



# Sciencecephalon

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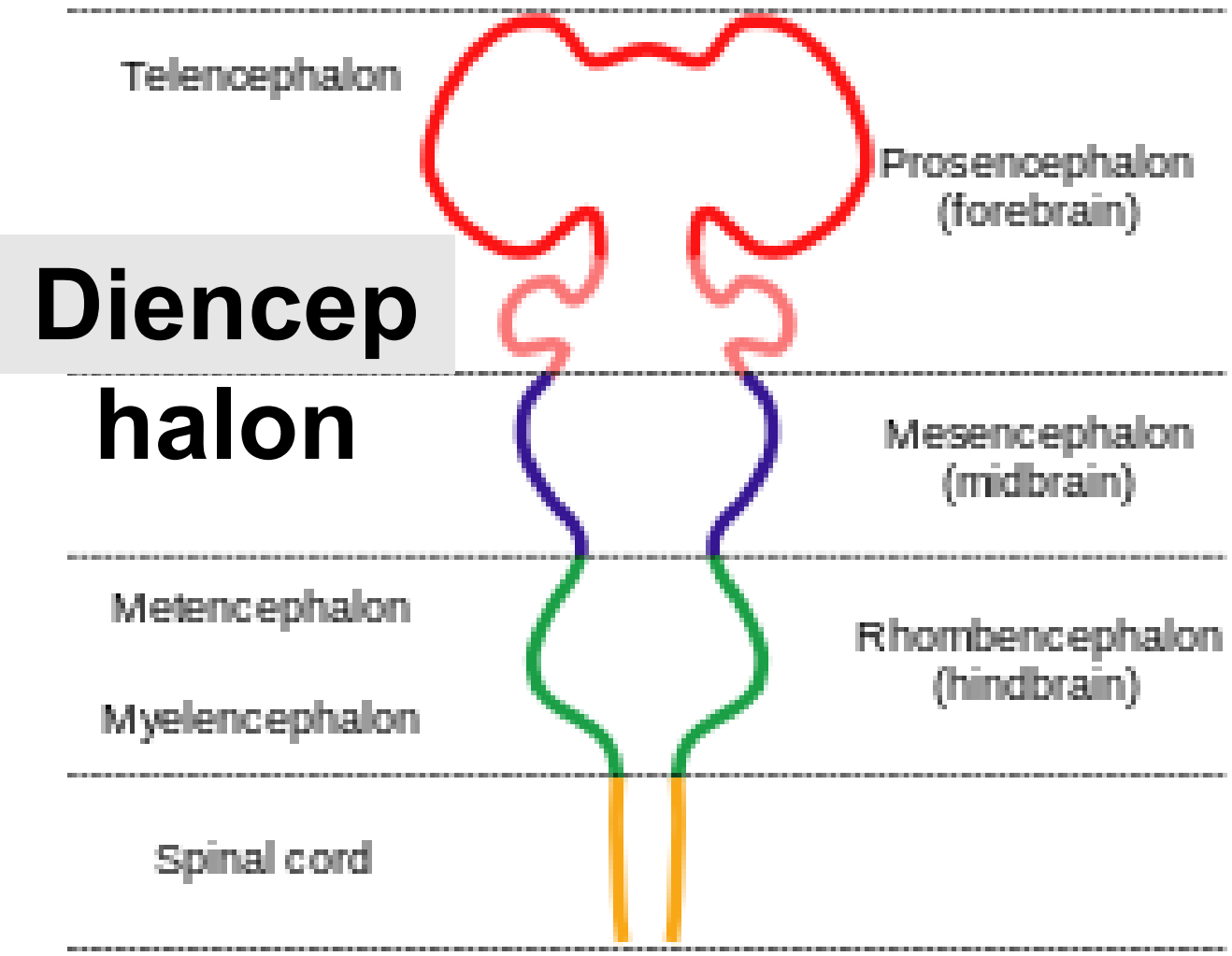
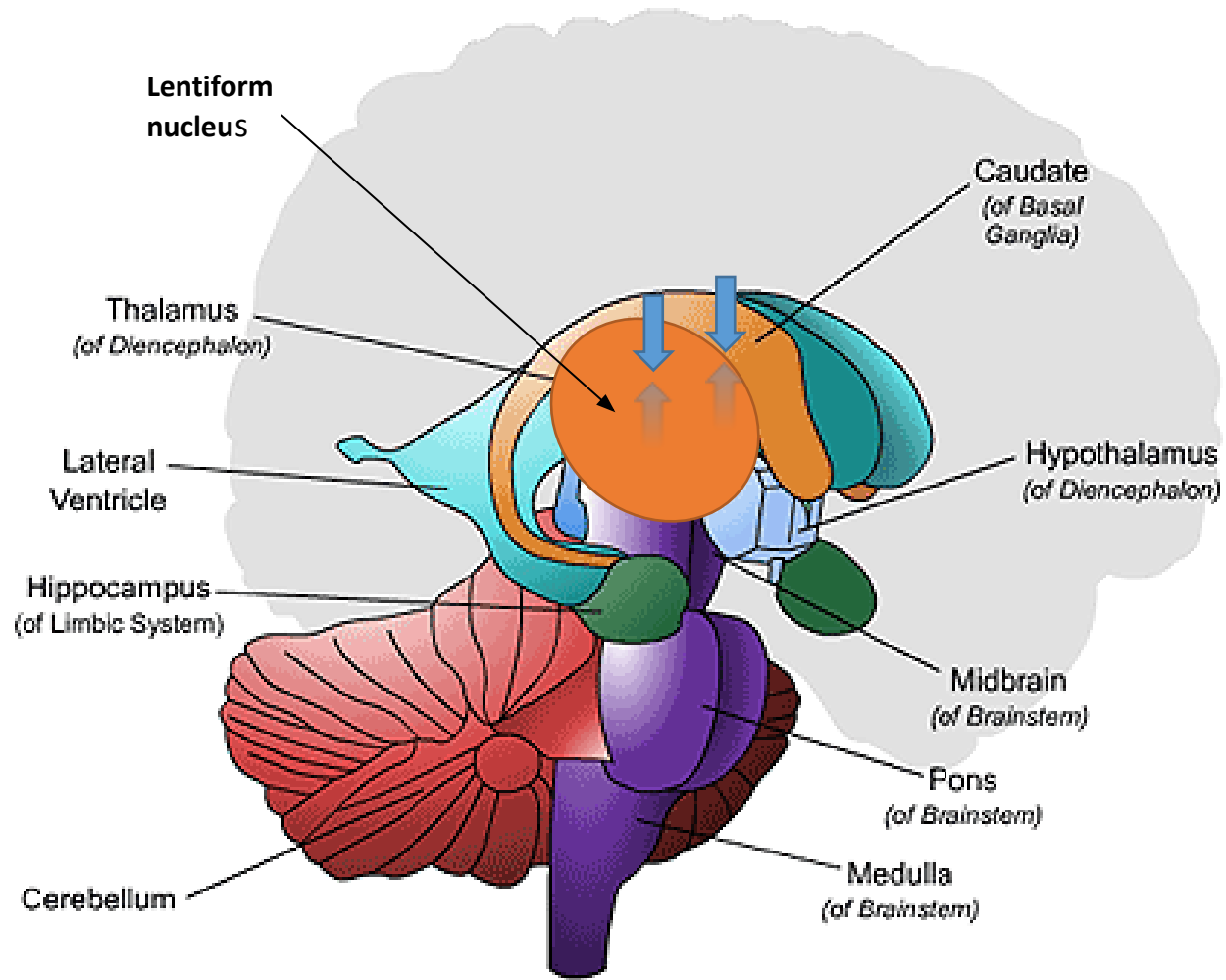
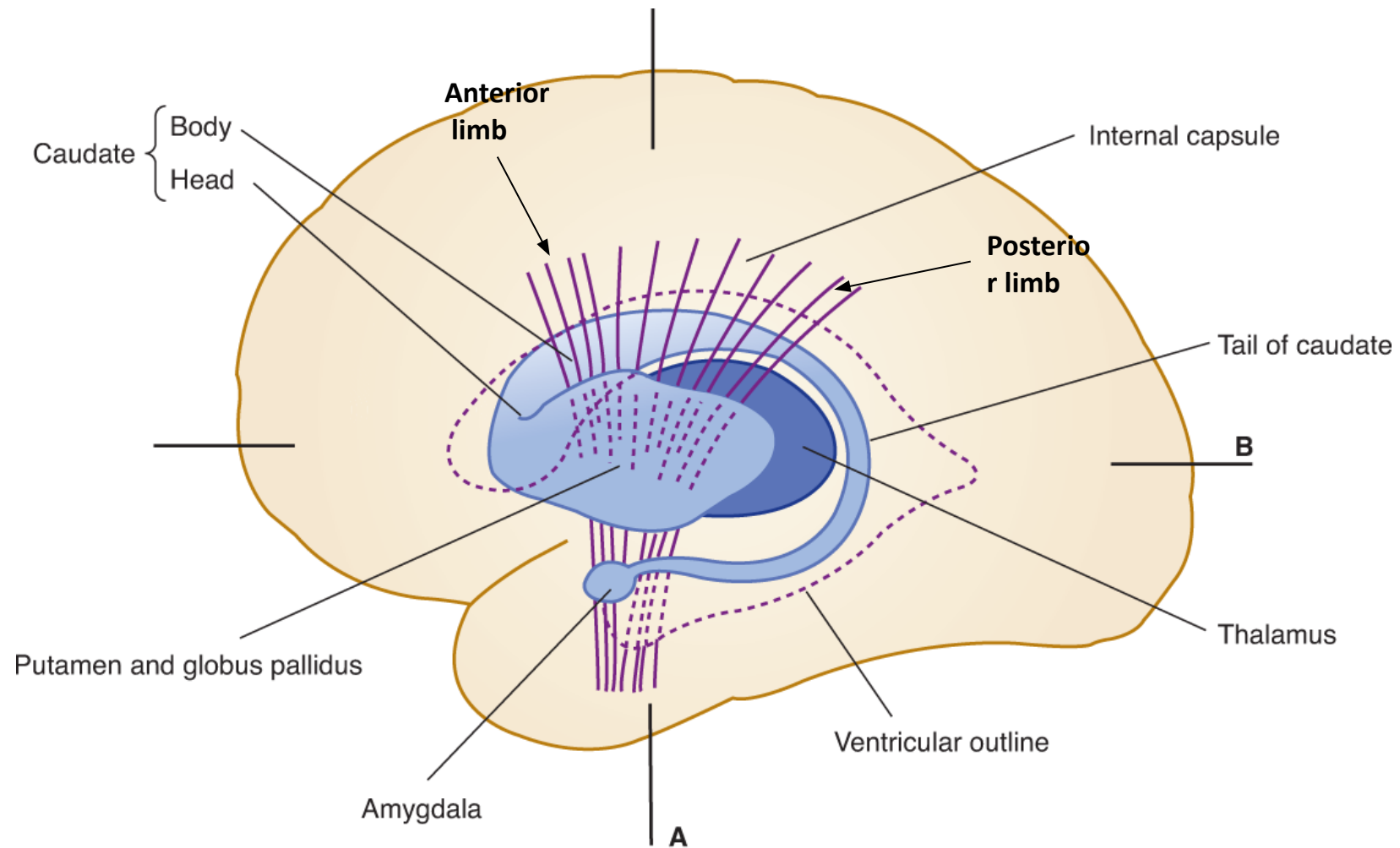


Figure AB-33: Build A Brain, Step 8







# Diencephalon

includes:

