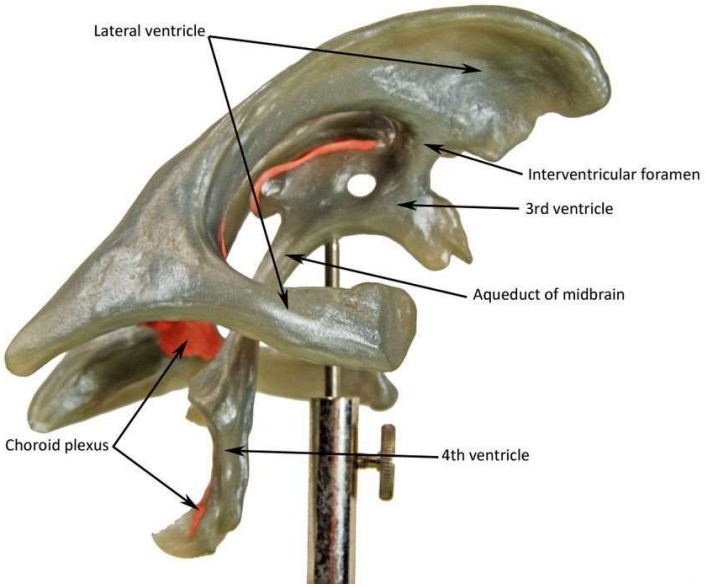
The ventricles and CSF fluid

D.Hammoudi.MD

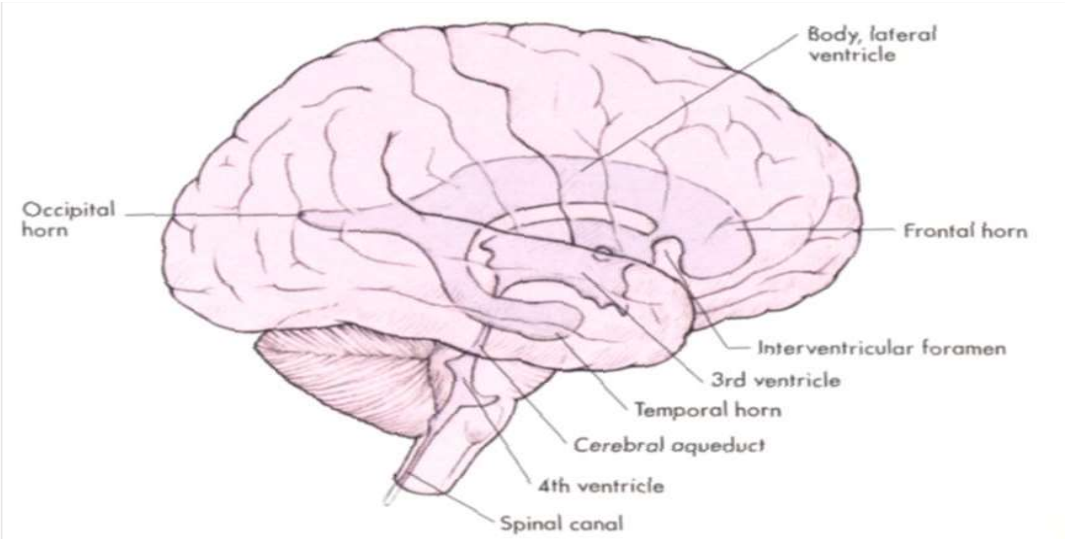


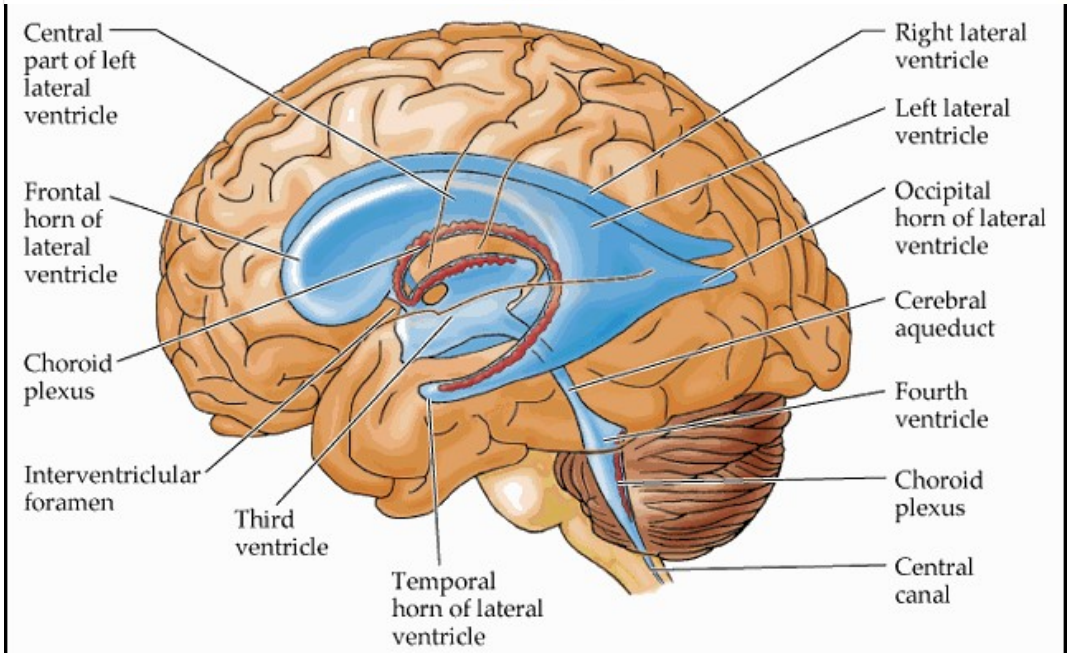
The Four Ventricles

-Lateral Ventricles:
largest
-Third Ventricle:
"wall" divides brain into symmetrical halves

