# Lateral ventricle

| | | | | |
|---|---|---|---|---|
| **Definition** | ▪ The cavity of the cerebral hemisphere. | | | |
| **Shape** | ▪ **C-shaped cavity** filled with the CSF. | | | |
| **Communication** | ▪ With the third ventricle through the interventricular foramen of Monro. | | | |
| **Choroid Plexus** | ▪ In the body & the inferior horn of the lateral ventricle. | | | |
| **Arterial supply** | ▪ Anterior & posterior choroidal arteries | | | |
| **Divisions/ Parts** | ▪ **Central Part + 3 Horns** "anterior, posterior and inferior" | | | |
| | **ANTERIOR HORN** | **CENTRAL PART (BODY)** | **POSTERIOR HORN** | **INFERIOR HORN** |
| **EXTENSION** | Extends into the frontal lobe anterior to the interventricular foramen. | In parietal lobe from interventricular foramen to splenium of corpus callosum. | Extends in occipital lobe behind splenium of corpus callosum. | it winds around thalamus and extends anteriorly into temporal lobe. |
| **RELATIONS** | | | | |
| **Anterior end** | Genu of the corpus callosum. | | | |
| **Roof** | Body of the corpus callosum. | Body of the corpus callosum. | Tapetum of corpus callosum. | ❶ Tail of caudate and amygdala<br>❷ Thalamo-striate vein.<br>❸ Stria terminalis |
| **Floor** | Rostrum of the corpus callosum. | **FROM LATERAL TO MEDIAL SIDE:**<br>❶ Body of the caudate nucleus.<br>❷ Thalamo-striate vein.<br>❸ Stria terminalis is a slender bundle of fibers originating in the amygdaloid body in the temporal lobe.<br>❹ Thalamus<br>❺ Choroid plexus in choroid fissure<br>❻ Body of the fornix. | collateral trigone produced by the collateral sulcus. | **FROM MEDIAL TO LATERAL:**<br>**Fimbria** - Arises from the hippocampus & continues backward as the fornix<br>**Hippocampus** - Its anterior end is enlarged to form the pes hippocampi.<br>**Collateral eminence** - Produced by collateral sulcus |
| **Medial wall** | Septum pellucidum. | The septum pellucidum. | **2 Elevations**<br>**Bulb** \| **Calcar avis**<br>Superior \| inferior<br>Produced by<br>Forceps major \| calcarine sulcus | Choroid plexus of inferior horn. |
| **Lateral wall** | Head of caudate nucleus. | Meeting roof with floor. | **FROM MEDIAL TO LATERAL:**<br>❶ Tapetum of corpus callosum<br>❷ Optic radiation<br>❸ Inferior longitudinal fasciculus | tapetum of corpus callosum |

- The **TEMPORAL HORN** extends to within about 3 cm of temporal pole.
- A triangular area, called **collateral trigone**, is found in the floor of the ventricle where occipital & temporal horns diverge from the central part of the ventricle.
- A substantial part of the choroid plexus of the lateral ventricle rests on the trigone.

# Cerebrospinal fluid

| | |
|---|---|
| **Definition:** | ▪ The fluid that fills the ventricles of the brain & the subarachnoid space. |
| **Characteristics** | ▪ It is a colorless fluid containing little protein and few cells.<br>▪ CSF is produced continuously, at a rate sufficient to fill these spaces several times each day.<br>▪ CSF is similar to blood plasma although it contains less albumin and glucose. |
| **Volume:** | ▪ **About 130 ml mainly in the subarachnoid space:**<br>**30 L** → In the ventricles<br>**100 ml** → in the subarachnoid space |
| **Formation** | ▪ **Formed by active secretion and by diffusion from:**<br>**Choroid plexus** - **The main source of the CSF (70%)** - It is produced mostly by the choroid plexus of the lateral ventricle<br>**Choroid plexus** - A series of modified ependymal cells responsible for producing 0.5 L of cerebrospinal fluid (CSF) a day in adults.<br>**Ependymal lining of the ventricles** - Add CSF to the ventricles<br>**Cells of the pia mater** - Add CSF to the subarachnoid space |
| **Circulation** | **Lateral** ventricles<br>↓<br>to **third** ventricle through the interventricular **foramina of Monro**<br>↓<br>to the **fourth** ventricle through the **aqueduct of Sylvius**. "**More CSF is added in each ventricle.**"<br>↓<br>to the **subarachnoid space** through the **median foramen of Magendie & the lateral foramina of Luschka.**<br>↓<br>A small amount flows to the **central canal** of the spinal cord.<br>↓<br>CSF flows in the subarachnoid space around the brain and the spinal cord.<br>➲ **The following factors facilitate CSF circulation:**<br>❶ Pulsations of the arteries in the subarachnoid space.<br>❷ Movements of the cilia of the ependymal cells.<br>❸ Positive & negative pressure created by continuous production and absorption. |
| **Absorption** | ❶ **Main site for drainage → Arachnoid villi & granulations.**<br>- Arachnoid granulations are minute pouches of the arachnoid membrane projecting through the dura into the venous sinuses. They drain the CSF into the venous **blood of the dural sinuses** especially the superior sagittal sinus.<br>❷ **Gap junctions** between ependymal cells & between pial cells back to the brain tissue<br>❸ **Venous blood through small veins in the subarachnoid space.**<br>❹ **Perineural lymph vessels around the cranial and spinal nerves.**<br>↓<br>***Reabsorption occurs at these sites because the hydrostatic pressure in the subarachnoid space is higher than that in the lumen of the sinus and also because of the greater colloid osmotic pressure of venous blood compared with CSF*** |

<table>
<tr><td colspan="2">Functions</td><td>❶ ⇊ brain weight 60 folds (from 1400 gm to 25 gm).<br>❷ Protects the brain & the spinal cord.<br>❸ Substitutes the lymphatic system in the CNS and provides a drainage system<br>❹ Maintains the chemical environment for the CNS through communication with the brain extracellular space.<br>❺ Regulation of intracranial pressure.</td></tr>
<tr><td colspan="2">Clinical Conditions</td><td>HYDROCEPHALUS</td></tr>
<tr><td></td><td>Definition</td><td>▪ It is an abnormal increase in the volume of the CSF with dilatation of the ventricles and increase in size of the head.</td></tr>
<tr><td></td><td>Causes</td><td><table>
<tr><td>Obstruction to its circulation</td><td>- It is the commonest cause.<br>1) The commonest site of obstruction is the aqueduct of Sylvius.<br>2) Other sites are interventricular foramina</td></tr>
<tr><td>Overproduction of CSF</td><td>- By choroid plexus tumor (rare).</td></tr>
<tr><td>Inadequate drainage of the CSF</td><td>- By thrombosis of the superior sagittal sinus</td></tr>
</table></td></tr>
<tr><td></td><td>TTT</td><td>▪ Decompression Of the Dilated Ventricles is achieved by inserting a shunt connecting the ventricles to the jugular vein or the abdominal peritoneum.</td></tr>
</table>