1- Thalamus

2-

Hypothalamus

3-

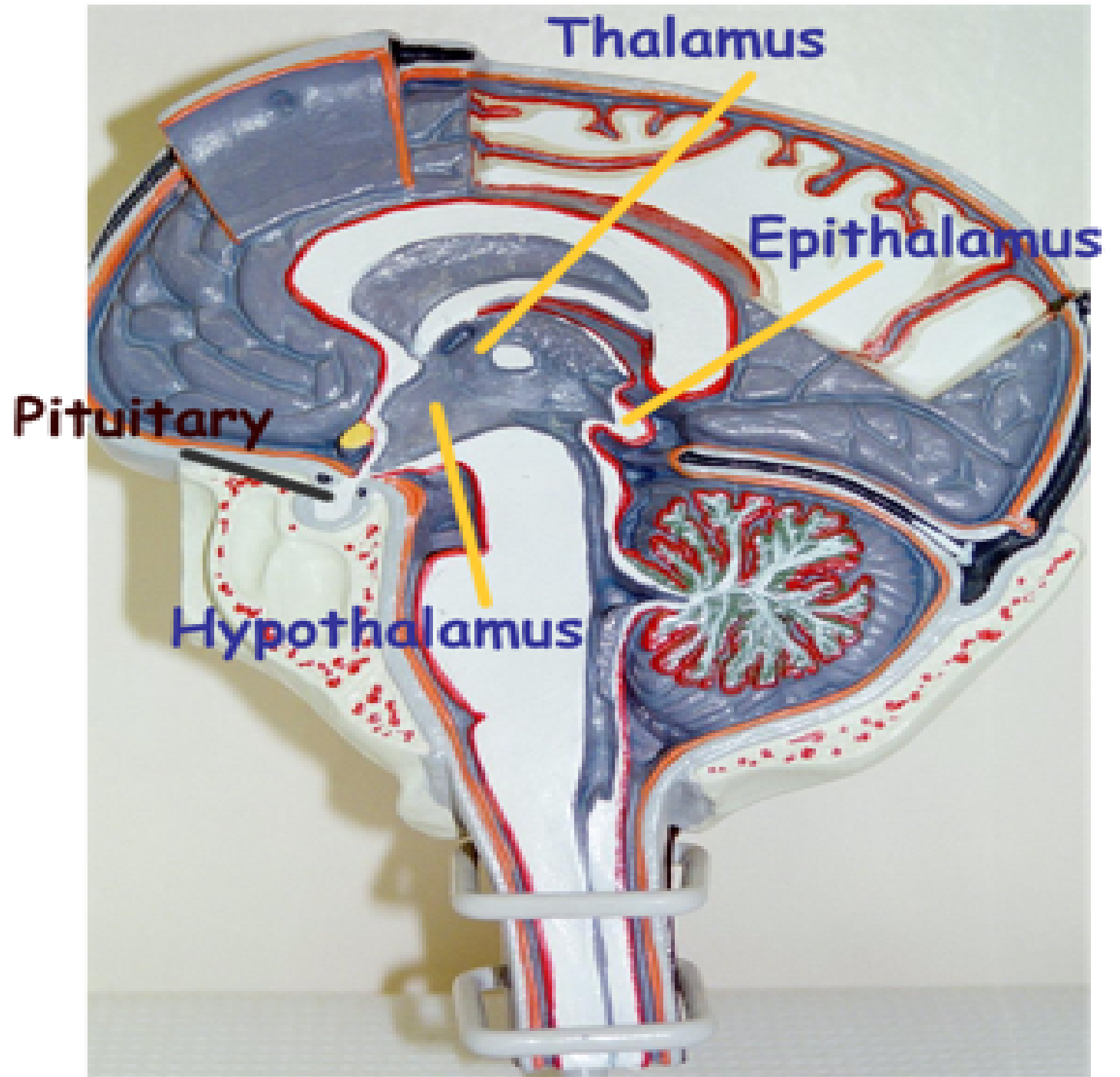
Epithalamus

4-

Subthalamus

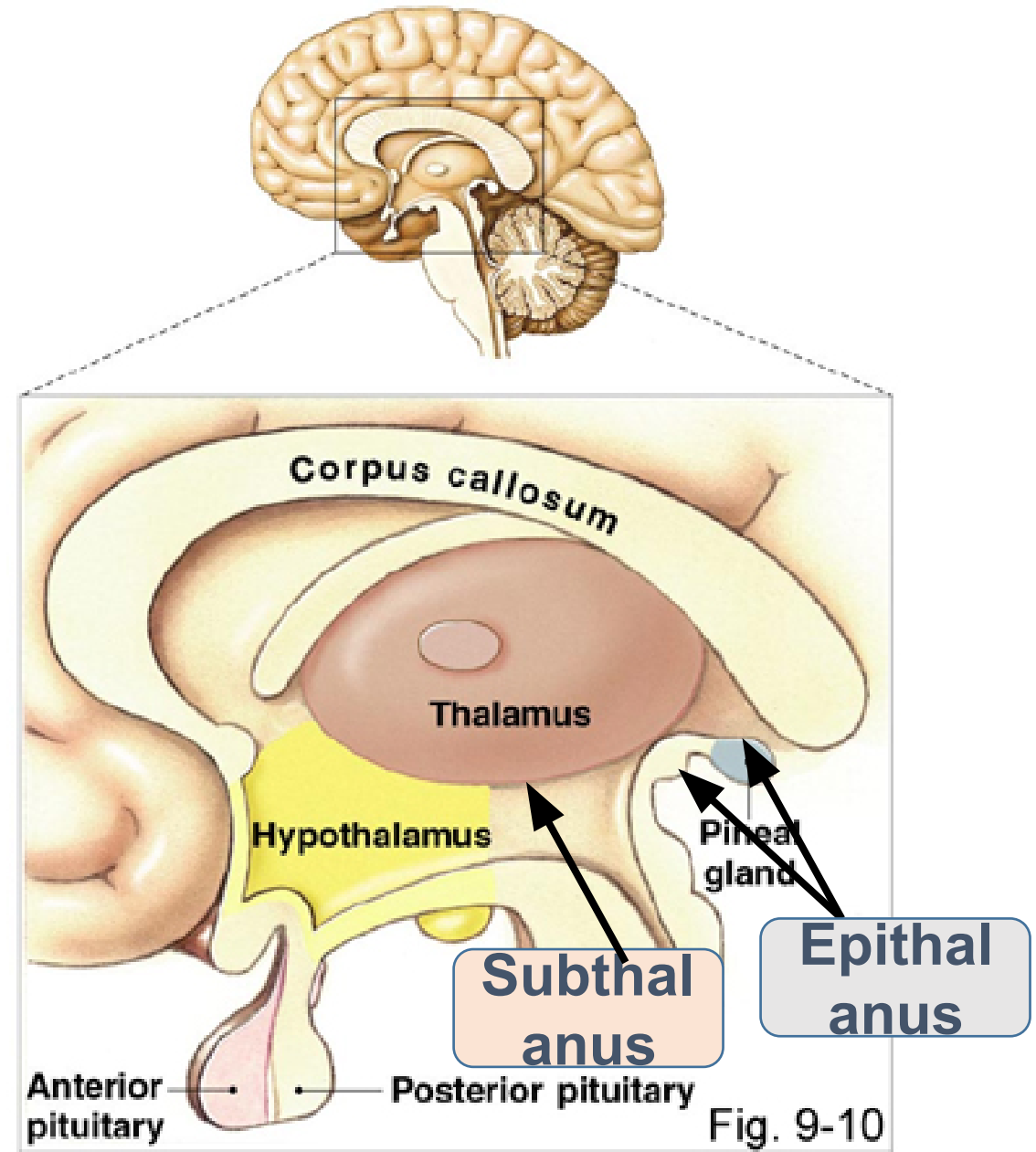
5-

Metathalamus



**Diencephalon**  
**includes:**

- 1- Thalamus
- 2- Hypothalamus
- 3- Epithalamus
- 4- Subthalamus
- 5- Metathalamus



# Diencephalon

includes:

1- Thalamus

2-

Hypothalamus

3-

Epithalamus

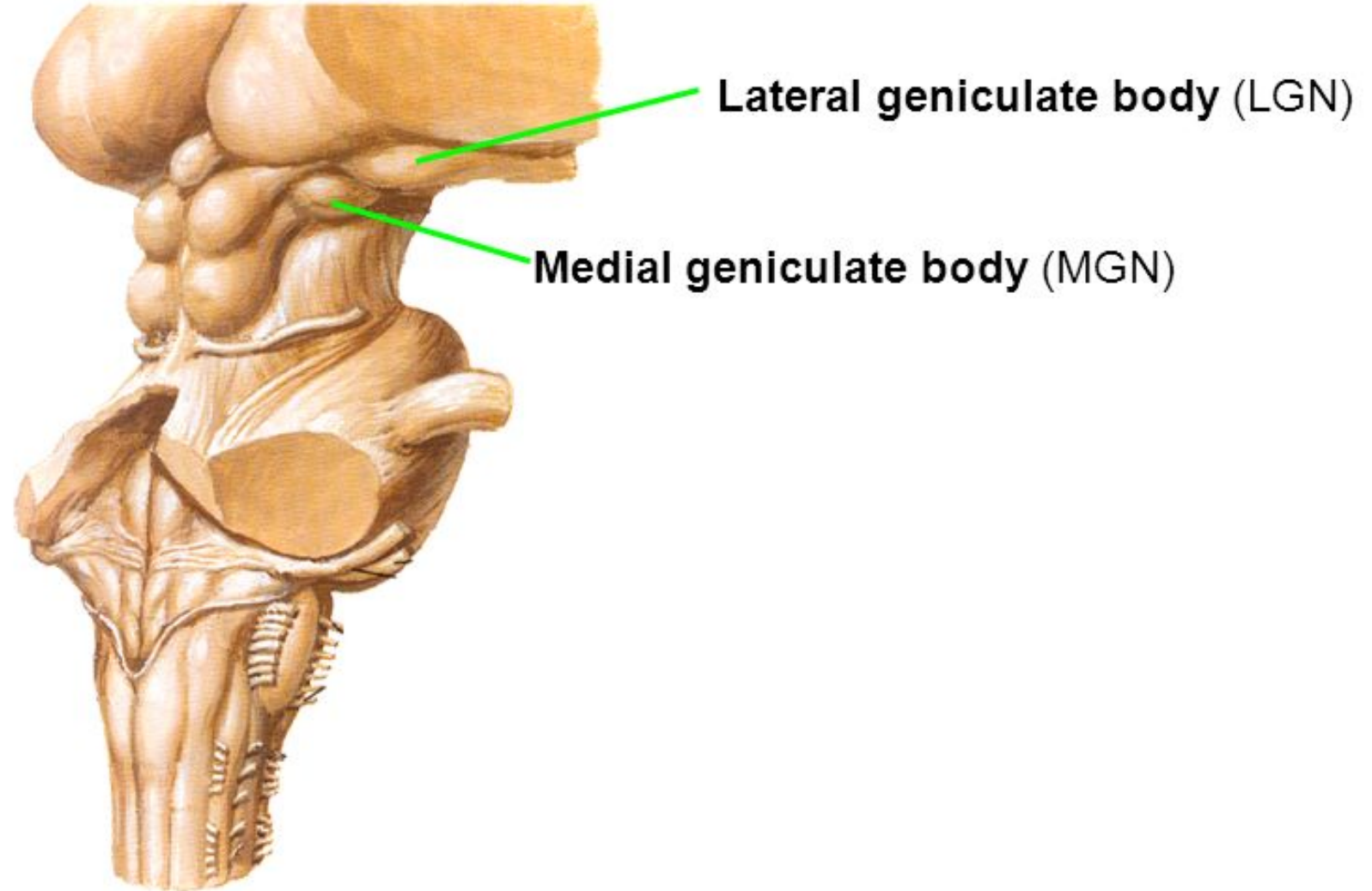
4-

Subthalamus

5-

Metathalamus

# Metathalamus

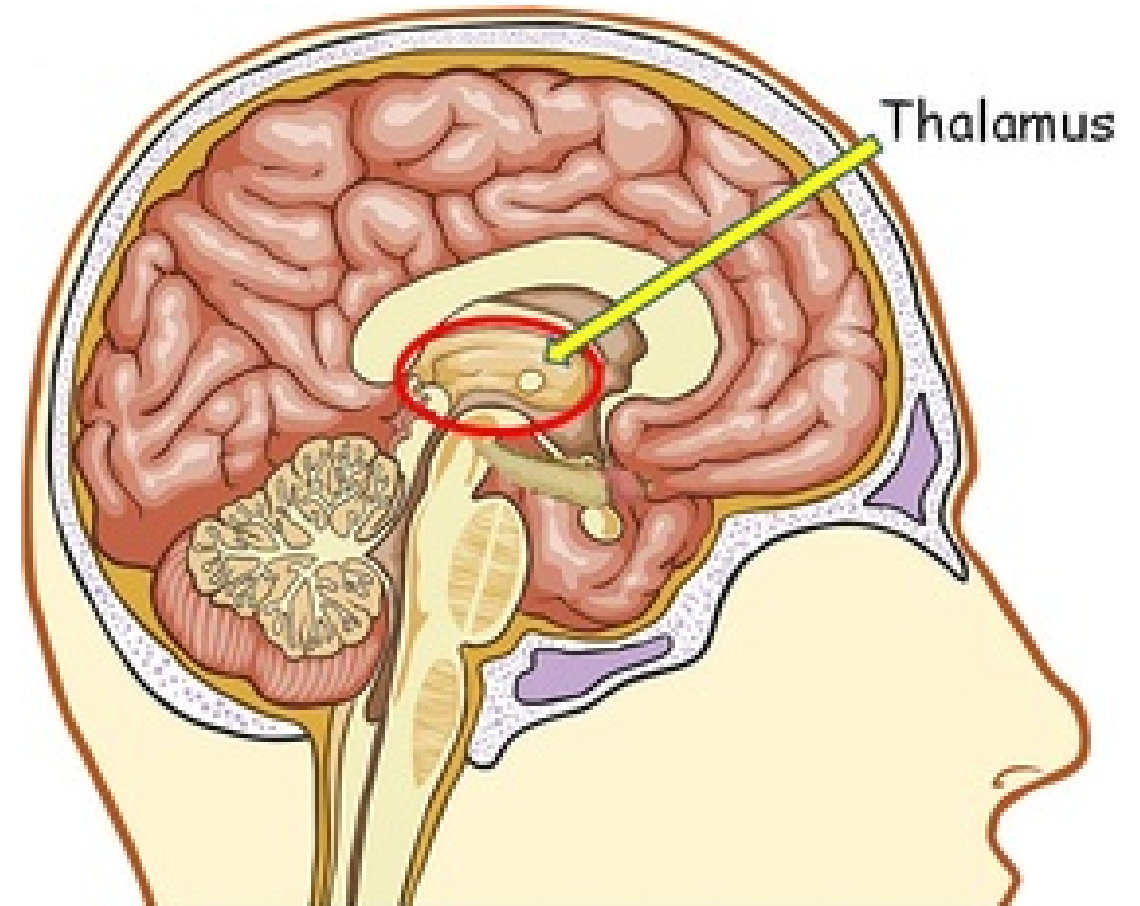


# Thalamus

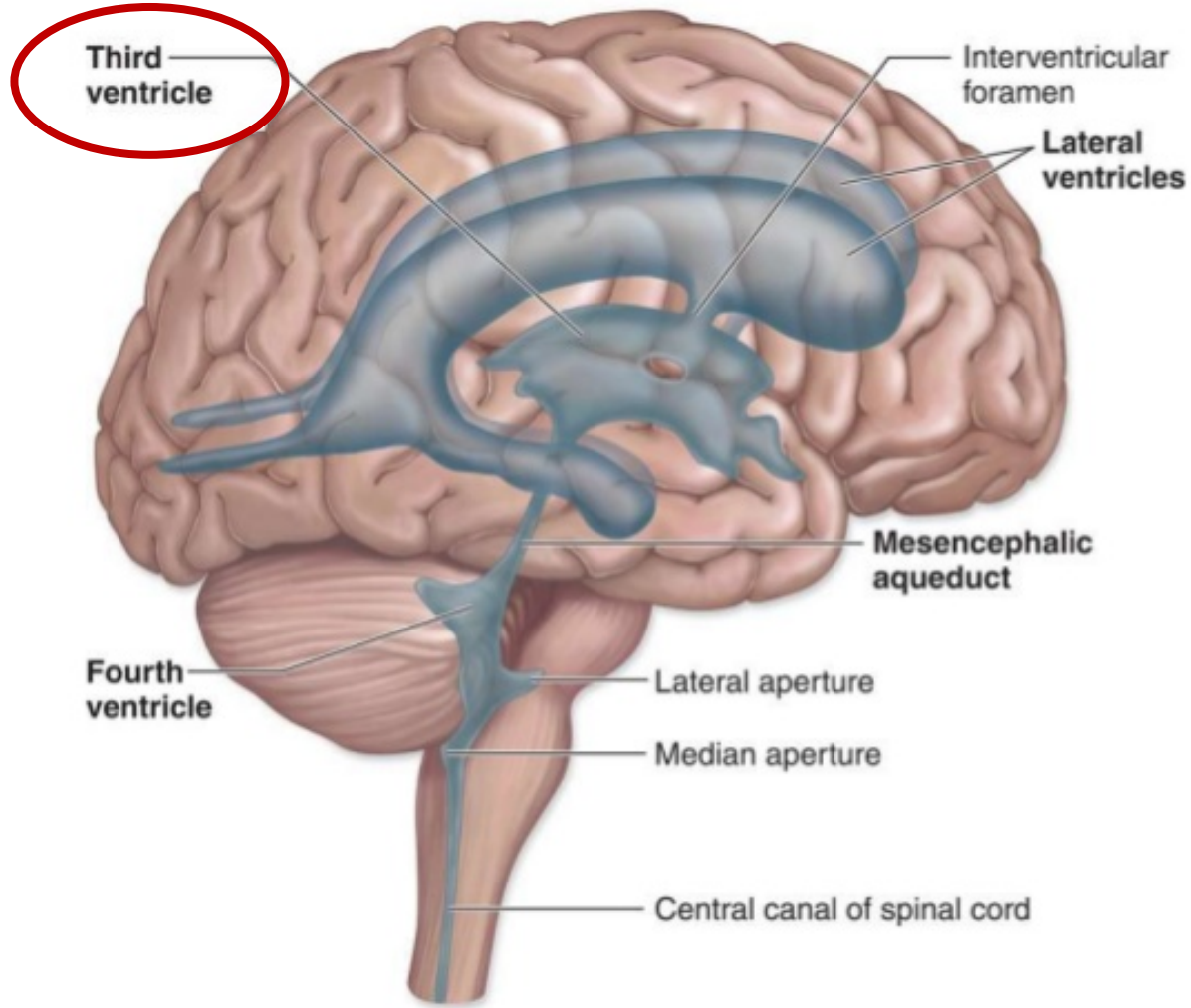
S

-It is an **oval** mass of **grey** matter which acts as a **gateway** for the cerebral cortex.

-It relays all **sensations** except smell.



