

Lec 2

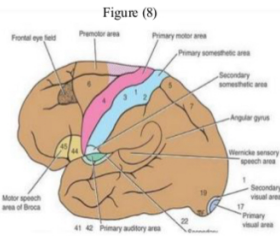
2.8 Frontal Eye Field 8: **Imp there will be a question in the exam about it:**

-**Location:** laterally in the middle of the middle frontal gyrus, in front of area 6.

-**Function:** **Voluntary** eye movement **to the opposite side** (the occipital eye field area is responsible for involuntary or reflex tracking eye movements of both eyes to the opposite side, e.g., moving your eyes while reading).

-**Ipsilateral Lesion:** deviation of both eyes to the same side of lesion, ex: if the lesion on the left both eyes won't move to the right.

Remember, a lesion in the posterior dorsal column system & cerebellum will cause a similar effect ipsilaterally.



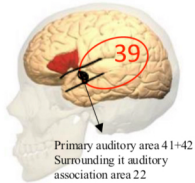
2.9 Motor Broca's area of speech 44,45: **imp there will be a question in the exam about it:**

-**Location:** inferior frontal gyrus, mainly on the **left (should be there)** dominant hemisphere.

*dominant hemisphere processes often are assigned to the left hemisphere.

-**Function:** coordination of **different** muscles of larynx, mouth, tongue and palate. (muscles produce speech)

Connected to **wernicke's area (22 auditory association area posteriorly +39 angular +40 supramarginal gyrus)** through arcuate fasciculus which is the sensory area of speech (inside the red circle). Wernicke's area responsible for understanding written and spoken words.



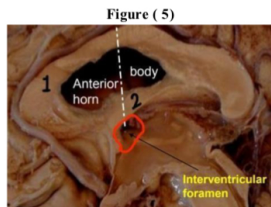
-**Lesion: (motor aphasia) non fluent aphasia** (mainly comes with contralateral hemiplegia since both are supplied by the middle cerebral artery, and both are located on the lateral surface of the brain

A lesion here will result in contralateral hemiplegia, as both the motor cortex and the affected area are supplied by the middle cerebral artery. This lesion may also cause Broca's aphasia (**non-fluent/expressive aphasia**), in which the patient understands language but struggles to produce coherent speech. They may use incorrect or random words but are aware of their difficulty, which often leads to frustration and anxiety. This contrasts with Wernicke's aphasia (**fluent/sensory aphasia**), caused by a lesion in Wernicke's area, where the patient produces fluent but meaningless speech and is typically unaware of their language deficit. They may use made-up or nonsensical words (neologisms) without recognizing the issue.

Lec 4

Figure (5) represents a **sagittal section**. 1. Corpus callosum 2. The fornix, below the fornix we can see a v. imp foramen (**might be an exam question**) called the **interventricular foramen**, it is a **connection** between the lateral ventricle and the 3rd ventricle (the CSF comes from it then goes to the 3rd ventricle). **A past paper question** was about this information: the **interventricular foramen lies between the anterior end of the thalamus and the anterior column of the fornix.**

An **imaginary line** should be drawn from the interventricular foramen toward the corpus callosum to identify the structures there. **In front** to it we have the anterior horn, **behind** we can see the body of the lateral ventricle. The rest parts can't be seen here in the sagittal section. Actually, the whole cavity can't be seen here till we remove the **cover** which is the **septum pellucidum**.



4.10 The Choroid Plexus:

• **Definition:**
o The choroid plexus consists of capillary tufts and is responsible for the production of cerebrospinal fluid "CSF" within the ventricles.

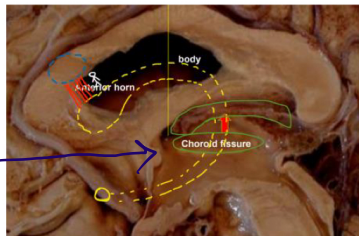
• **Location:**
o In the lateral ventricle, the choroid plexus is primarily located in the **body and inferior horn** and **trigone**. refer to figure (12) the orange structure. ... it **Projects into the choroid fissure**

• **Arterial Supply:**
o The choroid plexus is supplied by the anterior choroidal artery to inf. horn (from the internal carotid artery) and the posterior choroidal artery to body (from the posterior cerebral artery).

The Choroid Fissure: * might come in lab questions*

o It marks the boundary between the thalamus (below) and the fornix (above). refer to figure (10) the green structure.

