Diencephalon "located between the midbrain and the cerebral hemisphere"

Boundaries:

Anteriorly	Posteriorly	Superiorly	Inferiorly	Medially	Laterally
- Lamina terminalis - Anterior commissure.	"HP" - **P**ineal gland - **P**osterior commissure - **H**abenular trigone	"BTL→ بطل" - **B**ody of the fornix - **T**ela choroidea of 3rd ventricle - **L**ateral ventricle.	- Optic chiasma - Tuber cinereum - Infundibulum - Mamillary bodies - Post perforated substance.	**3rd ventricle.** ▪ ***Medial wall is divided by hypothalamic sulcus into:*** **a. upper part:** thalamus **b. lower part:** hypothalamus.	Posterior limb of internal capsule.

Divisions:

Thalamus "inner chamber"

- The **largest component** (4/5) **of diencephalon**
- **The largest nuclear mass in nervous system.**
- Lie at the center of the brain.
- large, **egg shaped** mass of gray matter
- **Function:** "**Processor of brain**"
  1) Receives all sensations ~~**except olfaction**~~ & projects them to sensory areas of the brain. "Gate-keeper"
  2) sustaining cortico-thalamo-cortical communication.
  3) It is involved in multiple activities, including consciousness, sleep, attention, memory and sensory and motor functions.

Blood vessels: -
- Post cerebral **"MAIN"**
- Post communicating
- Ant choroidal

Anterior	▪ Interventricular Foramen.
Superior & lateral	▪ As diencephalon
Inferior	▪ hypothalamus and subthalamus
Medial	▪ 3rd ventricle. connected with the opposite ▪ one in 70% of humans by the interthalamic adhesion (massa intermedia).
Posterior "pulvinar"	▪ superiorly → splenium of corpus callosum ▪ inferiorly → tectum of the midbrain

Hypothalamus

"Neuroendocrine organ"

- Principal autonomic & Endocrine Center
- Control fluid & electrolyte balance, food intake & energy balance, reproduction, thermoregulation, sleep–wake cycle, growth, immune & many emotional responses.

Anterior	▪ As diencephalon
Superior	▪ Hypothalamic Sulcus separating it from thalamus.
Inferior	▪ Interpeduncular fossa.

B. Vs: -
Circulus arteriosus

Subthalamus

- Lateral to hypothalamus
- between thalamus and midbrain.
- It contains **subthalamic nucleus** (**motor nucleus**) which regulates movement of ms.
- structurally and functionally related to the basal ganglia
- **Lesion:**
  ↳ **Hemiballismus** (involuntary movement).

Epithalamus

- Posterior part of roof of 3rd ventricle.
- **Formed of:**

1) **Pineal gland**
   " epiphysis cerebri":
   ▪ an endocrine gland.
   ▪ ~~**doesn't contain nerve cells**~~ but contains cells called **pinealocytes**.
   ▪ Secretes **melatonin** (hormone of darkness) → **regulates sleep-wake cycle**.
2) **Posterior commissure**
   Fibers connects:
   ▪ Pretectal nuclei
   ▪ Oculomotor nuclei
   ▪ Superior colliculi.
3) **Habenular nucleus**
4) **Stria medullaris thalami**

Parts of limbic system

Metathalamus	- Projects downward from pulvinar. - It is formed of MGB& LGB

THIRD VENTRICLE

Definition:

- ✓ The 3rd ventricle is the cavity of the diencephalon.
- ✓ It is a midline, narrow, slit-like cavity

Boundaries:

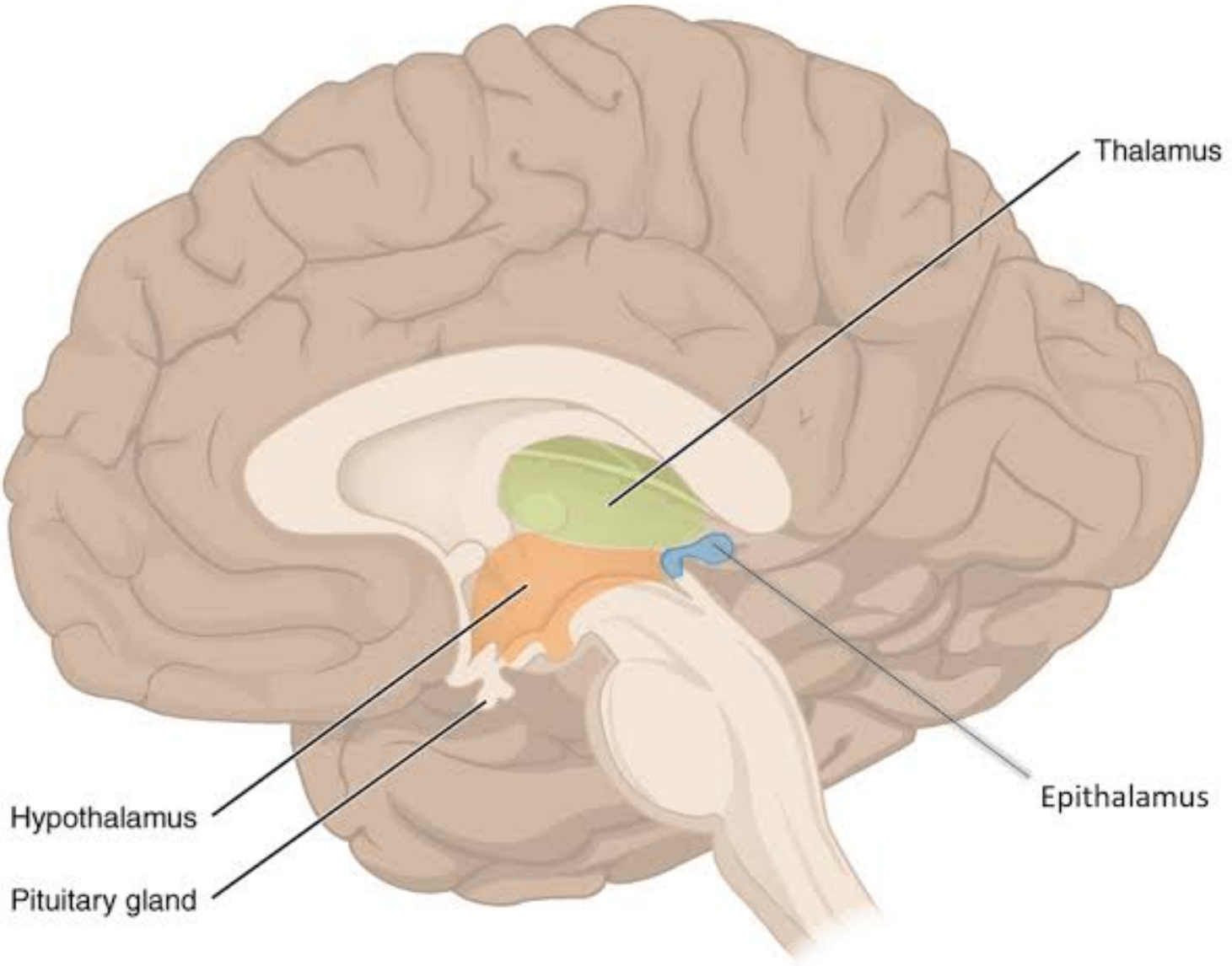
Anterior	As diencephalon
Posterior	
Floor "inferior"	As diencephalon + Tegmentum of the midbrain
Lateral	✓ Thalamus, as the 2 thalami are connected in 70% by inter-thalamic adhesion. ✓ Hypothalamus → It is separated from the thalamus by the hypothalamic sulcus.
Roof	✓ Ependymal Layer between the 2 stria medullaris thalami. ✓ Tela choroidea of the third ventricle above the ependymal layer. ✓ 2 internal cerebral veins inside the tela choroidea.