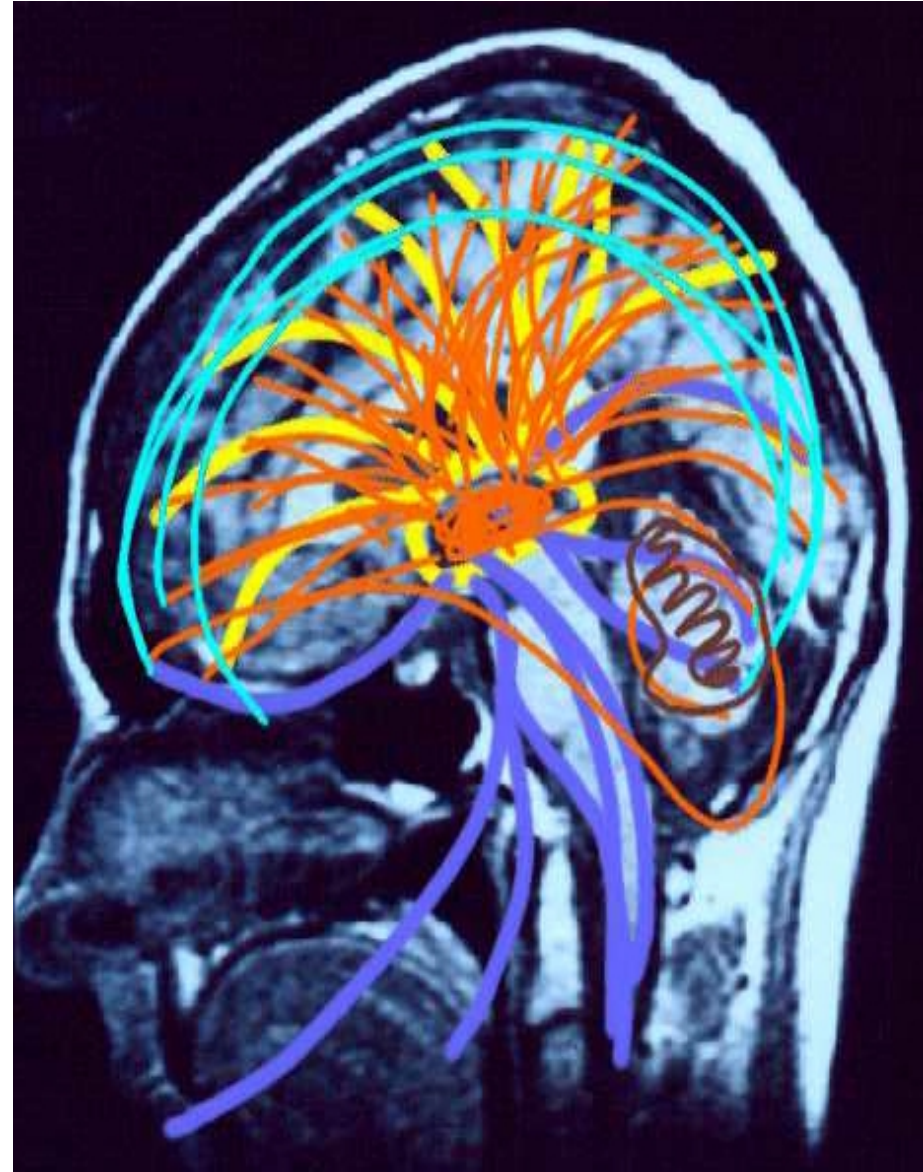
Posterior Anterior



(a) Lateral view



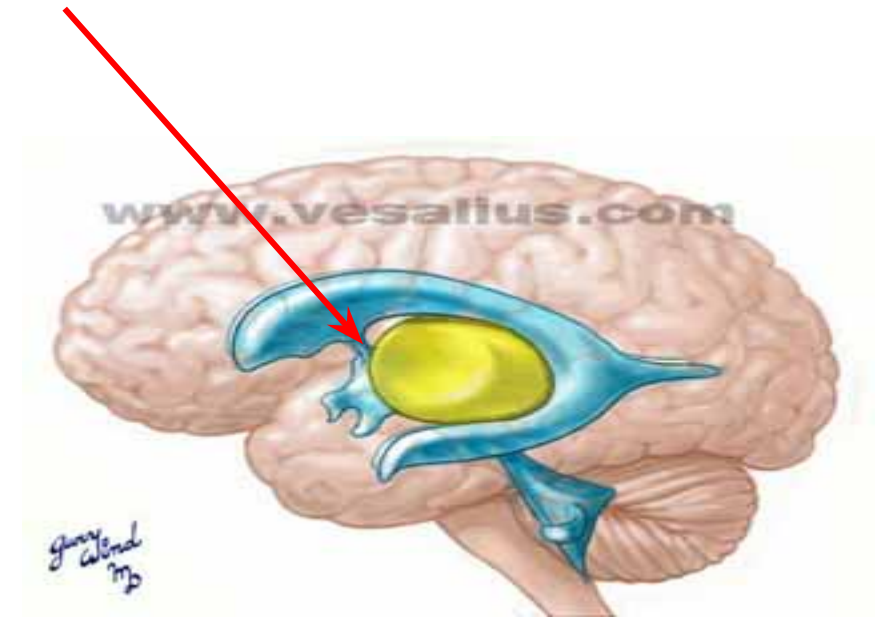
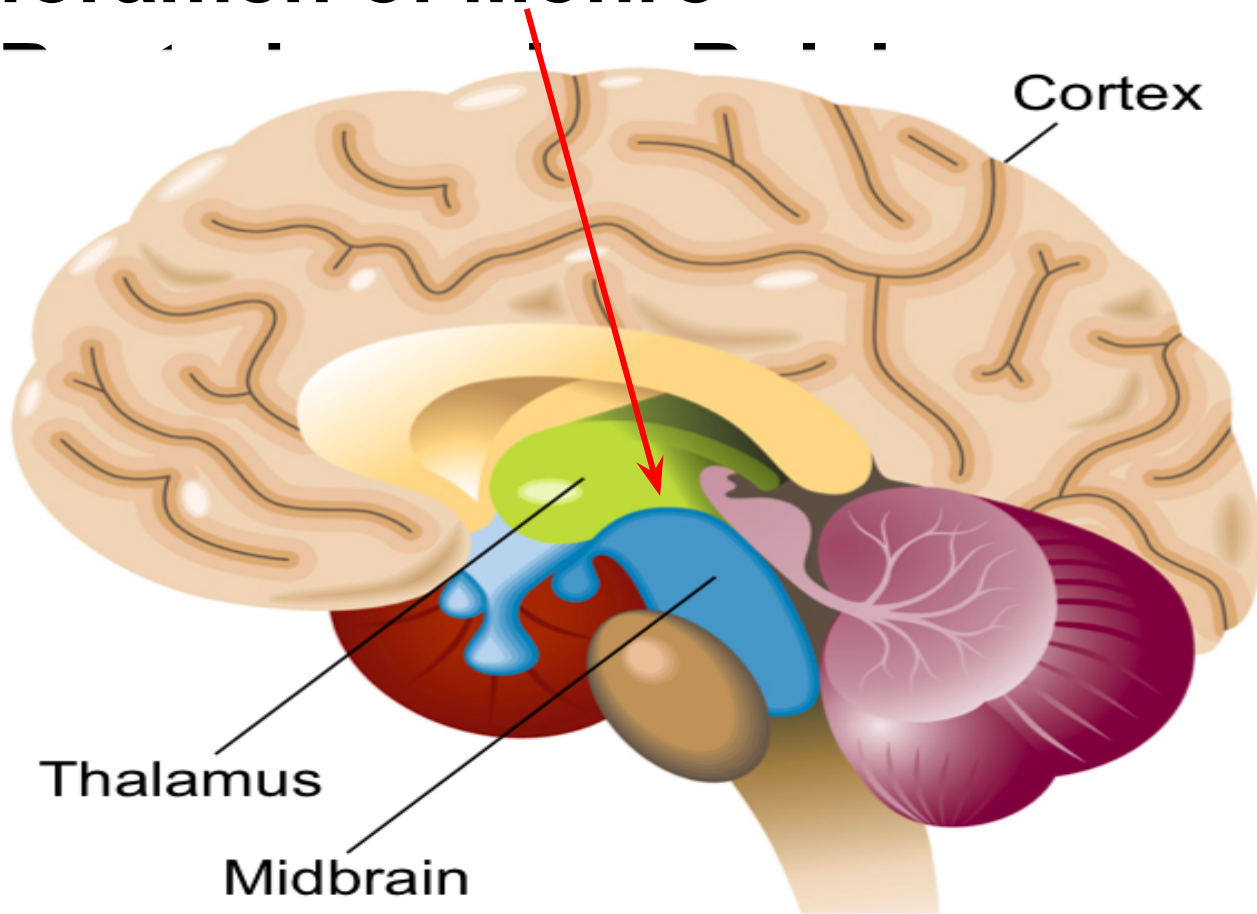
**Relay  
station  
for all  
sensations  
except  
smell**



En

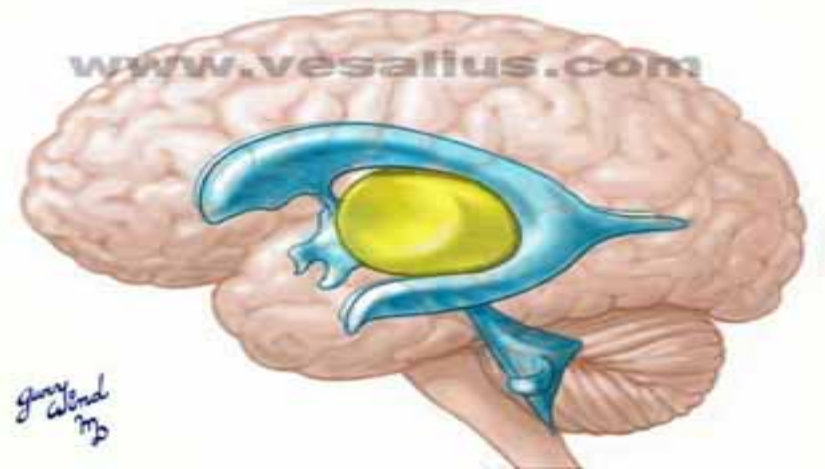
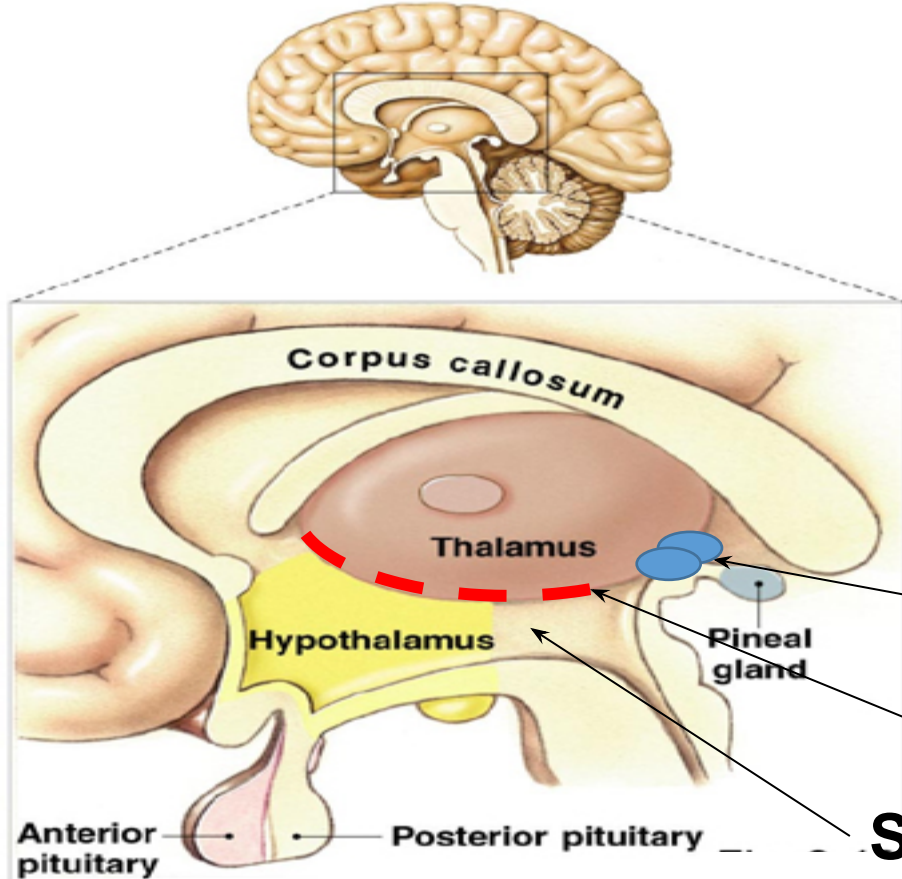
ds:

Anterior end-----Interventricular foramen of Monro



# Surfa

- Superior---floor of body of lateral ventricle.
- Inferior---hypothalamic sulcus separated thalamus from hypothalamus and subthalamus.  
posterior part---MGB, LGB



MGB, (Metathalamus)  
Hypothalamus  
Subthalamus



❖ **Medial surface :**  
**lateral wall of third**  
**ventricle (interthalamic**  
**adhesions)**

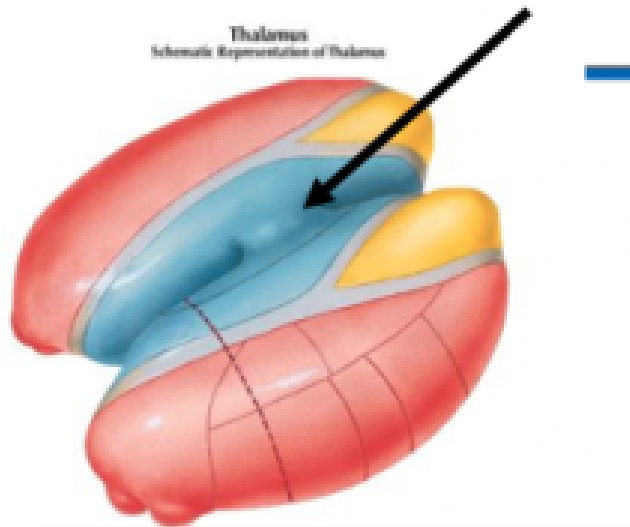
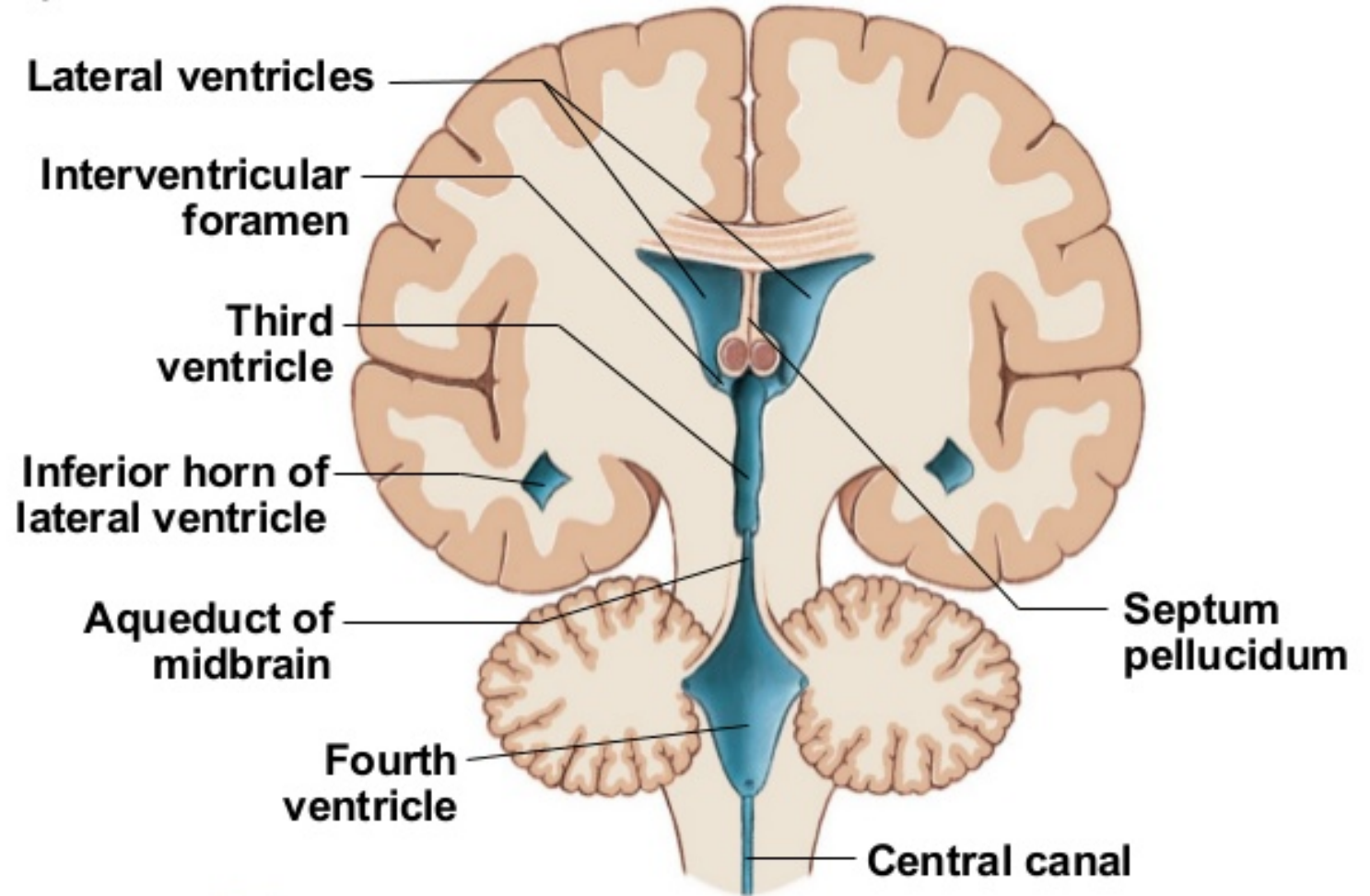
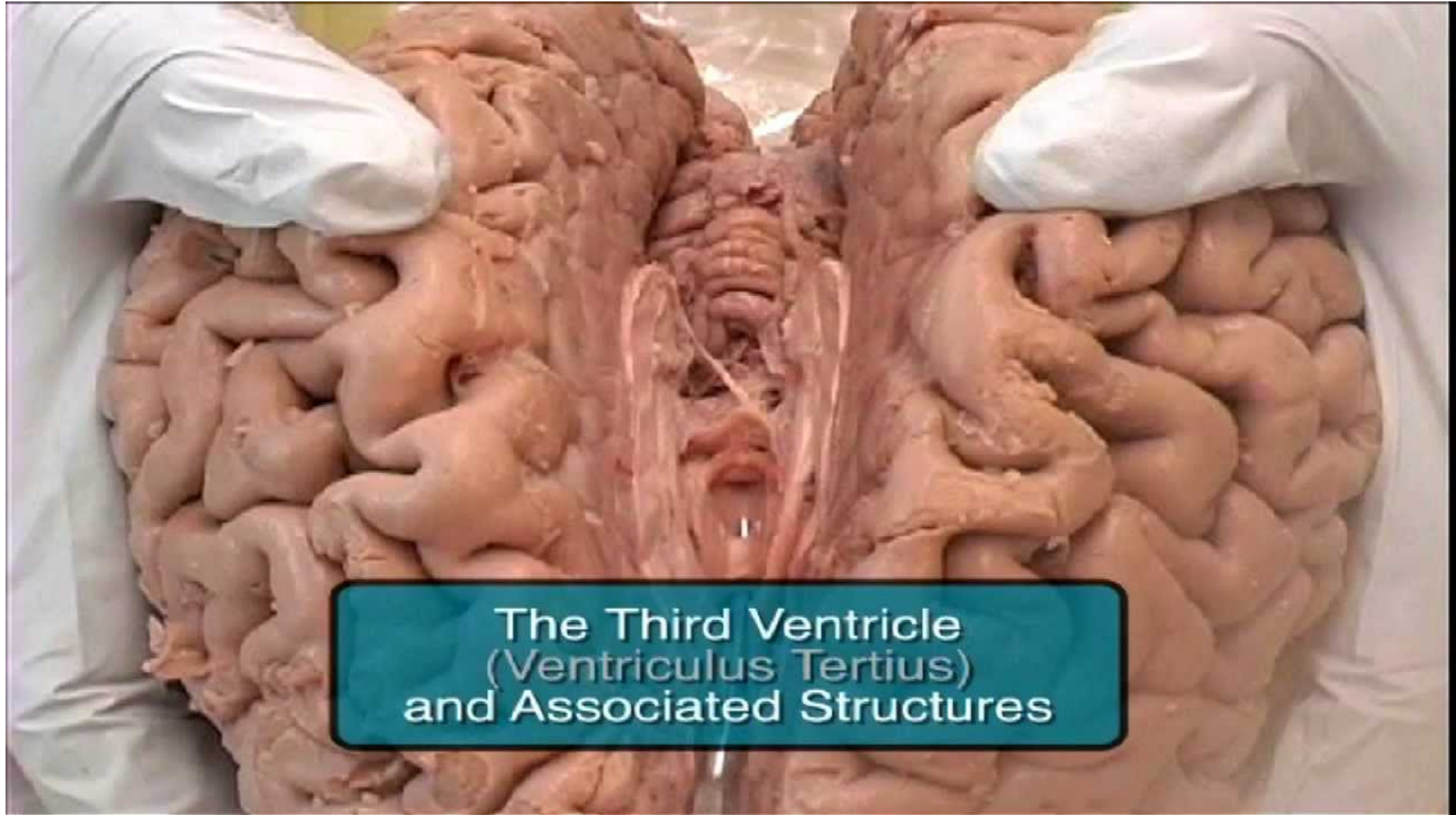


