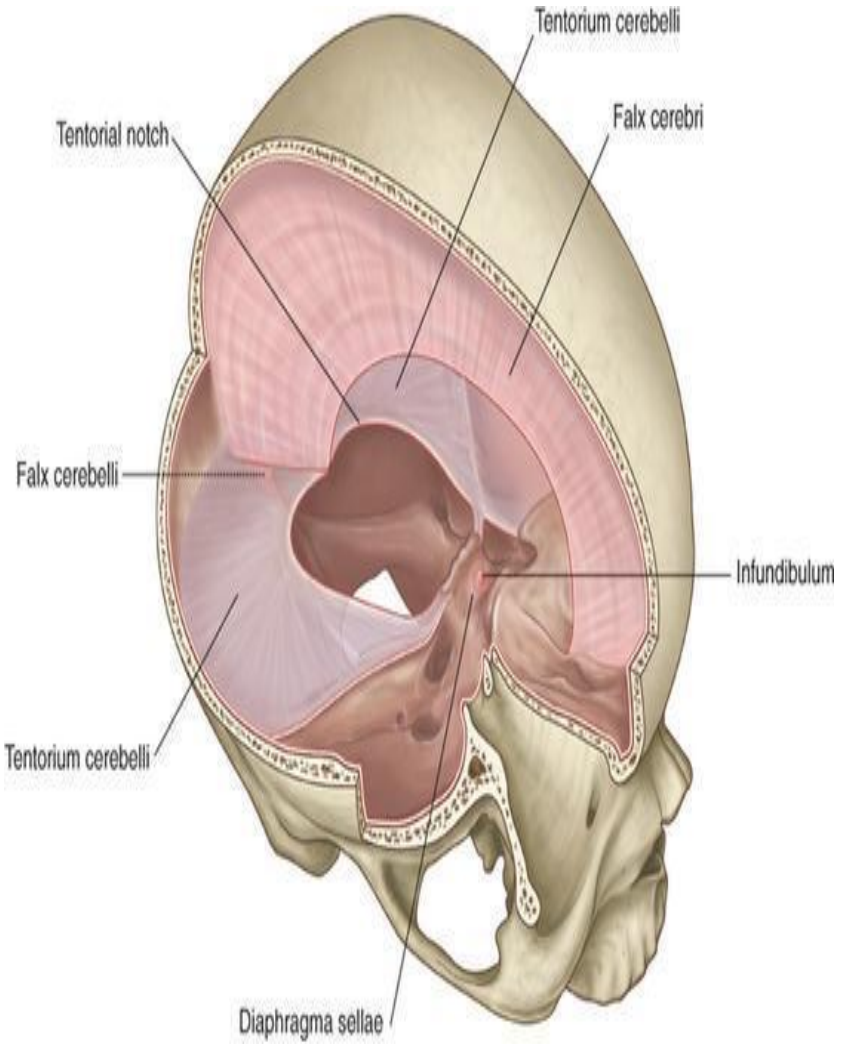


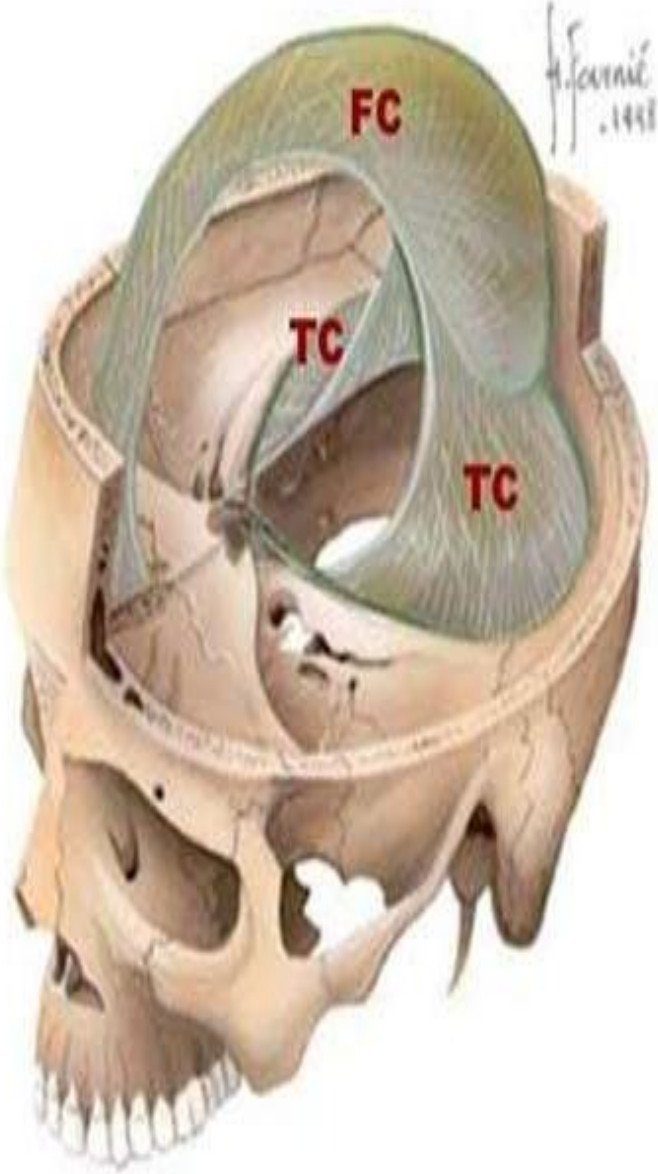
Tentorium cerebelli seen from above.