Recesses of the 3rd ventricle:

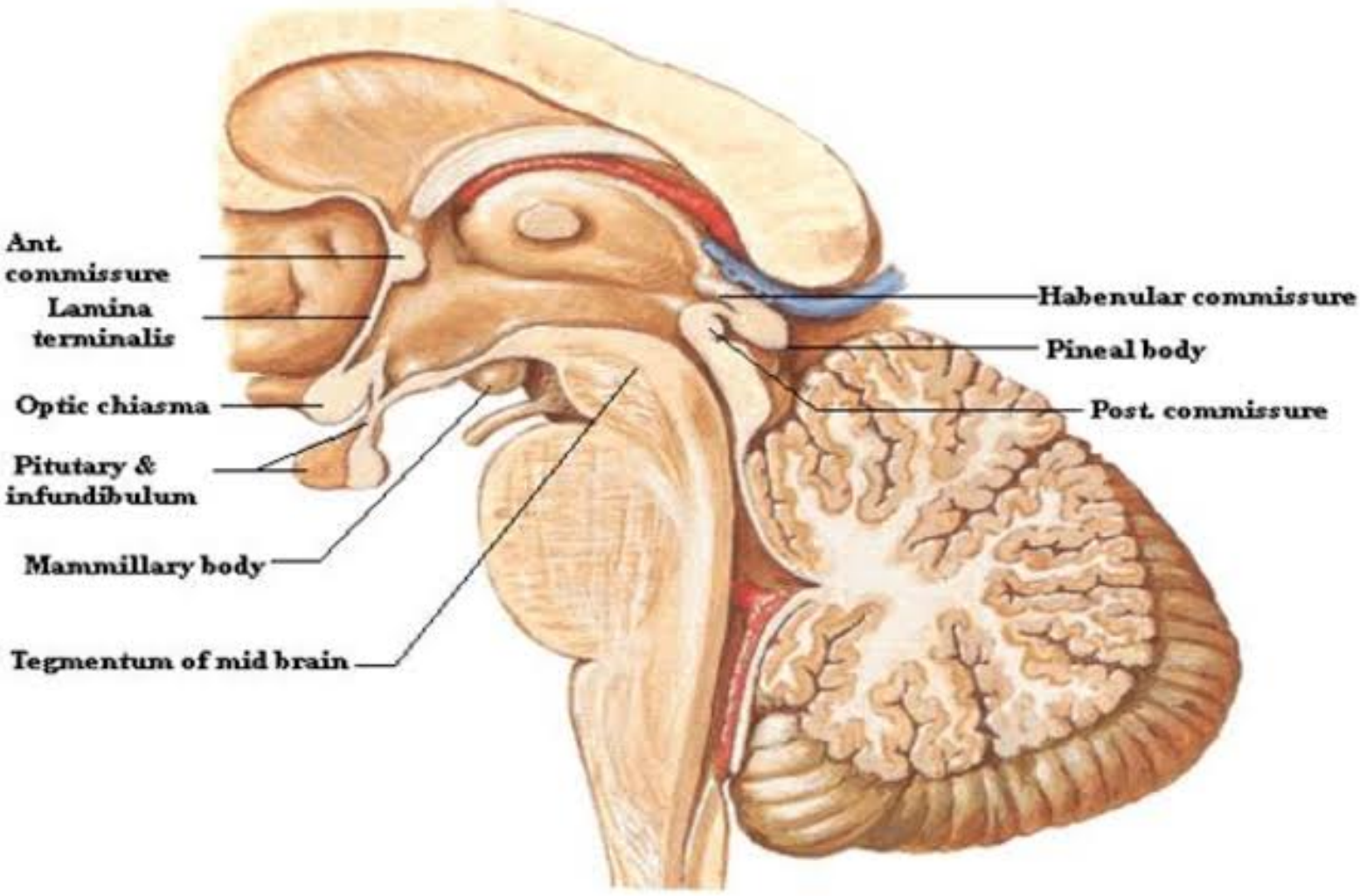
Optic recess	✓ Above the optic chiasma.
Infundibular recess	✓ Extends into the infundibulum.
Pineal recess	✓ Extends into the stalk of the pineal gland.
Supra-pineal recess	✓ Above the pineal gland.