-Cerebral aqueduct:
long tube that connects 3rd to 4th ventricle

Fourth Ventricle

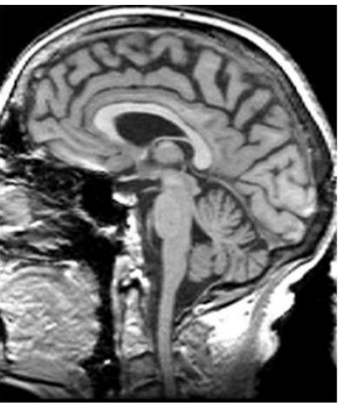


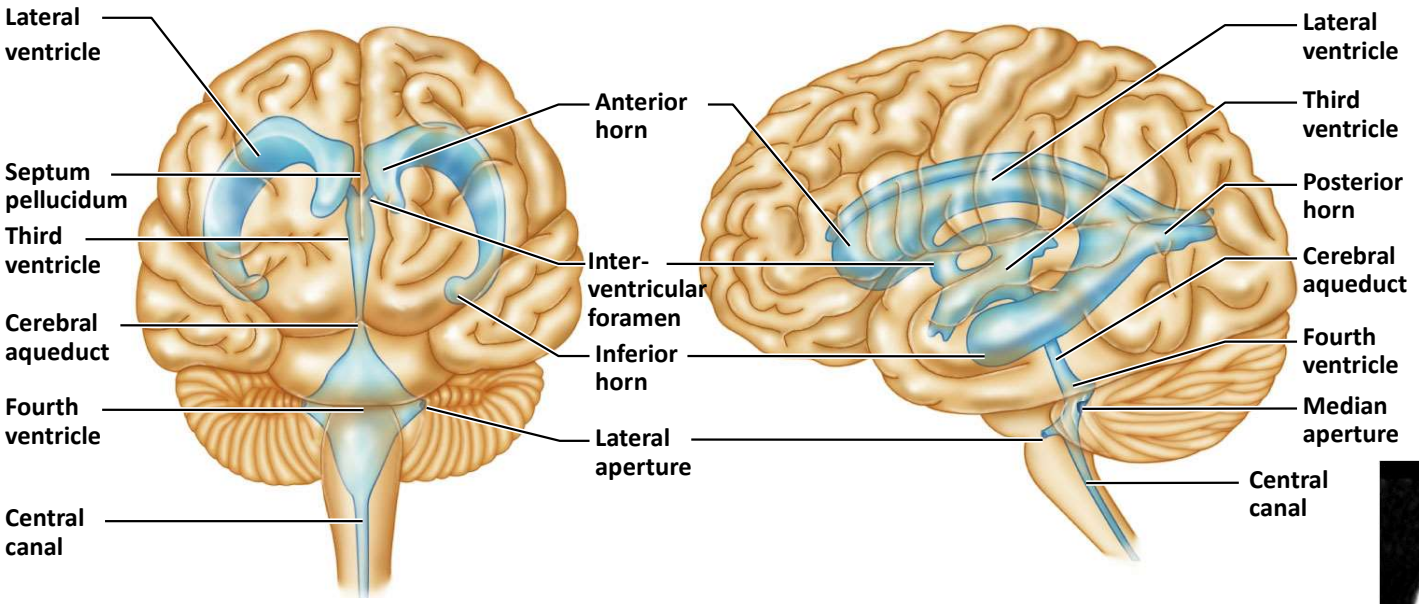


Function

- *Protects Brain From Trauma*
- *Provides Pathway for Circulation of CSF*
- *Continuous w/each other + central canal of spinal cord*

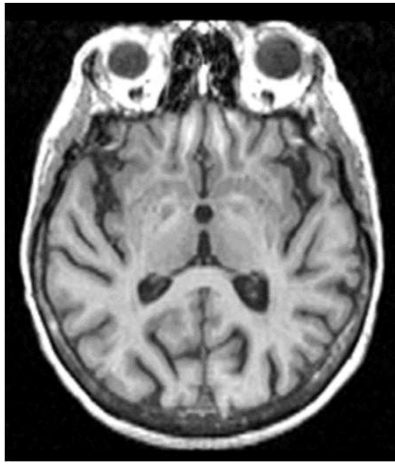
Figure 12.5: Ventricles of the brain, p. 434.

