

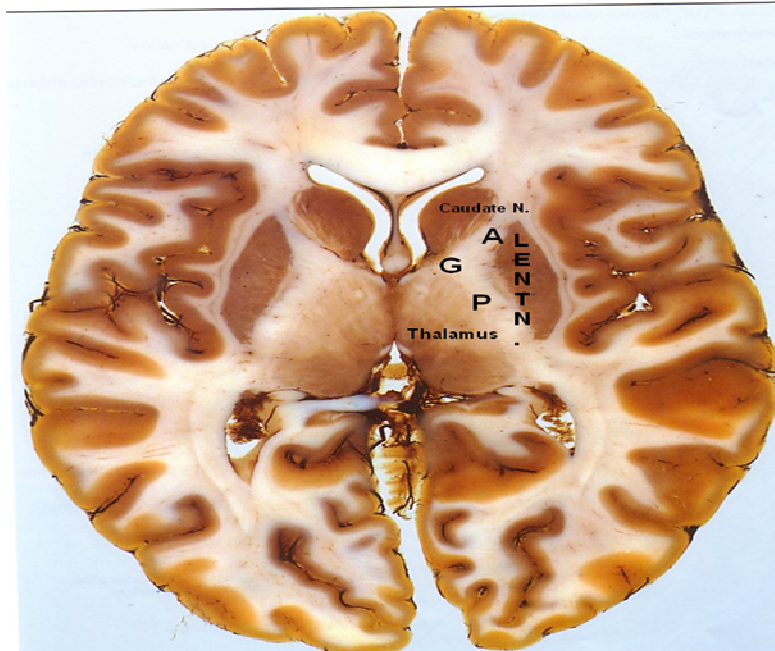
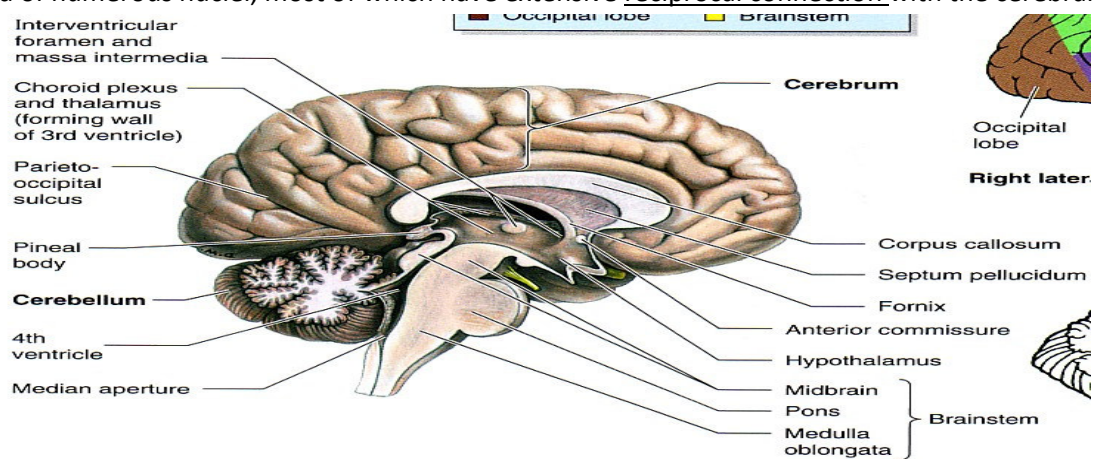
DIENCEPHALON I

ANATOMY OF THE DIENCEPHALON :

- It is the central part of the forebrain.
- It is continuous below with the midbrain.
- It lies in the central part of the cerebral hemisphere.
- It is composed of 4 parts :
 1. Thalamus.
 2. Hypothalamus.
 3. Epithalamus.
 4. Subthalamus.
- Some authors add a 5th part the "Metathalamus" for the medial & lateral geniculate bodies.