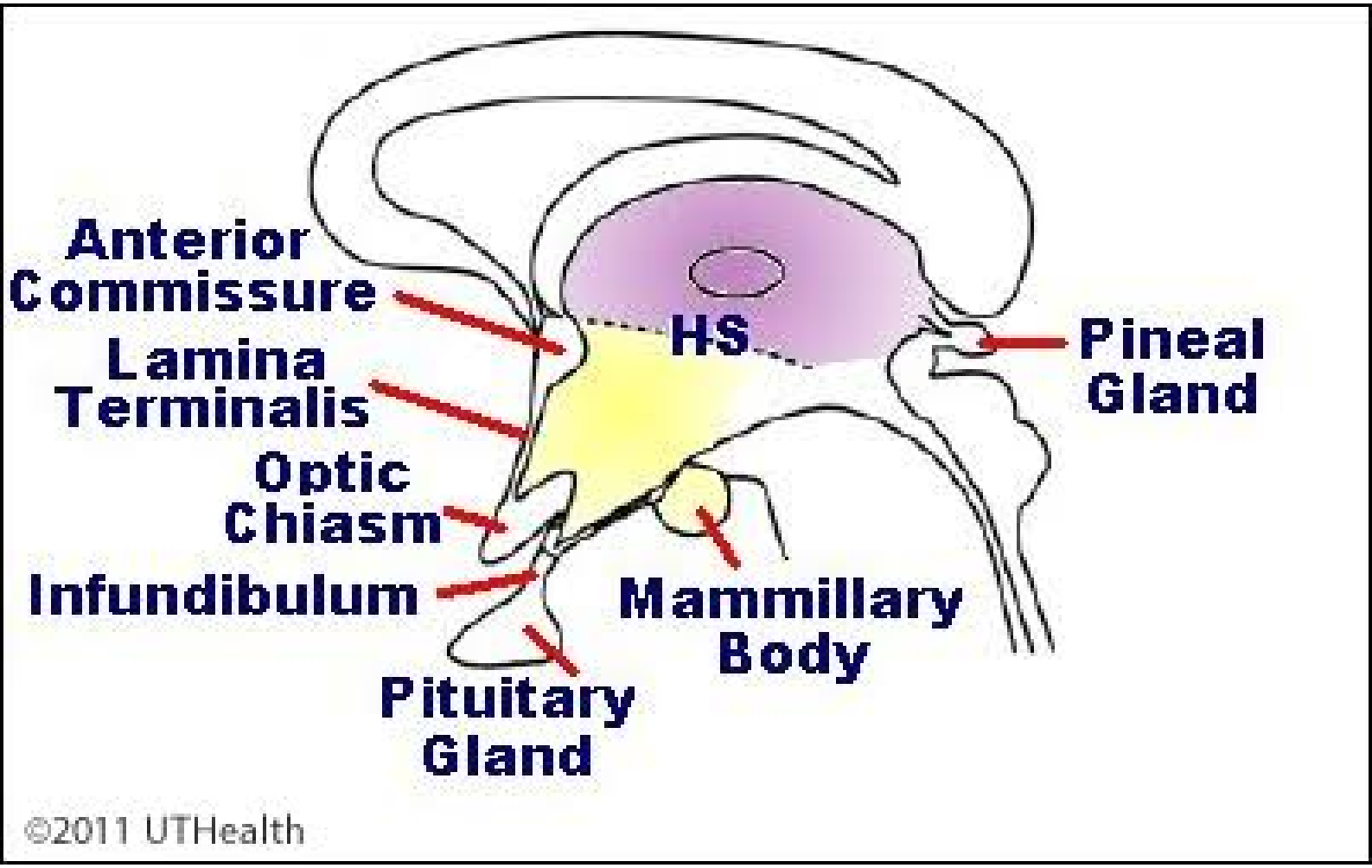
Choroid plexus of 3rd ventricle:

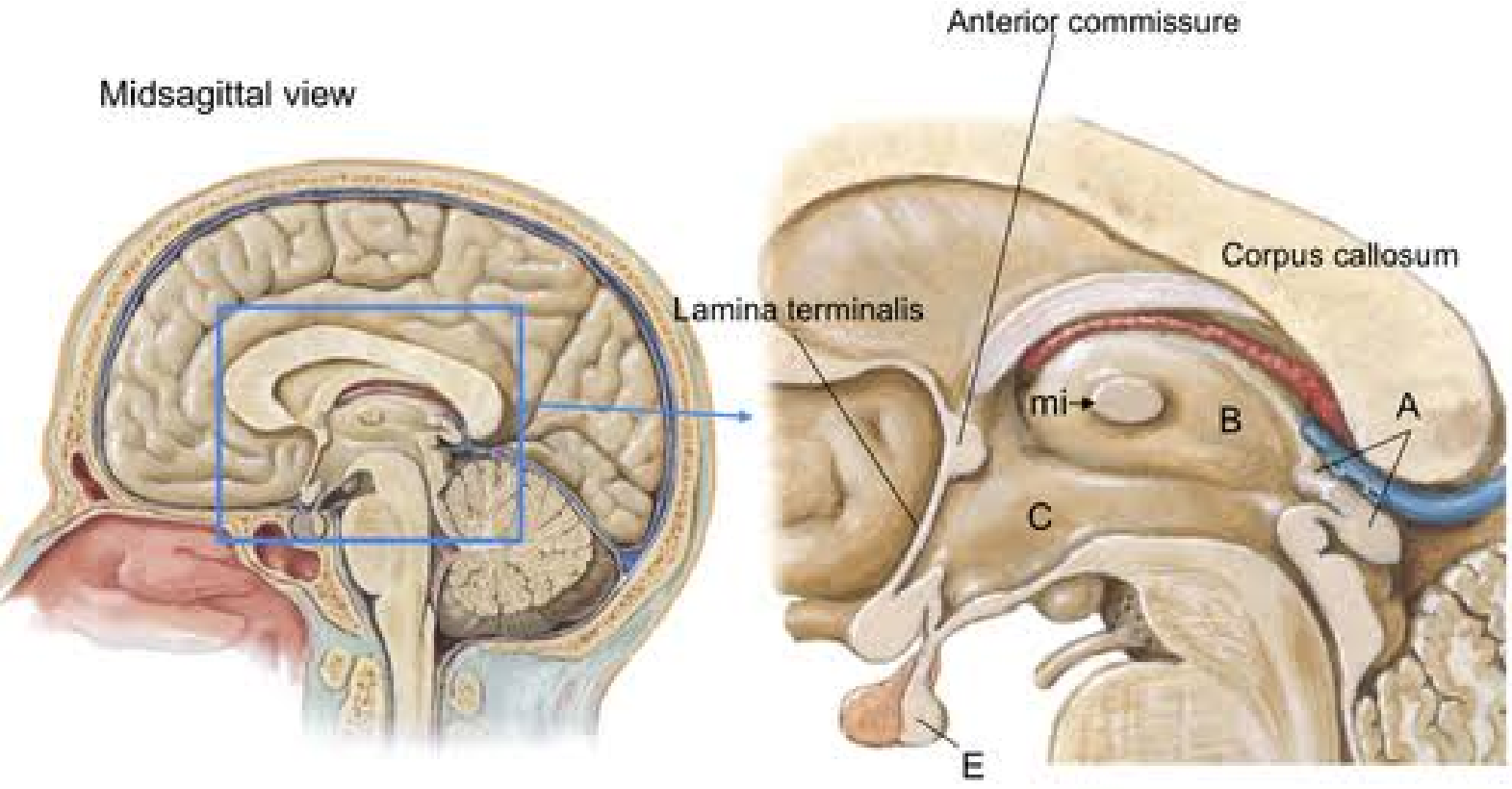
Site	✓ Projects downward from roof of the 3rd ventricle.
Shape	✓ 2 vascular ridges, one on each side of midline.
Supplied by	✓ **Posterior Choroidal Artery** (branch from the posterior cerebral artery)

