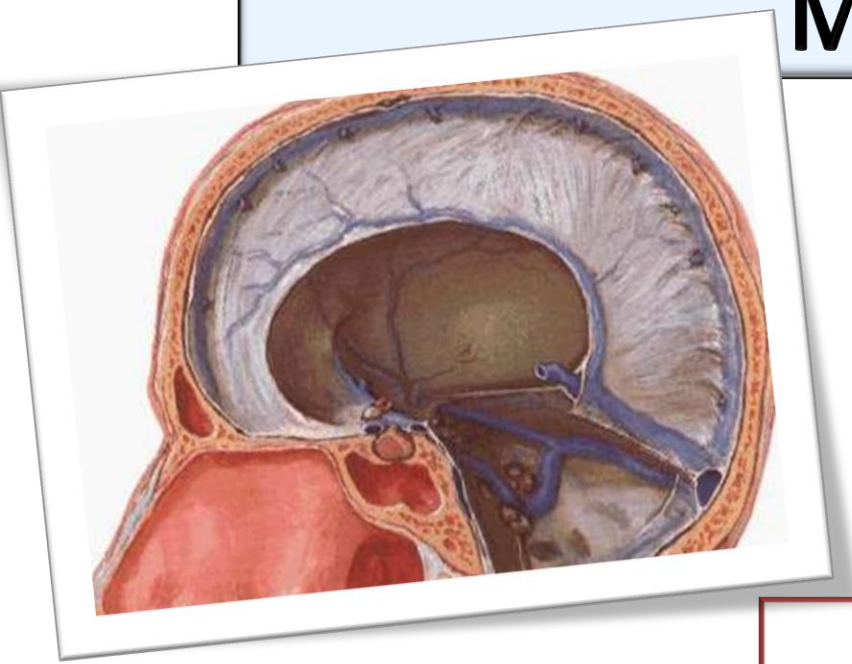
المرحلة : الثانية
المادة : التشريح

جامعة ذي قار / كلية الطب

MENINGES OF THE BRAIN



الدكتور
رافد رمثان التميمي

Done by

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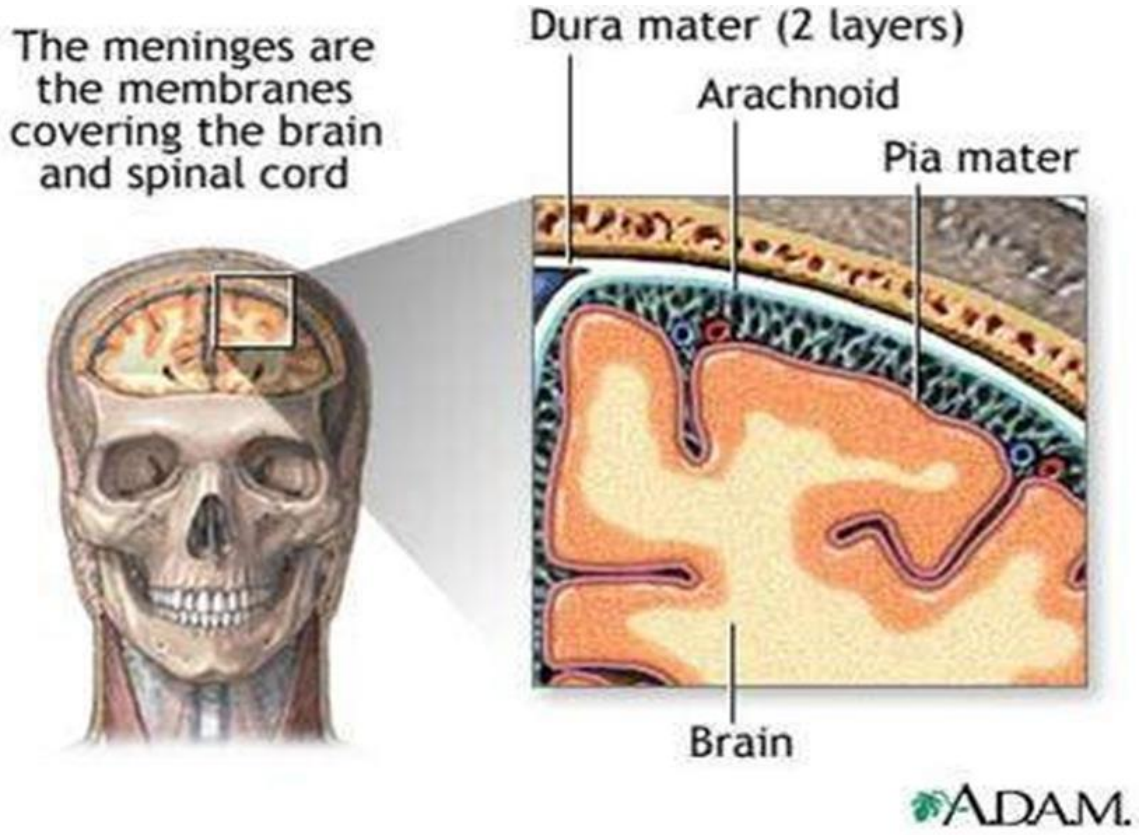
Clinical Radiology

CAMB,DMRD,M.B.Ch.B.,.

The Meninges

- The Meninges are the membrane covering the brain and spinal cord.
- The Meninges consist of three membranes:

1. The dura mater,
2. The arachnoid mater,
3. The pia mater.

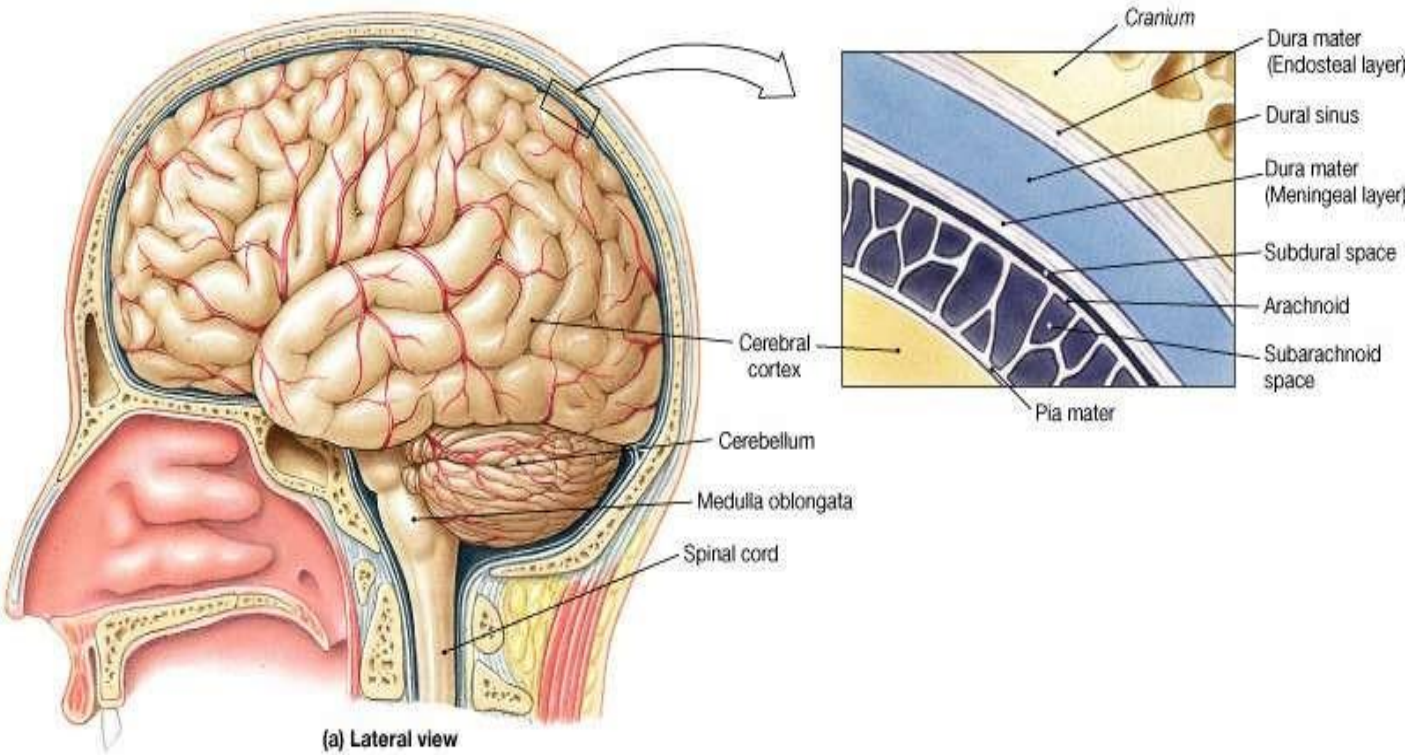


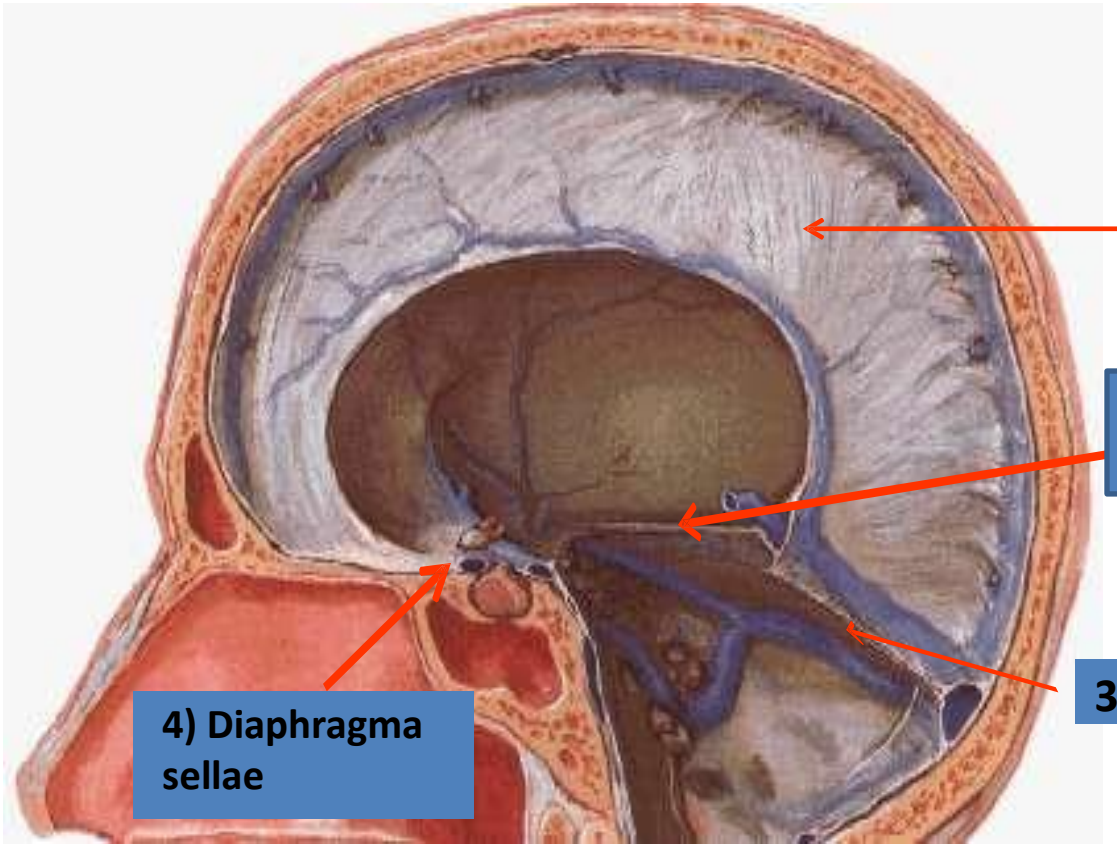
The Meninges

1. Dura mater -
   strong, "Tough mother"
   a. Falx cerebri
   b. Falx cerebelli
   c. Tentorium cerebelli
   d. Diaphragma sella