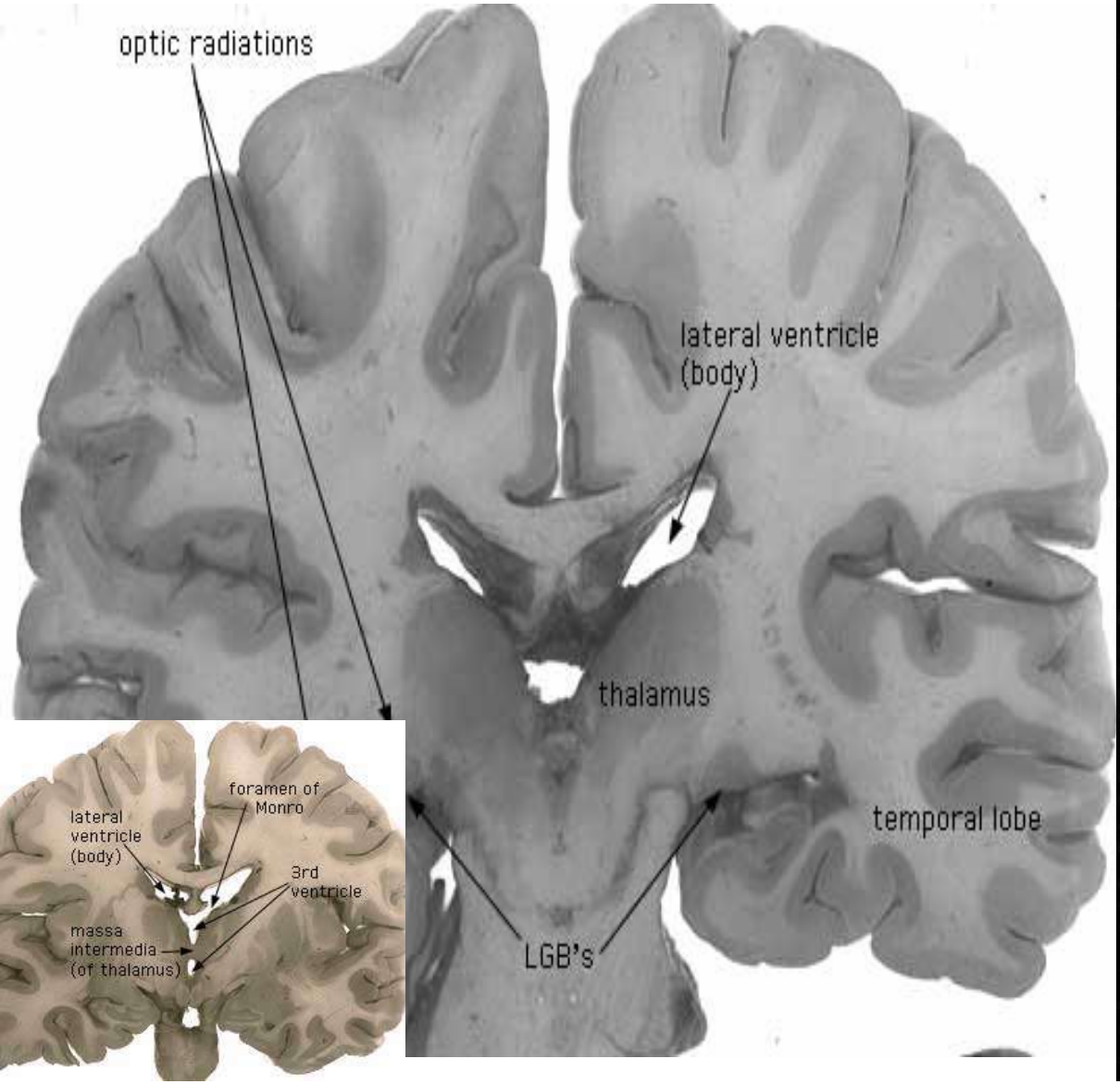


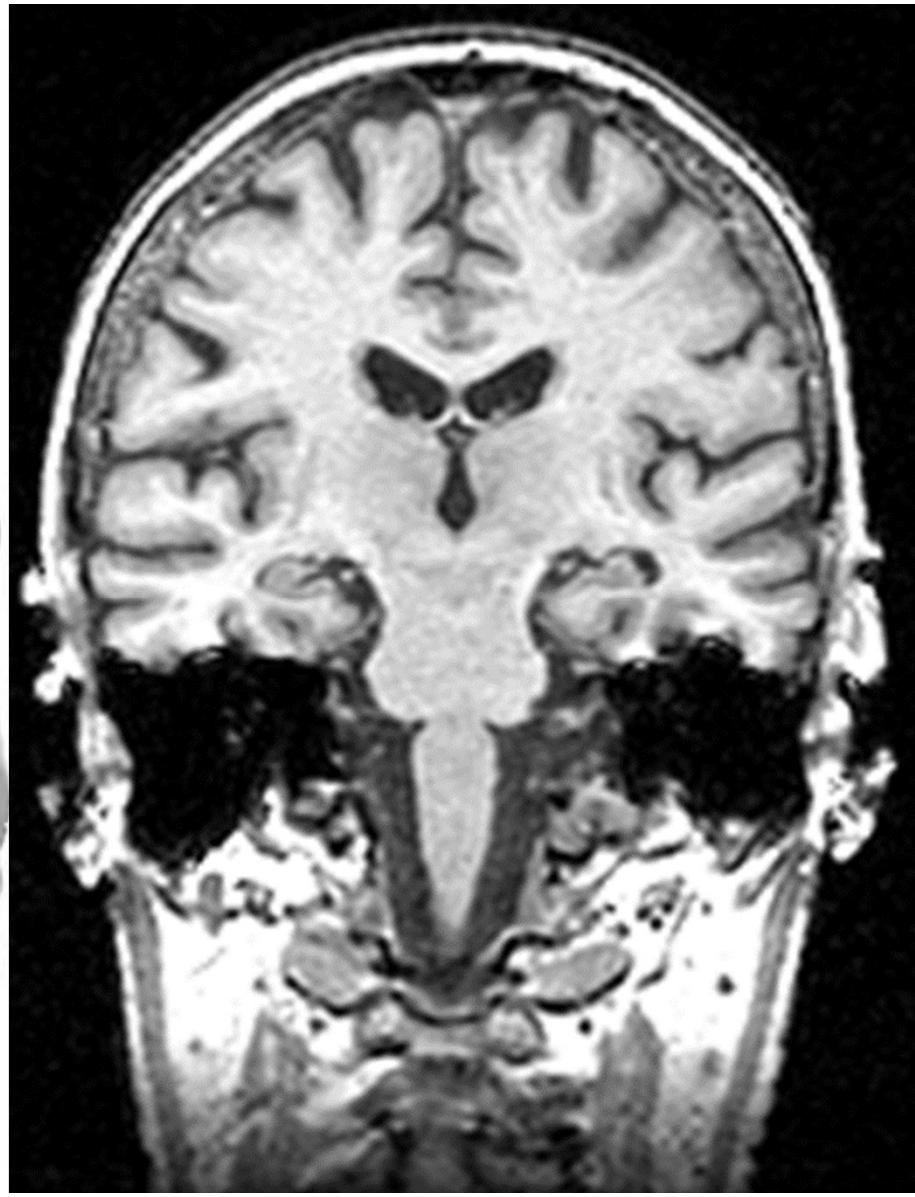


(a) Anterior view

(b) Left lateral view




optic radiations
lateral ventricle
(body)
thalamus
temporal lobe
LGB's
foramen of
Monro
lateral
ventricle
(body)
3rd
ventricle
massa
intermedia
(of thalamus)



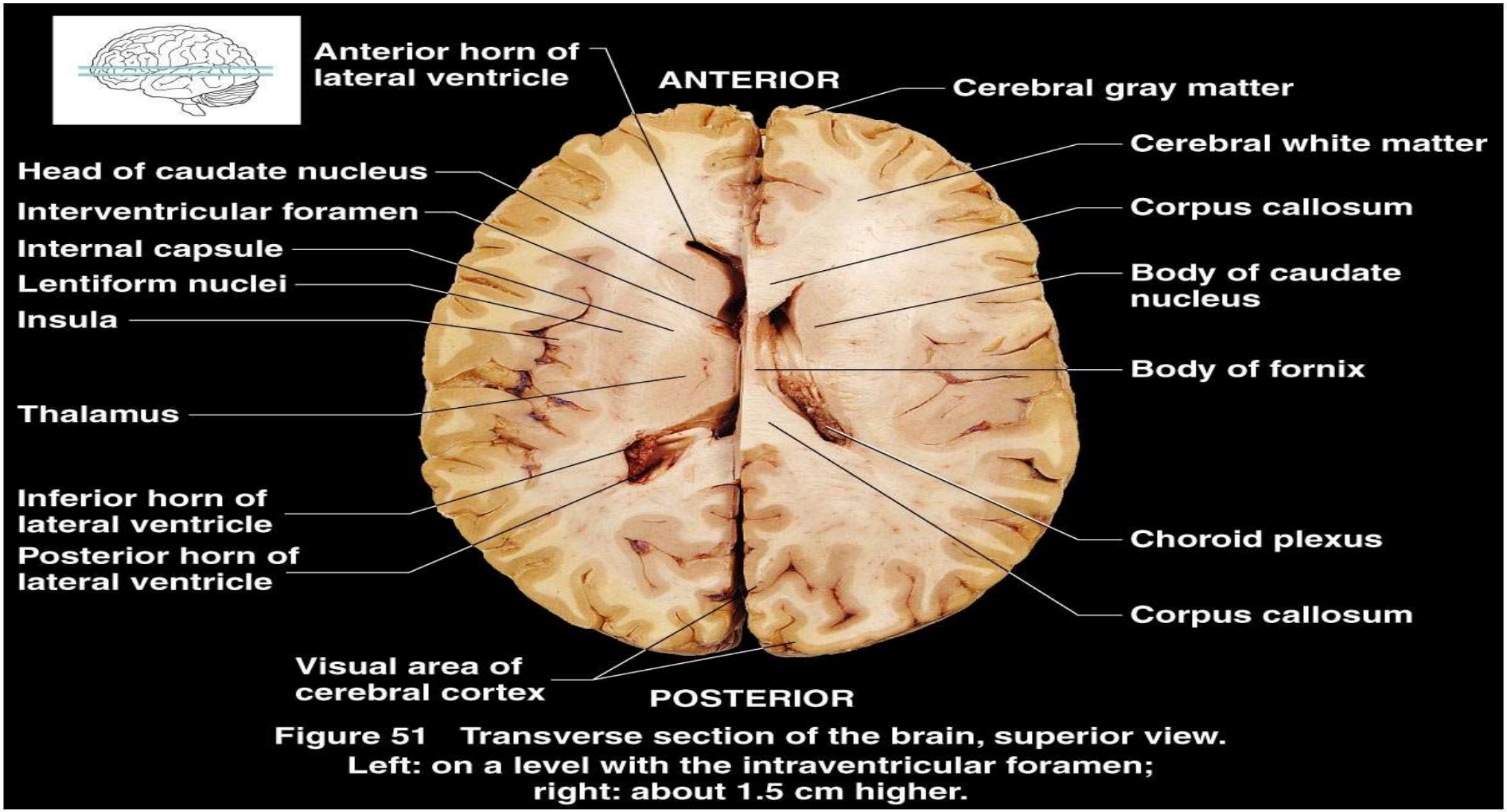
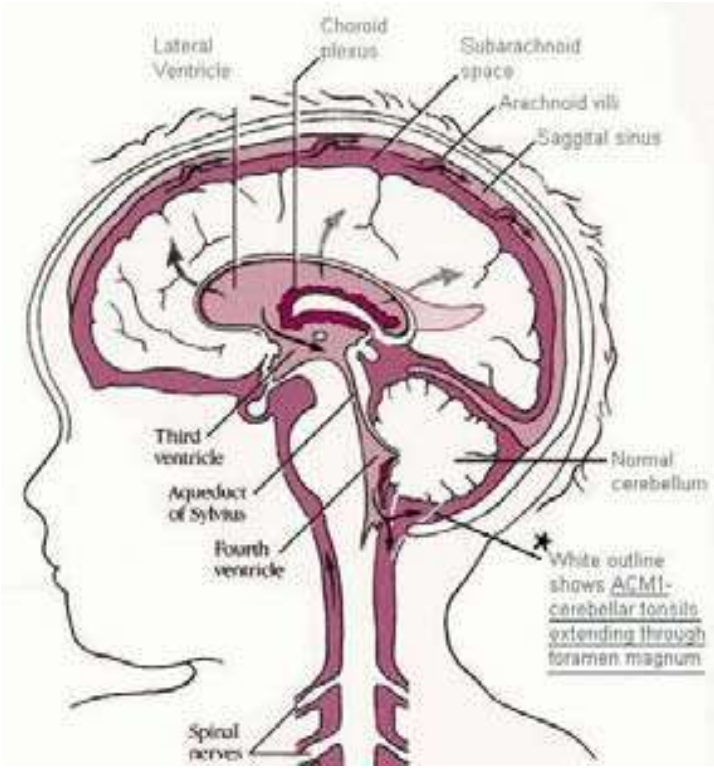