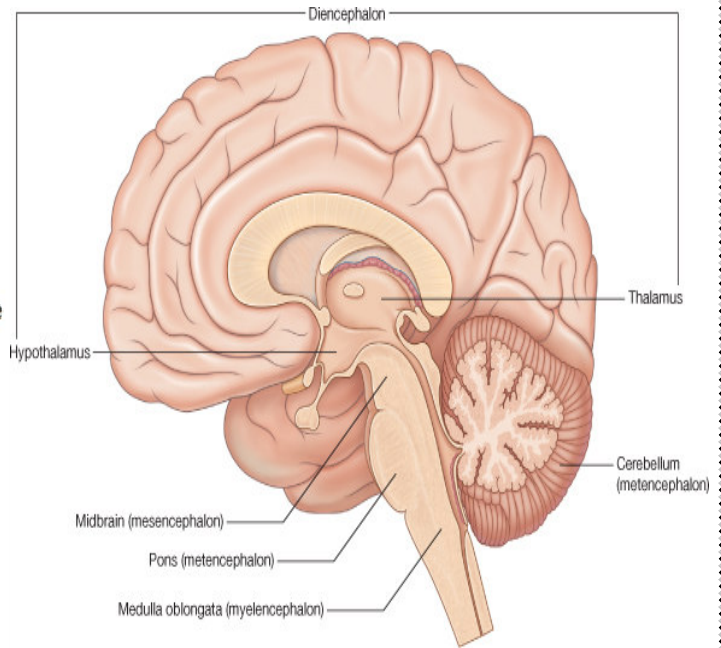
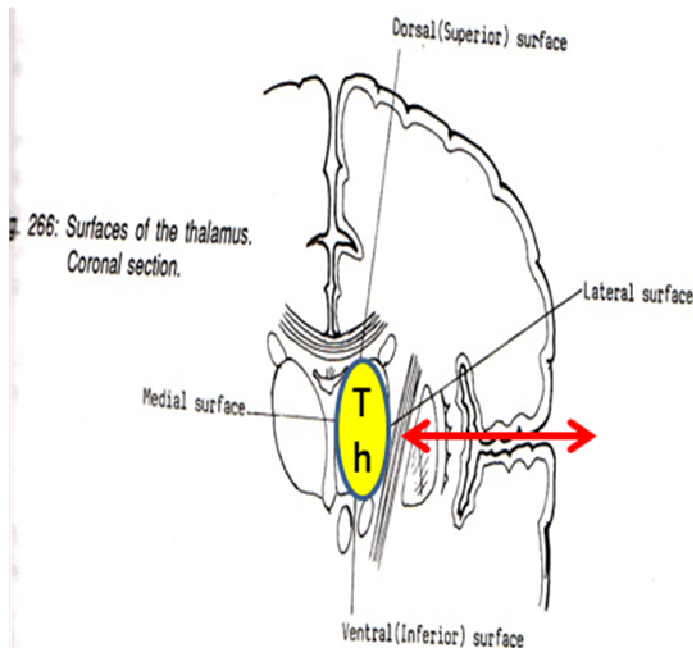
ANATOMY OF THE THALAMUS :

- It is the largest part of the diencephalon.
- It is formed of two oval masses of grey matter.
- Lie on each side of the 3rd Ventricle.
- Resemble a small hen's egg, 3 cm long & 1.5 cm broad.
- Together with the hypothalamus they form the lateral wall of 3rd ventricle.
- It is formed of numerous nuclei, most of which have extensive reciprocal connection with the cerebral cortex.