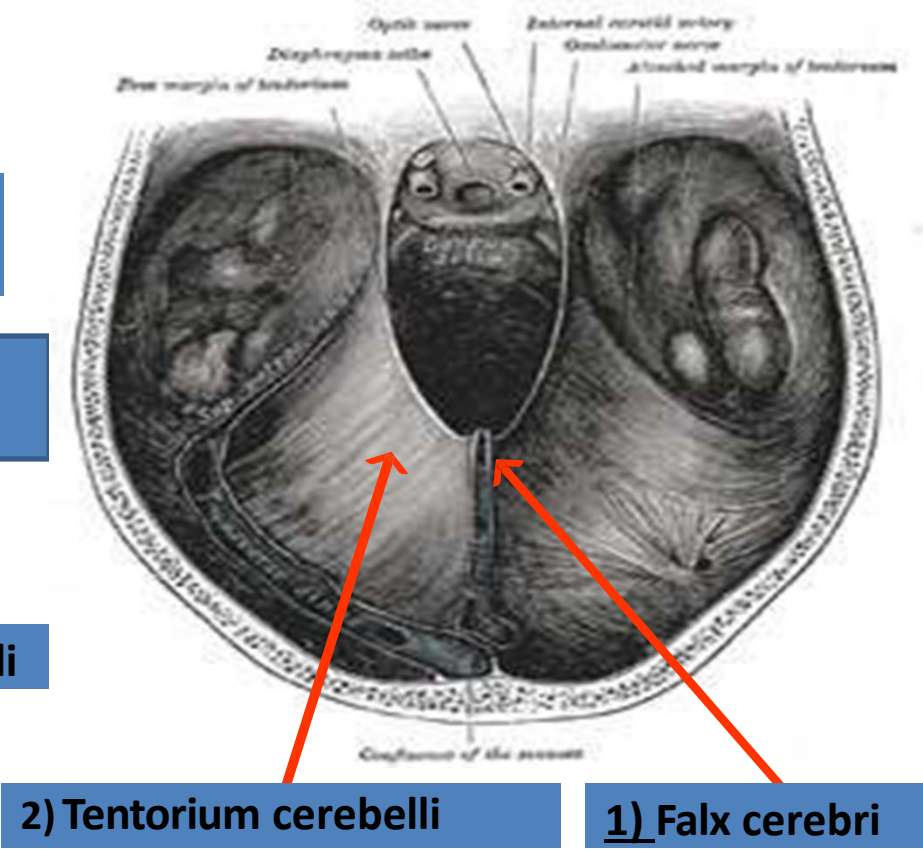
2. Arachnoid - spidery, holds blood vessels

3. Pia mater - "delicate mother"





Sagittal section showing the duramater

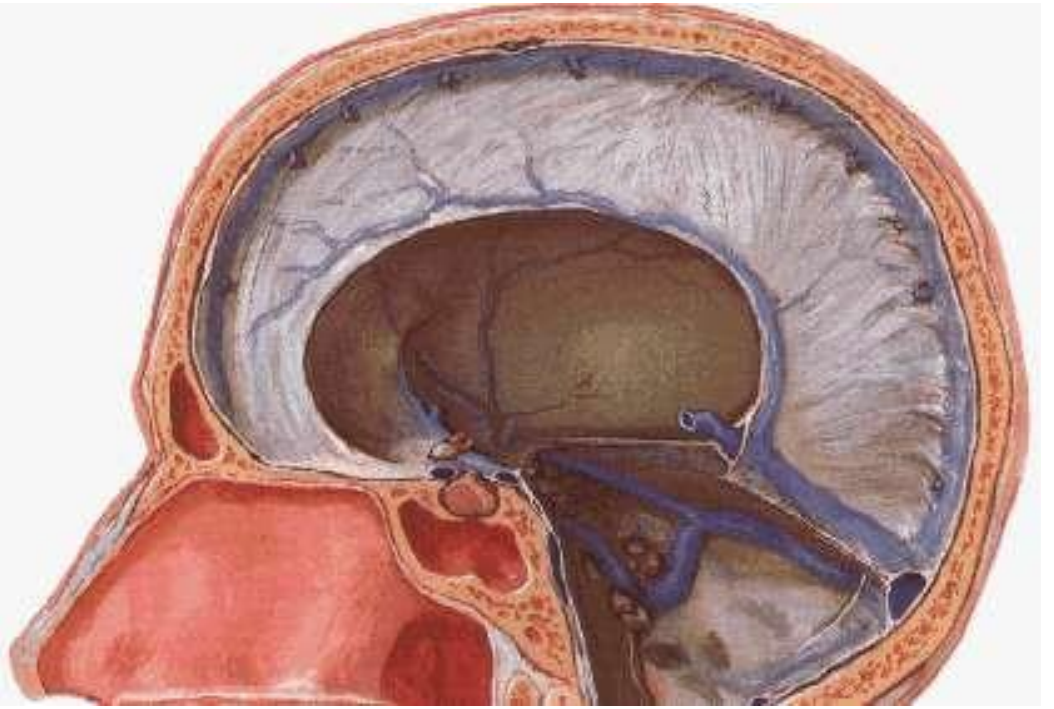


Superior view showing the duramater

DURA MATER

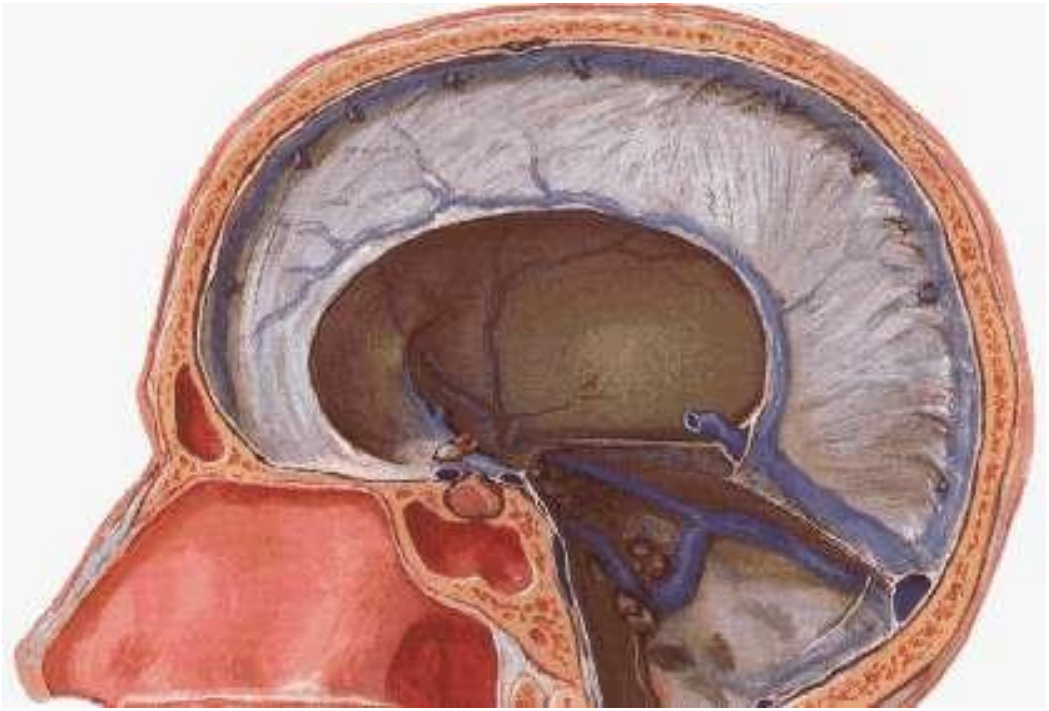
- Thick dense inelastic membrane and the outermost layer of the meninges
- Bilaminar:
  - Endosteal layer (outer)
  - Meningeal layer (inner)

These are closely united except along certain lines, where they separate to form venous sinuses.



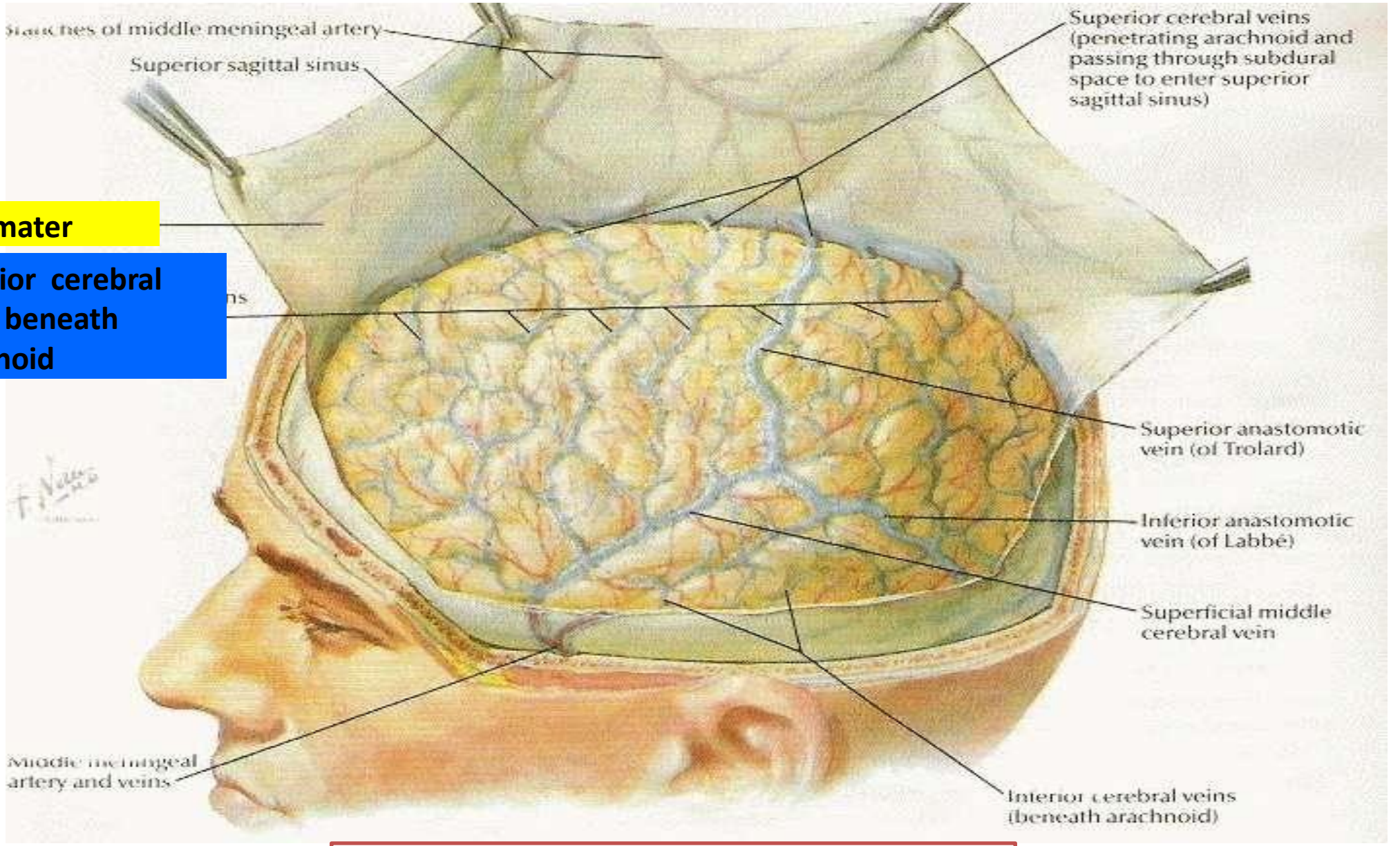
DURA MATER

- **Endosteal layer ;**
  - **Periosteum - inner surface of the skull bones**
  - **Not continuous with dura mater of spinal cord**
- **Meningeal layer ;**
  - **Dura mater proper**
  - **Covering the brain**
  - **Continuous with dura mater of spinal cord**
  - **Folded inwards as 4 septa between part of the brain**
  - **The function of these septa is to restrict the rotatory displacement of the brain.**