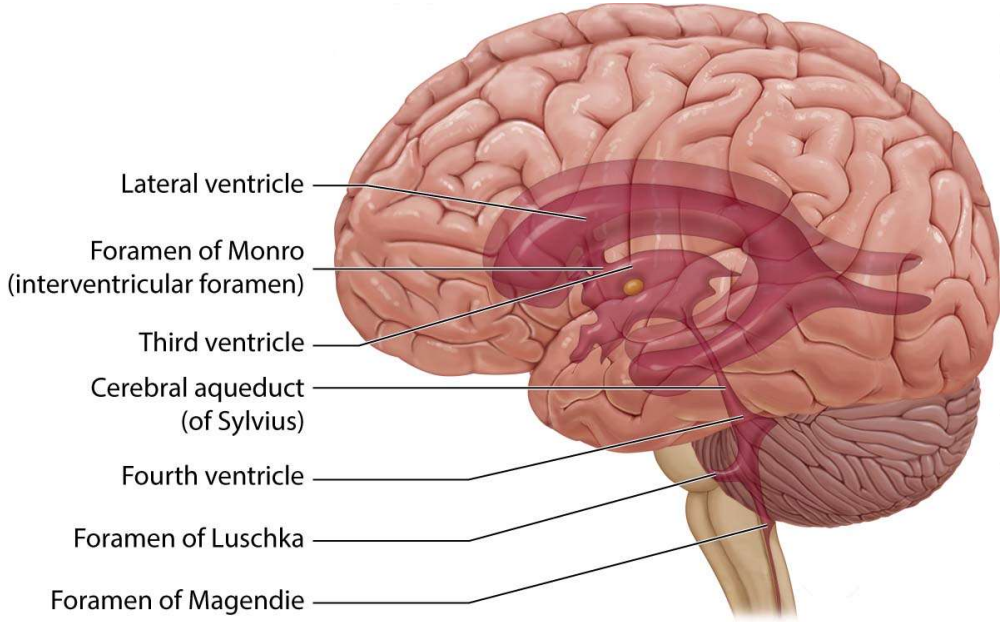
Figure 51 Transverse section of the brain, superior view. Left: on a level with the intraventricular foramen; right: about 1.5 cm higher.

CSF

Cerebrospinal Fluid (CSF)

- Watery solution similar in composition to blood plasma
- Contains less protein and different ion concentrations than plasma
- Forms a liquid cushion that gives buoyancy to the CNS organs
- Prevents the brain from crushing under its own weight
- Protects the CNS from blows and other trauma
- Nourishes the brain and carries chemical signals throughout it
- HYDROCEPHALUS WHEN CSF DO NOT CIRCULATE INCREASING ITS PRESSURE





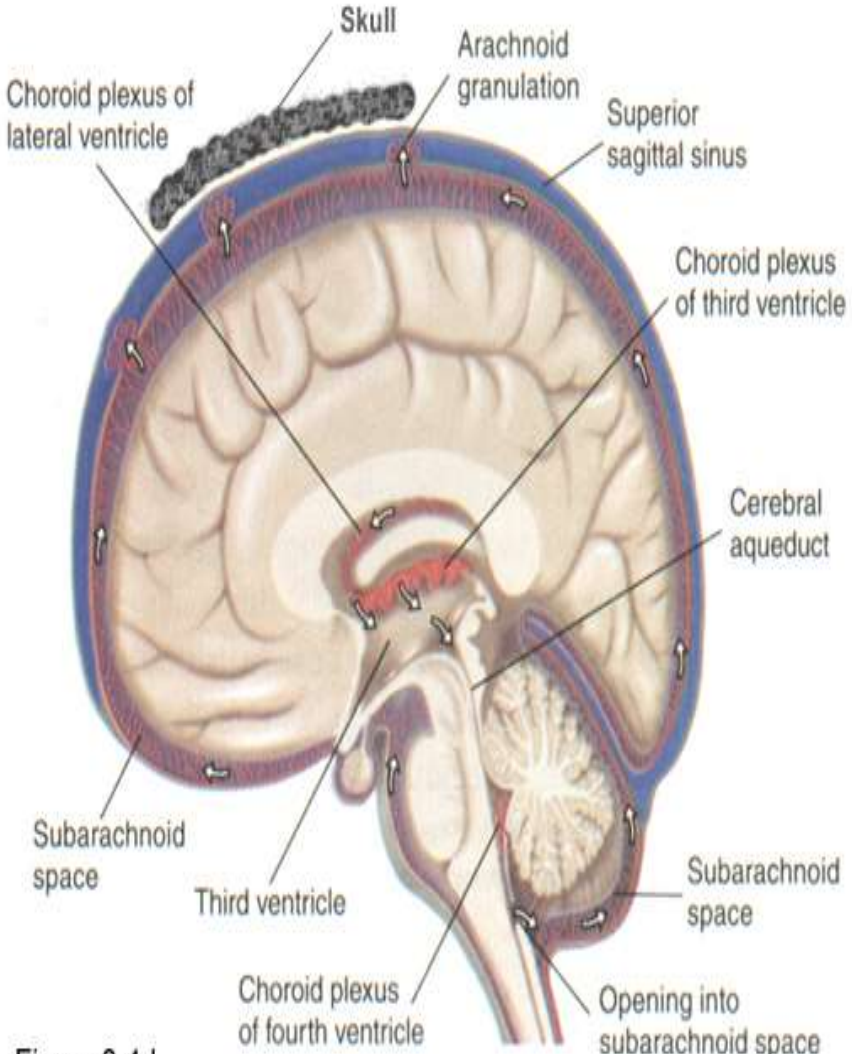
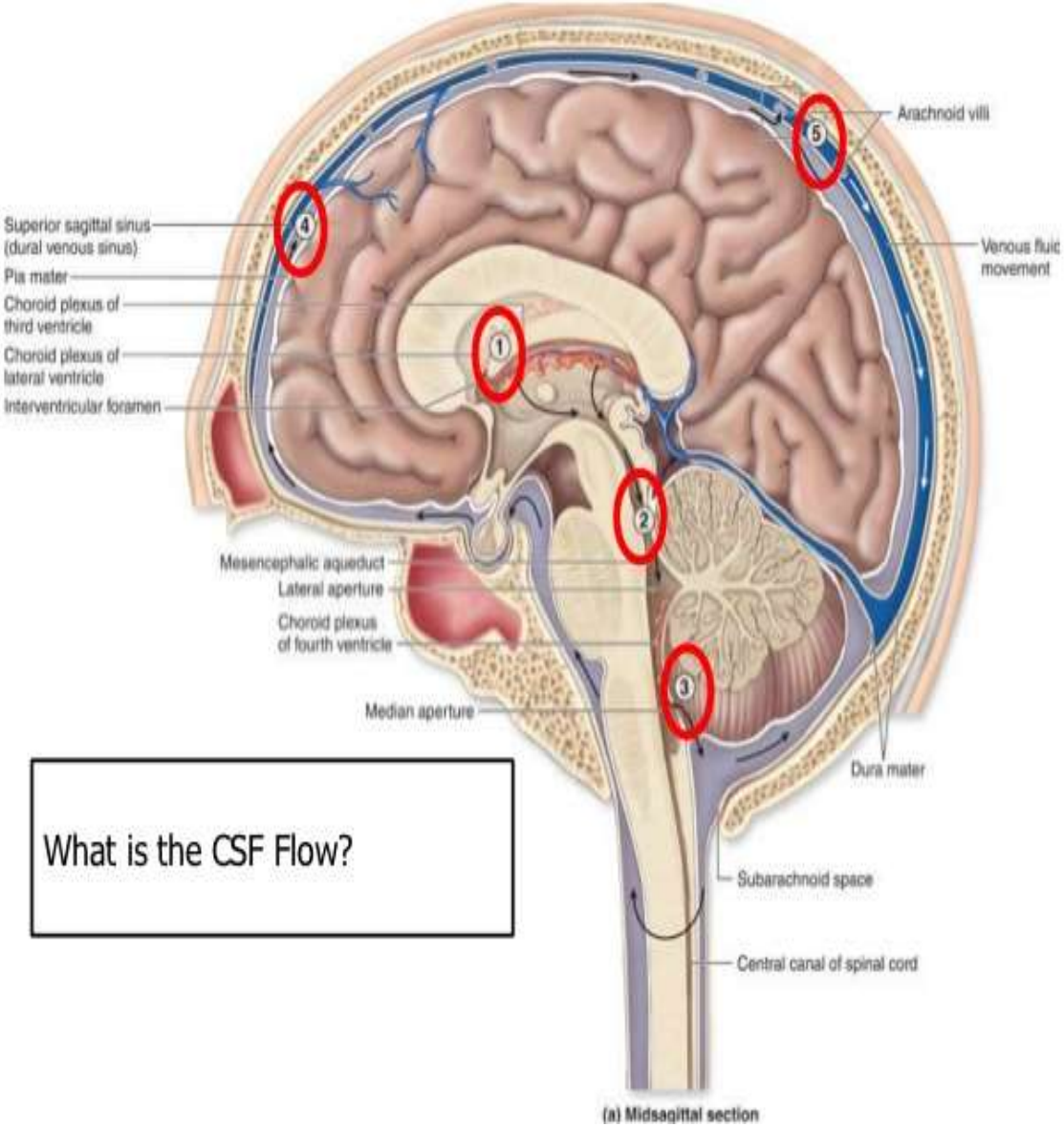
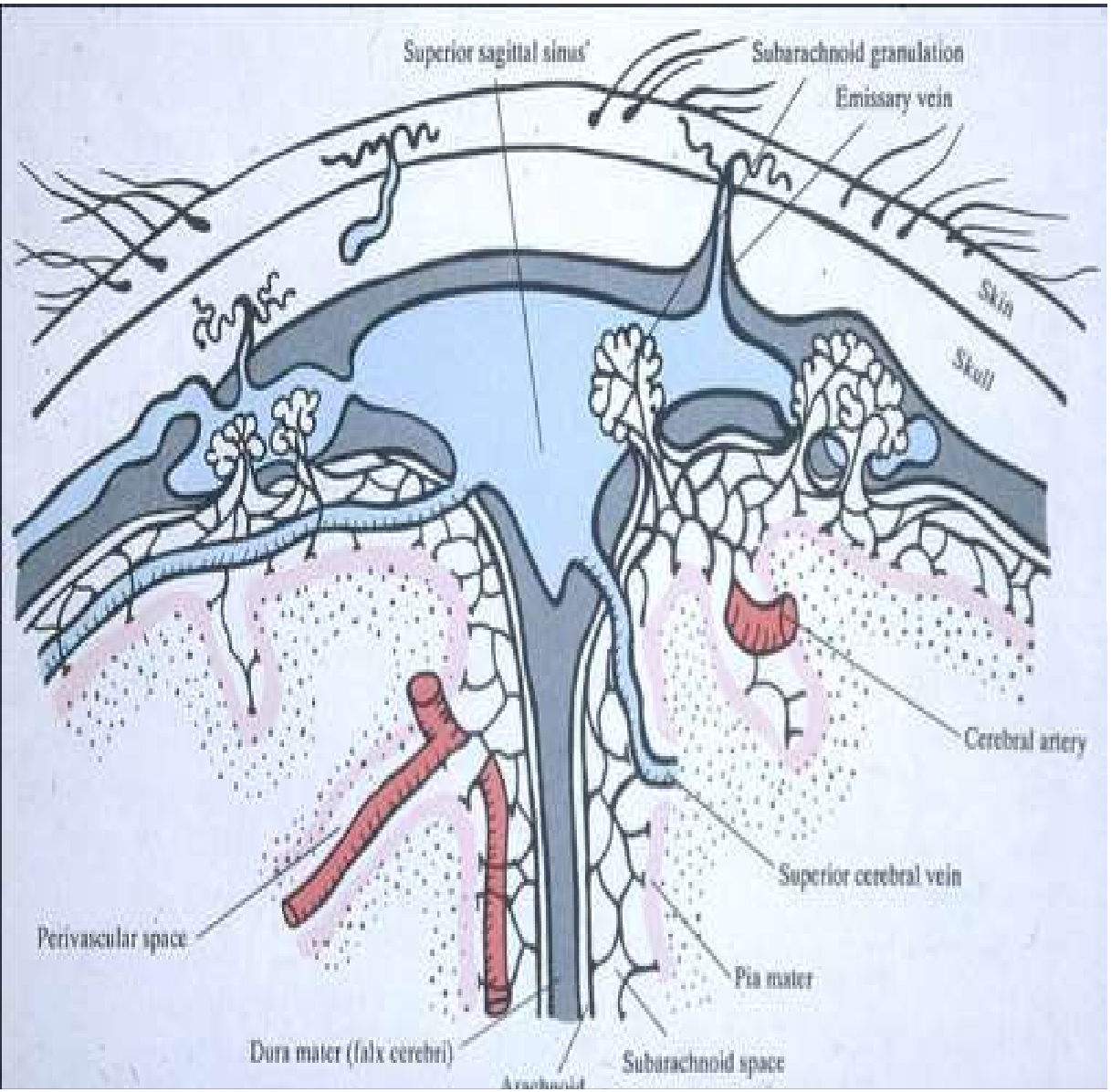