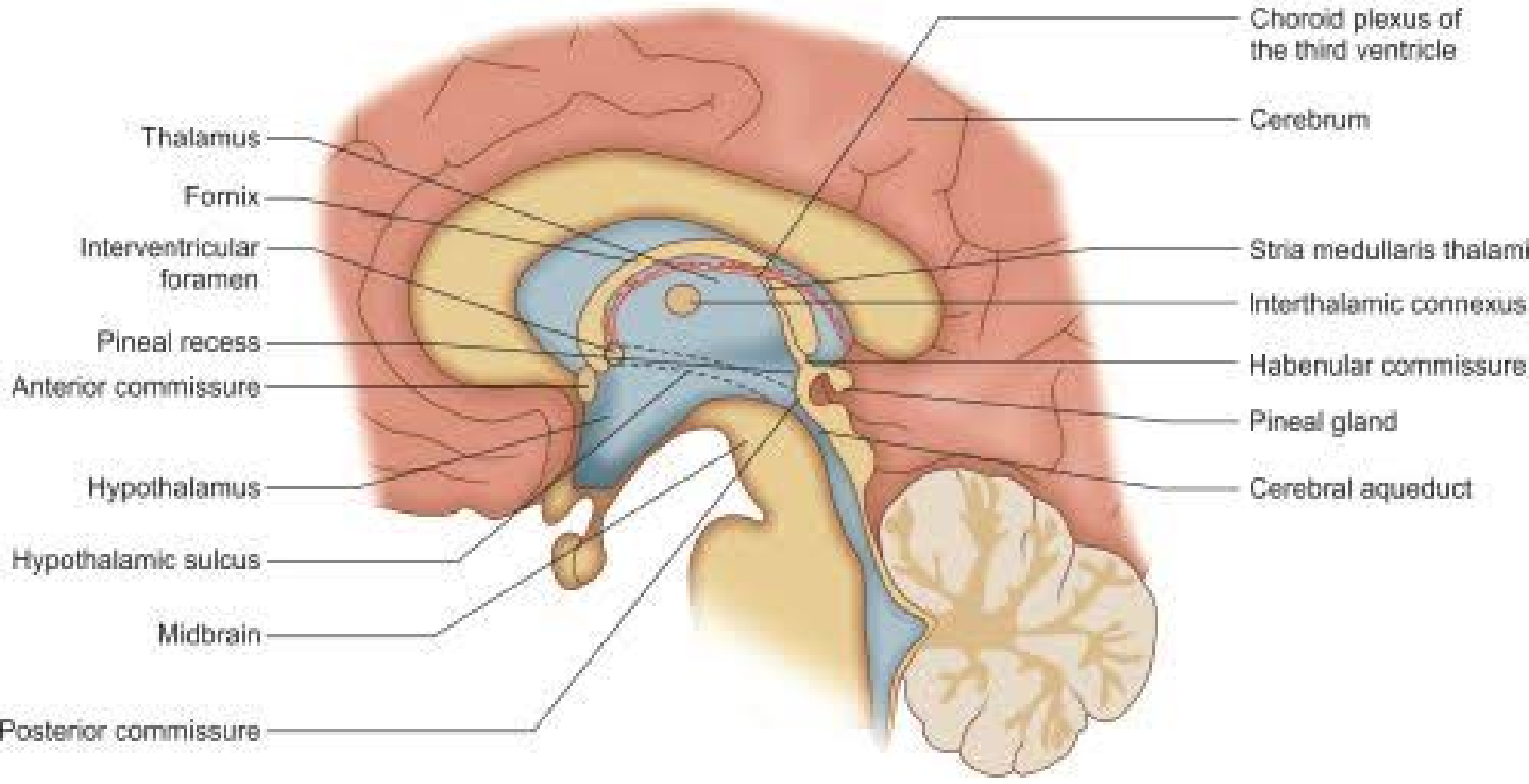

Thalamus
Epithalamus
Hypothalamus
Pituitary gland

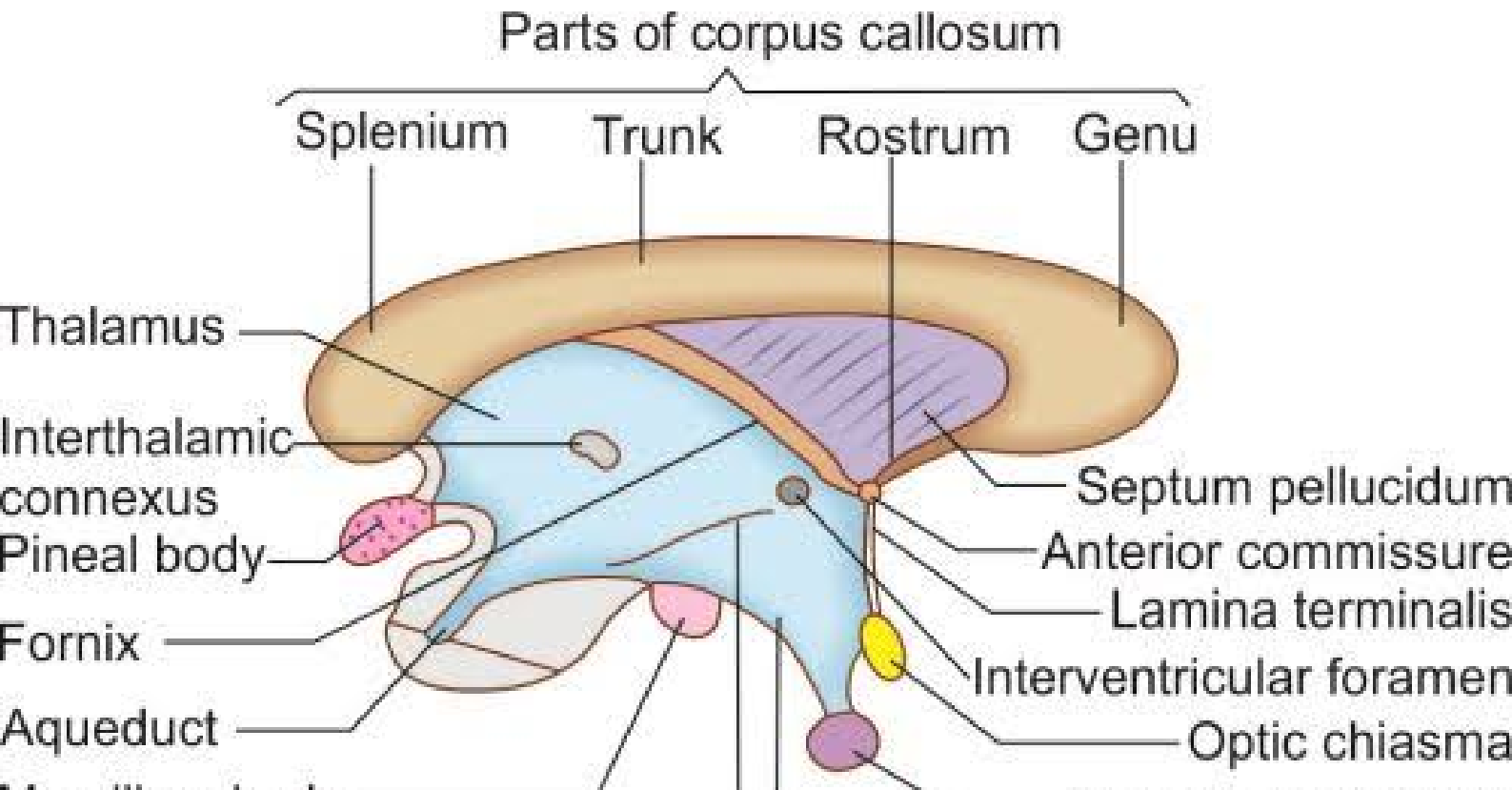
Source: Snell 2010 Clinical Neuroanatomy




Anterior Commissure
Lamina Terminalis
Optic Chiasm
Infundibulum
Pituitary Gland
HS
Pineal Gland
Mammillary Body
©2011 UTHealth


Midsagittal view
Anterior commissure
Corpus callosum
Lamina terminalis
mi
B
A
C
E


Choroid plexus of the third ventricle
Cerebrum
Thalamus
Fornix
Interventricular foramen
Stria medullaris thalami
Interthalamic connexus
Pineal recess
Habenular commissure
Anterior commissure
Pineal gland
Hypothalamus
Cerebral aqueduct
Hypothalamic sulcus
Midbrain
Posterior commissure


Parts of corpus callosum
Splenium
Trunk
Rostrum
Genu
Thalamus
Interthalamic connexus
Pineal body
Fornix
Aqueduct
Mamillary body
Septum pellucidum
Anterior commissure
Lamina terminalis
Interventricular foramen
Optic chiasma
Hypophysis cerebri
Hypothalamus
Hypothalamic sulcus