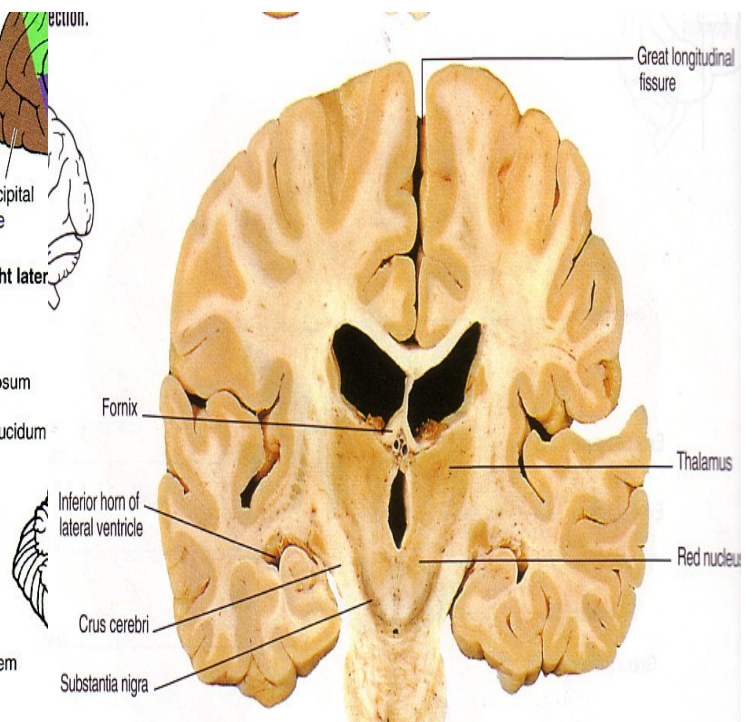
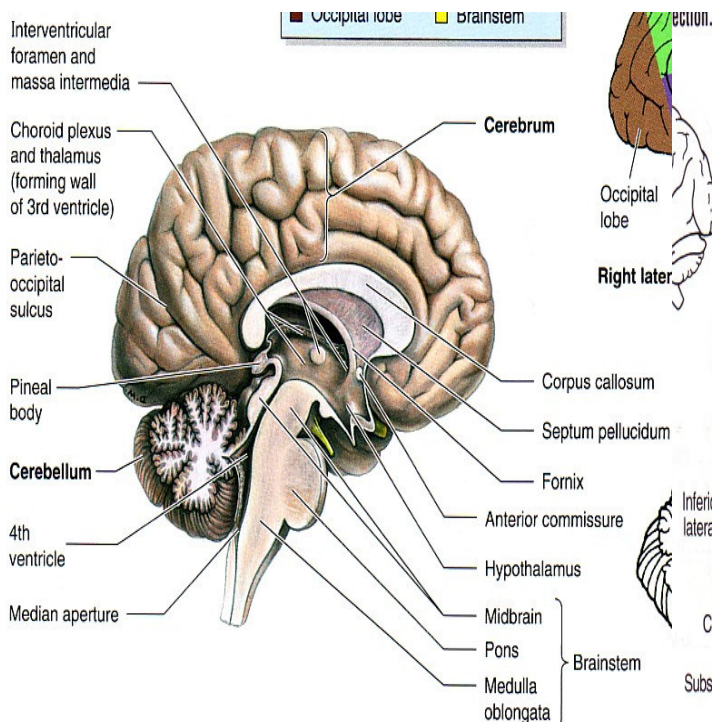


RELATIONS :

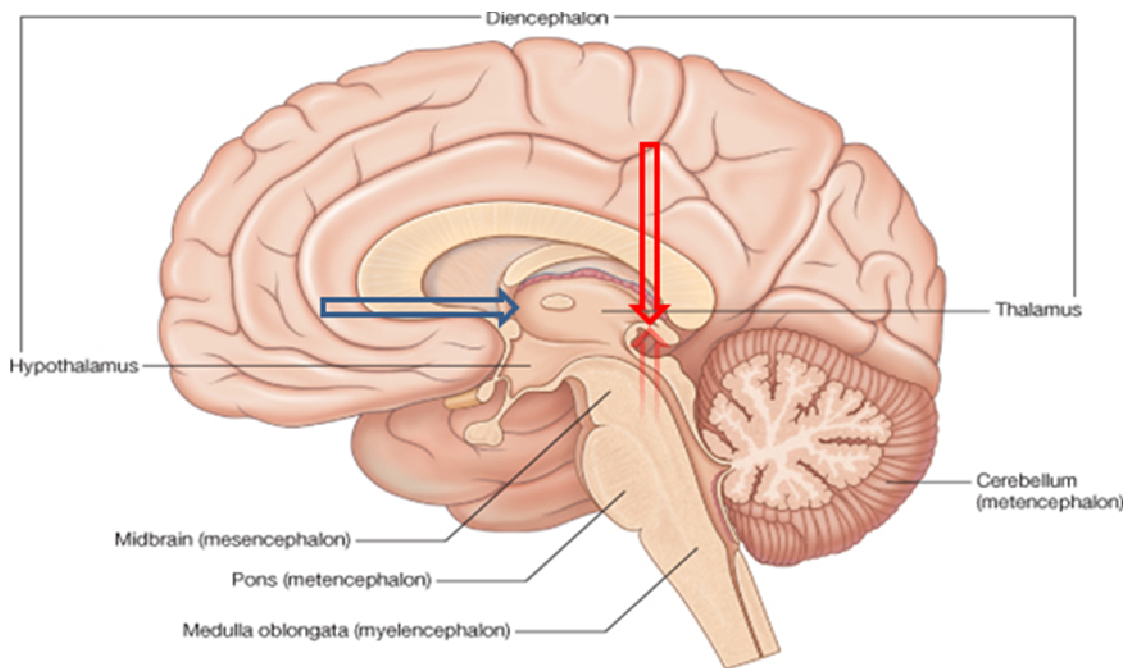
- It has 4 surfaces & 2 ends.
- **Surfaces :**
 - **Lateral :** Post. limb of internal capsule.
 - **Medial :** together with the hypothalamus they form the lateral wall of 3rd ventricle.
 - It is covered by ependyma and connected to the thalamus of the opposite side by interthalamic connexus, (adhesion) or massa intermedia.
 - **Superior :** It is grooved by fornix.
 - It is related from medial to lateral, to: stria medullaris thalami, tela choroidae, ependymal floor of central part of lateral ventricle, & thalamostriate vein.
 - **Inferior :** Hypothalamus, anteriorly & Subthalamus posteriorly.