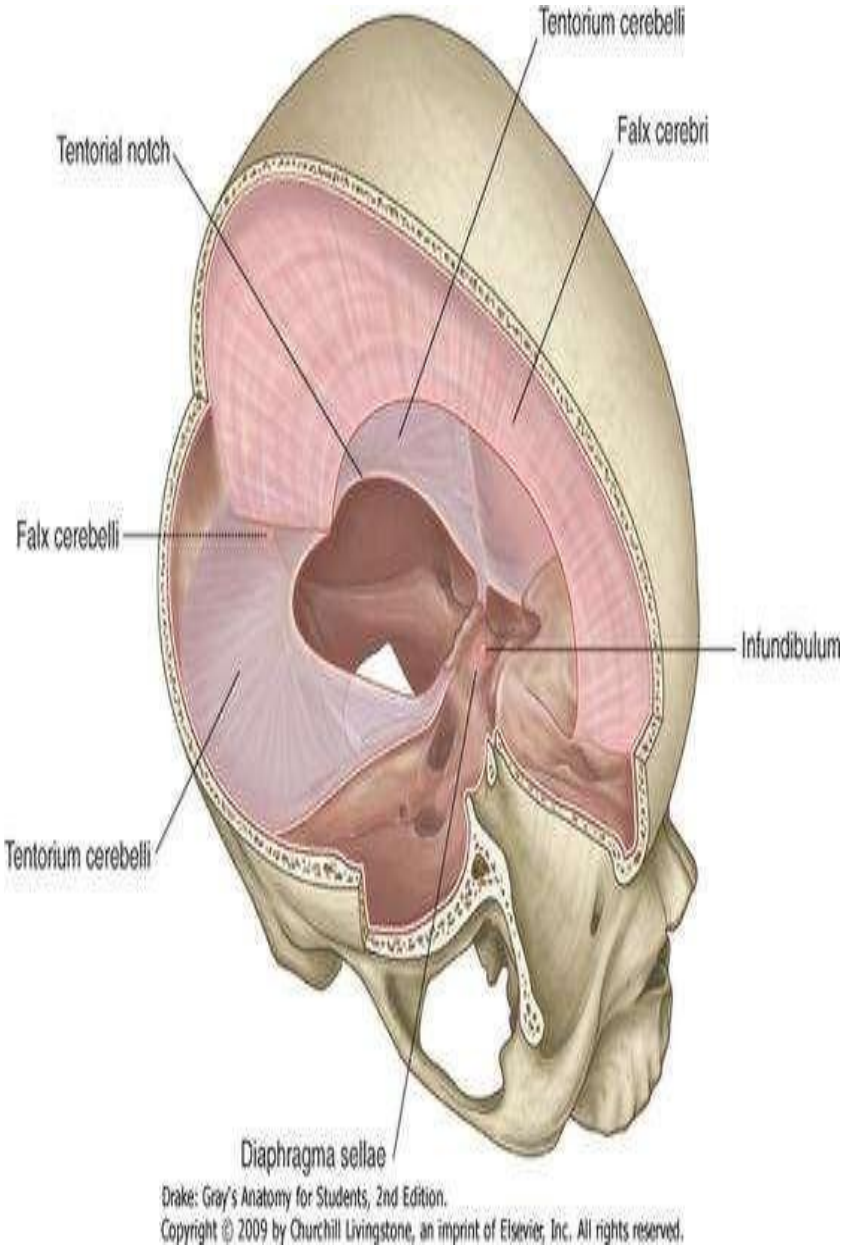
Diaphragma sellae

- **Circular,** horizontal fold of dura mater that forms the **roof** of sella turcica, covering the pituitary gland