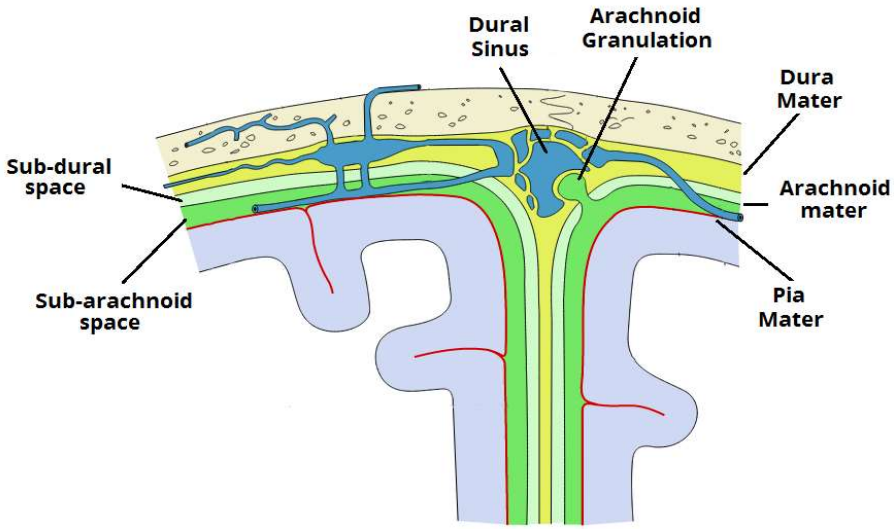
Figure 3.4d



What is the CSF Flow?



Arachnoid granulation



Arachnoid granulations, also known as **Pacchionian granulations**,
-are projections of the **arachnoid** membrane (villi) into the dural sinuses

-that allow CSF to pass from the subarachnoid space into the venous system

choroid plexus

- It produces the cerebrospinal fluid (CSF) which is found within the ventricles of the brain and in the subarachnoid space around the brain and spinal cord.
- It is comprised of a rich capillary bed, pia mater, and choroid epithelial cells.
- It is located in certain parts of the ventricular system of the brain.

