**Ventricular system**

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|  | Lateral ventricle | 3rd ventricle | 4th ventricle |
|  | -C\_shaped cavities ; one for each cerebral hemisphere. | -slit\_like cavity of the diencephalon.  -the cavity is traversed by interthalamic adhesions. | -tent\_like cavity of hindbrain.  -between the pons & medulla anteriorly and the cerebellum posteriorly. |
| COMMUNICATIONS | - communicate medially with the 3rd ventricle through interventricular foramen of monro (at the junction between the body and anterior horn). | -communicates with the 4th ventricle by cerebral aqueduct of sylvius. | 1-Subarachinoid space》through foramina of lushcka and magendie  2-3rd ventricle》aqueduct of midbrain.  3-Central canal of spinal cord. |
| RECESSES |  | 1-infandibular.  2-optic.  3-supra pineal.  4-pineal. | 1-2 lateral.  2-dorsal or cerebellar. |
| BOUNDARIES | It is devided into:-  1-Anterior horn:-  》in frontal lobe.  》is continuous with the central part at the interventricular foramen of monro.  2-Posterior horn:-  》in occipital lobe.  3-Inferior horn:-  》in temporal lobe.  》the largest.  4-Central part:-  》from interventricular foramen of monro till the splenium of CC.  RELATIONS:-  #Corpus callosum:-  -Rostrum》floor of anterior horn.  -Genu》anterior to anterior horn.  -Body》roof of anterior horn - roof of central part.  -Tapetum》roof and lateral of posterior horn with the Optic radiation - lateral wall inferior horn.  -Forceps major (bulb of posterior horn) 》inferomedial wall of posterior horn.  #Caudate nucleus:-  -Head》floor and lateral of anterior horn.  -Body》floor of central part with Thalamus.  -Tail》roof of inferior horn with Stria terminalis:-  #Septum pellucidum:-  》medial to anterior horn - medial to central part with Fornix.  #Calcar avis(calcarine sulcus):-  》inferomedial wall of posterior horn.  #Hippocampus and collateral eminence:-  》floor of inferior horn. | #Roof:-  1-telachoroidea.  2-ependymal layer.  3-2 internal cerebral veins  #Floor:-  (from ant. to post.)      (Hypothalamus)  1-optic chiasma.  2-tuber cinerium & infundibulum.  3-2 mamillary bodies.  4-posterior perforated substance.  5-tegmentum of midbrain.  #Anterior wall:-  1-column of fornix.  2-lamina terminalis.  3-anterior commisure.  #Lateral wall:-  1-thalamus.  2-hypothalamus.  3-hypothalamic sulcus.  4-interventricular foramen of monro.  #Posterior wall:-      (epithalamus)  1-pineal body.  2-posterior & habenular comissure.  3-cerebral aqueduct of midbrain. | #BOUNDARIES:-  -Upper 1/2》superior cerebellar peduncles.  -Lower 1/2》inferior cerebellar peduncles + gracile and cuneate tubercles.  #ROOF:-  -Upper 1/2》superior cerebellar peduncles and superior medullary velum in between.  -Lower 1/2》tela choroidea, ependyma and inferior medullary velum.  #FLOOR:-  -it is rhomboidal in shape.....each of 2 halves is triangular.  -Upper 1/2》back of pons.  -Lower 1/2》back of medulla.  -the bases of the two triangles meet together in the middle (pontomedullary junction) showing the striae medullaries.  -the floor is devided longitudinally into right and left halves by median salcus.  -elevation on each side of the salcus named eminentia medialis (medial eminence).  -the upper part of medial eminence is the facial colliculus (back of pons).  -lateral to facial colliculus is a rounded area (upper vestibular area) with superior fovea in between.  -lower part show inferior fovea deviding the back of the medulla into hypoglossal triangle medially ... vestibular area laterally ... vagal triangle between the two limbs of inferior fovea. |

#between the thalamus and body of caudate there are:-

1-stria terminalis.

2-thalamostriate vein.

3-choroid plexus.

#lamina terminalis »From rostrum to optic chiasma.

#Choroid plexus:-

》choroid plexus (in the lateral ventricle) + sheath of pia matter = tela choroidea.

》it is derived from:-

1-anterior choroidal artery》ICA.

2- posterior choroidal artery》PCA.

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**CSF**

 -It is a clear transparent fluid that fills all the cavities inside the brain (ventricles) and surrounding subarachinoid space.

#COMMUNICATIONS:-……(Like the four ventricles)

#SUBARACHNOID SPACE:-

-It is a space lies between the arachnoid and pia matters.

-when the space increases in size it is called cistern.