duramater

Superior cerebral veins beneath arachnoid



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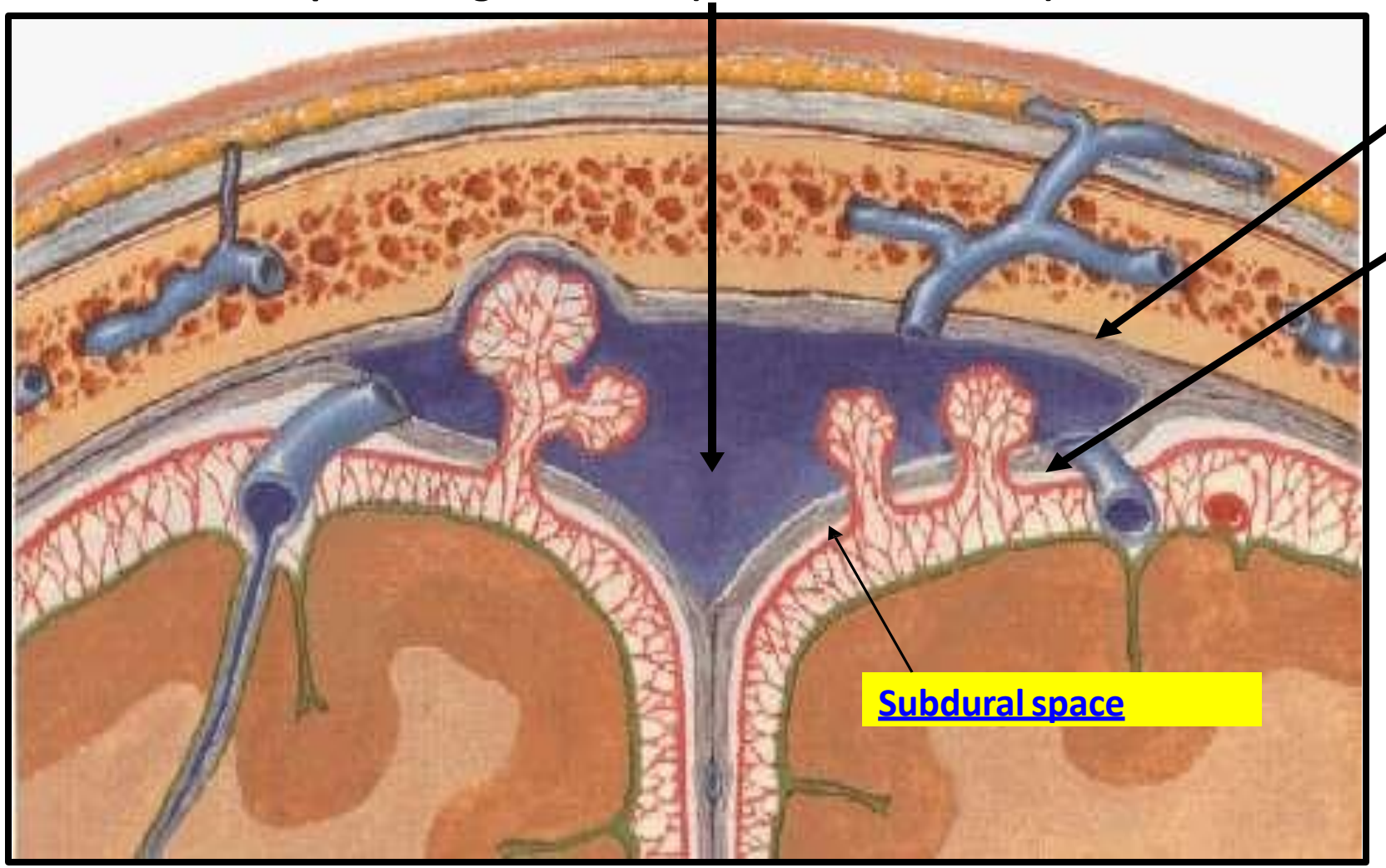
Dura mater

Superior sagittal sinus (Dural venous sinus)



They are closely united except along certain lines; they are separated to form venous sinuses

Coronal section of the upper part of the head

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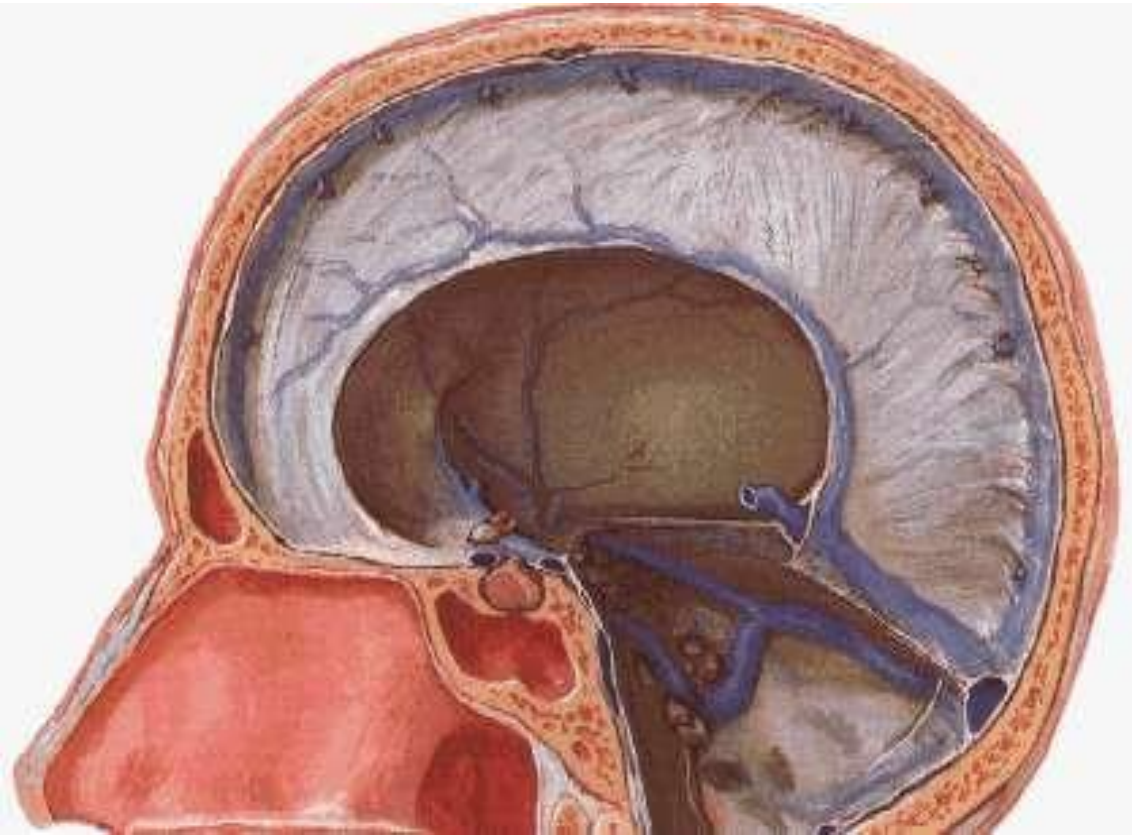
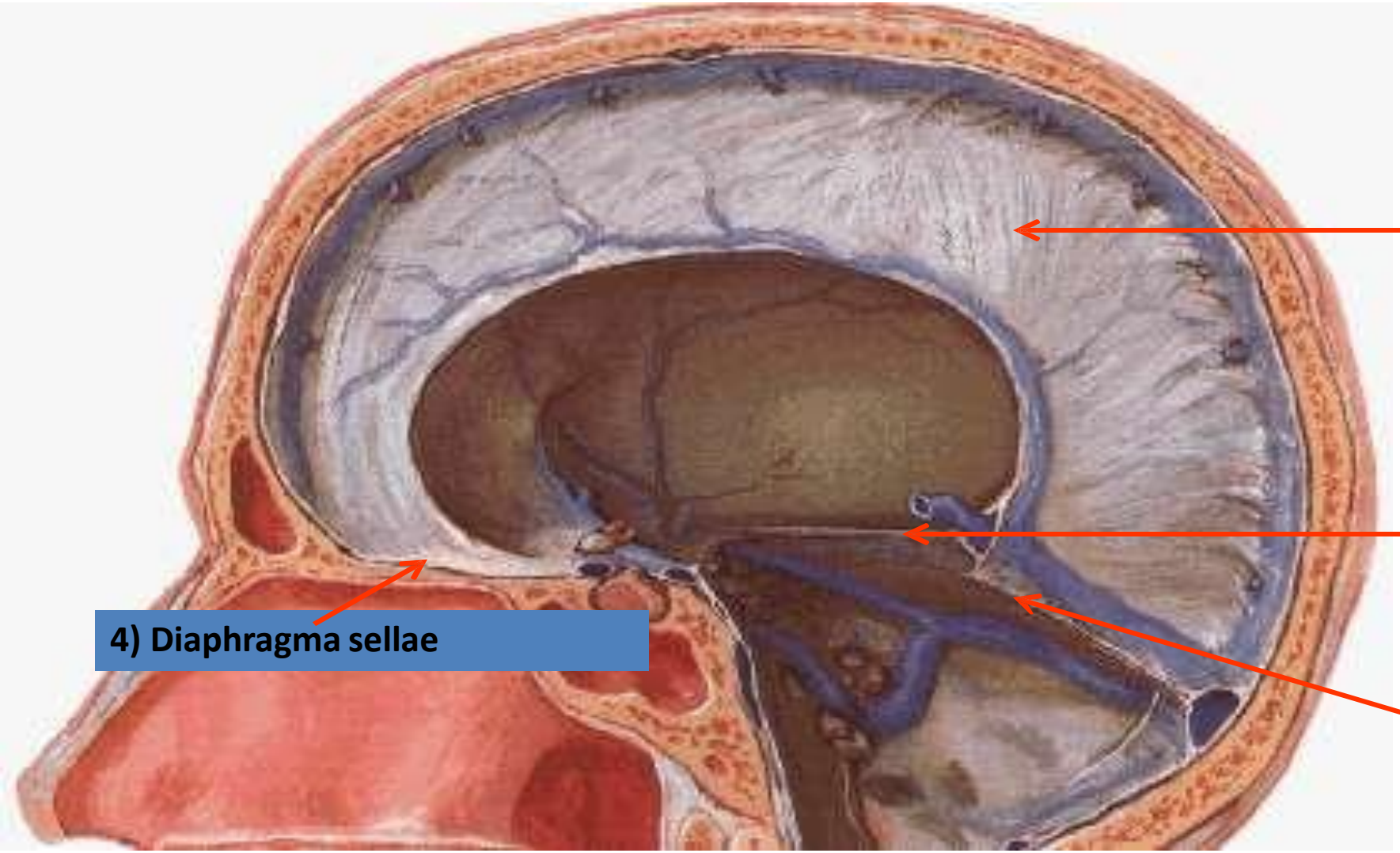
DURA MATER