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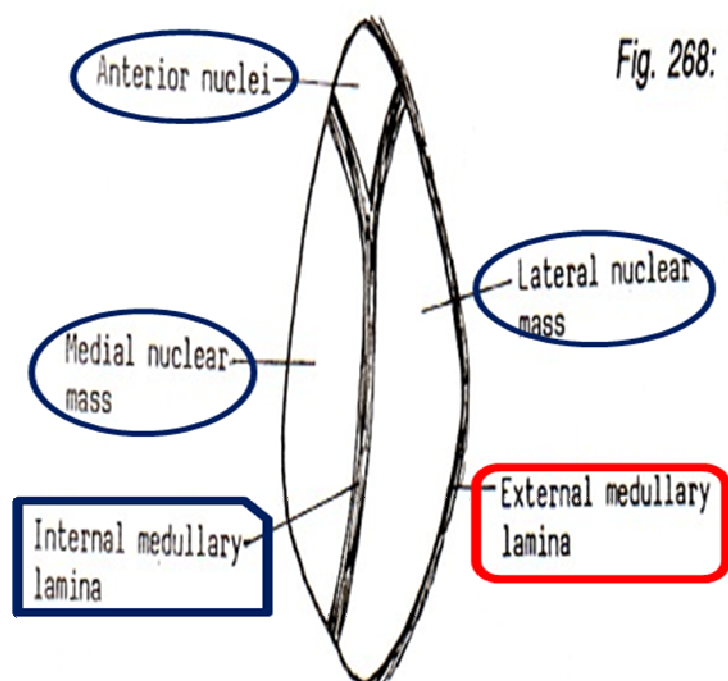
- Anterior end : Forms a projection, which may called the anterior tubercle.
 - It forms the posterior boundary of the interventricular foramen.
- Posterior end : Forms a projection called the Pulvinar which lies just above the superior colliculus and the lateral & medial **Geniculate bodies**.