- Has a central **aperture** for the **hypophysial** stalk







Dural nerve supply

- Branches of the
- trigeminal
- vagus
- first 3 cervical nerves
- branches from the sympathetic system pass to the dura.
- • The dura is **sensitive** to stretching, which produces the sensation of headache.

Blood supply of the dura
Venous drainage

- Dural **Venous** Drainage • The **meningeal veins** lie in the endosteal layer of dura. •
- The middle meningeal vein follows the branches of the middle meningeal artery and drains into the pterygoid venous plexus or the sphenoparietal sinus.
- •
- The veins lie lateral to the arteries

Blood supply of the dura
Arterial supply

- • The dura mater’s arteries supply from the
- **Internal carotid,**
- **Maxillary►► M.M.artery**
- **Ascending pharyngeal, Occipital**
- **and Vertebral arteries**. •

- most important is the middle meningeal artery, which is commonly damaged in head injuries

Arachnoid mater

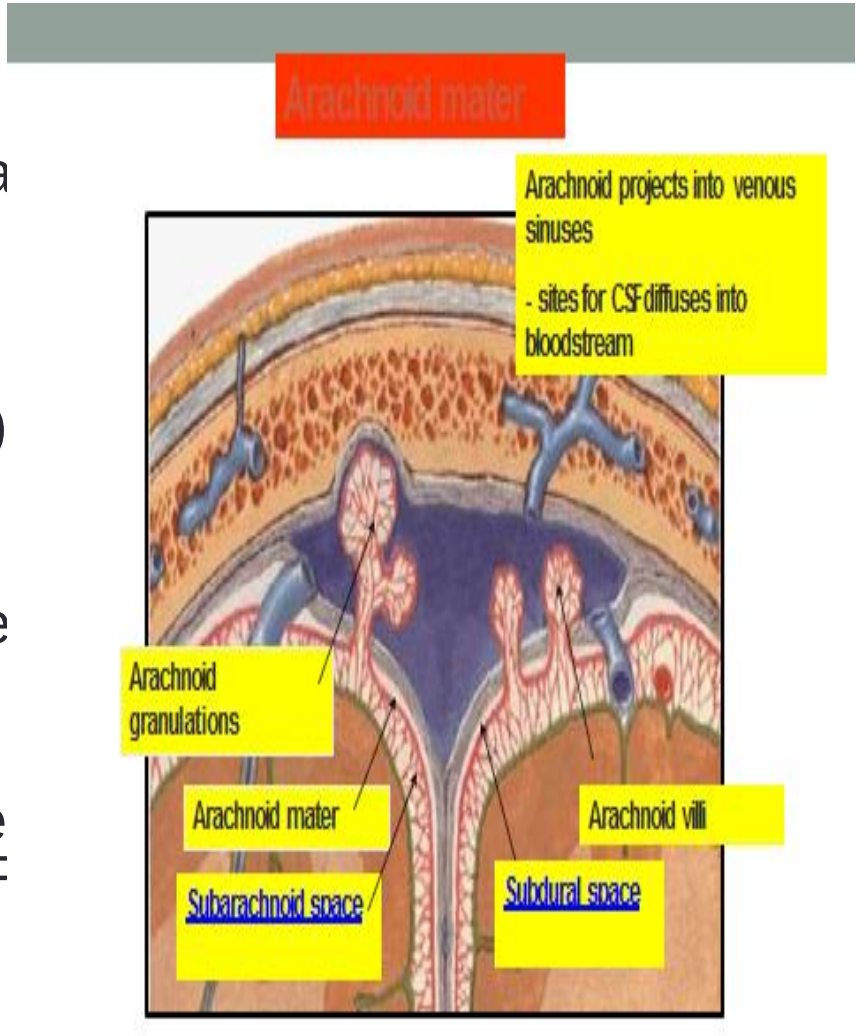
- Delicate, impermeable & avascula membrane covering the brain
-