#TYPES OF CISTERN:-

1-Subarachnoid.

2-cisterna magna(cerebello\_medullary).

3-pontine.

4-interpeduncular.

5-cistern of lateral salcus.

6-cistern of great cerebral vein.

7-cistern of optic chiasma(prechiasmatic and postchiasmatic).

#FUNCTIONS OF THE CSF:-

1-shock absorption.

2-support the brain.

3-active substrate for the structures inside the skull.

4-nourishment of nervous tissue.

5-removal of products of neuronal metabolism.

#FORMATION:-

-by choroid plexus of the lateral, 3rd and 4th vetricles.

#ABSORPTION:-

-within the SSS through the arachinoid villi and granulations.

(Herniation of arachinoid matter into dural venous sinuses especially SSS).

#PATHWAY:-

-lateral ventricles 》 3rd vebtricle 》 4th ventricle》1-central canal of spinal cord.

2-subarachnoid space (behind the brain.....below....around the superolateral surface) 》 absorbed by SSS.

**White matter of the brain**

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| Association fibers | Commissural fibers | projection fibers |
| connect between 2 areas on the same side of the cerebral hemispheres. | between 2 same areas on both sides of the brain. | These are fibers that passing from or to the cerebral hemispheres. |
| A)short association fibers » between two adjacent gyri.  B)long aissociation fibers » between two widely separated gyri.(between two lobes).  #LONG ASSOCIATION FIBERS:-  1-uncinate fasciculus》between orbital gyri and anterior portion of temporal lobe.  2-cingulum》between cingulate gyrus and the hippocampus.  3-superior longitudinal fasciculus (The largest) 》between frontal lobe and temporal lobe -it sends fibers to occipital lobe.  4-inferior longitudinal fasciculus 》between occipital and temporal lobes.  5-fronto\_occipital fasciculus 》between frontal and occipital lobes. | 1-anterior commissure》upper part of lamina terminalis ...... between olfactory structures of both sides (olfactory bulb-anterior perforated substance-pyriform area-amygdaloid bodies)  2- posterior commissure 》it present in a stalk of pineal body.....above the upper end of cerebral aqueduct.  3-habenular commisure》 it presnt in a stalk of pineal body.....above the posterior commissure.....its fibers derived from the stria habenularis.  4-hippocampal commisure (commissure of the fornix)》is in the form of transverse fibers Crossing from one crus of the fornix to the other crus just behind the body of the fornix .  These fibers connect the hippocampus with its fellow of the opposite side.  5-CORPUSCALLOSUM:-  -The greatest commissure.  -it consists of :-  1-ROSTRUM》between the 2 orbital surfaces of the frontal lobes.  2-GENU》between the 2 anterior parts of the 2 frontal lobes ...... it radiates forwards and towards the frontal poles forming forceps minor.  3-BODY》between the posterior part of the 2 frontal lobes and anterior part of the 2 parietal lobes...... these fibers radiate laterally forming the radiation of corpus callosum.  4-SPLENIUM》between the posterior part of the two parietal lobes, the 2 temporal lobes and the 2 occipital lobes...... these fibers pass either:-  A) Lateral to posterior horn of the lateral ventricle called tapetum.  B) Medial to posterior horn of the lateral ventricle called forceps major. | A)ascending fibers......corticopetal.  B)descending tract.......corticofugal. |

# fronto\_occipital fasciculus is medial to corona radiate …… superior longitudinal fasciculus is lateral to corona radiate.

**Internal capsule**

-It is composed of all fibers (afferent and efferent) ( projecting fibers) which go or come from the cerebral cortex.

-It is divided to:-

1-ANTERIOR LIMB》frontopontine fibers - anterior thalamic radiation.

2-GENU》corticobulbar fibers.

3-POSTERIOR LIMB:-

|  |  |  |
| --- | --- | --- |
| Thalamolentiform part | Retrolentiform part | Sublentiform part |
| between the lentiform nucleus and the thalamus.  1-paritopontine fibers.  2-superior thalmic radiation  3-corticospinal tract.  4-corticorubral.  5- corticostriate. | extend caudally behind the lentiform nucleus.  1-occiptopontine fibers.  2-posterior thalamic radiation including optic radiation nucleus. | beneath the lentiform nucleus.  1-tempropontine fibers.  2-inferior thalamic radiation including auditory radiation. |

#BLOOD SUPPLY:-

-Anterior limb 》lateral striate branches from the middle cerebral artery - anterior cerebral artery (anteromedial parts).

-Posterior limb 》lateral striate branches from the middle cerebral artery - anterior choroid artery (ventral portion and its entire retrolentricular part).

-Genu 》ICA.