Dura mater septa:

1. Falx cerebri
2. Falx cerebelli
3. Tentorium cerebelli
4. Diaphragma sella





Sagittal section showing the duramater

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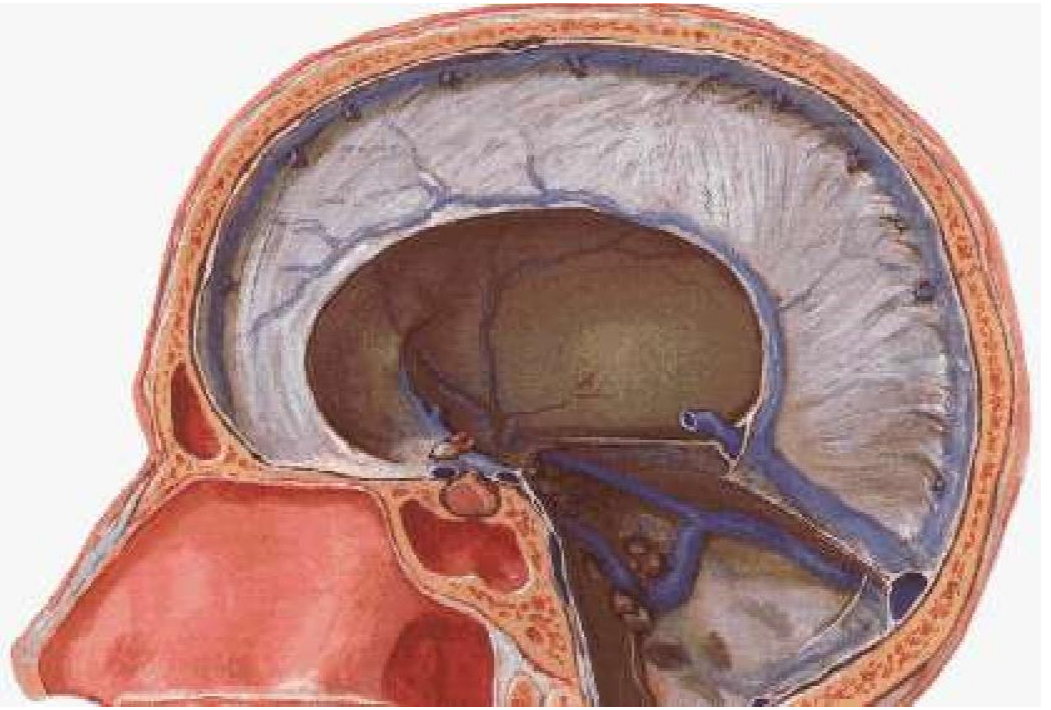
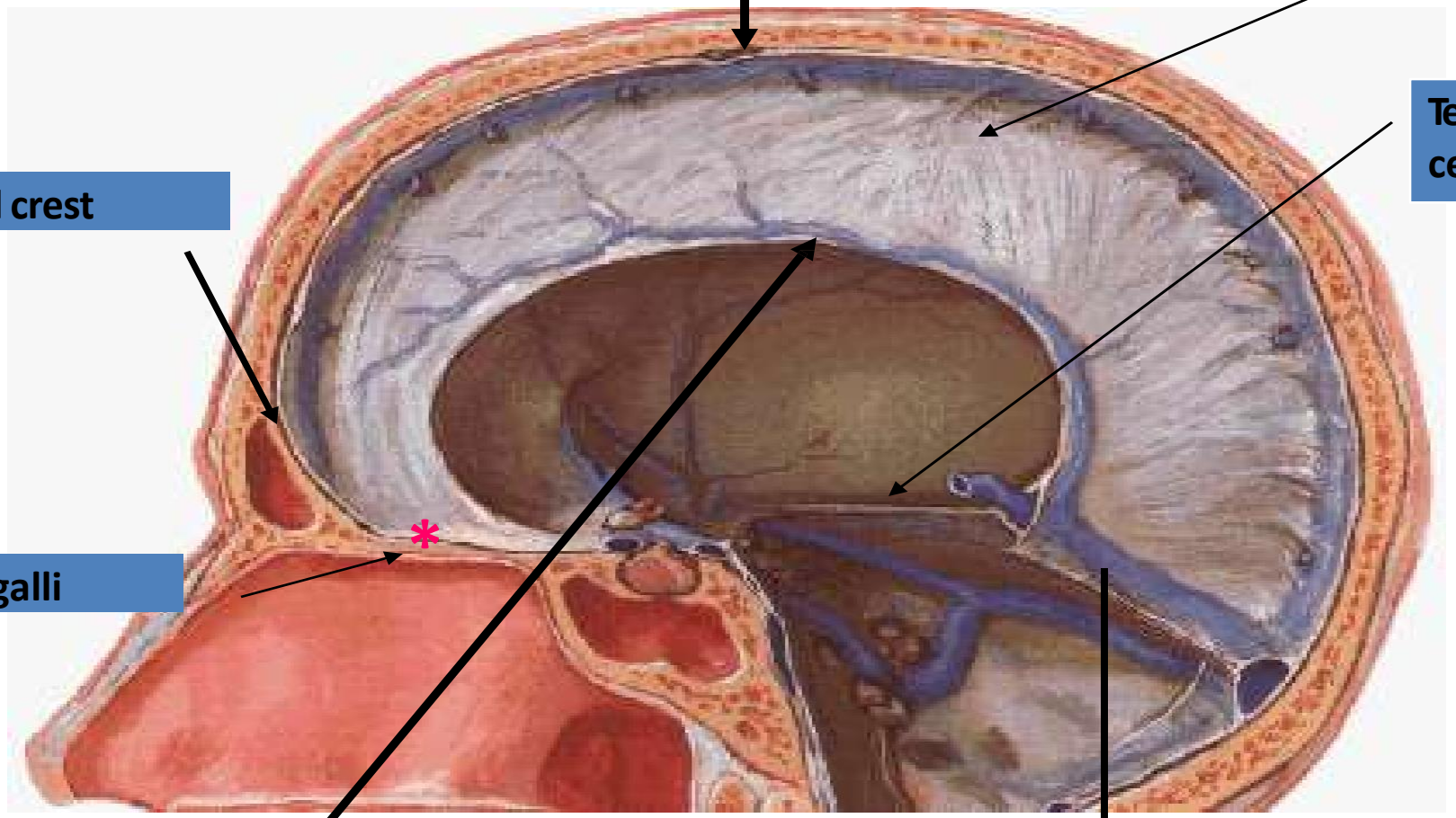
The Falx Cerebri

- It is a sickle-shaped fold of dura mater that lies in the midline between the two cerebral hemispheres.
- Its narrow end in front is attached to the internal frontal crest and the crista galli.
- Its broad posterior part blends in the midline with t upper surface of the tentorium cerebelli.
- ***The superior sagittal sinus*** **runs** in its upper fixed margin ***the inferior sagittal sinus*** runs in its lower concave free margin, and *the straight sinus runs* along its attachment t the tentorium cerebelli.





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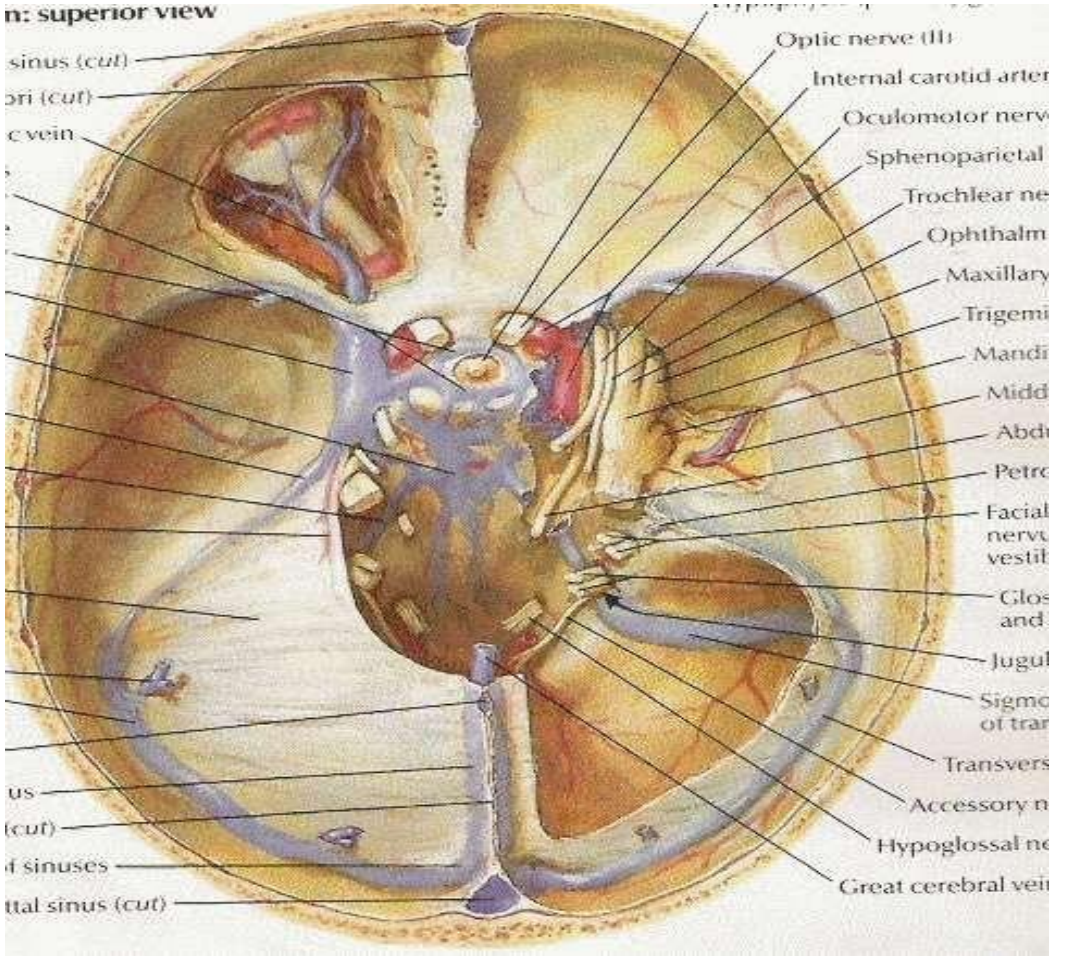
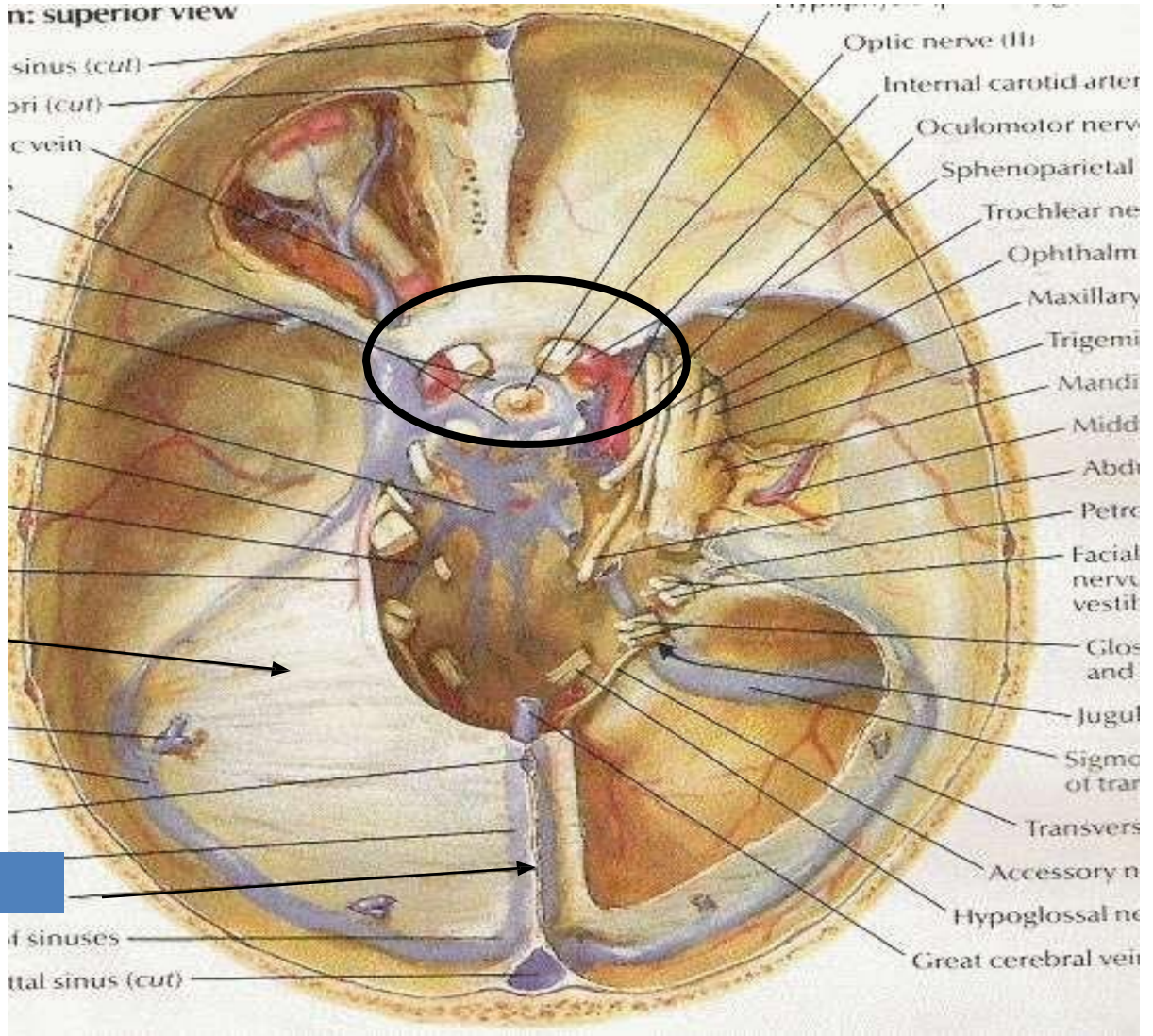
The Tentorium Cerebelli