Lying between Pia mater (internally) & dura Mater(externally)

 Separated from dura mater by a potential space, the subdural space (filled by a film of fluid)

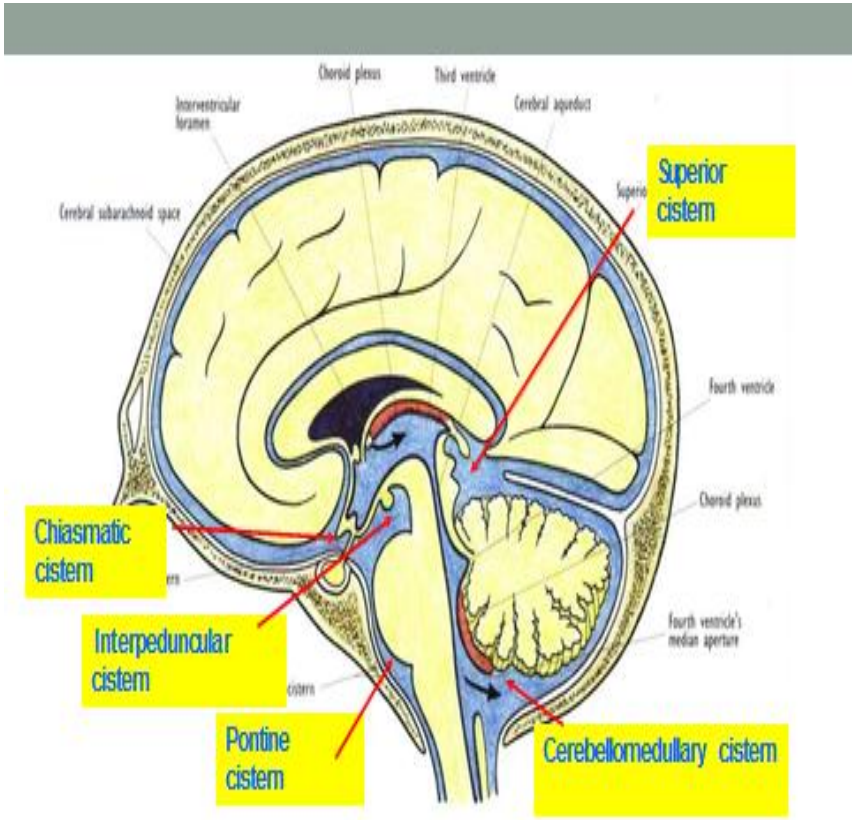
 Separated from pia mater by the subarachnoid space (filled with CSF