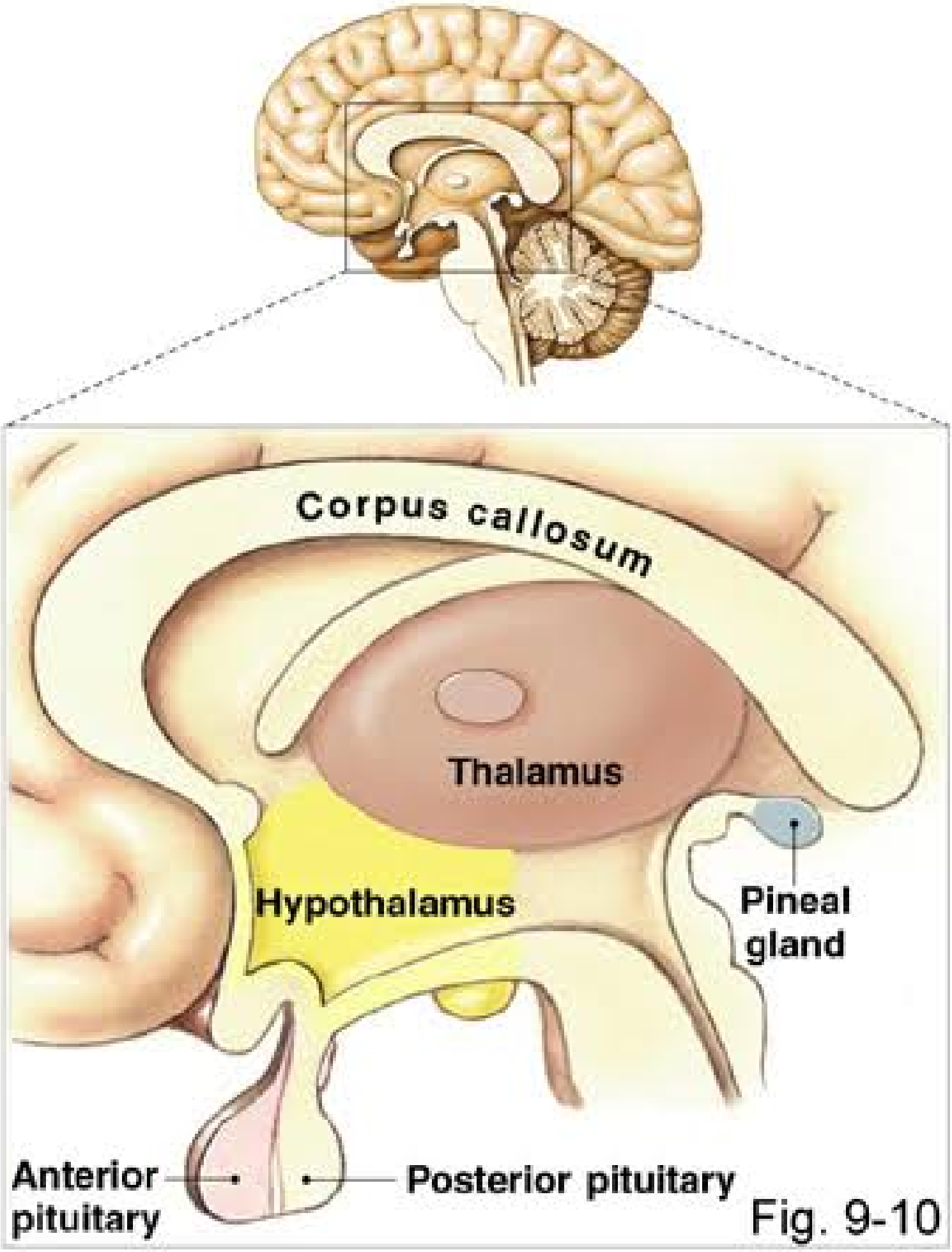