- The tentorium cerebelli is a crescent-shaped fold of dura mater that roofs over the posterior cranial fossa.
- It covers the upper surface of the cerebellum and supports the occipital lobes of the cerebral hemispheres.



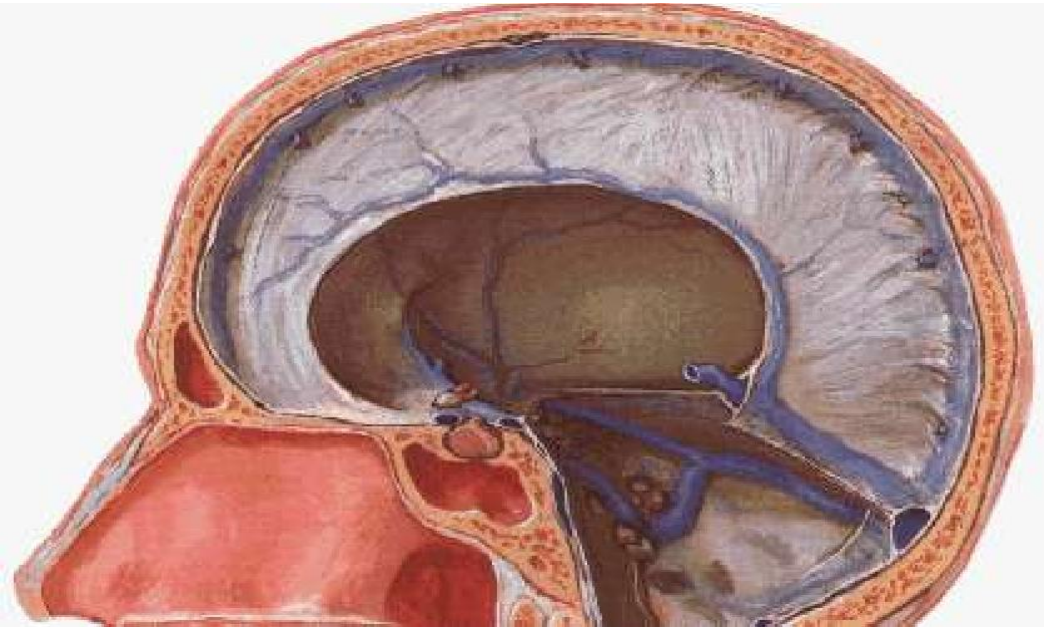
Tentorium cerebelli

Falx cerebri



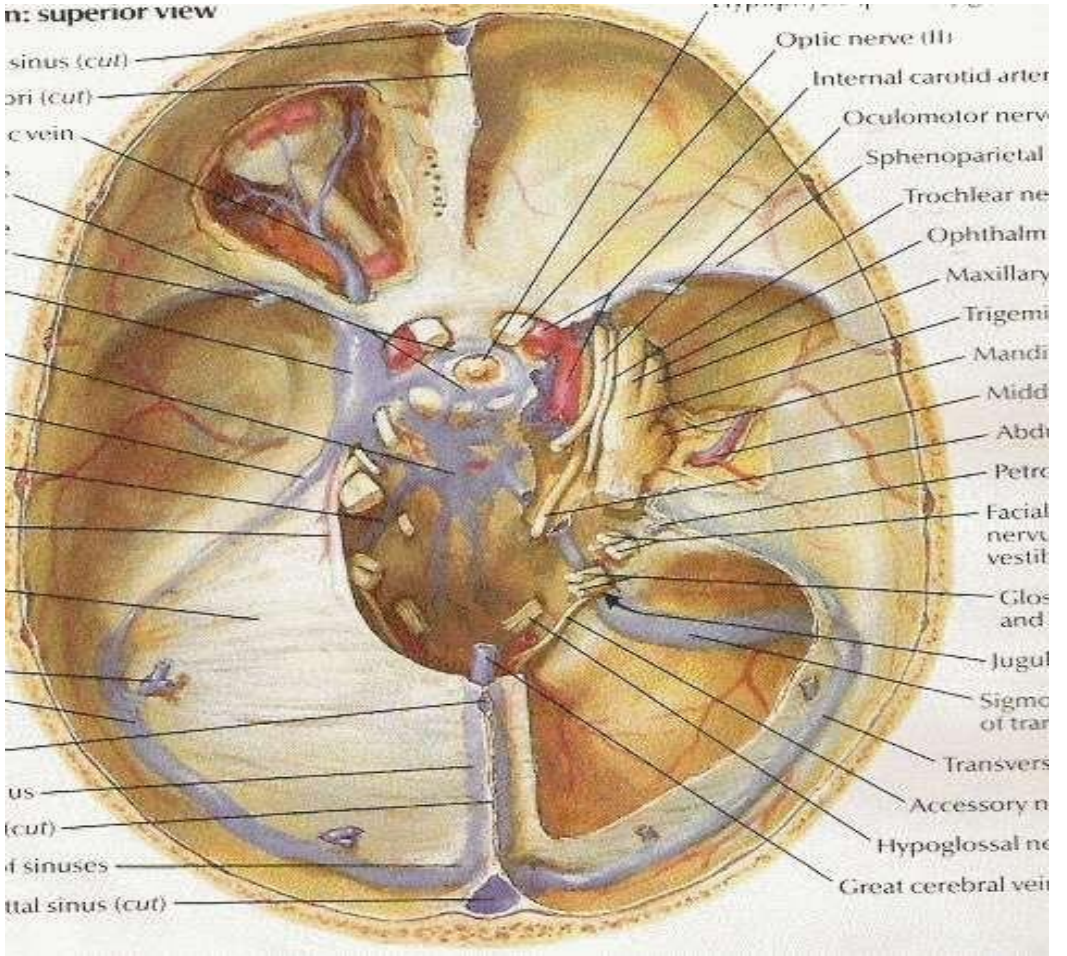
The Falx Cerebelli

- The falx cerebelli is a small, sickle-shaped fold of dura mater that is attached to the internal occipital crest and projects forward between the two cerebellar hemispheres.
- Its posterior fixed margin contains the occipital sinus.



The Diaphragma Sellae

- The diaphragma sellae is a small circular fold of dura mater that forms the roof for the sella turcica.
- A small opening in its center allows passage of the stalk of the pituitary gland



Dural Nerve Supply

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

Dural Blood Supply

Dural Arterial Supply

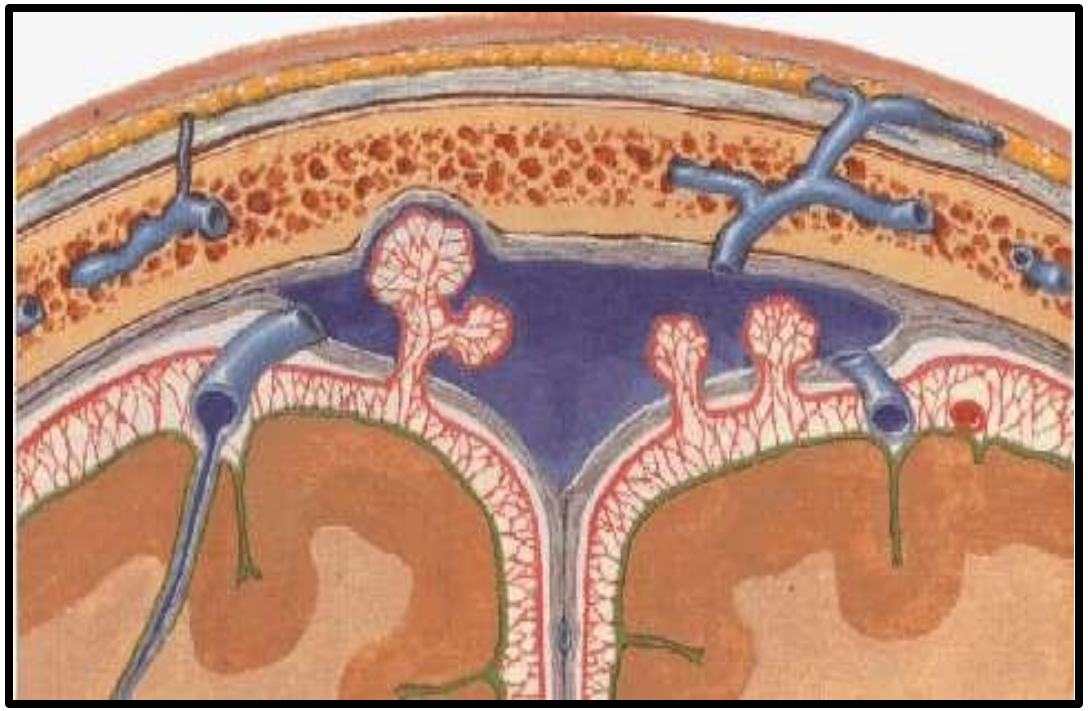
- The dura mater's arteries supply from the internal carotid, maxillary, ascending pharyngeal, occipital, and vertebral arteries.
- From a clinical standpoint, the most important is the *middle meningeal artery*, which is commonly damaged in head injuries.