The outer and inner surfaces covered with flattened mesothelial cells /p

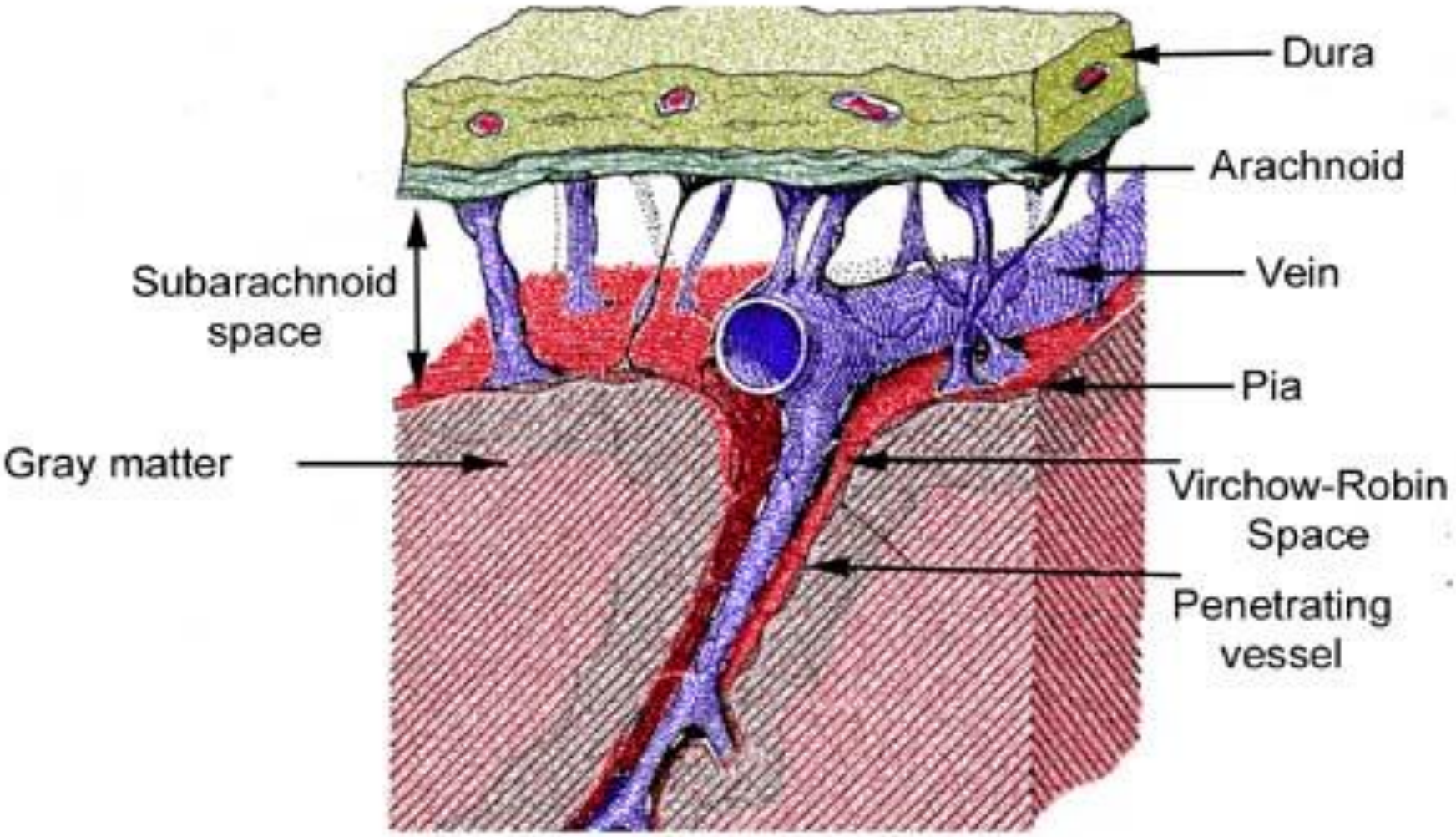


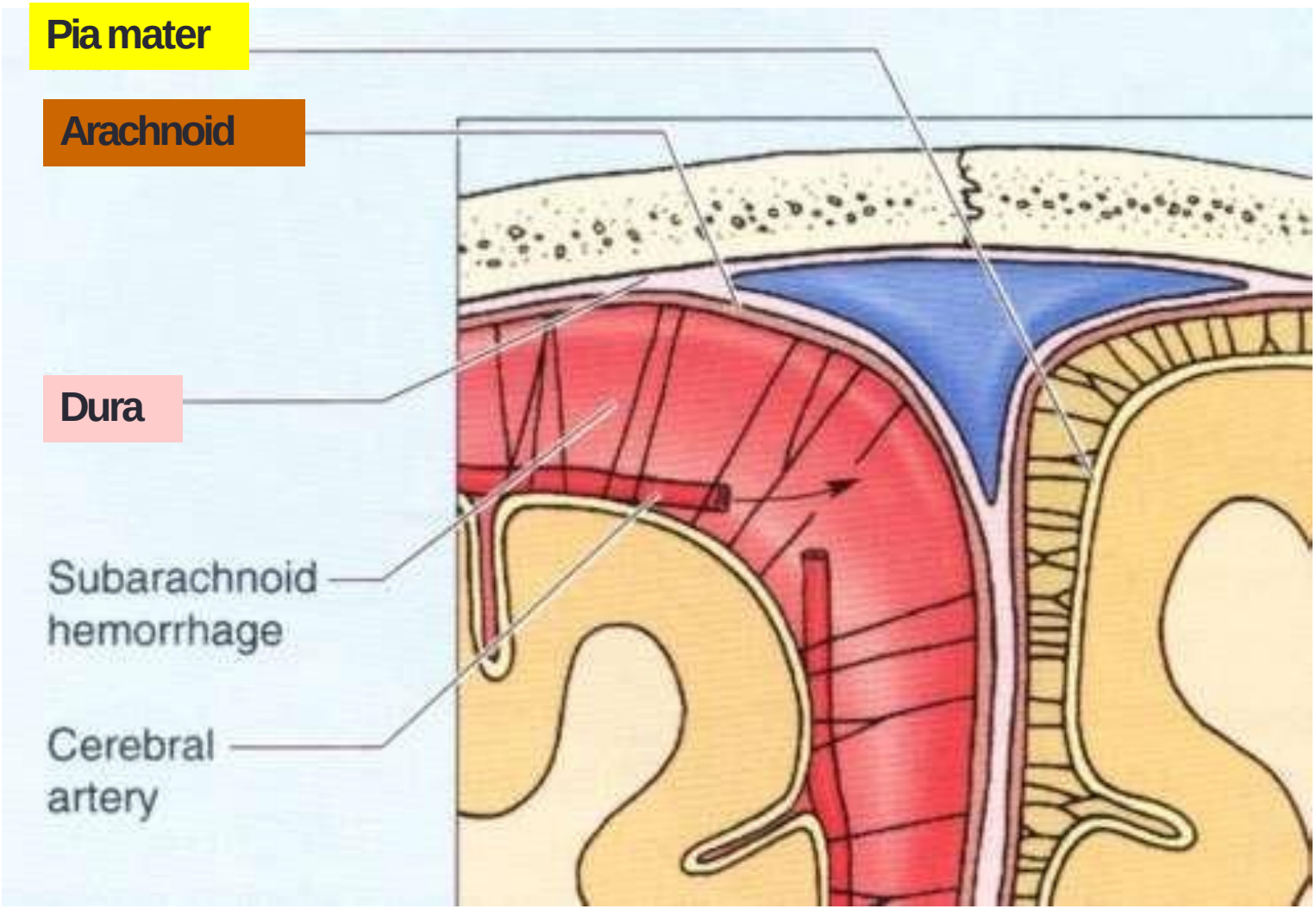
Subarachnoid space

- Relatively narrow over the surface of cerebral hemisphere, but sometimes becomes much wider in areas at the base of the brain,
- the widest space is called **subarachnoid cisterns**
-
- The cisterna cerebellomedularis lies between inferior surface of the cerebellum and roof of 4th ventricle
- The cisterna interpeduncularis lies between 2 cerebral hemispheres.
- All the cisternae are in free communication with one another & with the remainder of subarachnoid space



Median sagittal section to show the subarachnoid cisterns & circulation of CSF


Dura
Arachnoid
Vein
Subarachnoid space
Pia
Gray matter
Virchow-Robin Space
Penetrating vessel