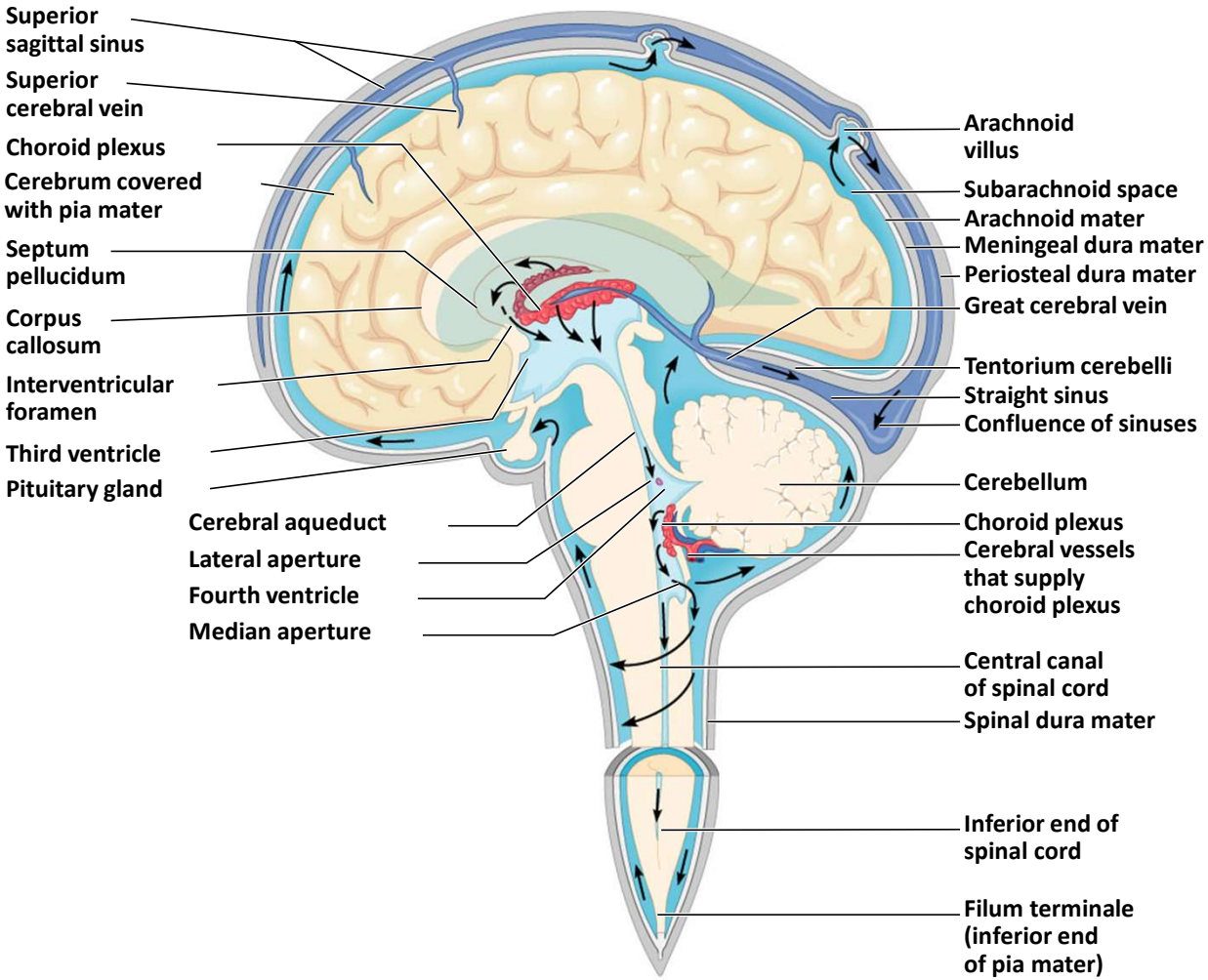
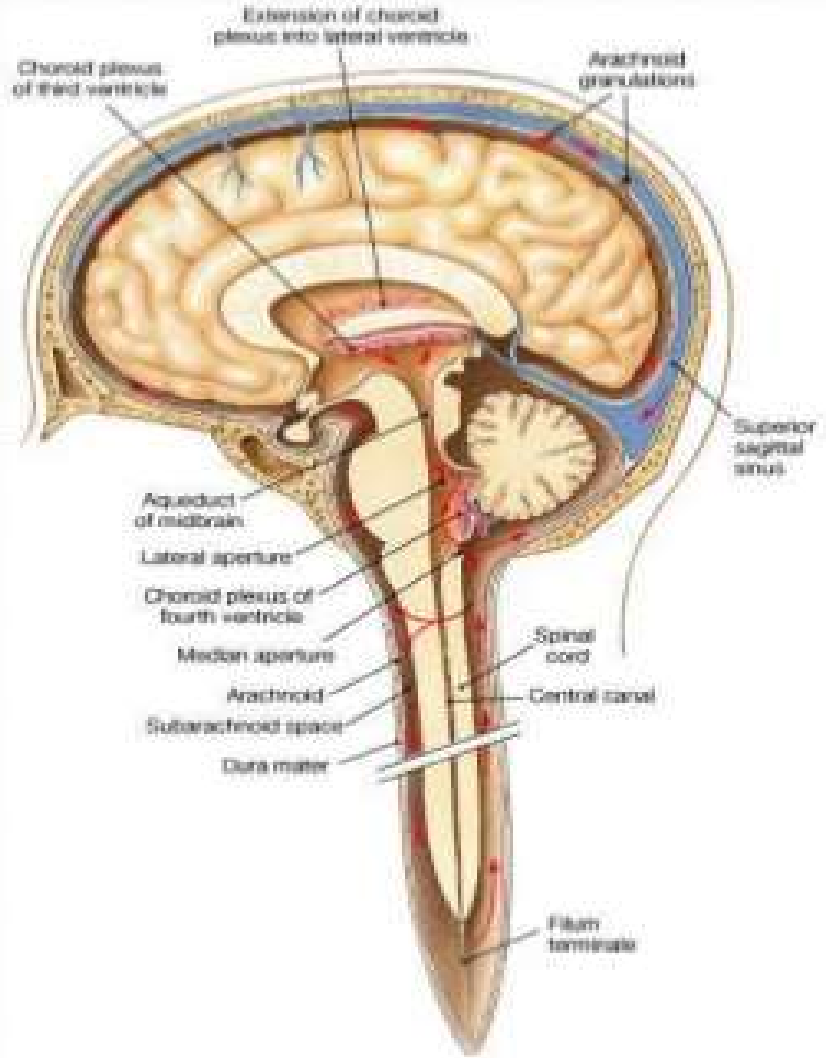


Figure 12.26: Formation, location, and circulation of CSF, p. 466.