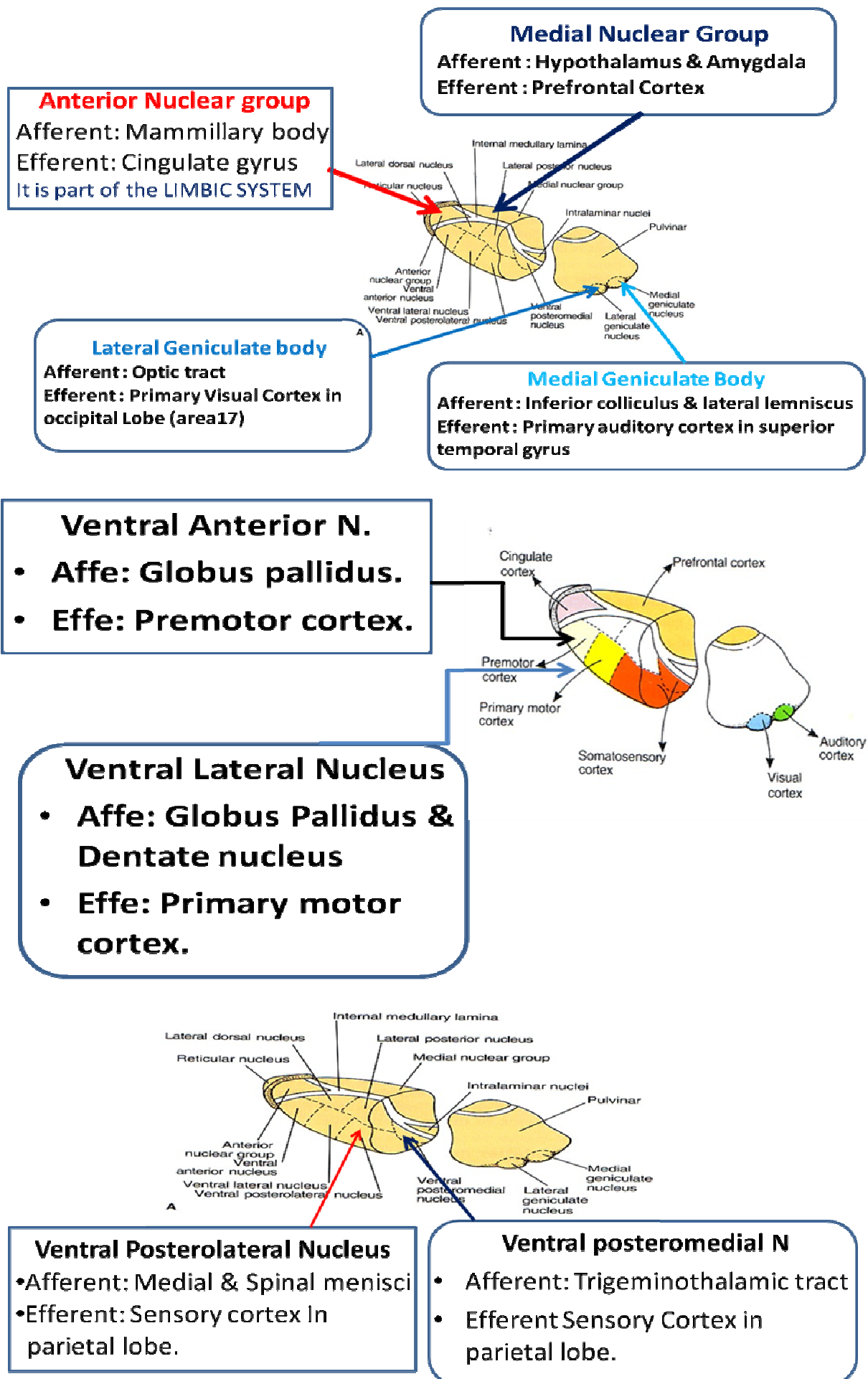
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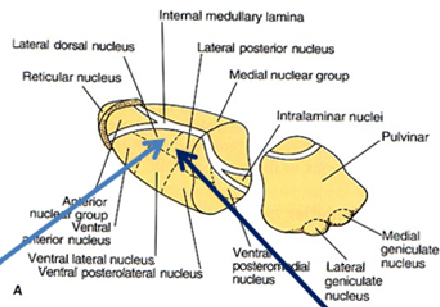
INTERNAL STRUCTURE – WHITE MATTER :

- **External or lateral medullary lamina** :
 - Covers the lateral surface.
 - It consists of thalamocortical & corticothalamic fibers.
- **Internal medullary lamina** :
 - Bundle of Y-shaped myelinated (afferent & efferent) nerve fibers.
 - It divides the thalamus into: **Anterior, Medial, and Lateral groups**.
 - Each of these masses is subdivided into a number of individually named nuclei.



MAIN CONNECTION OF THE THALAMUS :