Figure 16.2d Ventricles of the Brain



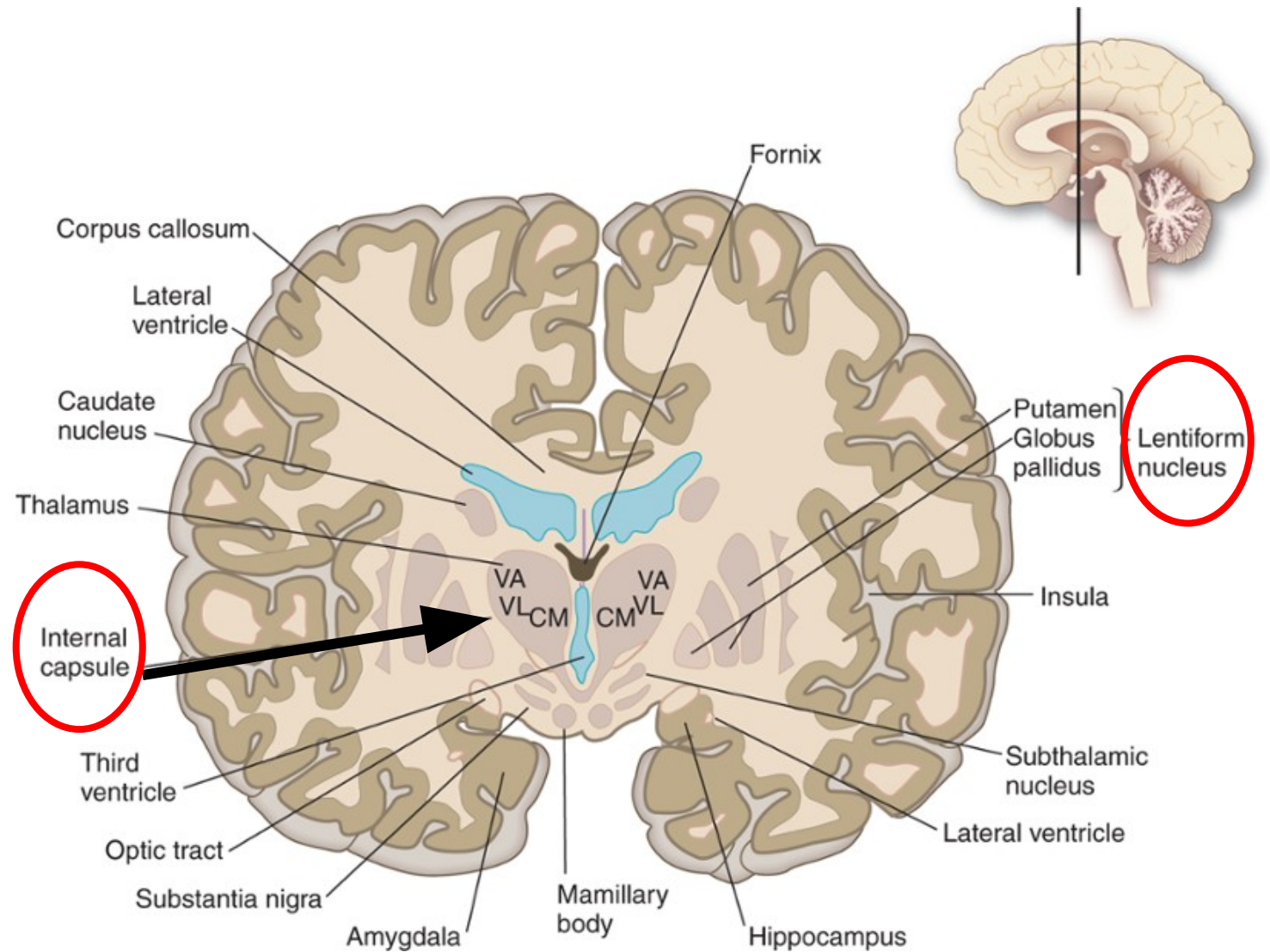
**d** Diagrammatic coronal section showing the interconnections between the ventricles



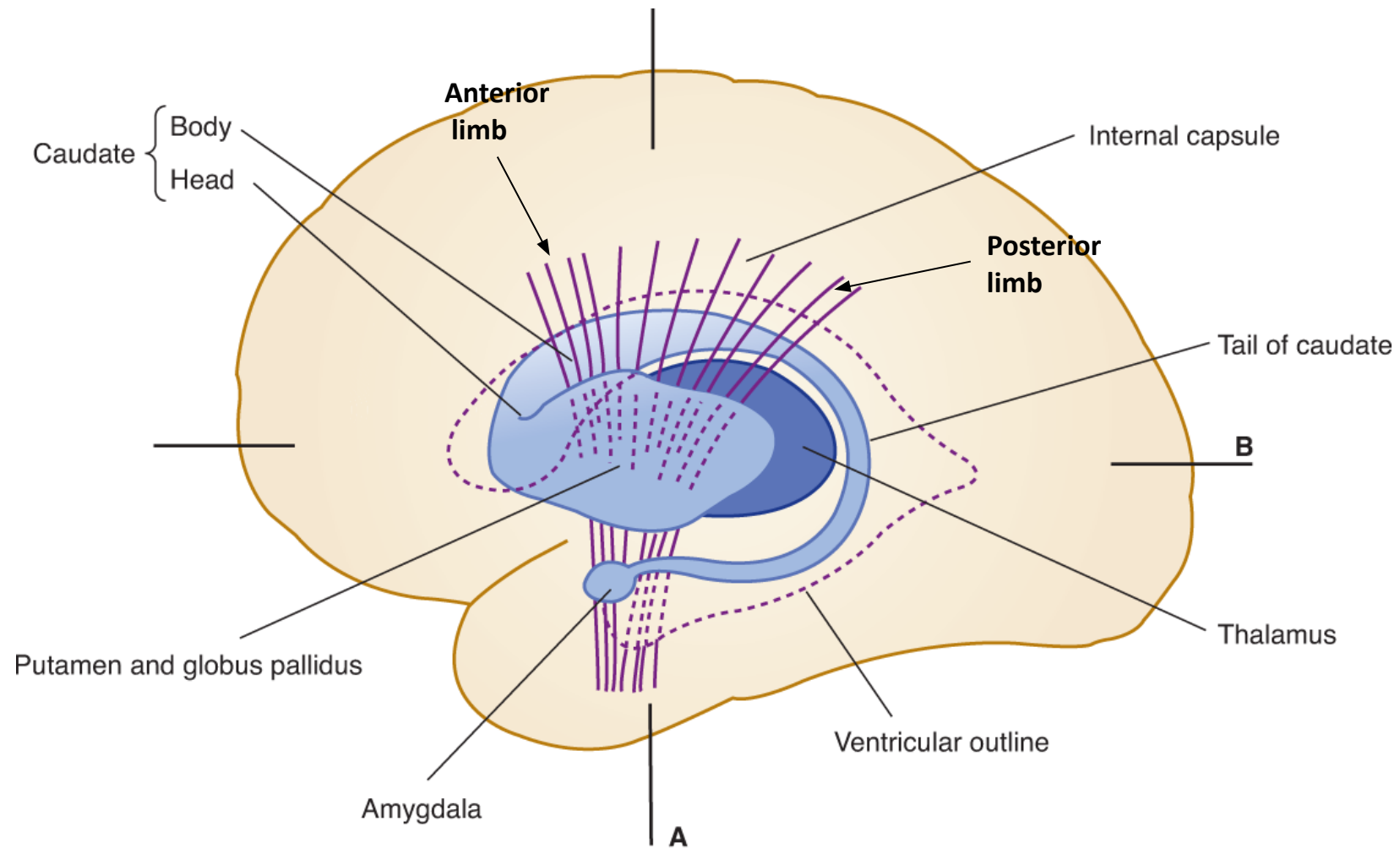
**The Third Ventricle  
(Ventriculus Tertius)  
and Associated Structures**