Function: The choroid fissure accumulates and directs the flow of CSF into the lateral ventricle



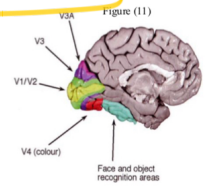
CSF Flow and Ventricular System:

2.11 Visual cortex: **Imp there will be a question in the exam about it:**

V I: area 17

-**Location:** around the calcarine sulcus lips (notice 17) (between the cuneus above and lingual below) → receives visual radiations from LGB.

-**Function:** perception of the opposite visual field.



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-**Lesion: contralateral homonymous hemianopia** in the half of the visual field at the **same side** of the retina that projects to the opposite visual field.

V II: 18, 19 (visual association area)

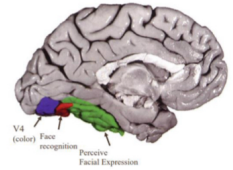
-**Location:** remainder of cuneus and lingual gyri.

-**Function:** Interpretation of visual stimulus with past experience.

-**Lesion: loss of vision on the opposite side. This may be an exam question**
Loss of vision can affect the upper (superior) quadrants in the left-hand quadrant or the right-hand quadrant. Loss of vision can affect the lower (inferior) quadrants in the left-hand quadrant or the right-hand quadrant.

Lesion in the right lingual will cause left superior quadrantanopia.
Lesion in the right cuneus will cause left inferior quadrantanopia.

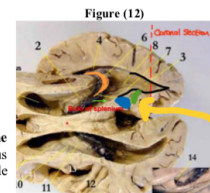
Figure (12): Visual association areas



4.8 Relations Of The Occipital Horn:

The **occipital horn** is located within the **occipital lobe**. To better understand its relations, let's examine a **coronal section**.

The **medial wall** (in black in figure 12) is of particular importance in the posterior horn, along with the **floor**.



Structures forming the **medial wall** include: 1. **Bulb of the Corpus Callosum**, the **splenium** (in blue) of the corpus callosum extends into the medial wall, creating a noticeable elevation known as the bulb of the splenium.

2. **Calcarine Fissure** (in green). Adjacent to the bulb is the calcarine fissure, which is closely associated with visual area 17. This fissure plays a crucial role in separating parts of the primary visual cortex.
• **Above the fissure:** The cuneus
• **Below the fissure:** The lingual gyrus. This anatomical arrangement has functional significance.

For instance, a **lesion** in the cuneus results in **contralateral inferior quadrant anopia**, meaning vision loss in the lower quarter of the opposite visual field. * as you remember from prev. lecs * The calcarine also pushes inward into the substance of the medial wall of the lateral ventricle, particularly in the **posterior portion making (Calcar avis).**

(Calcar avis) This term refers to the elevation near the calcarine fissure.

The **calcarine fissure** and its related elevation are situated on the **medial wall** of the lateral ventricle specifically in the **occipital region**. * might be an exam question*

Choroid plexus of Lateral Ventricle

Choroid plexus projects into the ventricles on its **medial aspect**.

Composed of **pia matter** covered with ependymal lining of the ventricle.

Choroid plexus is made of **tela choroidea** (two layers of pia matter).

Lies between **fornix superiorly** and **thalamus inferiorly**.

Situated in the **inferior horn** of the lateral ventricle. + **trigone**

Projects into the **choroid fissure**

Formed by **posterior choroid branch of PCA (body)** and **anterior choroid branch of ICA (inferior horn)**

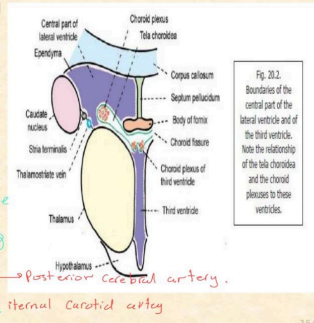


Fig. 30.2. Boundaries of the central part of the lateral ventricle and of the third ventricle. Note the relationship of the tela choroidea and the choroid plexuses to these ventricles.