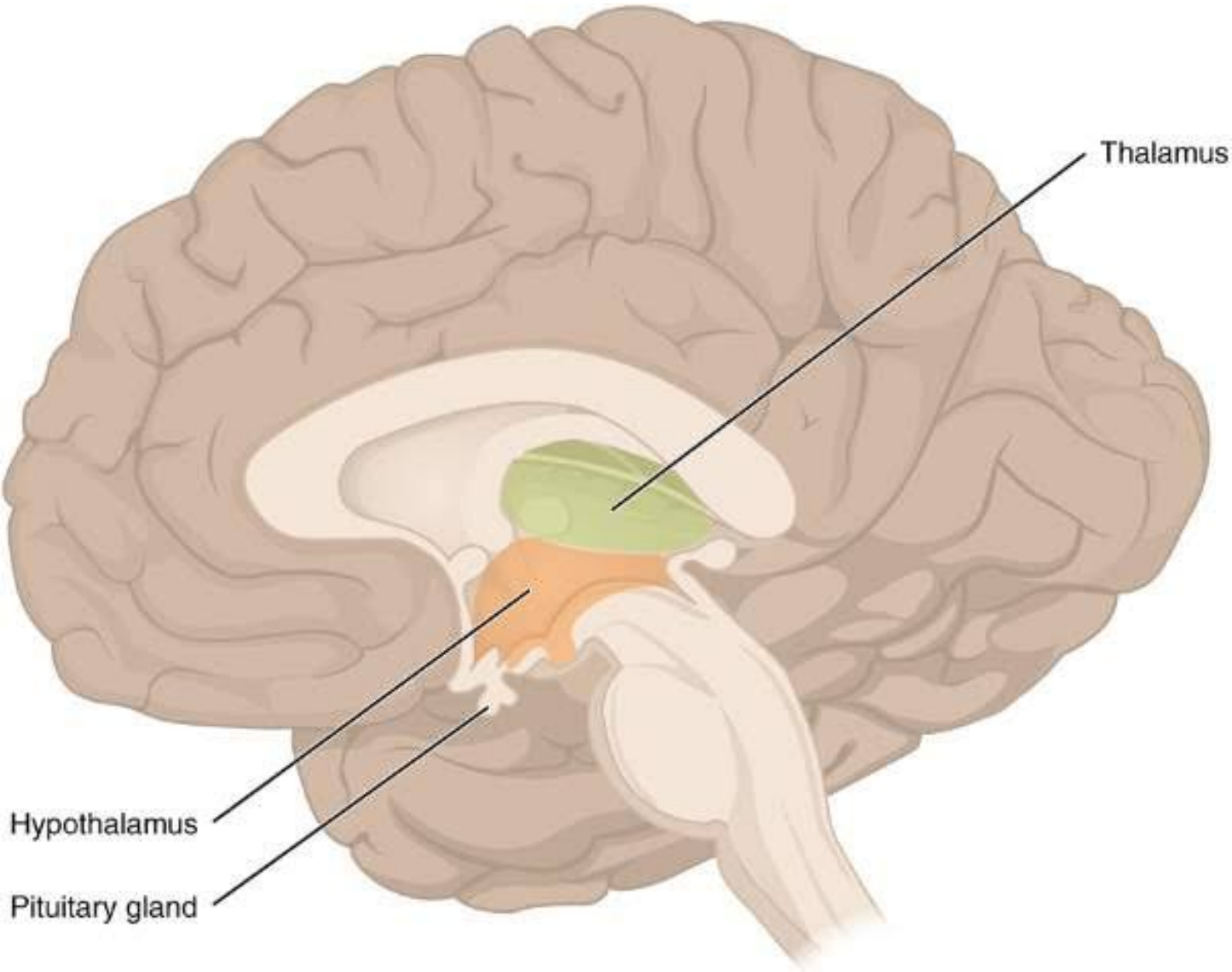
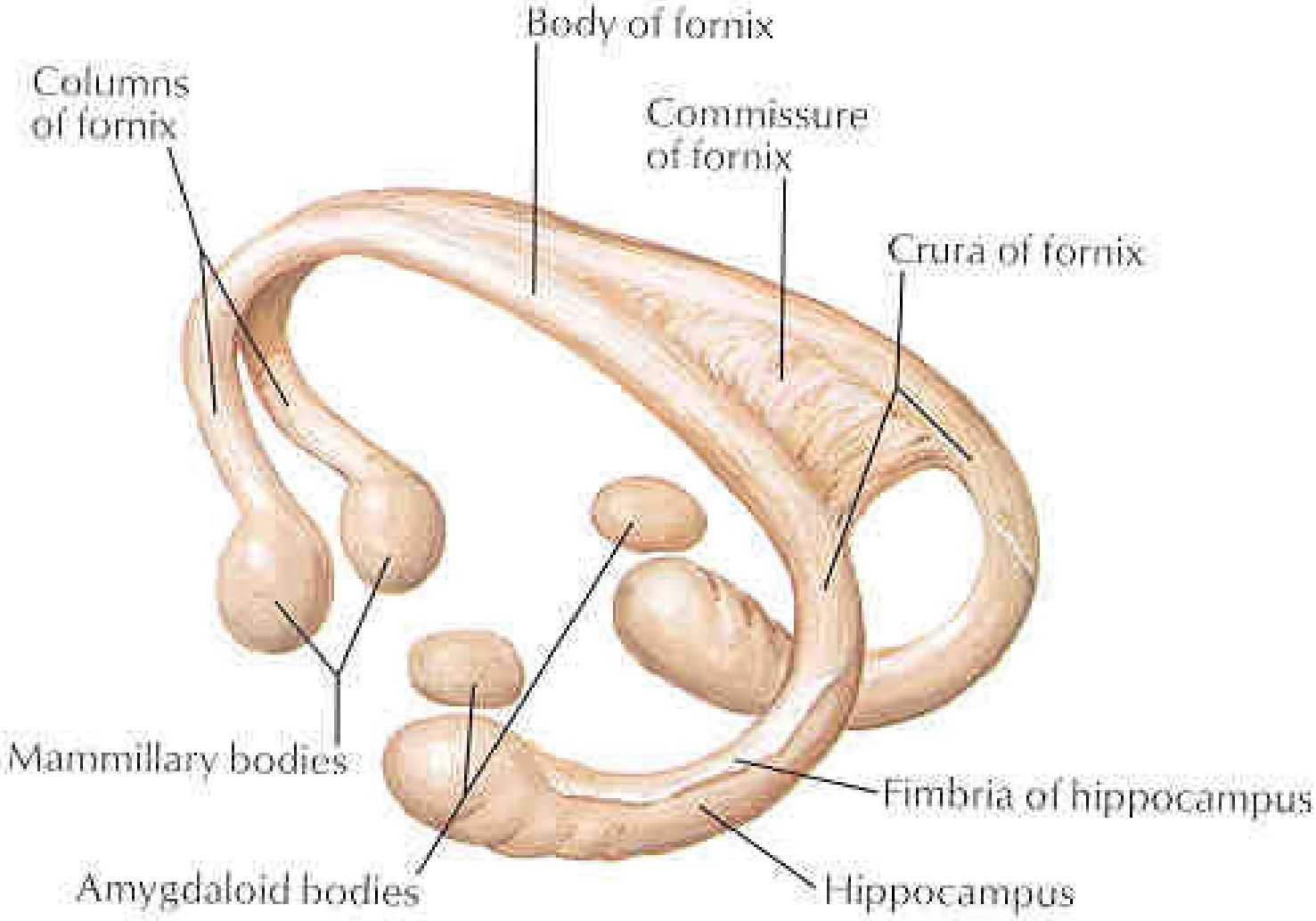