❖ **Lateral surface:**

**internal capsule separating it from lentiform**

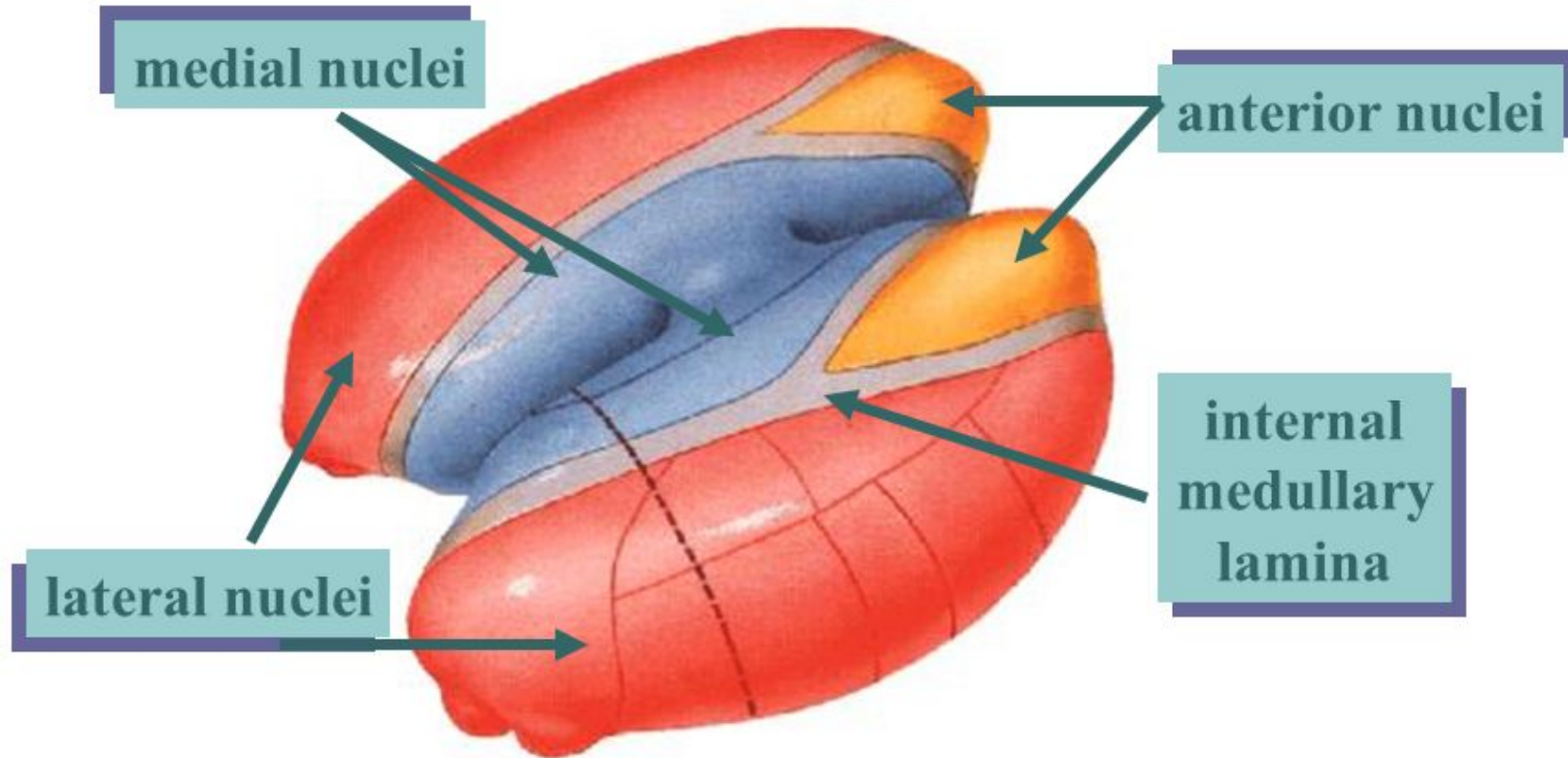


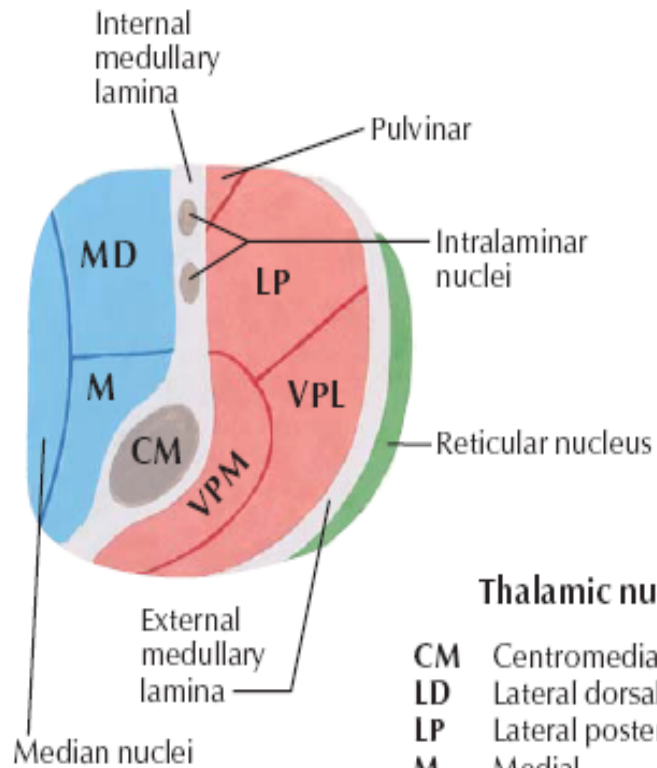




## Thalamic nuclei:

Thalamus is divided by Y-shaped sheet of white matter (internal



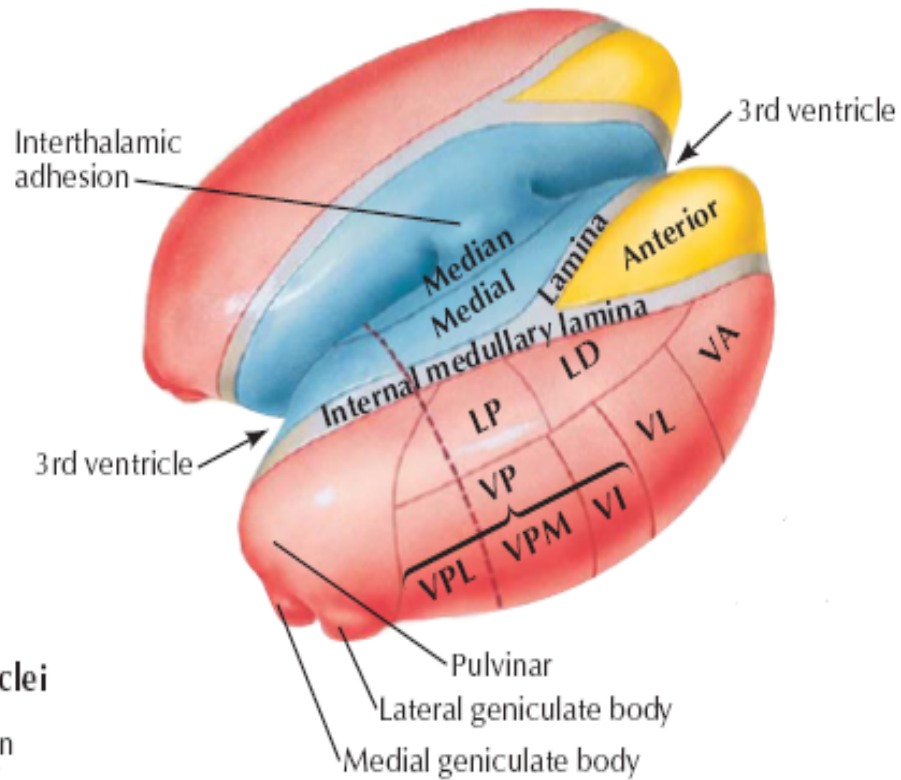


### Schematic section through thalamus

(at level of broken line shown in figure at right)

### Thalamic nuclei

- CM Centromedian
- LD Lateral dorsal
- LP Lateral posterior
- M Medial
- MD Medial dorsal
- VA Ventral anterior
- VI Ventral intermedial
- VL Ventral lateral
- VP Ventral posterior
- VPL Ventral posterolateral
- VPM Ventral posteromedial



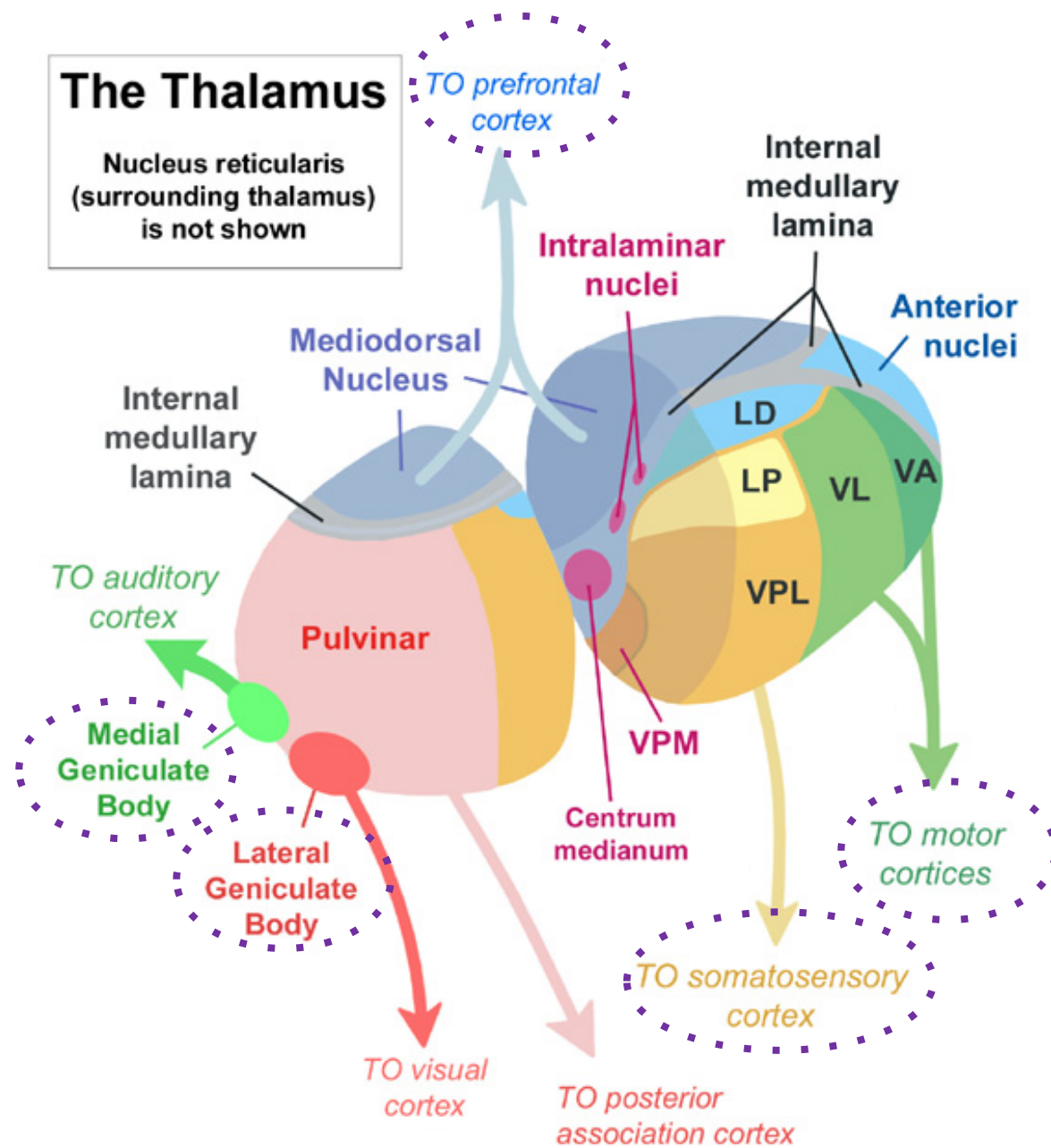
### Schematic representation of thalamus

(external medullary lamina and reticular nuclei removed)

- Lateral nuclei
- Medial nuclei
- Anterior nuclei

# The Thalamus

Nucleus reticularis (surrounding thalamus) is not shown

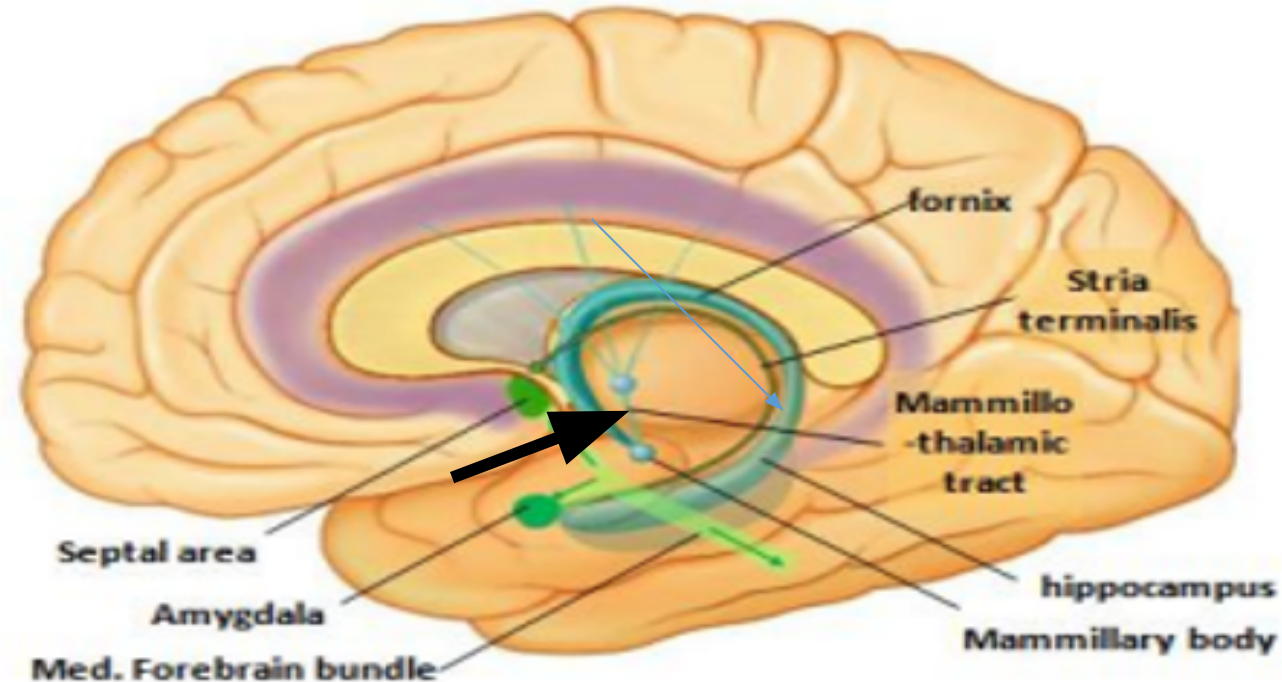
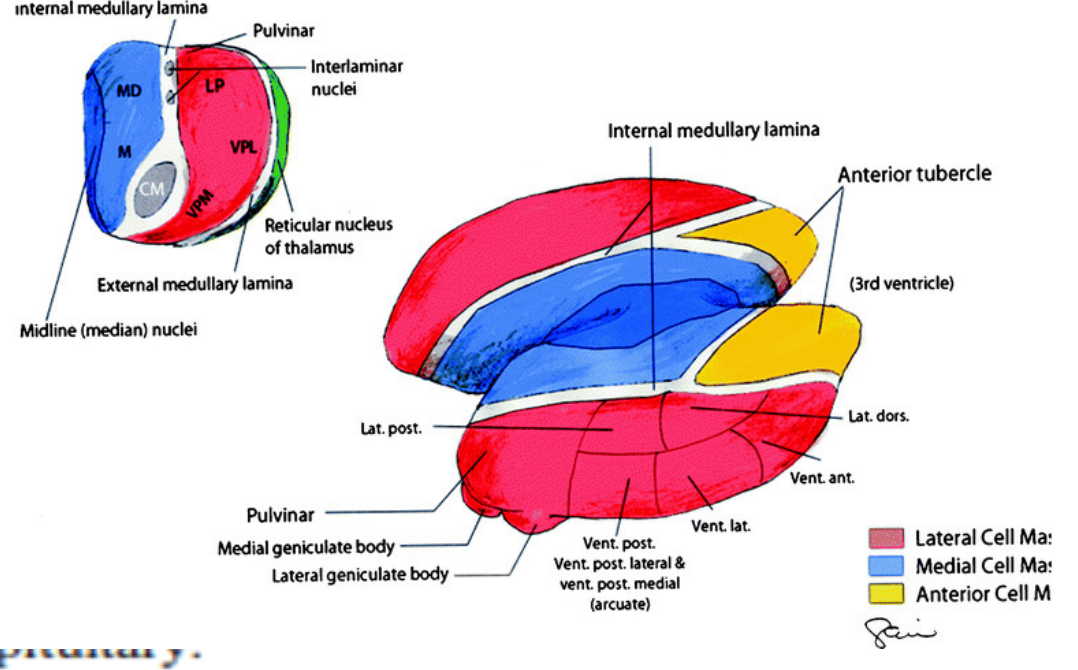


*connec  
tions*



# Anterior nuclei:

- **Site:** between the 2 limbs of the Y-shaped internal medullary lamina.
- **Afferents:** receives the mammillo-thalamic tract from the mammillary bodies.
- **Efferents:** sends the anterior thalamic radiation to the cingulate gyrus
- **Function:** forms part



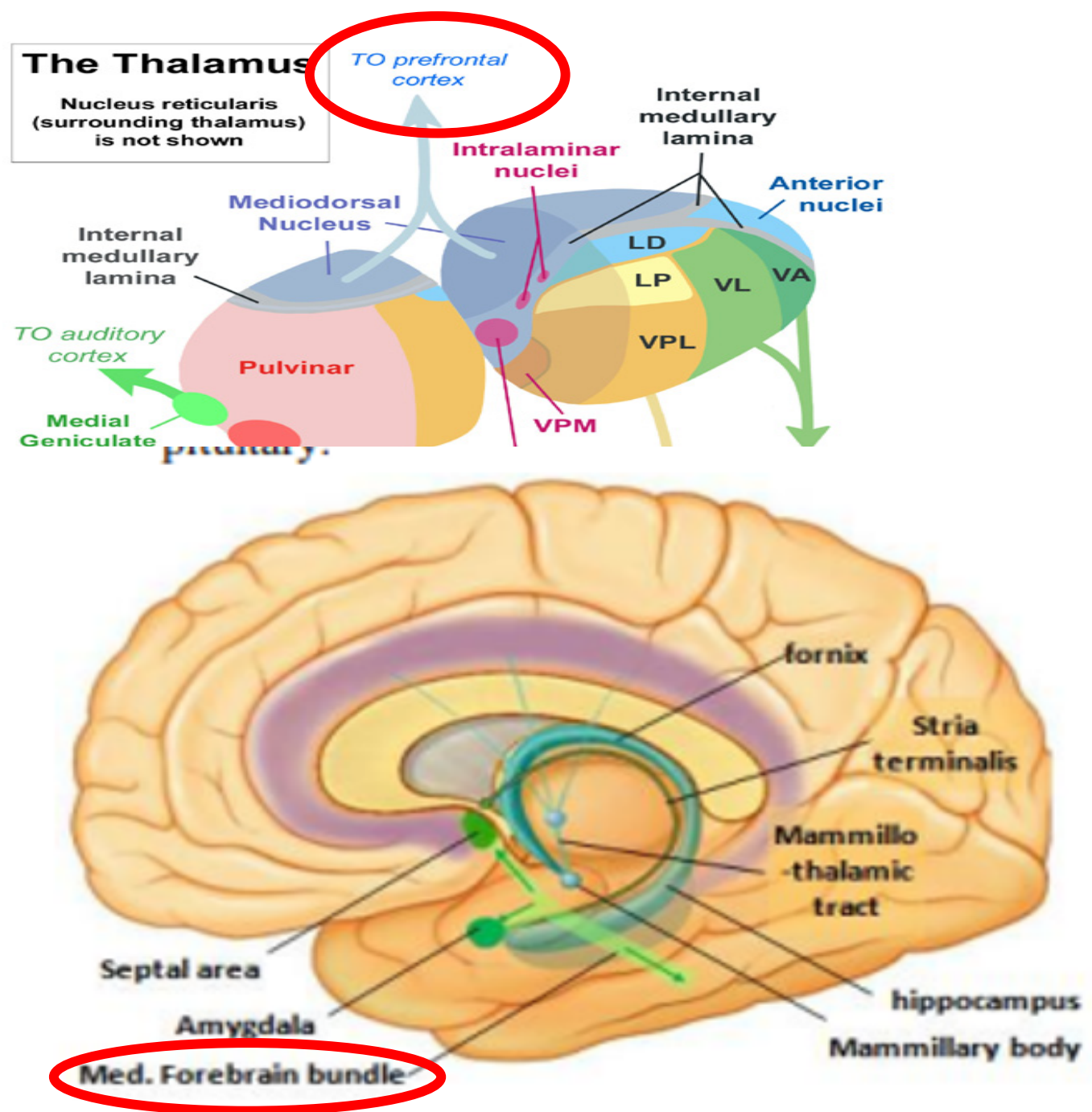


## Medial nuclei (Dorso-medial nucleus):

- **Afferents:** from the hypothalamus, amygdala & olfactory cortex

- **Efferents:** via the medial forebrain bundle to the prefrontal cortex.