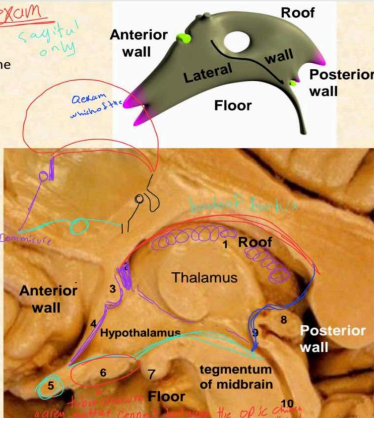
LEC 5

The third ventricle

is a narrow slit like cleft between the 2 halves of the diencephalon.

boundaries:

- Roof:** Thin layer of ependyma stretched between lateral walls containing **choroid plexus** (1).
- More superiorly, **fornix**, **septum pellucidum** and **corpus callosum**
- Anterior wall:** Columns of fornix (2), anterior commissure (3), **Lamina terminalis** (4) & **Septum pellucidum**
- Floor:** Hypothalamus [optic chiasma (5), tuber cinereum (6) Mammillary body (7)] & tegmentum of midbrain.
- Posterior wall:** Pineal body (8), posterior commissure (9) & aqueduct of sylvius (10).
- Lateral wall:** Thalamus & hypothalamus.



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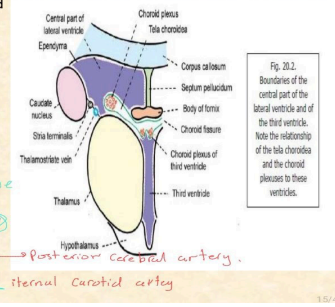
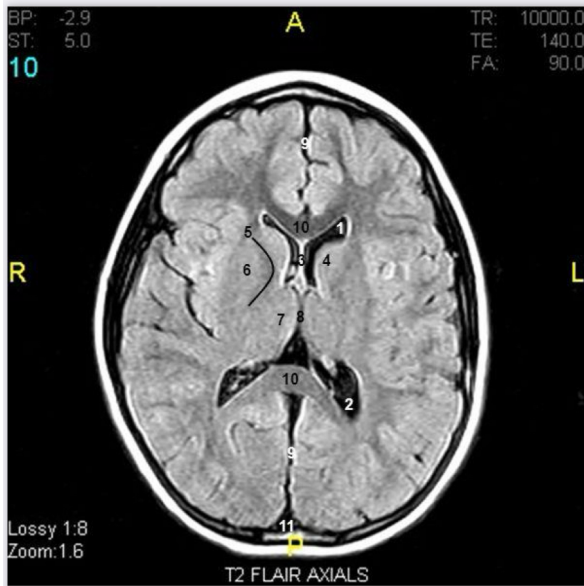


Fig. 20.2. Boundaries of the central part of the lateral ventricle and of the third ventricle. Note the relationship of the tela choroidea and the choroid plexuses to these ventricles.



Key to MRI:

- anterior horn of lateral ventricle
- posterior horn of lateral ventricle
- septum pellucidum
- head of caudate nucleus
- internal capsule
- lentiform nucleus
- thalamus
- 3rd ventricle
- longitudinal fissure
- corpus callosum
- superior sagittal sinus

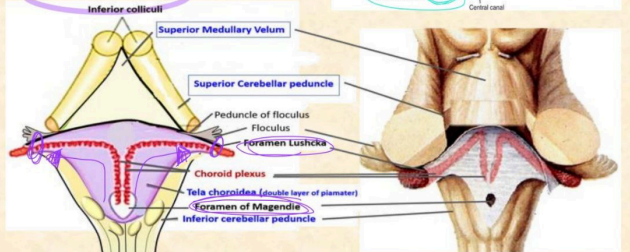
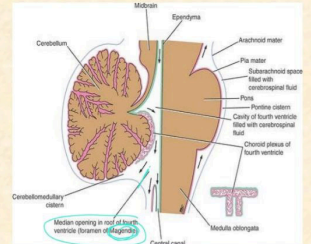
Choroid plexus of Fourth Ventricle

T shape.

Formed of highly vascular **tela choroidea**.

Suspended from the inferior half of the roof.

Blood supply: Posterior inferior cerebellar arteries (vertebral arteries)



Subarachnoid cisterns

1- Cerebello-medullary cisterna (Cisterna magna)