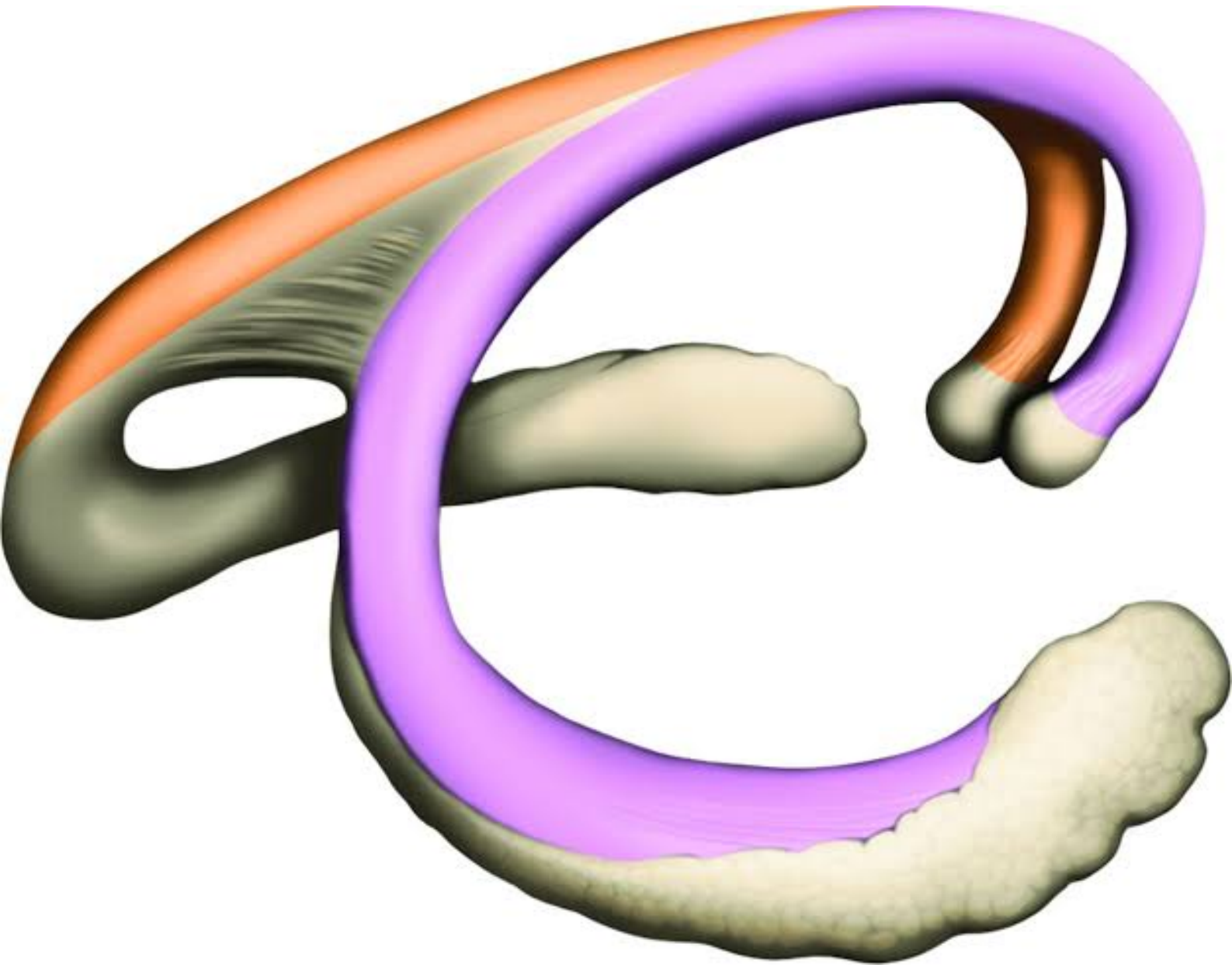