- **Function:** forms part of the limbic system involved in



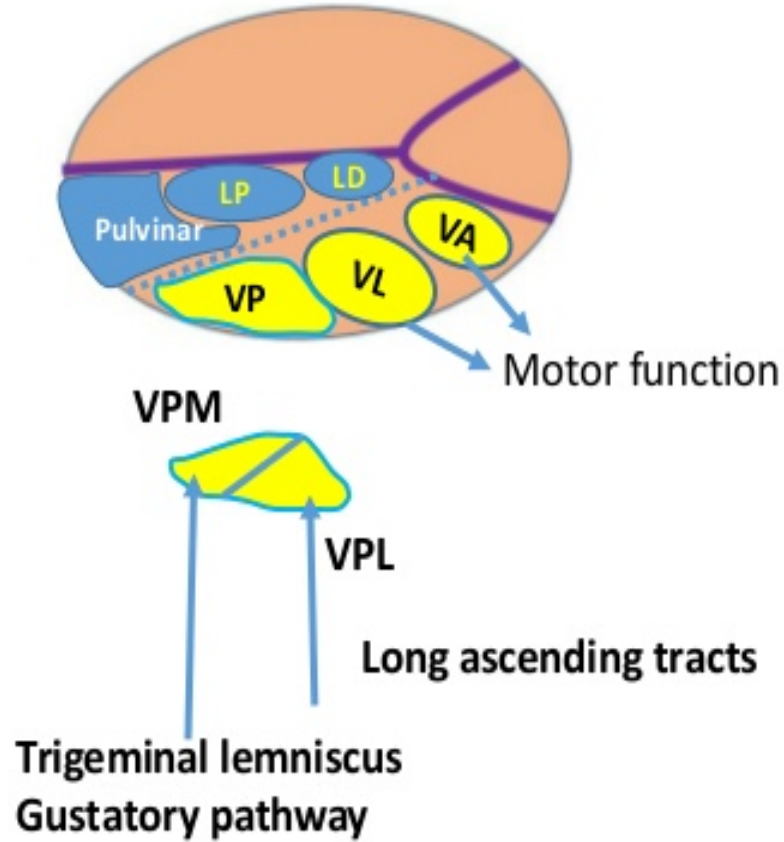
**lateral part of thalamus: Divided into:**

**Dorsal tier:**

**Includes 3 association nuclei:**

- **Lateral-dorsal nucleus, Lateral-posterior nucleus & Pulvinar.**

- **Afferents:** they receive input from the other thalamic nuclei and integrate them:



**1. Anterior thalamus**

Anterior nucleus of thalamus

**2. Medial thalamus**

Dorsomedial nucleus

**3. Lateral thalamus**

A. Dorsal tier

Lateral dorsal

Lateral posterior

Pulvinar

B. Ventral tier

Ventral anterior

Ventral lateral

Ventral posterior

VPM

VPL

# Ventral tier: 3 nuclei:

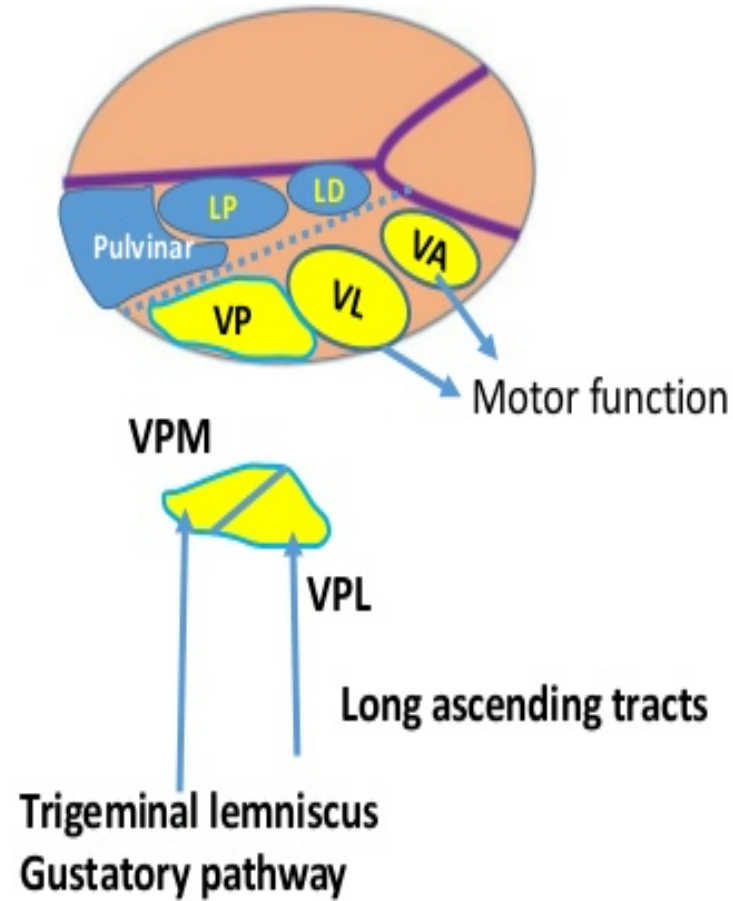
## 1- Ventral-anterior (VA) nucleus:

- **Afferents:** from the basal ganglia (globus pallidus).

- **Efferents:** to the supplementary motor area.

- **Function:** relays motor circuits.

## 2- Ventral-lateral or ventral-intermediate (VL or VI) nucleus:



1. **Anterior thalamus**  
Anterior nucleus of thalamus
2. **Medial thalamus**  
Dorsomedial nucleus
3. **Lateral thalamus**
  - A. Dorsal tier
    - Lateral dorsal
    - Lateral posterior
    - Pulvinar
  - B. Ventral tier
    - Ventral anterior
    - Ventral lateral
    - Ventral posterior
    - VPM
    - VPL

**3- Ventral-posterior nucleus (VP nucleus) is sensory & includes 2 parts:**

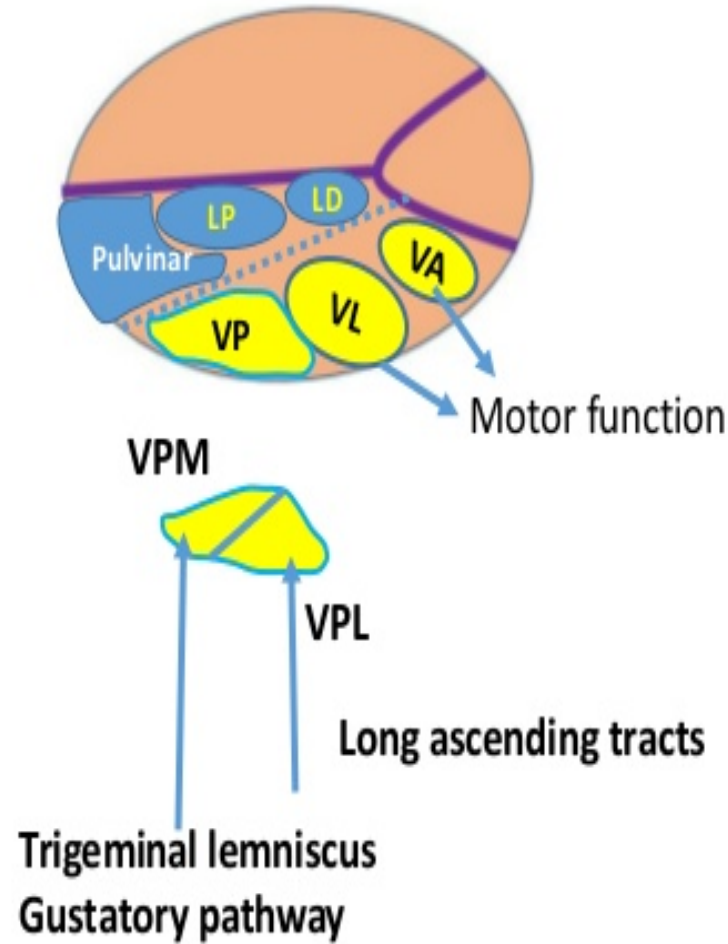
**a. VP Lateral (VPL)**

- **Afferents:** receives the medial & spinal lemnisci.

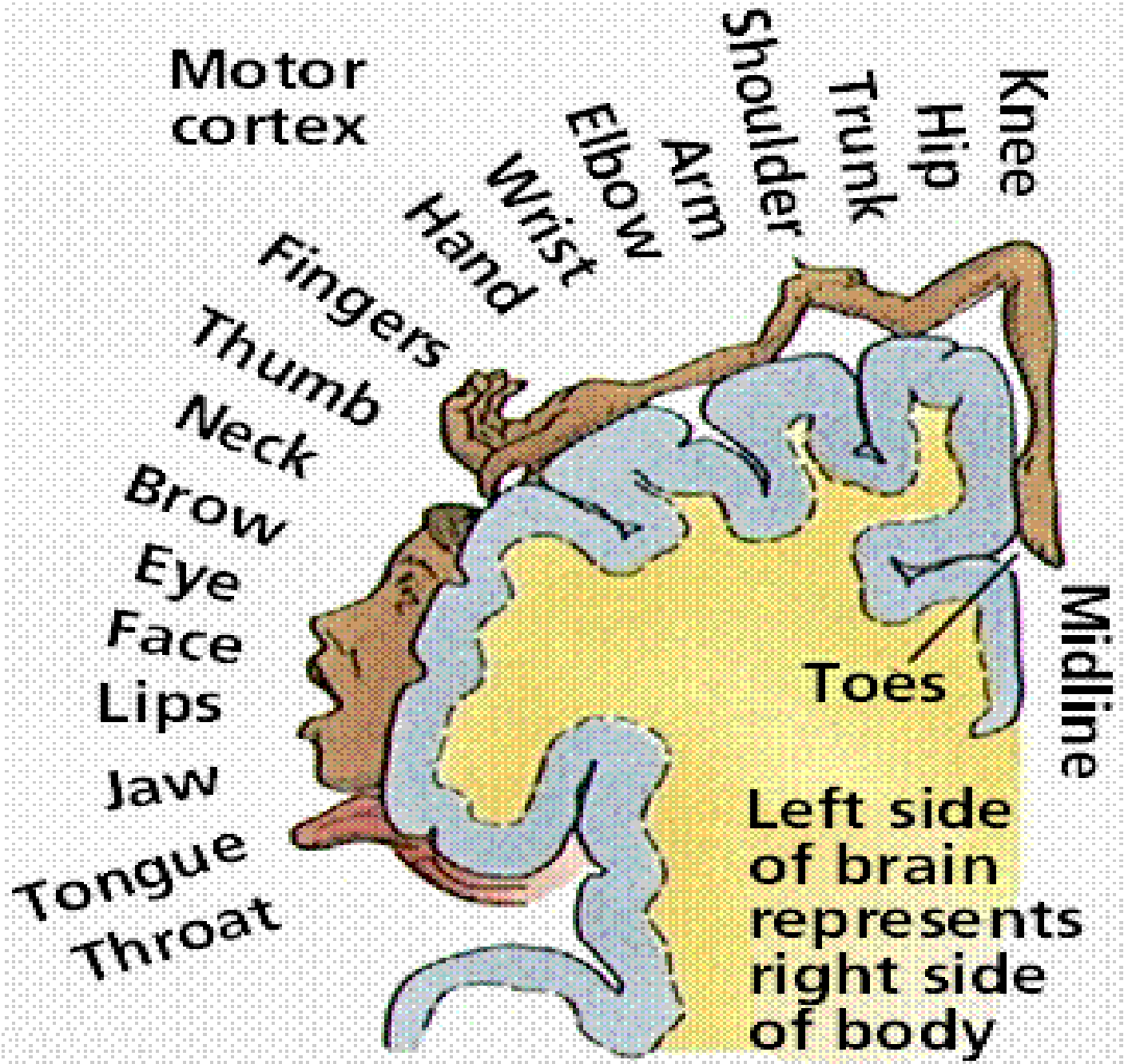
- **Efferents:** to the upper 2/3 (body area) of the postcentral gyrus.

**b. VP Medial (VPM)**

- **Afferents:** receives the trigeminal lemniscus & solitariothalamic tract



1. Anterior thalamus
  - Anterior nucleus of thalamus
2. Medial thalamus
  - Dorsomedial nucleus
3. Lateral thalamus
  - A. Dorsal tire
    - Lateral dorsal
    - Lateral posterior
    - Pulvinar
  - B. Ventral tire
    - Ventral anterior
    - Ventral lateral
    - Ventral posterior
    - VPM
    - VPL





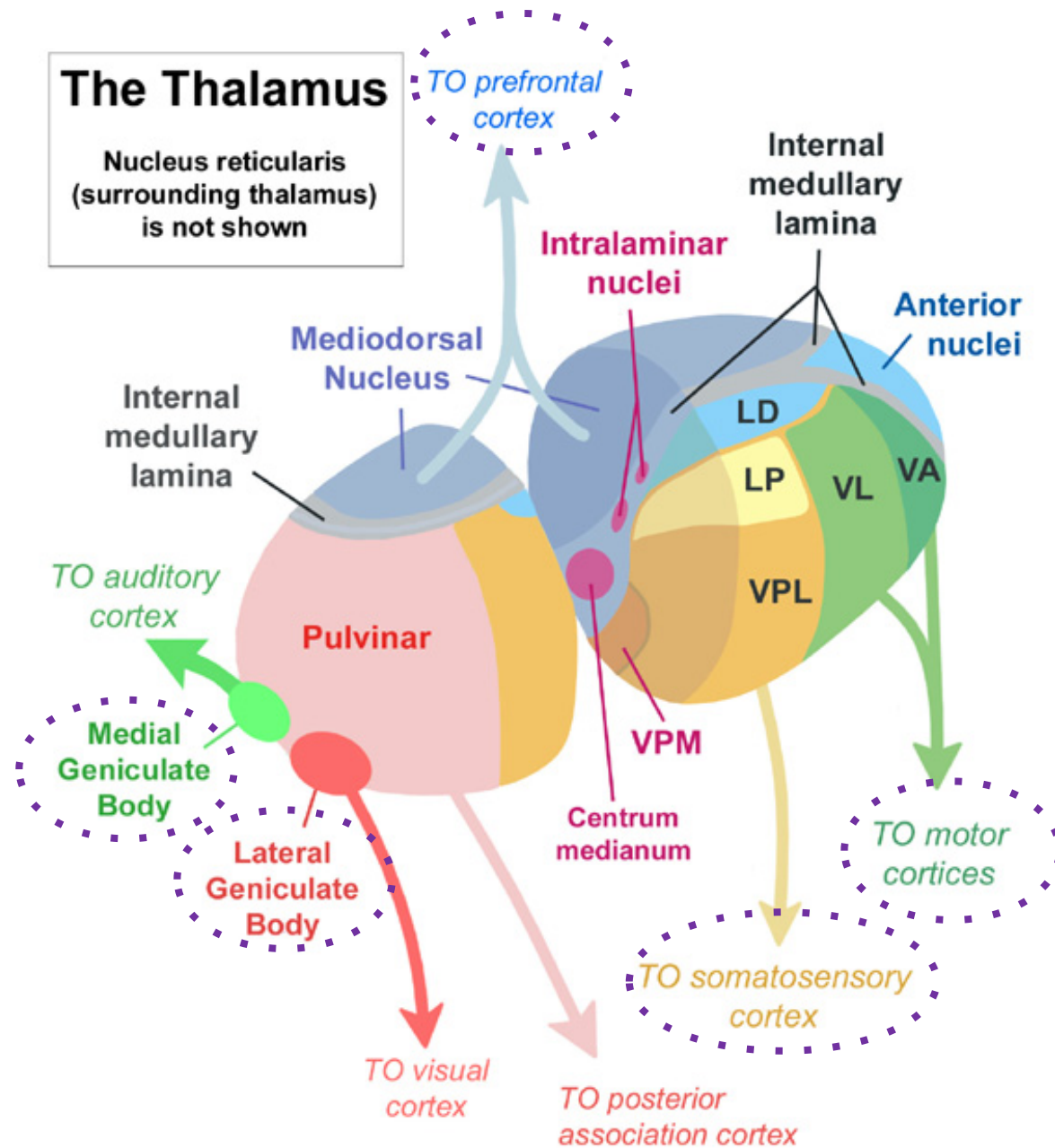
# Medial & lateral geniculate bodies: (both are called *metathalamus*)

## 1. The medial geniculate body (MGB)

- Afferents: receives *auditory* input from the *inferior colliculus* of midbrain.