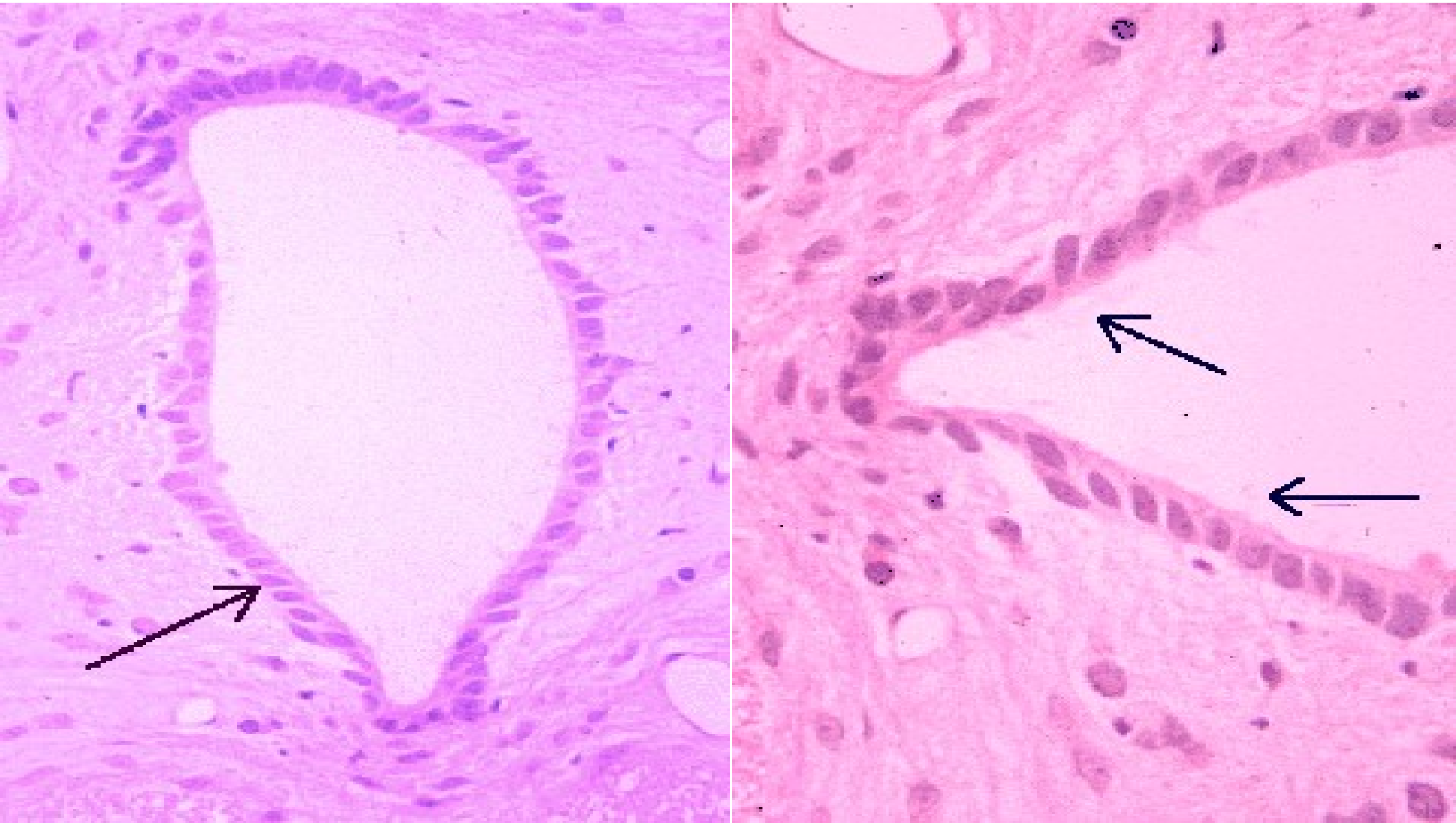
Pathway of CSF Flow

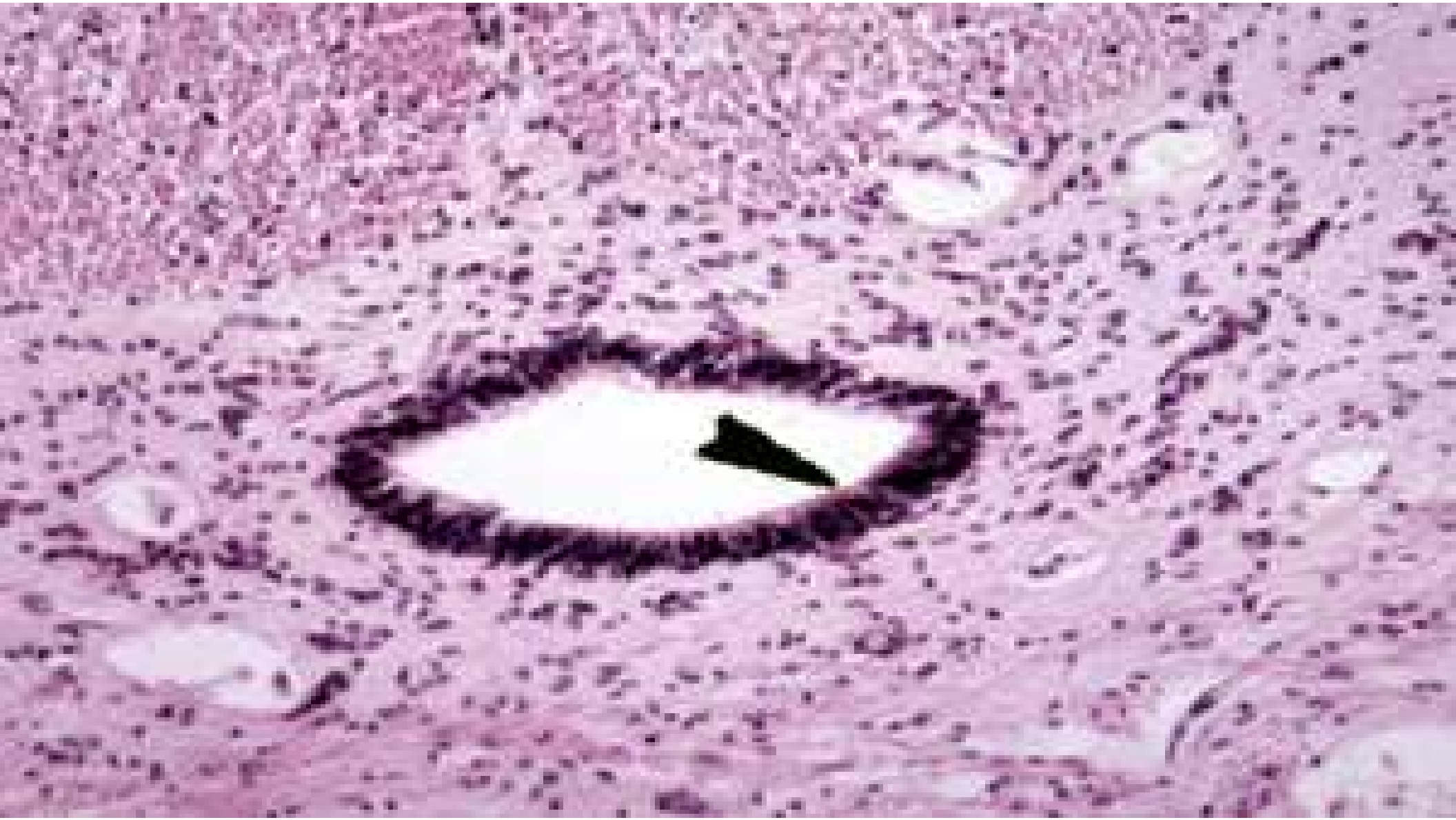
- Lateral ventricles
- Foramen of Monro → Third ventricle
- Aqueduct of Sylvius
- Fourth ventricle
- Foramina of Magendie and Luschka
- Subarachnoid space of brain & spinal cord
- Reabsorption into venous sinus