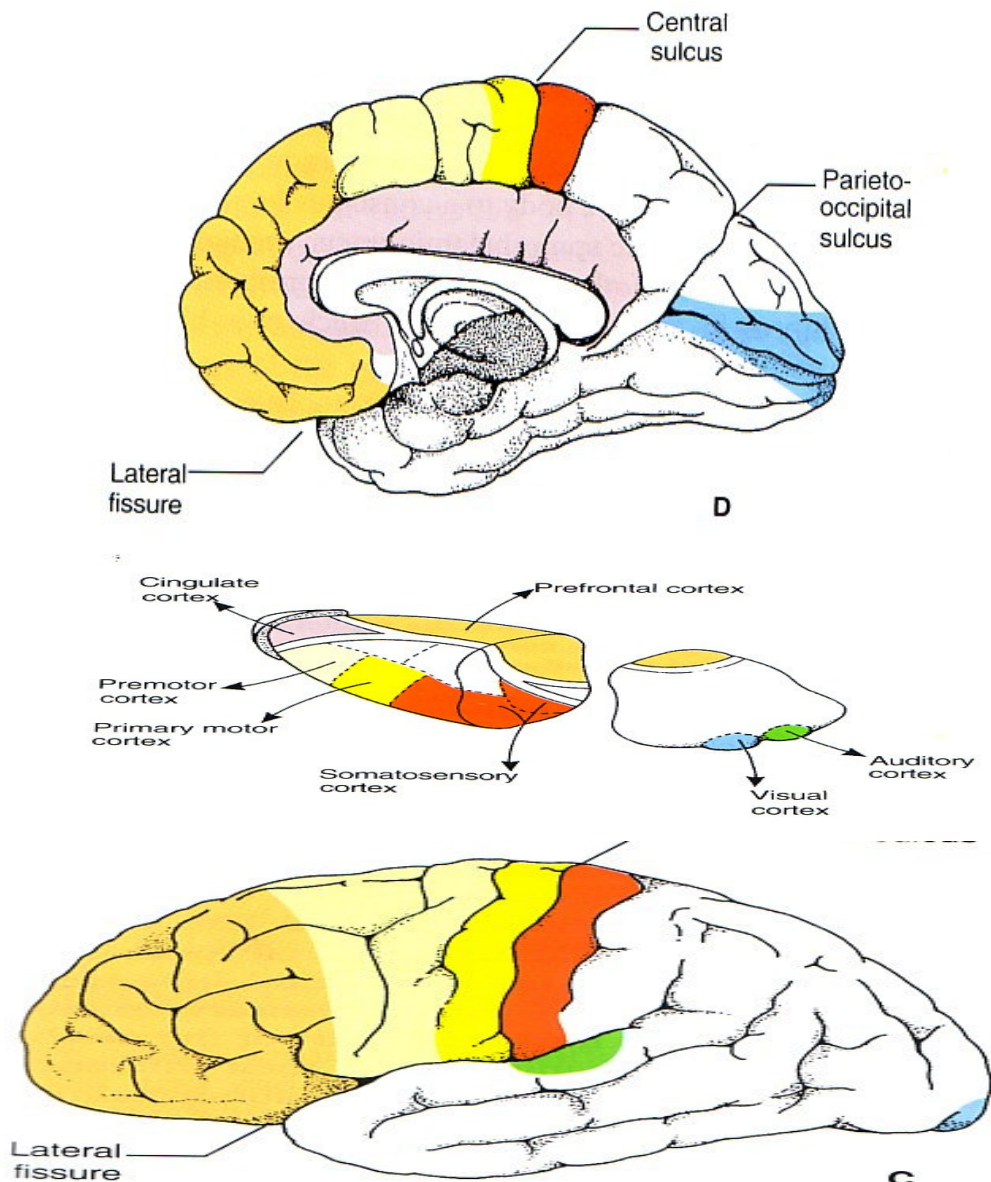
Lateral Dorsal nucleus

- Afferent : Hippocampus
- Efferent : Cingulate Gyrus
- It is a part of limbic system

Lateral posterior Nucleus

- Afferent :
- Efferent : Sensory association cortex of the parietal lobe.

EFFERENTS OF THE THALAMIC NUCLEI :



FUNCTION OF THE THALAMUS :

1. All sensation (except olfaction) relay directly in the thalamus.
2. In the thalamus, all sensation are integrated, correlated and spread and diffused to cortical centers, then the motor activities descend from the motor cortex.
3. It is interposed as a great associative center, which connects between the cerebral cortex, cerebellum, hypothalamus, substantia nigra and basal ganglia.
4. Thalamus may be considered as a higher center for **painful stimuli**, and extremes of temperature stimuli.
5. Its connections with the frontal cortex are important in **mood and emotions**.
6. Its anterior nucleus is considered as a part of **limbic system**.
7. Its reticular nuclei has role in activation and **arousal reaction**.

EPITHALAMUS :