Between cerebellum and **roof of 4th ventricle**

Receives foramen of **magendie**

2- Pontine (ponto-medullary) cisterna

In front of pons and medulla

Contain **basilar and vertebral arteries**

Receives foramina of **luchka**

Transversed by roots of **lower 8 cranial nerves**

3- Interpeduncular cistern

Lies over interpeduncular fossa

Contains **circle of willis**

Transversed by roots of **3rd and 4th cranial nerves**

4- Cistern of lateral fissure

Contains the **middle cerebral vessels**

5- Callosal cistern

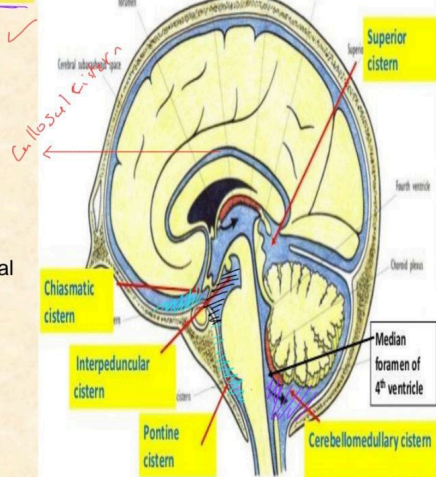
Lies above corpus callosum

Contains **anterior cerebral vessels**

6- Chiasmatic cistern

Lies around **optic chiasma**

Q exam
which of the following protects



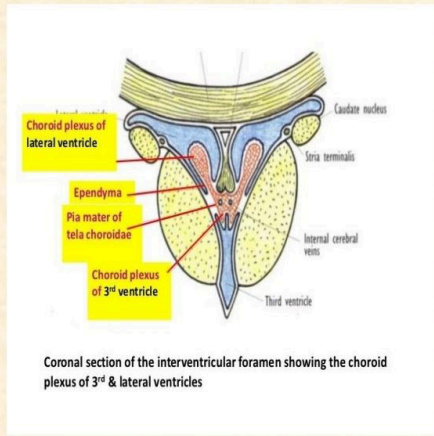
In Lec 3: blood supply of internal capsule is important, but it is explained by dr. in the last lecture

Choroid plexus of Third Ventricle

Formed of tela choroidea above the roof of the ventricle.

Vascular tela choroidea projects downward on each side of the midline, invaginating the ependymal roof of the ventricle.

Blood supply of choroid plexus of third ventricle is derived from **choroidal branch of posterior cerebral artery**



27/49

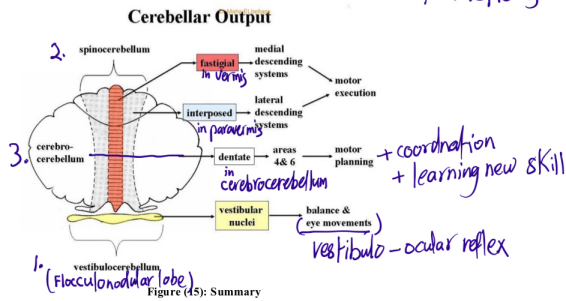
Lec 6

Important:

Nucleus	Afferent	Efferent	Function
Anterior	Mammillothalamic tract, cingulate gyrus, hypothalamus	Cingulate gyrus, hypothalamus	Emotion and memory
Dorsomedial	Prefrontal cortex, hypothalamus	Prefrontal cortex, hypothalamus	Integration of somatic, visceral, olfaction
LD & LP	Cerebral cortex	Cerebral cortex	unknown
VA	Premotor cortex, BG	Premotor cortex, BG	Motor activity
VL	Premotor cortex, cerebellum	Premotor cortex, cerebellum	Motor activity
VPM	Trigeminal lemniscus	Area 3,1,2	general sensation → face 3h
VPL	Medial & spinal lemnisci	Area 3,1,2	general sensation → body
Intralaminar	Reticular formation	Cerebral cortex	Alertness
Reticular	Cerebral cortex	Other thalamic nuclei	Regulate thalamus
MGB	Lateral lemniscus	Superior temporal gyrus	hearing
LGB	Optic tract	Visual cortex	Vision

Lec 7

summary to brain division + Functions

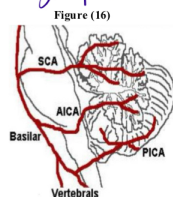


7.9 Cerebellar Blood Supply: very very important → last lec

Supplied by three arteries:

SCA (Superior Cerebellar Artery) – from basilar artery
AICA (Anterior Inferior Cerebellar Artery) – from basilar artery
PICA (Posterior Inferior Cerebellar Artery) – from vertebral artery; also supplies lateral medulla.

-Slide 29: For your information only, not an exam material.



Shatha Maqableh & Sara Omar

7.10 Cerebellar Lesions:

Cause ataxia (lack of coordination)

Posterior column lesions can also cause ataxia (seen in gracile and cuneate fasciculi), but differ: Posterior column ataxia worsens when eyes are closed.

Cerebellar ataxia persists with eyes open or closed.

↑ Another cause of ataxia in spinal cord