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.

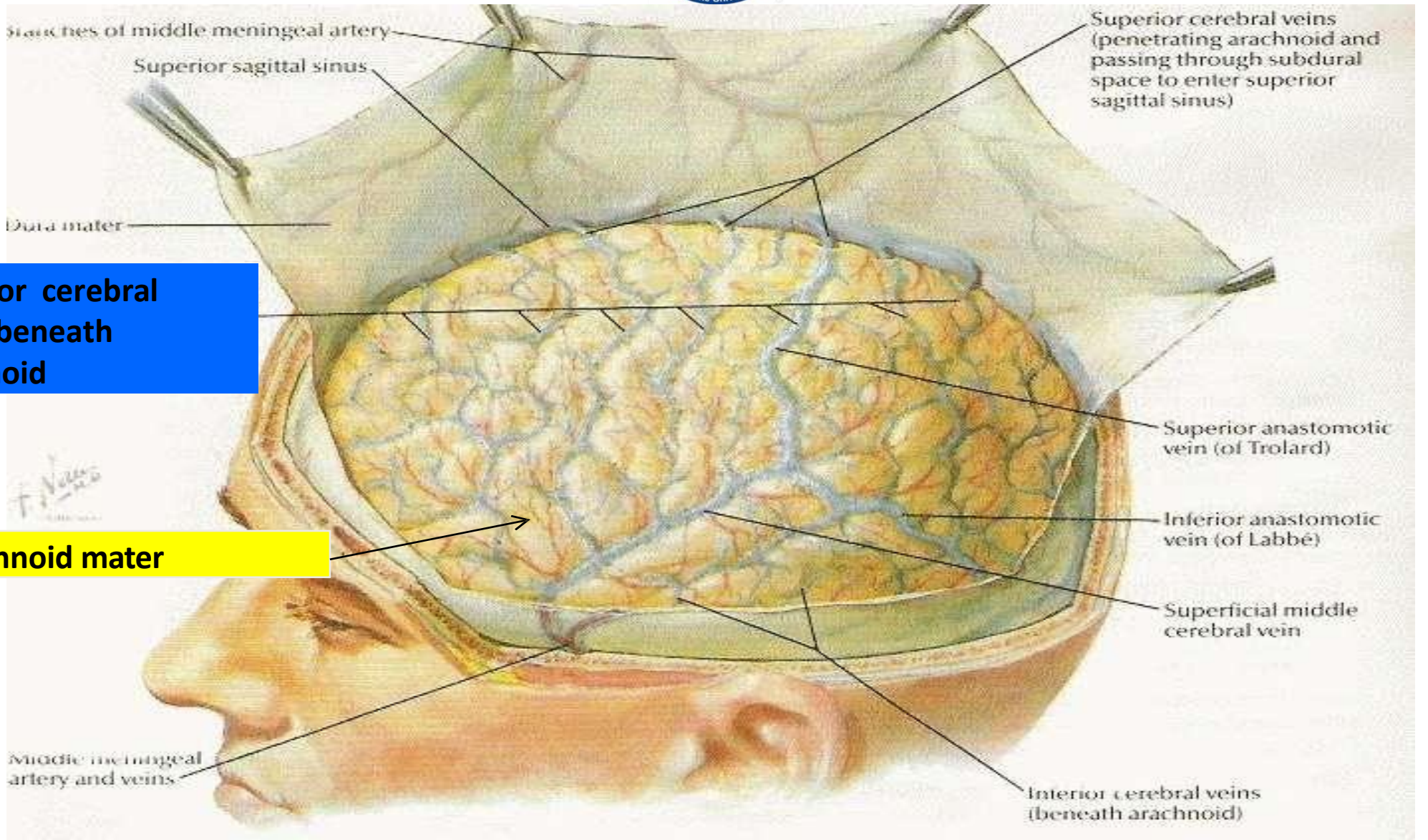
Arachnoid Mater

- ✓ Delicate, impermeable & avascular 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



Superior cerebral veins beneath arachnoid

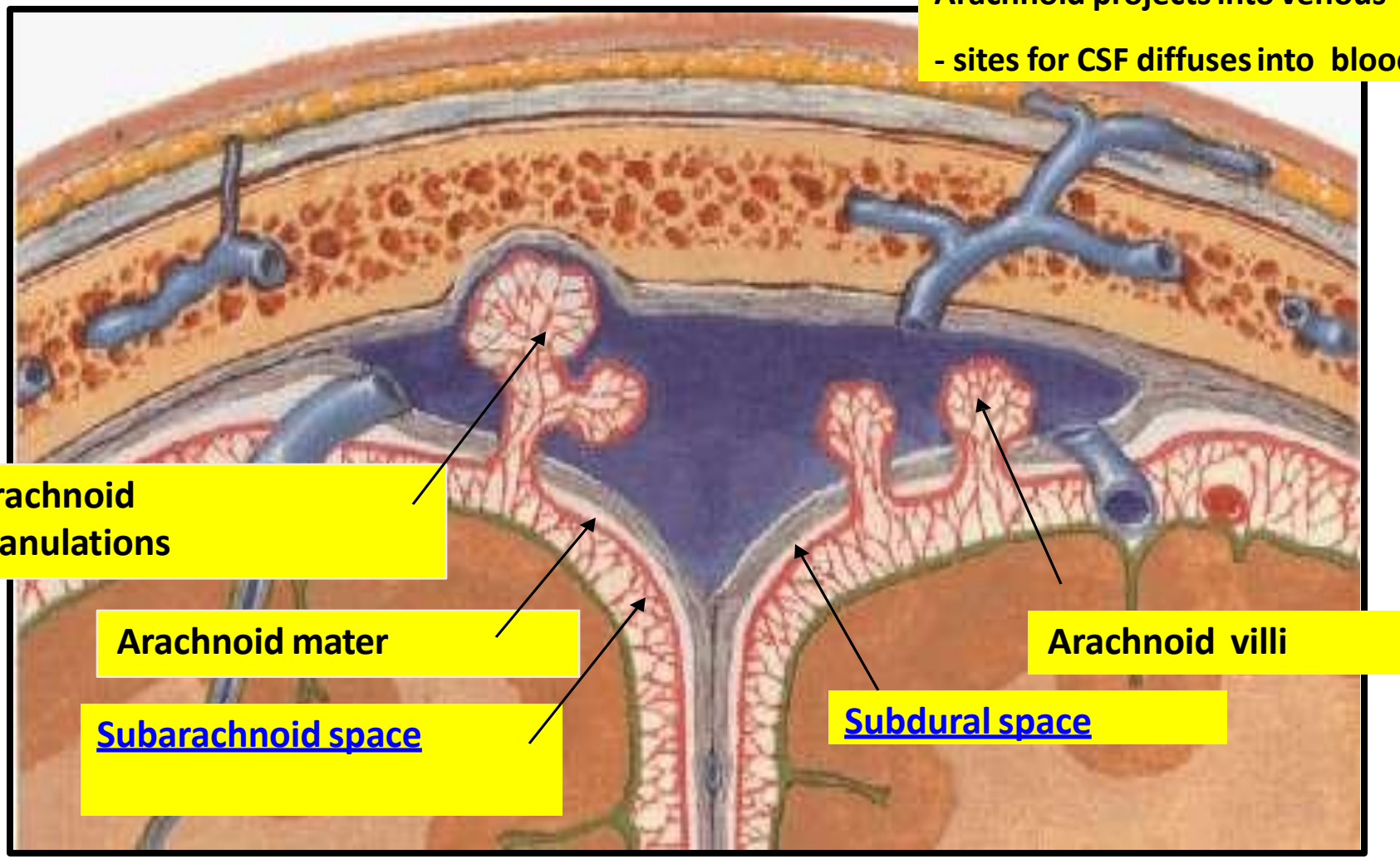
Arachnoid mater



Arachnoid mater

Arachnoid projects into venous sinuses

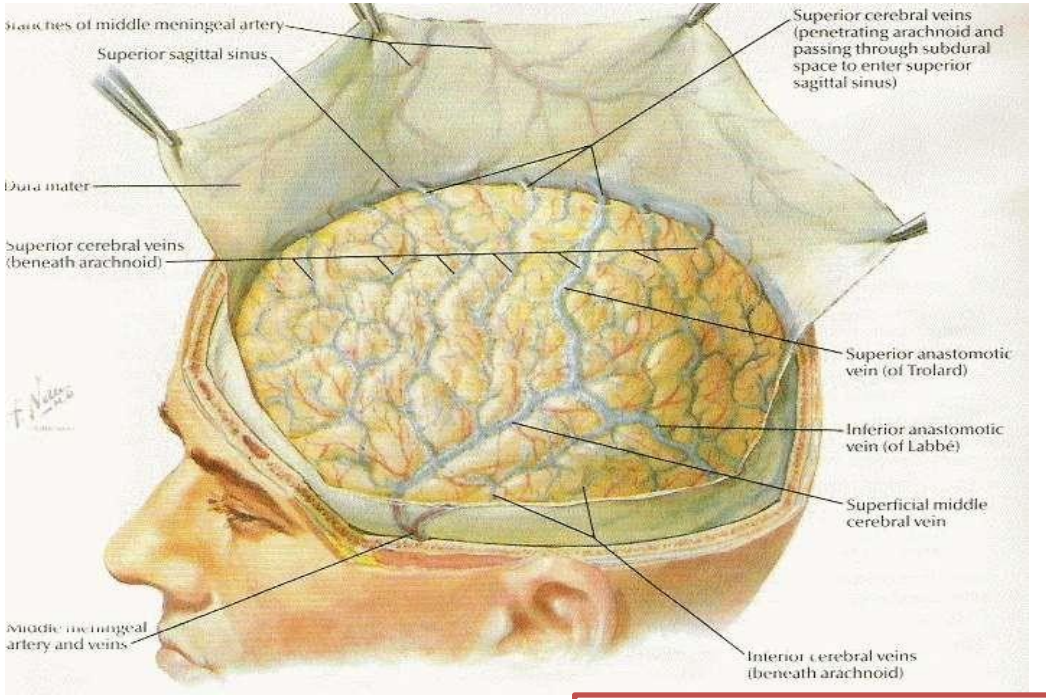
- sites for CSF diffuses into bloodstream