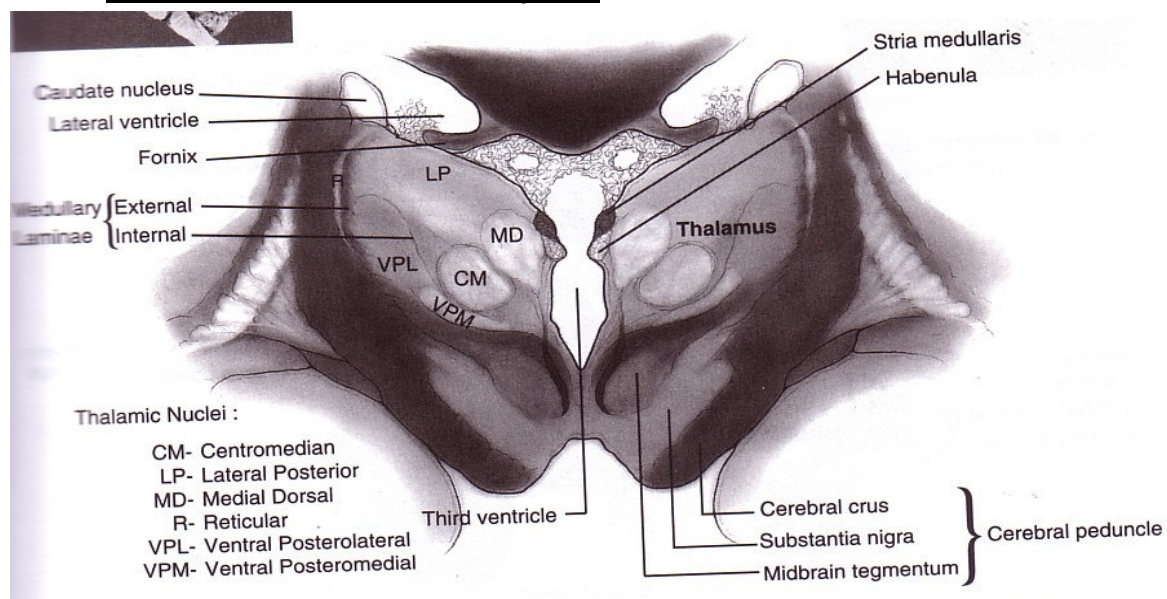
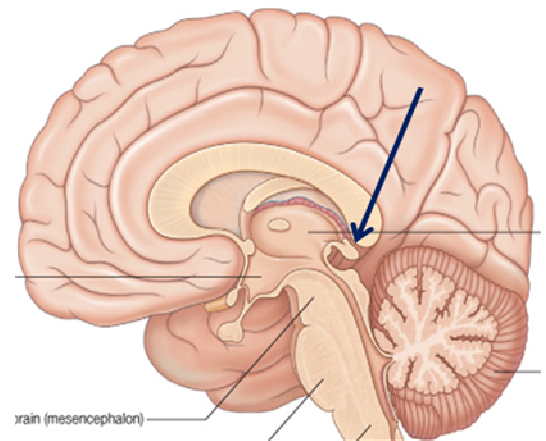
- Small part of the diencephalon.
- Lies caudal & dorsal to the thalamus.
- Lies rostral to the superior colliculus of the midbrain.
- It is formed of :

1. Pineal gland :

- Endocrine, forms melatonin.
- Control the circadian rhythm.
- Control the onset of puberty.

2. Habenular trigone & nuclei :

- Have connection with the limbic system.



THE END

LoveTomy Team 426

Team leader : Dr. hams

Dr. S Dr. noop Omar H

!! ابتسم همي بروحي

M.A.M Abo Slo7 Cute Killer



SELF QUIZ

1- Regarding the diencephalon, all are true EXCEPT :

- a. It is continuous below with the midbrain.
- b. It lies in the central part of the cerebral hemispheres.
- c. The medial and lateral geniculate bodies are regarded parts of the subthalamus.
- d. It can be divided into four or five parts.
- e. It is the central part of the forebrain.

2- Regarding the thalamus, all are true EXCEPT :

- a. It is formed of many nuclei extensively connected to the cerebral cortex via reciprocal connections.
- b. It is the largest part of the diencephalon formed by 2 oval masses of white matter.
- c. It forms the lateral wall of the 3rd ventricle with the hypothalamus.
- d. The mammillary bodies can be seen in the base of the brain.
- e. Lies on each side of the 3rd ventricle.

3- Regarding the relations of the thalamus, all are true EXCEPT :

- a. It forms the lateral wall of the 3rd ventricle with the hypothalamus.
- b. It is separated from the hypothalamus by the hypothalamic sulcus.
- c. The anterior limb of the internal capsule lies lateral to it.
- d. It is connected to the opposite thalamus by the massa intermedia.
- e. It is covered by external medullary lamina laterally, and ependyma medially.

4- Regarding the relations of the thalamus, all are true EXCEPT :

- a. Inferiorly; it is related to the hypothalamus anteriorly and metathalamus posteriorly.
- b. Its posterior end forms a projection called the pulvinar lying above the superior colliculus and the medial and lateral geniculate bodies.
- c. It forms the posterior boundary of the interventricular foramen.
- d. It is grooved superiorly by the fornix.
- e. Its anterior end forms a projection called the anterior tubercle.