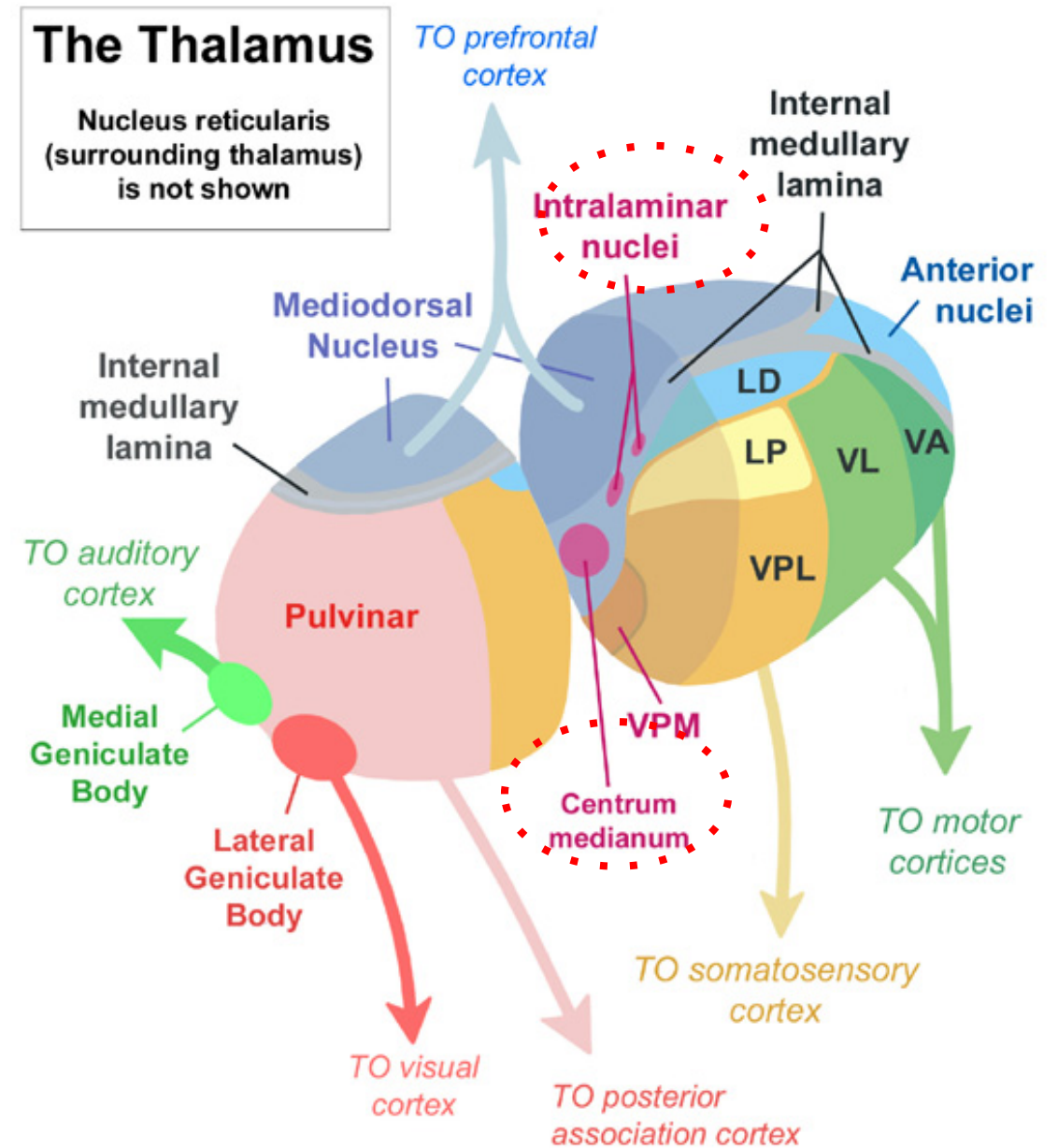
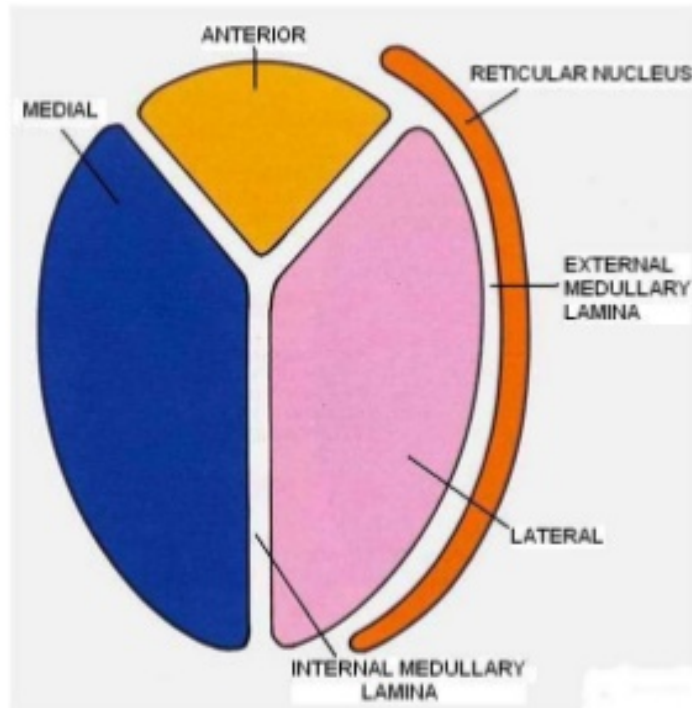
- Efferents: projects *auditory radiation* to the *auditory area* of cortex.

## 2. The lateral geniculate body (LGB)



# Intralaminar nuclei (within the internal medullary lamina) & Midline nuclei

- Functions: part of RAS responsible for alertness.



# Blood supply of Thalamus:

## Arterial:

**Medial & anterior regions by posteromedial group of posterior cerebral artery.**

**Lateral & posterior parts by posterolateral group of posterior cerebral artery (thalamogeniculate artery).**

**Applied: Thalamic syndrome Vascular lesions of the thalamus (thalamogeniculate artery) decreased threshold to pain with overreaction to painful stimuli& spontaneous pains**



# Hypothalamus

## Extent:

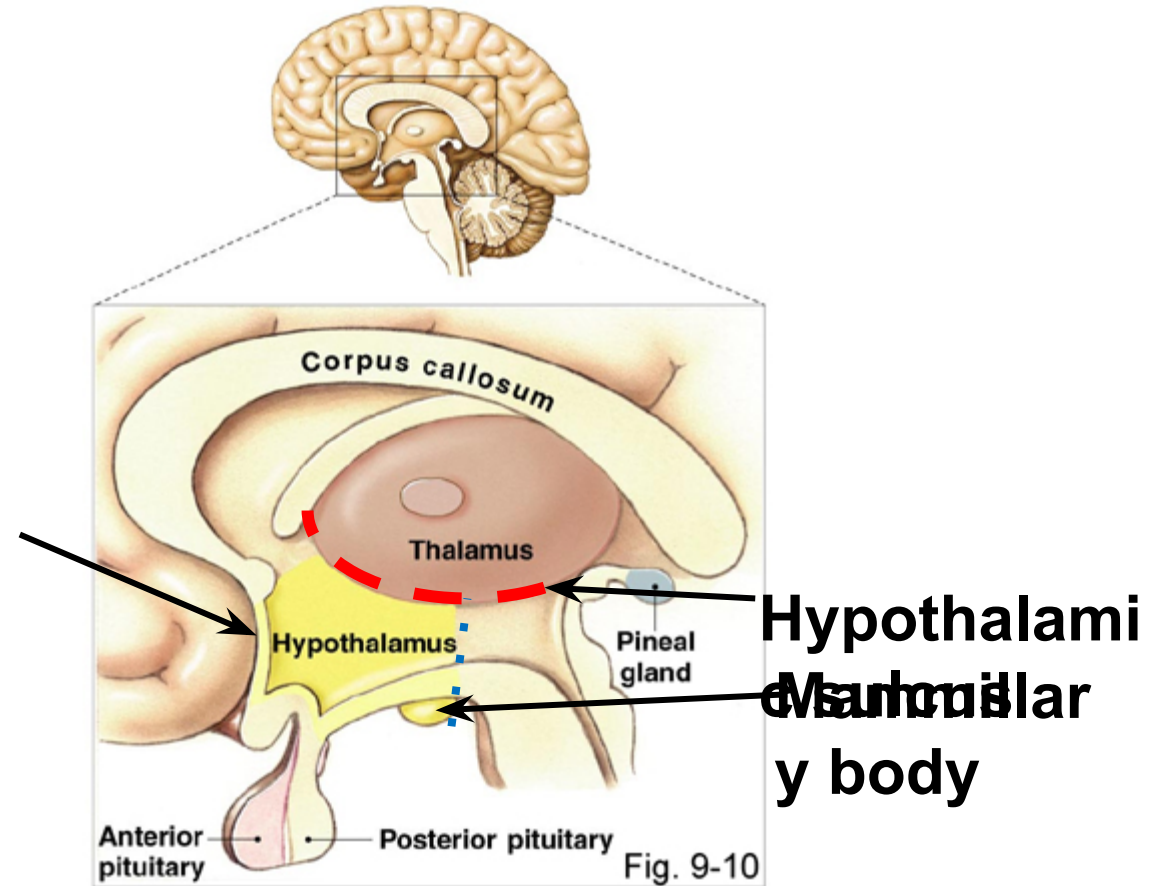
Superior:  
hypothalamic  
sulcus

Anterior: Lamina  
terminalis

Posterior:  
Mammillary bodies

Inferior:  
Interpeduncular

Lamina  
Terminalis



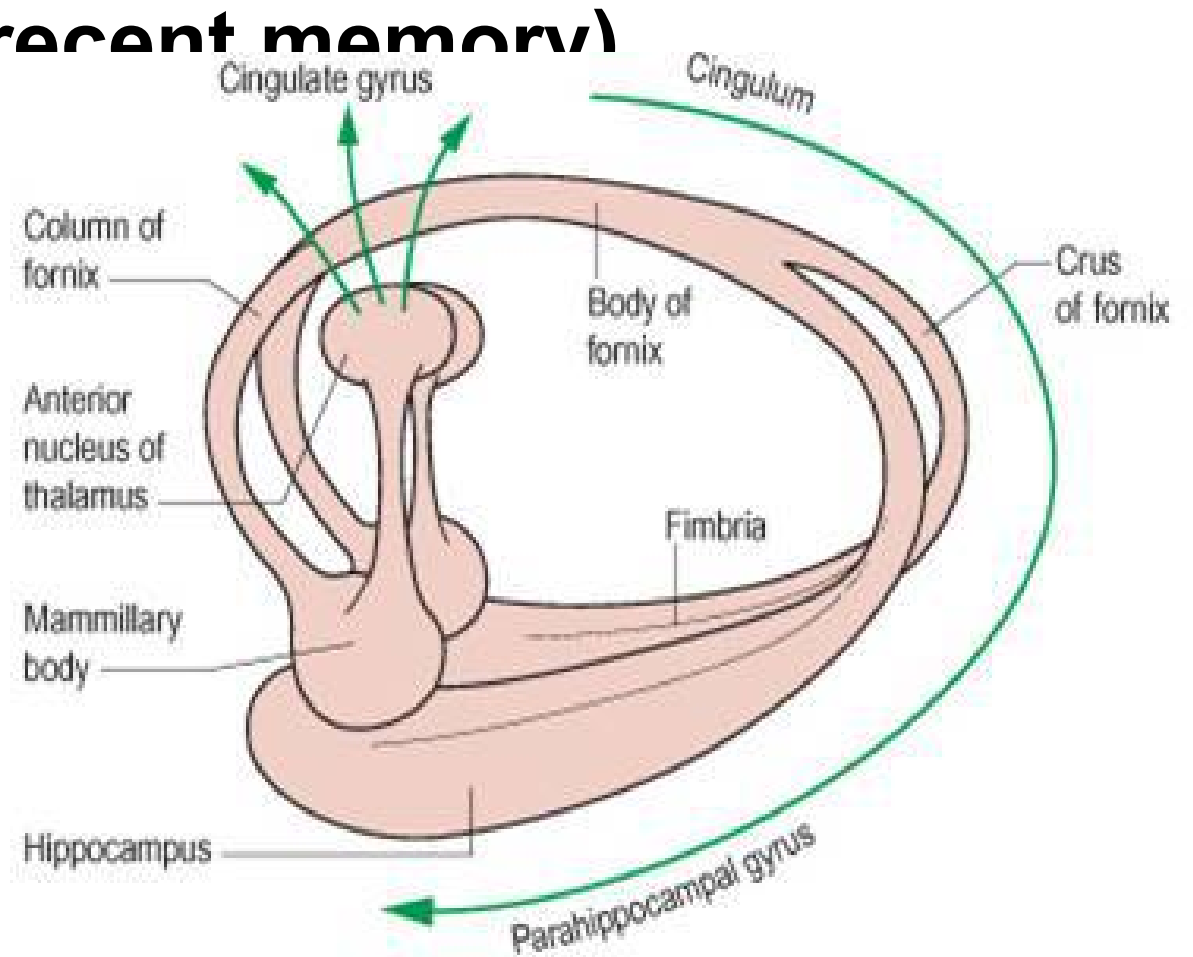
Hypothalami  
Mammillar  
y body

## Limbic system:

Hippocampus---fornix---mammillary

body-----ant. n. of thalamus

-----cingulate G. (emotion recent memory)

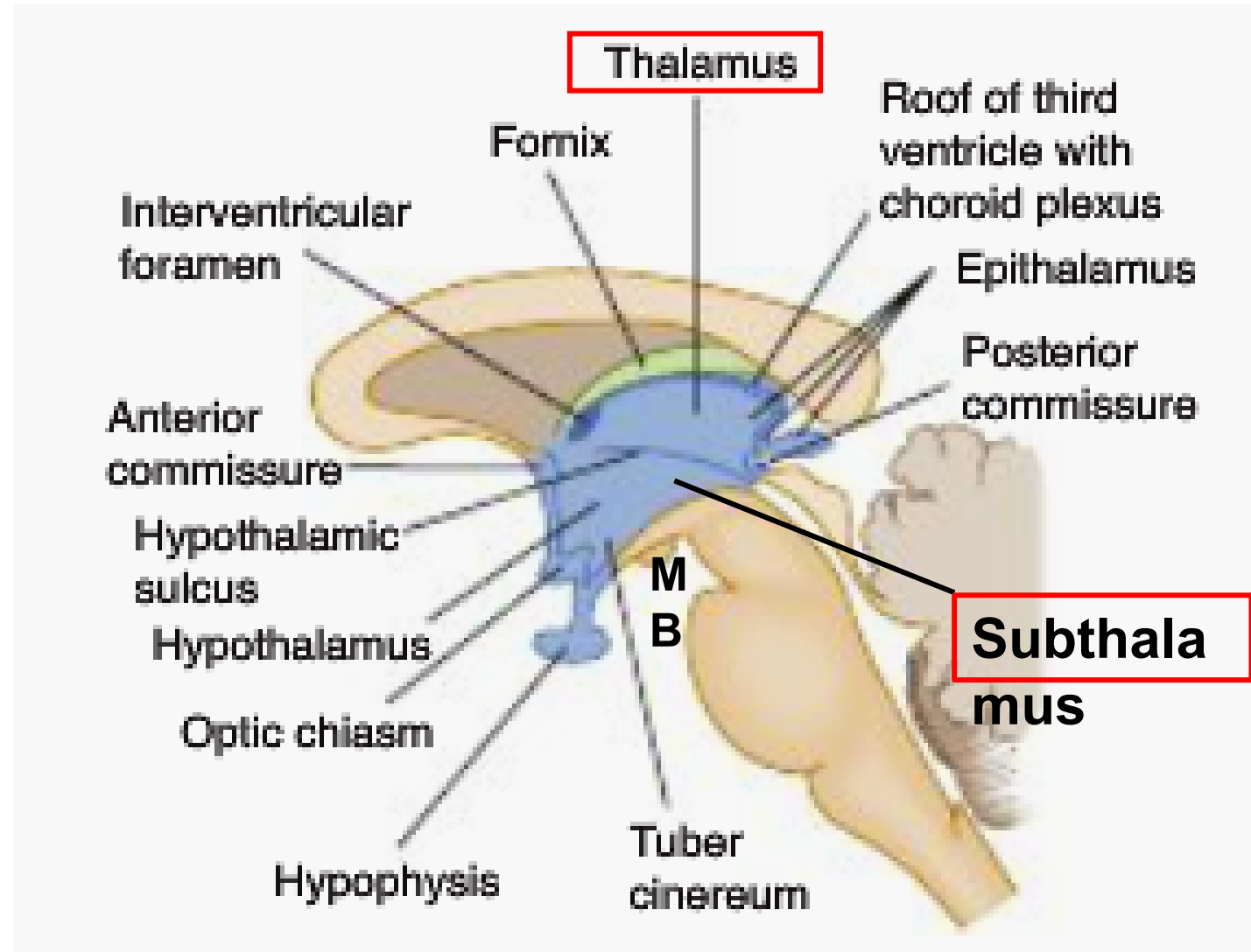


# Subthal

## amus:

-Inferior to thalamus lying between the thalamus and midbrain

- Subthalamic nucleus is a part of basal



# Epithalamus

It consists of:

Pineal gland:

endocrine gland  
secretes melatonin,  
activates in dark

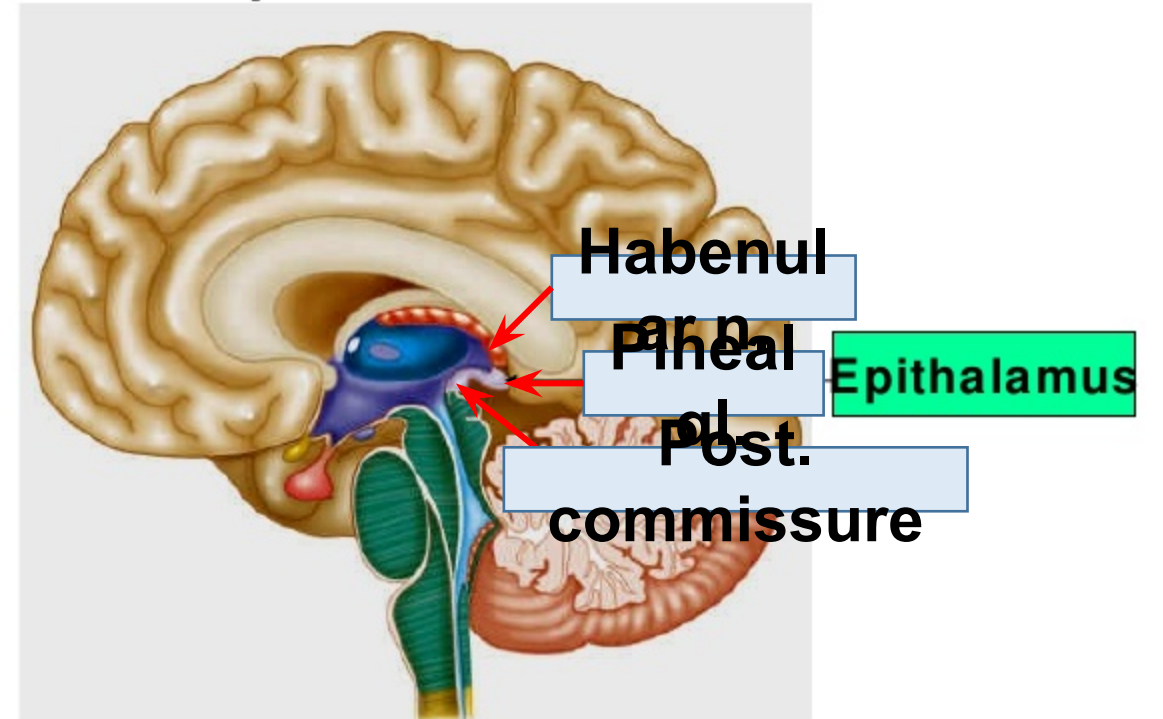
Habenular nucleus:

connects olfactory  
input with cranial  
nerves nuclei

Posterior

commissure: (  
connects superior

## Epithalamus



- The epithalamus is the posterior portion of the diencephalon
- It forms the roof of the third ventricle

# Third Ventricle Boundaries:

ies:

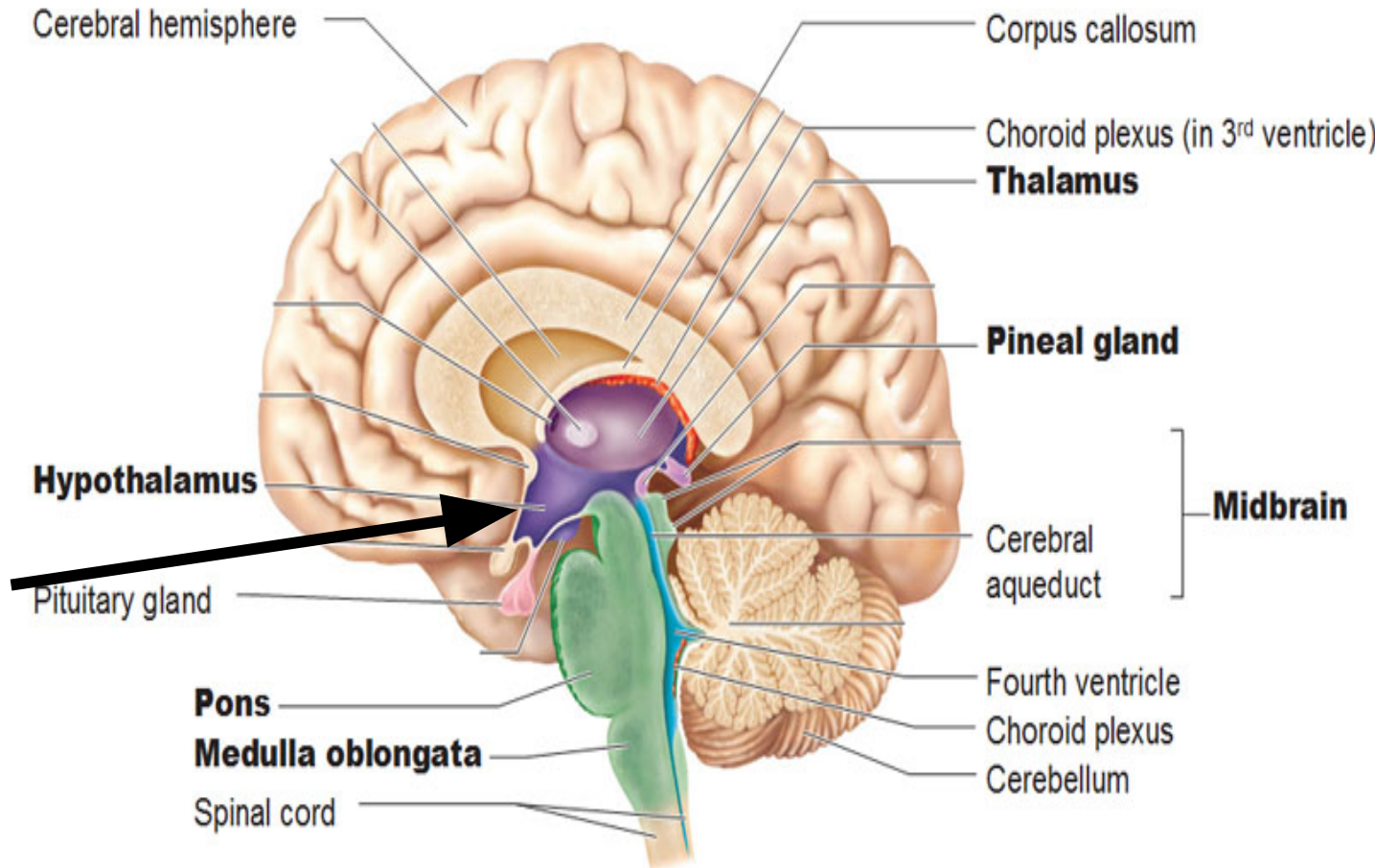
Lateral wall: thalamus and hypothalamus

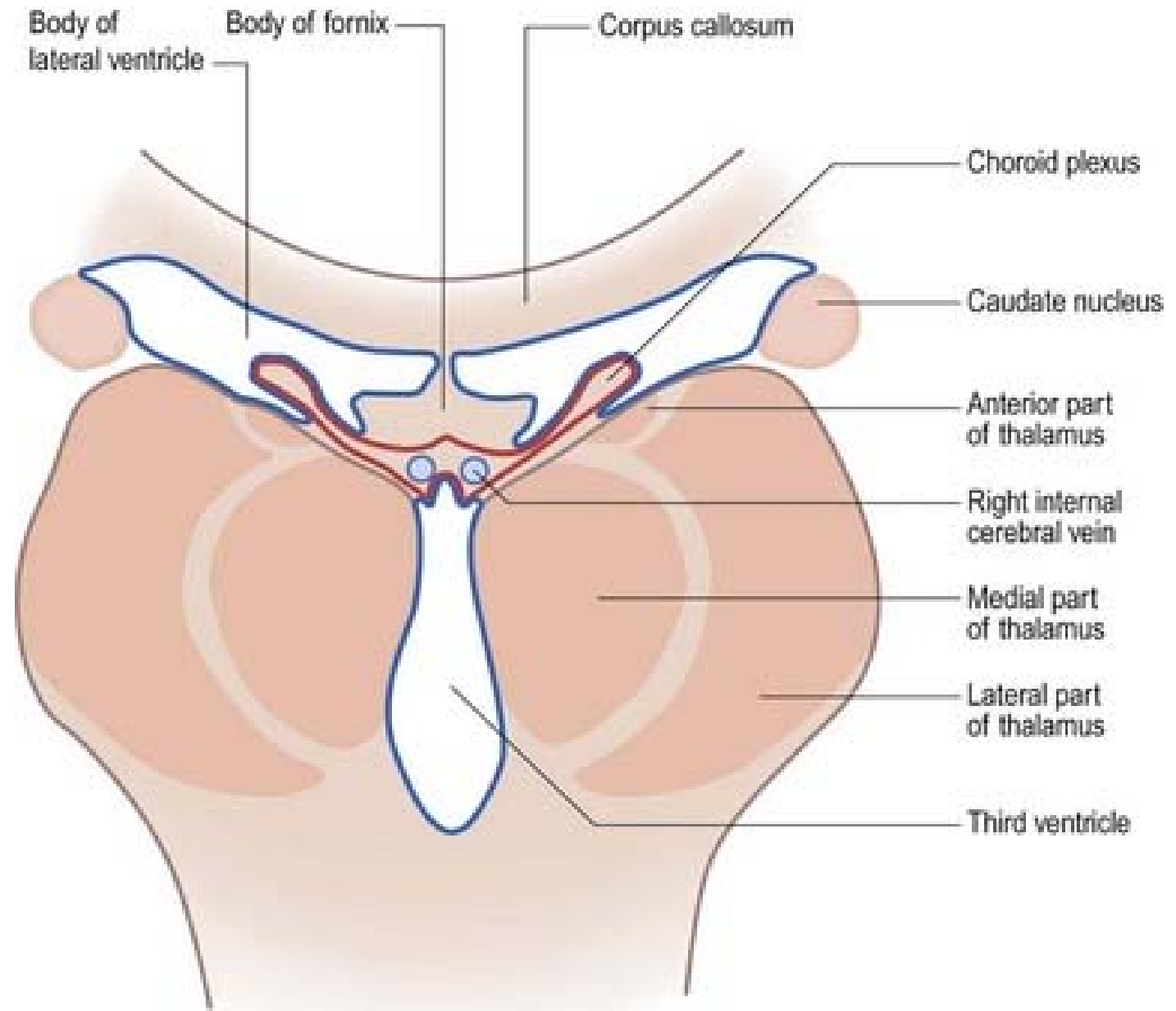
Roof : ependyma and choroid plexus

Floor: interpeduncular fossa

Anterior wall: fornix, lamina terminalis

**Ependyma: simple cuboidal epithelium which lines the ventricles**



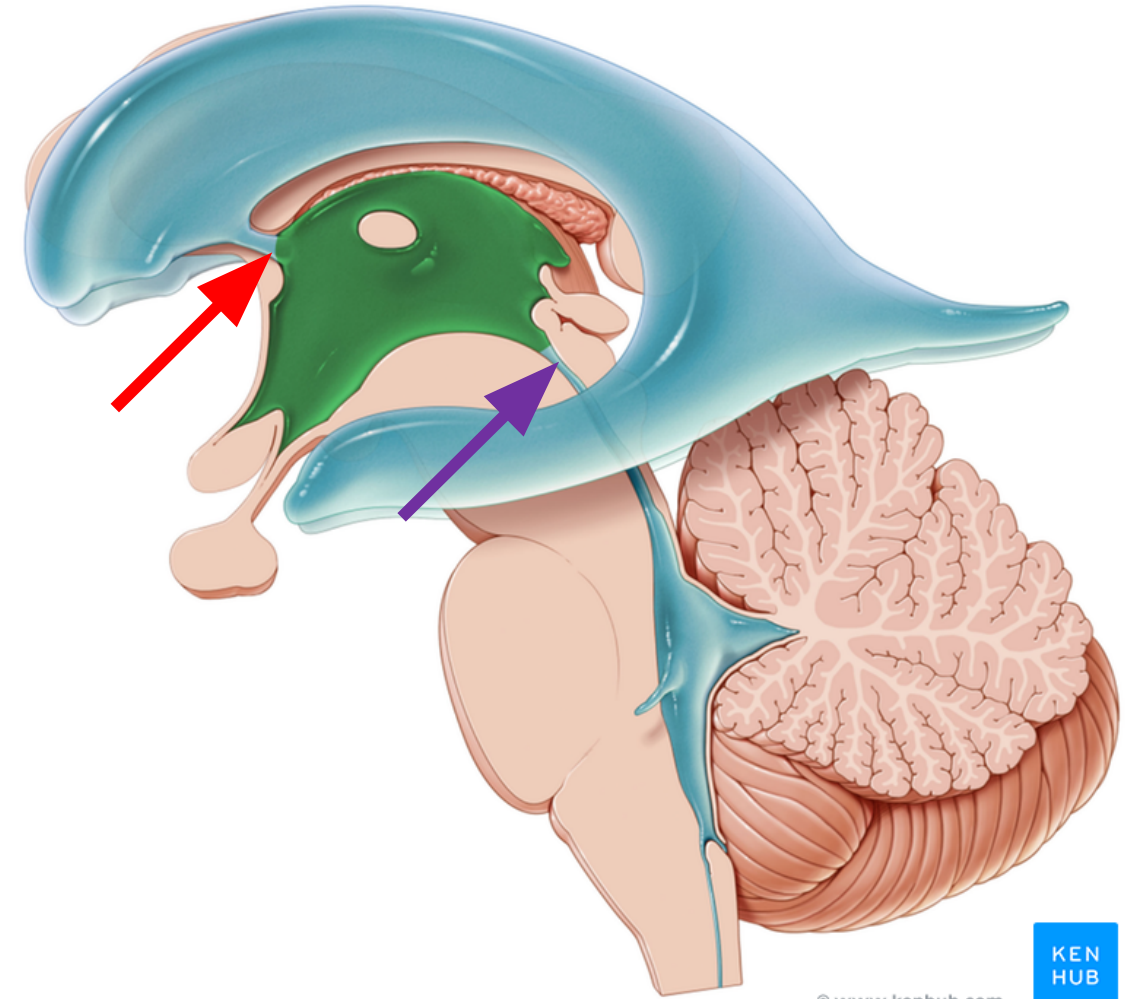




## Communications:

-With the lateral ventricle through **interventricular foramen of Monro**

-With the fourth ventricle with the **cerebral aqueduct of Sylvius**



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**Thank you**