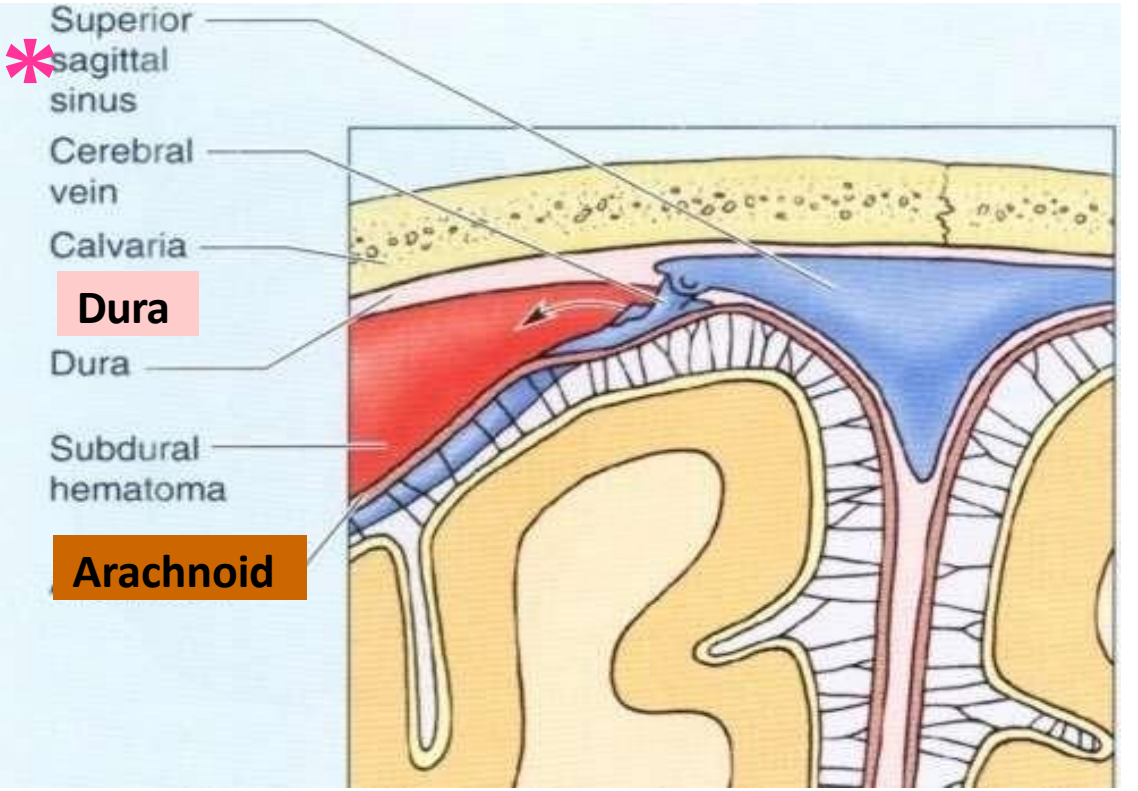


SUBDURAL SPACE :

- Superior cerebral veins, traverse the
  subdural space to reach the superior sagittal sinus and its lacunae

Superior cerebral veins beneath arachnoid

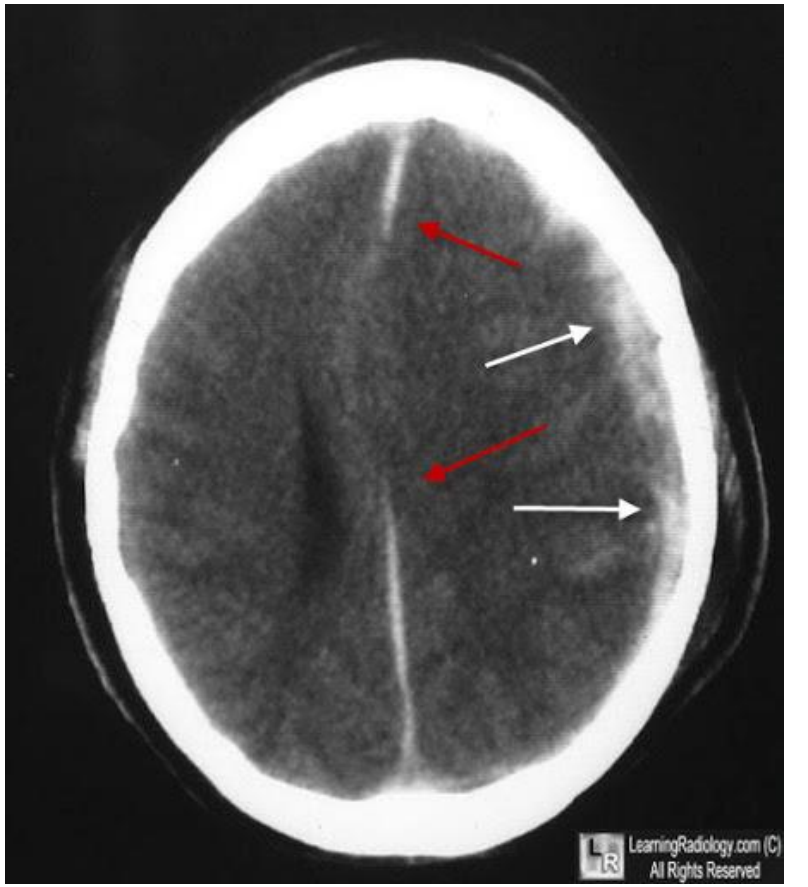




Subdural haematoma

Normal CT

Subdural haematoma

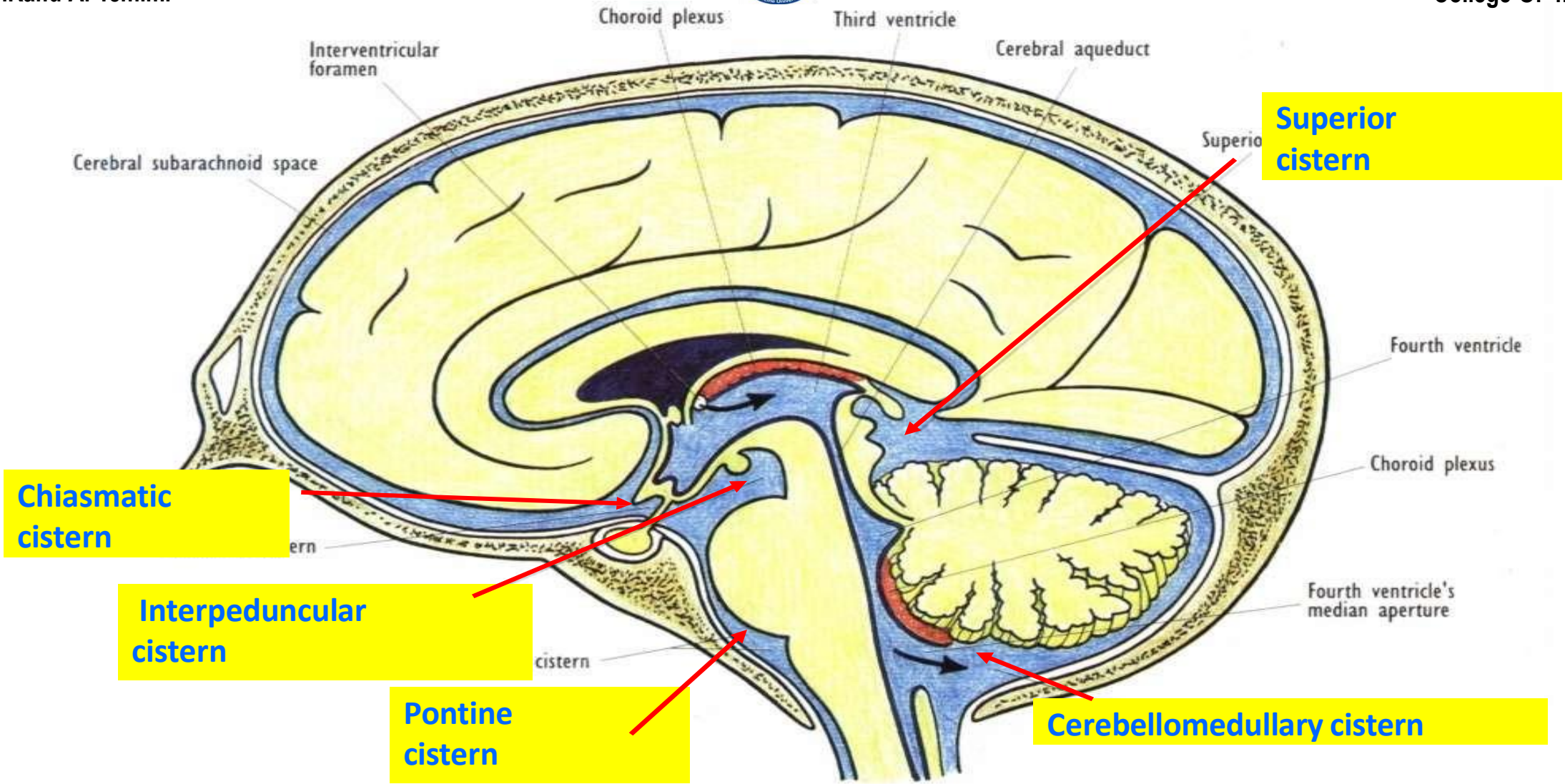


Subdural haematoma

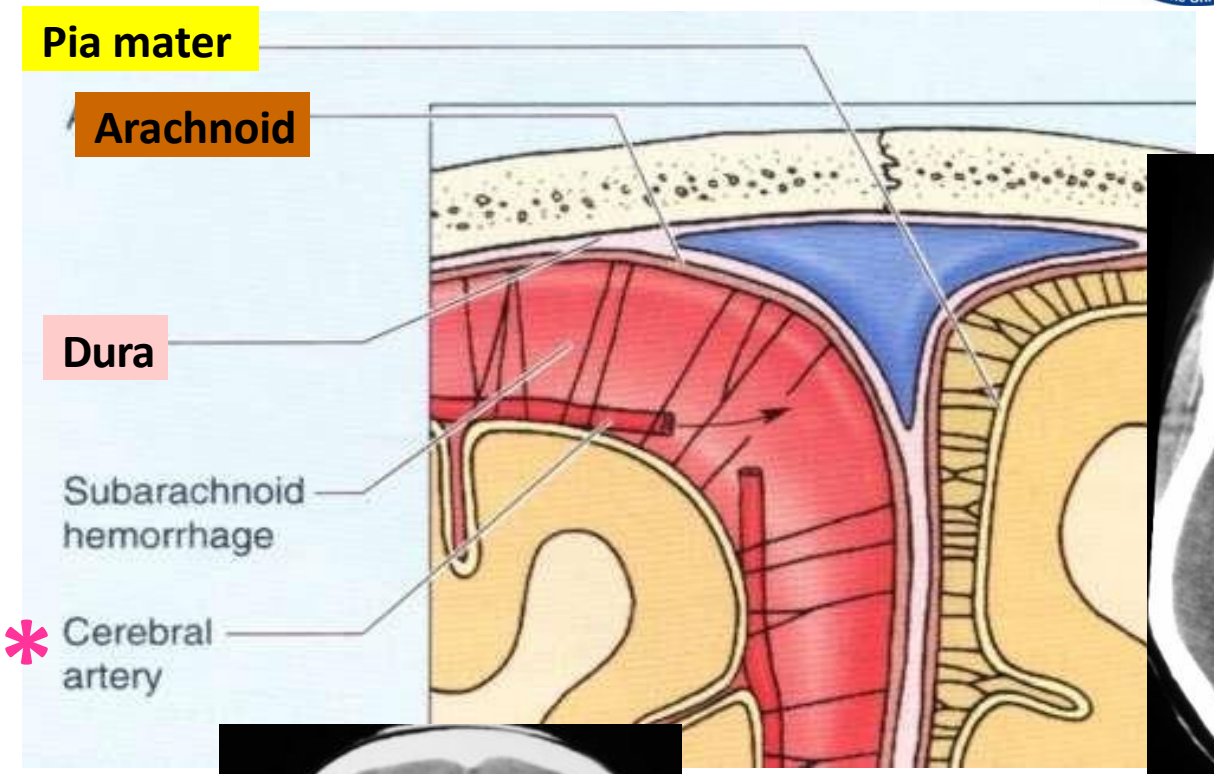
Subarachnoid Space (SP) :