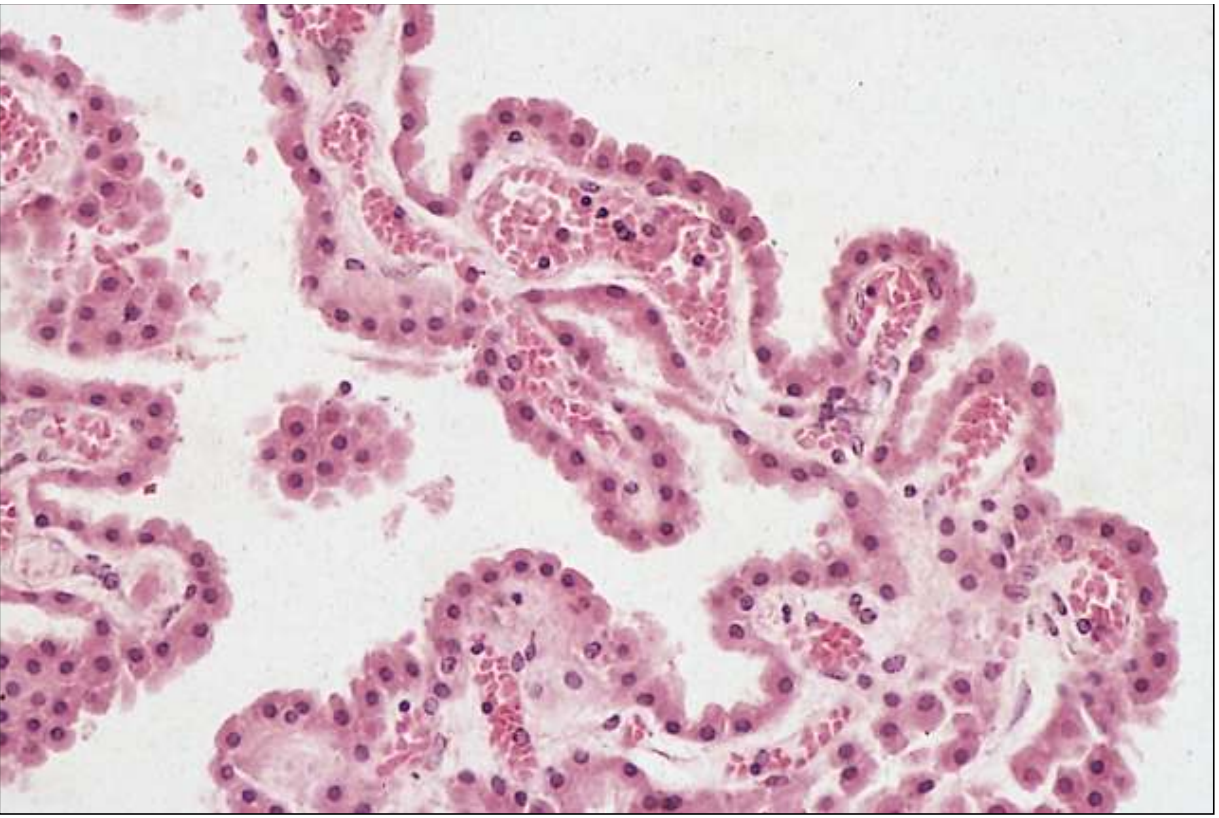


EPENDYMA

- **Cuboidal – low columnar epithelium**
- **lines ventricles & central canal of spinal cord**
- **ciliated - CSF**



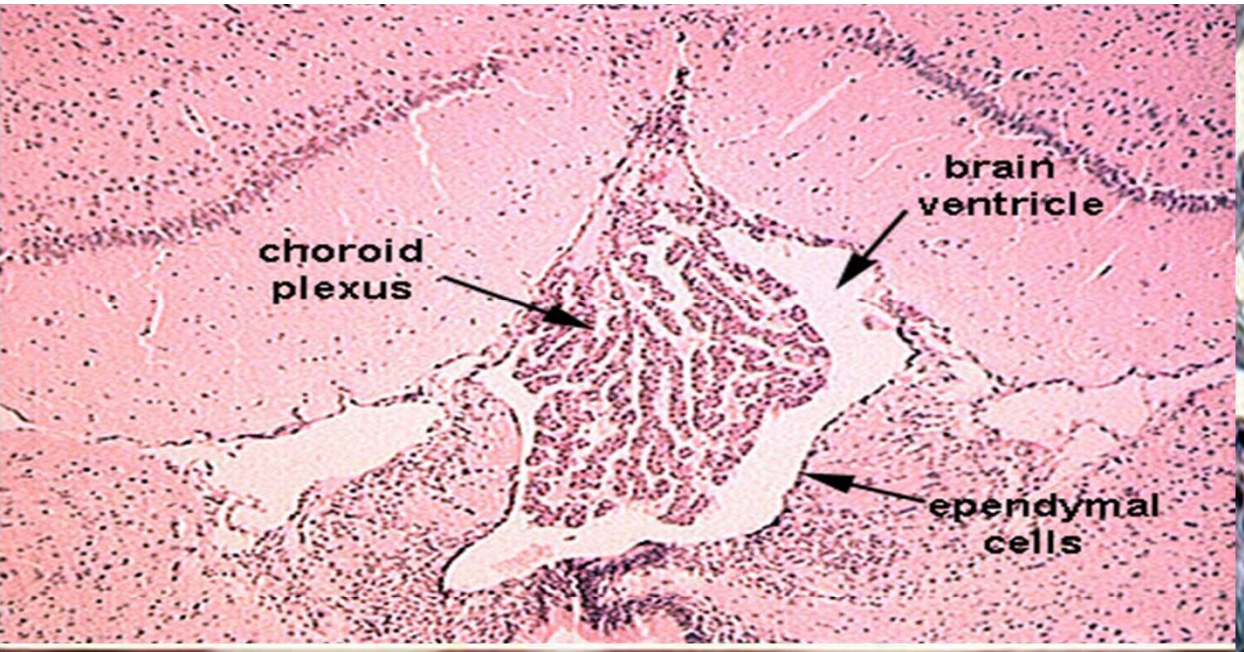




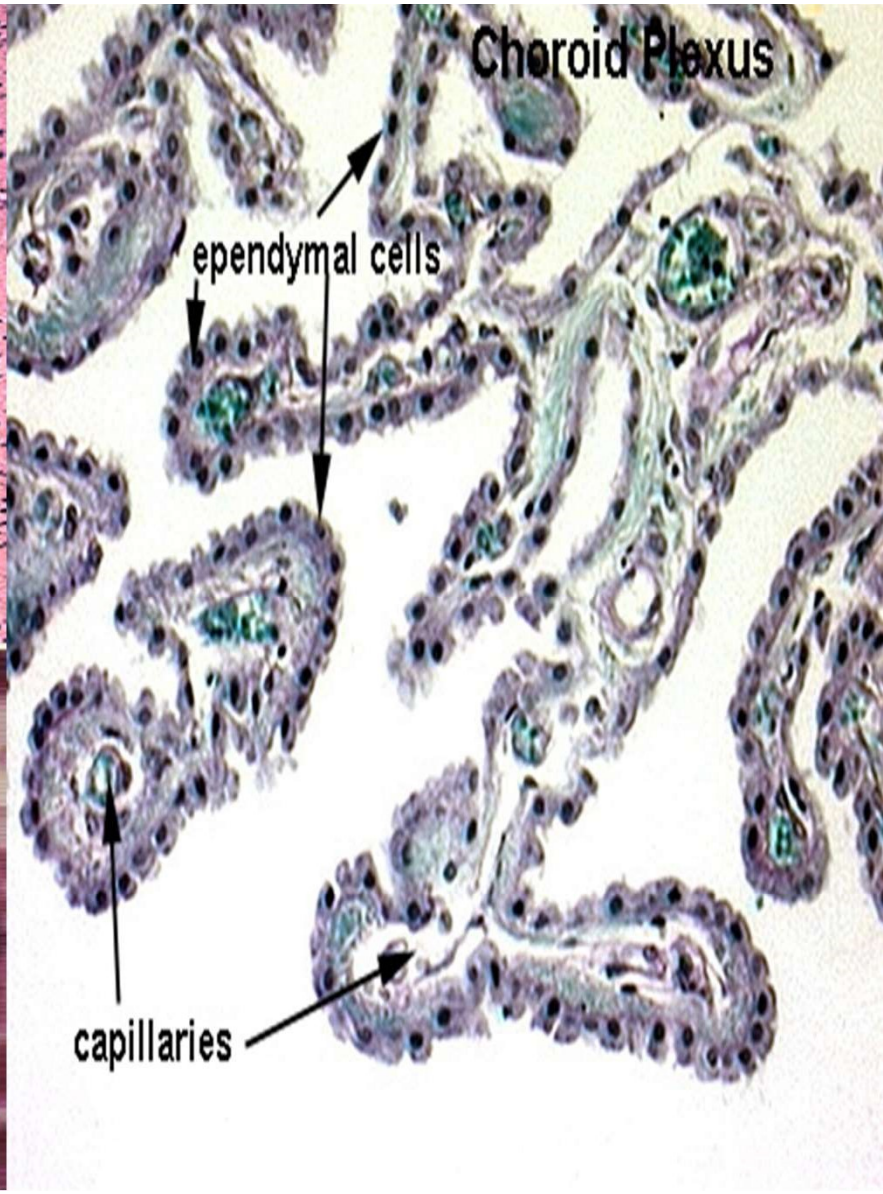
Modified to form choroid plexus

secrete cerebro-spinal fluid (CSF)

SEM of choroid plexus


brain
ventricle
choroid
plexus
ependymal
cells


Dr. J. Bruni, Human Anatomy & Cell Science, 1998


Choroid Plexus
ependymal cells
capillaries

TANYCYTES

- **Specialized ependymal cells that extend processes into hypothalamus.**
- **Processes terminate near blood vessels and neurosecretory cells**
- **?Transport CSF or substances in the CSF to neurosecretory cells.**