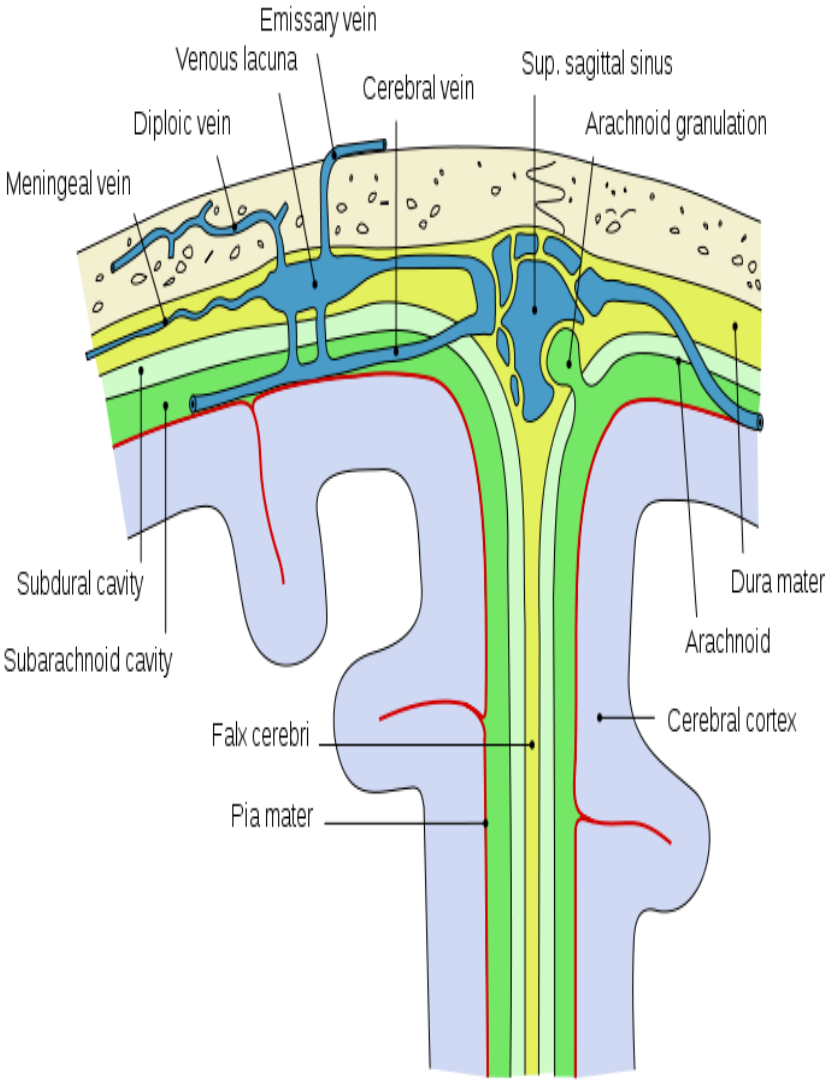


*

Subarachnoid haemorrage

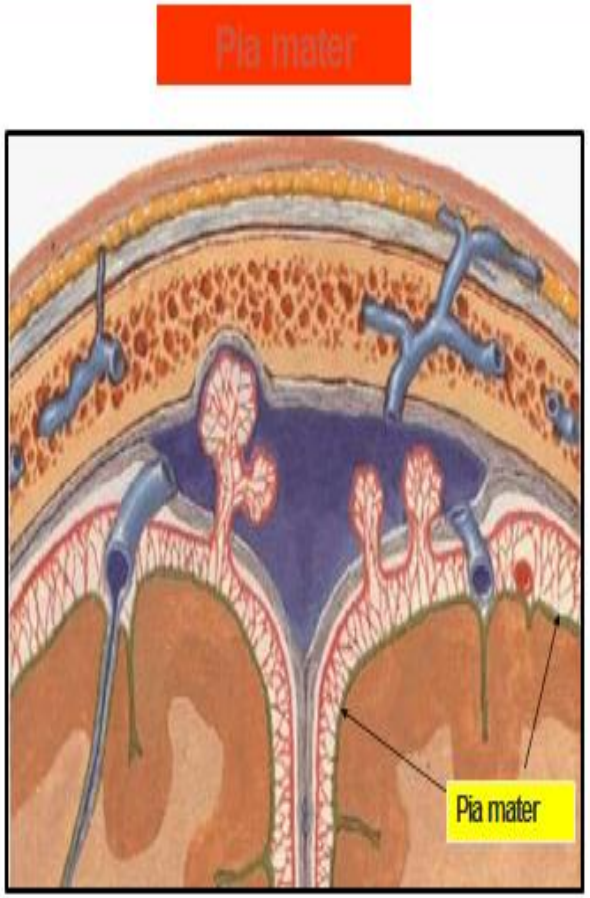
Pia mater

- Pia Mater is vascular membrane covered by mesothelial cells.
- • Closely invests the brain, covering the gyri, descending into the deepest sulci & closely applied to the cortical surface.



Pia mater

- It extends out over the cranial nerves & fuses with their epineurium
- The cerebral arteries entering the substance of the brain, carry a sheath of pia mater with them
- The pia mater forms the tela choroidae
- .
- The tela choroidae fuse with ependyma to form the choroid plexus
- Choroid plexus forms CSF