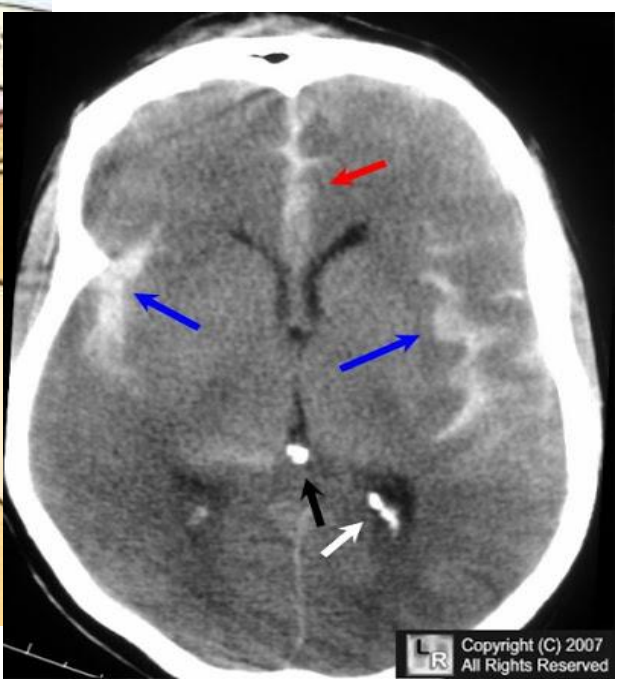
- Relatively narrow over the surface of cerebral hemisphere, but sometimes becomes much wider in areas at the base of the brain, the widest space is called subarachnoid cisterns
- The cisterna cerebellomedularis lies between inferior surface of the cerebellum and roof of 4th ventricle
- The cisterna 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





NORMAL CT

Subarachnoid haemorrage

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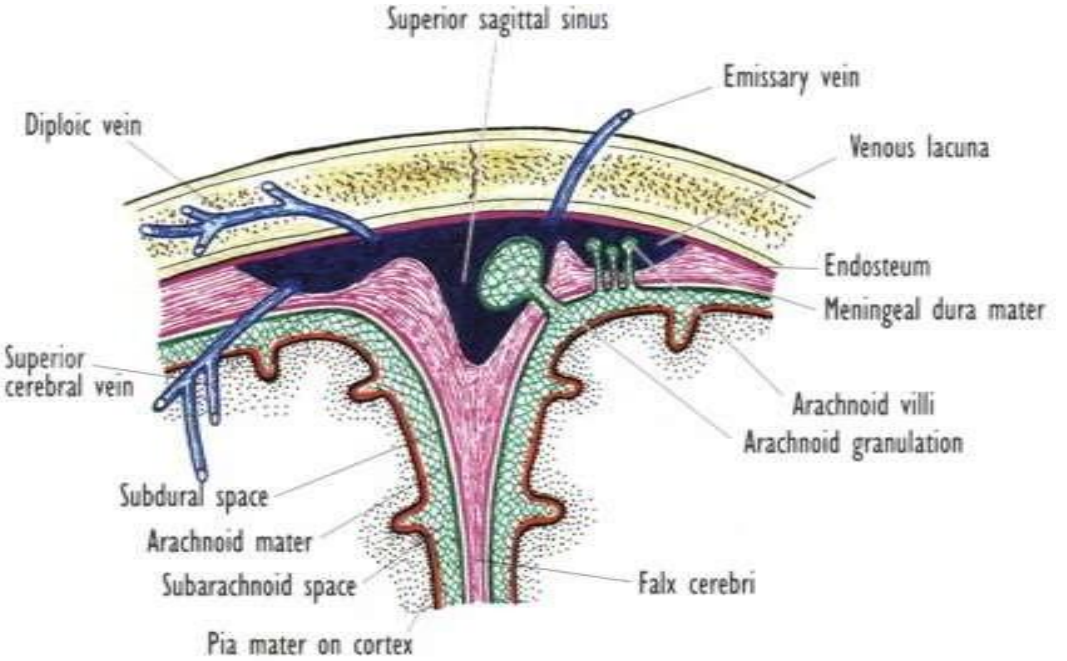
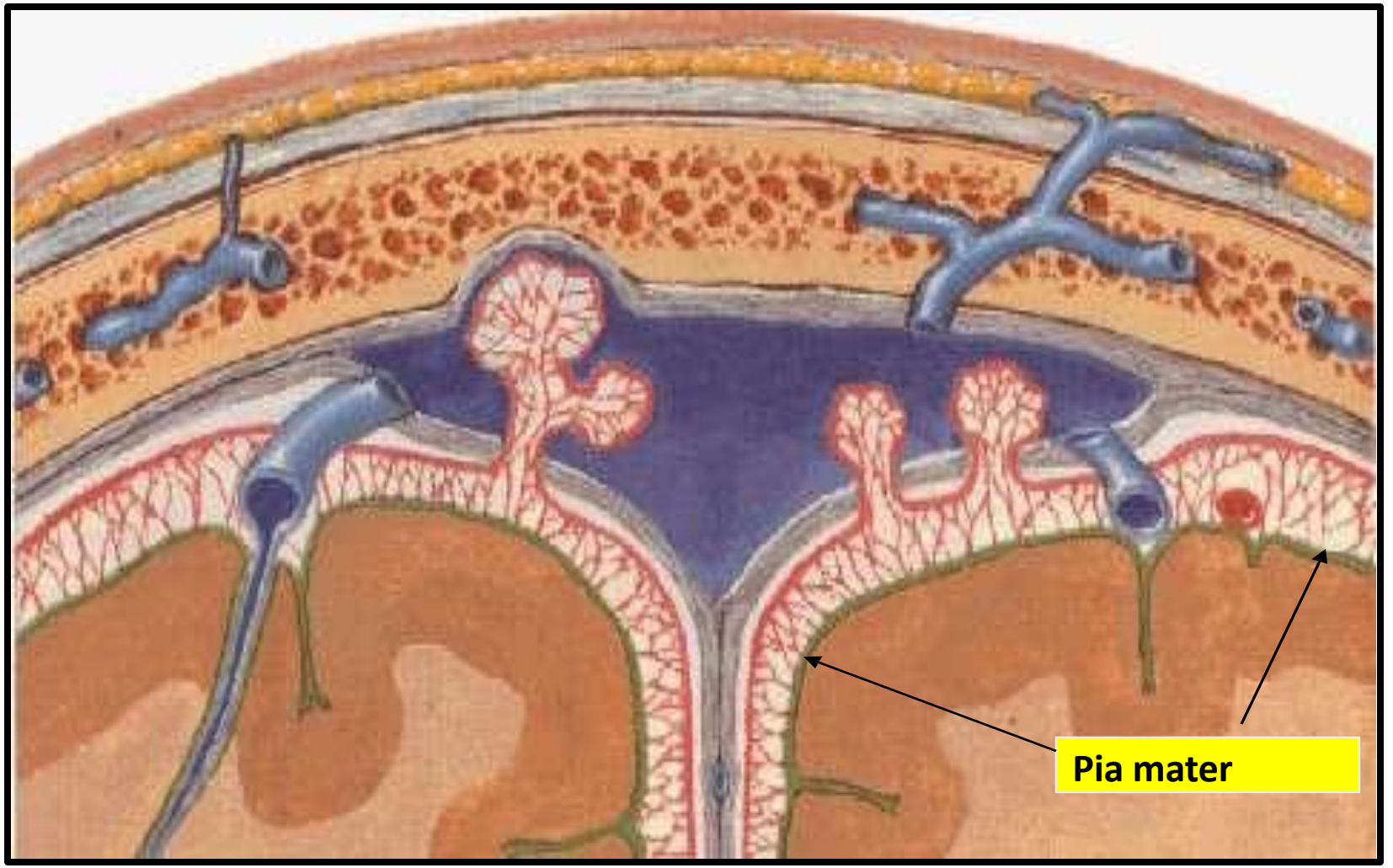
Pia Mater

- Pia Mater is a vascular membrane covered by mesothelial cells.

- Closely invests the brain, covering the gyri, descending into the deepest sulci & closely applied to the cortical surface.

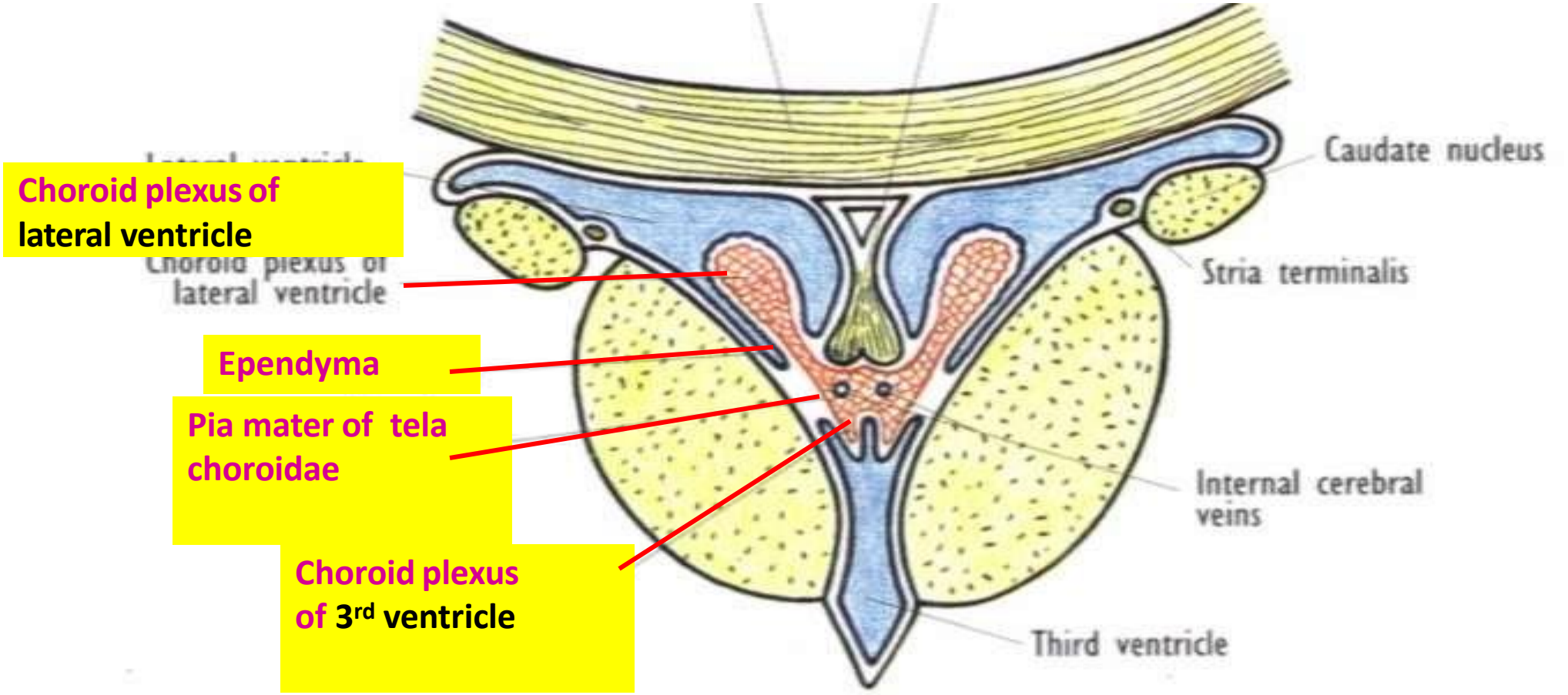


Pia mater



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



Coronal section of the interventricular foramen showing the choroid plexus of 3rd & lateral ventricles


Thank You