[N.B. you have to revise the relations carefully from the slides, since these MCQ's are just for revision and doesn't cover up the whole lecture]

5- Regarding the internal structure of the thalamus, all are true EXCEPT :

- a. The internal medullary lamina is a bundle of Y-shaped myelinated fibers.
- b. The external medullary lamina covers the lateral surface of the thalamus.
- c. The external and internal medullary laminae are white matter in nature.
- d. The external medullary lamina consist of thalamocortical and corticothalamic fibers.
- e. The external medullary lamina divides the thalamus into lateral, medial and anterior groups of nuclei.

6- The ventral tire of the lateral geniculate group contain all the following EXCEPT :

- a. Ventral posterior nucleus.
- b. Medial geniculate body.
- c. Lateral posterior nucleus.
- d. Ventral lateral nucleus.
- e. Ventral anterior nucleus.

7- Regarding the ventral posterior nucleus, all are true EXCEPT :

- a. It is further divided into ventral posteriomedial and posteriolateral groups of nuclei.
- b. It lies between the ventral lateral nucleus and the pulvinar.
- c. The ventral posteriolateral group receives sensations from the trunk and limbs via medial lemniscus and spinothalamic tracts.
- d. All conscious sensations from the ipsilateral side of the body terminate in the VPN.
- e. The ventral posteriomedial group receives sensations from the head via trigeminothalamic tract and taste and vestibular sensations from the solitary and vestibular nuclei respectively.

8- Regarding the geniculate bodies, all are true EXCEPT :

- a. The lateral geniculate body receives ipsilateral temporal and contralateral nasal fibers through the optic tract.
- b. The medial geniculate body is a part of the olfactory system.
- c. The lateral geniculate body lies ventral to the pulvinar.
- d. The medial geniculate body receives fibers from the inferior colliculus via the inferior brachium.
- e. The medial and lateral geniculate bodies send fibers to the primary auditory and visual cortices through the retrolenticular part of the internal capsule.

9- Regarding the ventral anterior and lateral groups of nuclei, all are true EXCEPT :

- a. The ventral lateral nucleus is further divided into Pars oralis, medialis and caudalis.
- b. The ventral lateral nucleus lies caudal to the ventral anterior nucleus.
- c. The ventral anterior nucleus lies in the caudal part of the lateral nuclear mass.
- d. The ventral lateral nucleus has a reciprocal connection with the primary motor area.
- e. The ventral anterior nucleus is subdivided into a large principal part and a small magnocellular part.

10- Regarding the anterior and medial nuclear groups, all are true EXCEPT :

- a. The medial nuclear group is a part of the limbic system.
- b. The dorsomedial nucleus has an extensive reciprocal connection with the prefrontal cortex.
- c. The medial nuclear group receives afferents from the hypothalamus, amygdala and other thalamic nuclei.
- d. The anterior nuclear group is subdivided into anteromedial, anteroventral and anterodorsal.
- e. The dorsomedial nucleus controls mood and emotions.

11- Regarding the intralaminar and reticular thalamic nuclei, all are true EXCEPT :

- a. The reticular thalamic nuclei lie close to the lateral surface of the thalamus.
- b. The intralaminar nuclei send efferents to the cerebral cortex.
- c. The centromedian and the parafascicular nuclei are parts of the intralaminar nuclei.
- d. The intralaminar nuclei receive afferents from the reticular formation of the brain stem.
- e. The reticular thalamic nuclei lie between the internal medullary lamina & the posterior limb of internal capsule.

12- Regarding the functions of the thalamus, all are true EXCEPT :

- a. Its reticular nuclei have a role in the activation and arousal reactions.
- b. The thalamus is considered as a higher center for extremes of pain and temperature.
- c. Its connections with the frontal cortex are important in mood and emotions.
- d. All sensations relay directly in the thalamus.
- e. Its anterior nuclei are considered as parts of the limbic system.

13- Thalamic syndrome is manifested by all the following EXCEPT :

- a. Loss of sensation of the opposite side of the face and head.
- b. Loss of superficial and deep sensations on the same side of the body.
- c. Ataxia and intentional tremors.
- d. Thalamic hand on the opposite side.
- e. Hemiparesis on the opposite side.

14- Regarding the epithalamus, all are true EXCEPT :

- a. Lies caudal and ventral to the thalamus.
- b. The habenular trigone and nuclei have connections with the limbic system.
- c. It is a small part of the diencephalon.
- d. The pineal gland controls the circadian rhythm and the onset of puberty.
- e. It lies rostral to the superior colliculus of the midbrain.

8. b	9. c	10. a	11. e	12. d	13. b	14. a
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