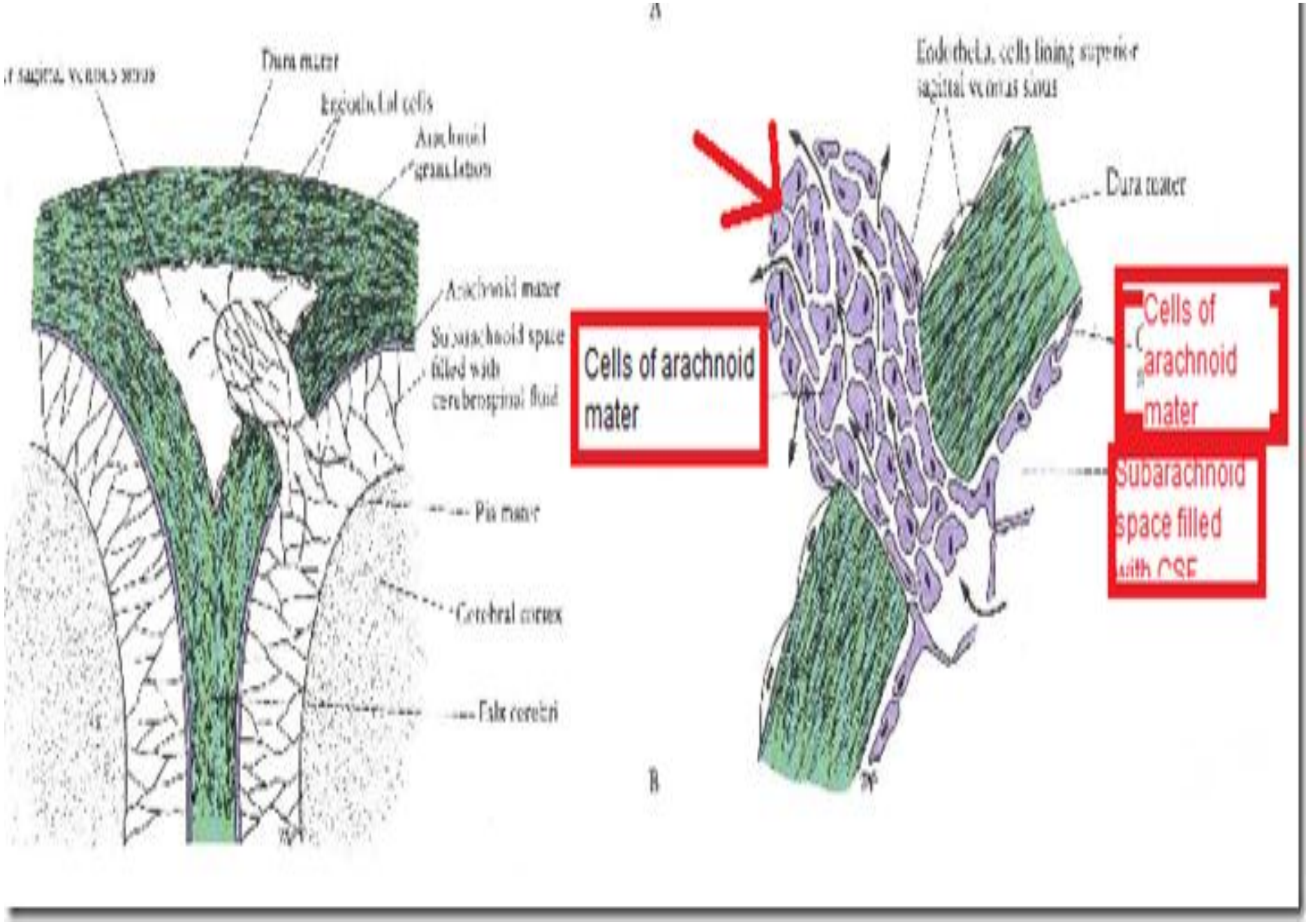


Tela Choroidea and choroid plexesus

- Pia mater forms the tela chordia on the roof of the3rd and 4th ventricle
- Which fuses with epindyma to form the choroid plexus
- CSF produced from the choroid plexus

Arachnoid Granulations

- Microscopic projections of the arachnoid into some of the venous sinuses
- Prolongations of pia-arachnoid that protrude through the meningeal layer of the dura mater and have a thin limiting membrane
- Collections of arachnoid villus form arachnoid granulations that lie in venous lacunae at the margin of the superior sagittal sinus


Dura mater
Arachnoid granulation
Arachnoid mater
Pia mater
Cerebral cortex
A
Endothelial cells lining superior sagittal venous sinus
Dura mater
Cells of arachnoid mater
Cells of arachnoid mater
Subarachnoid space filled with CSF
B