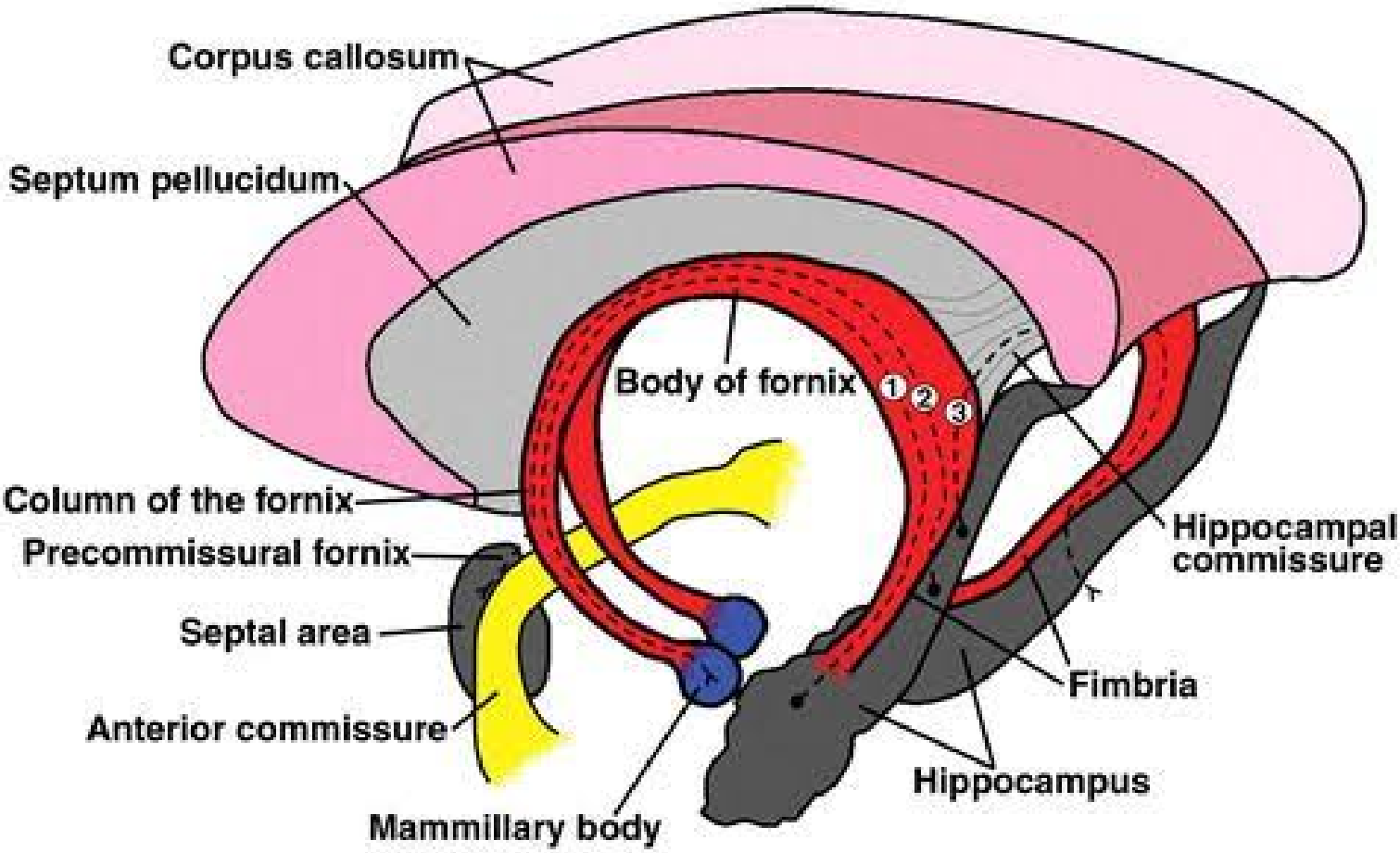
Fig. 9-10

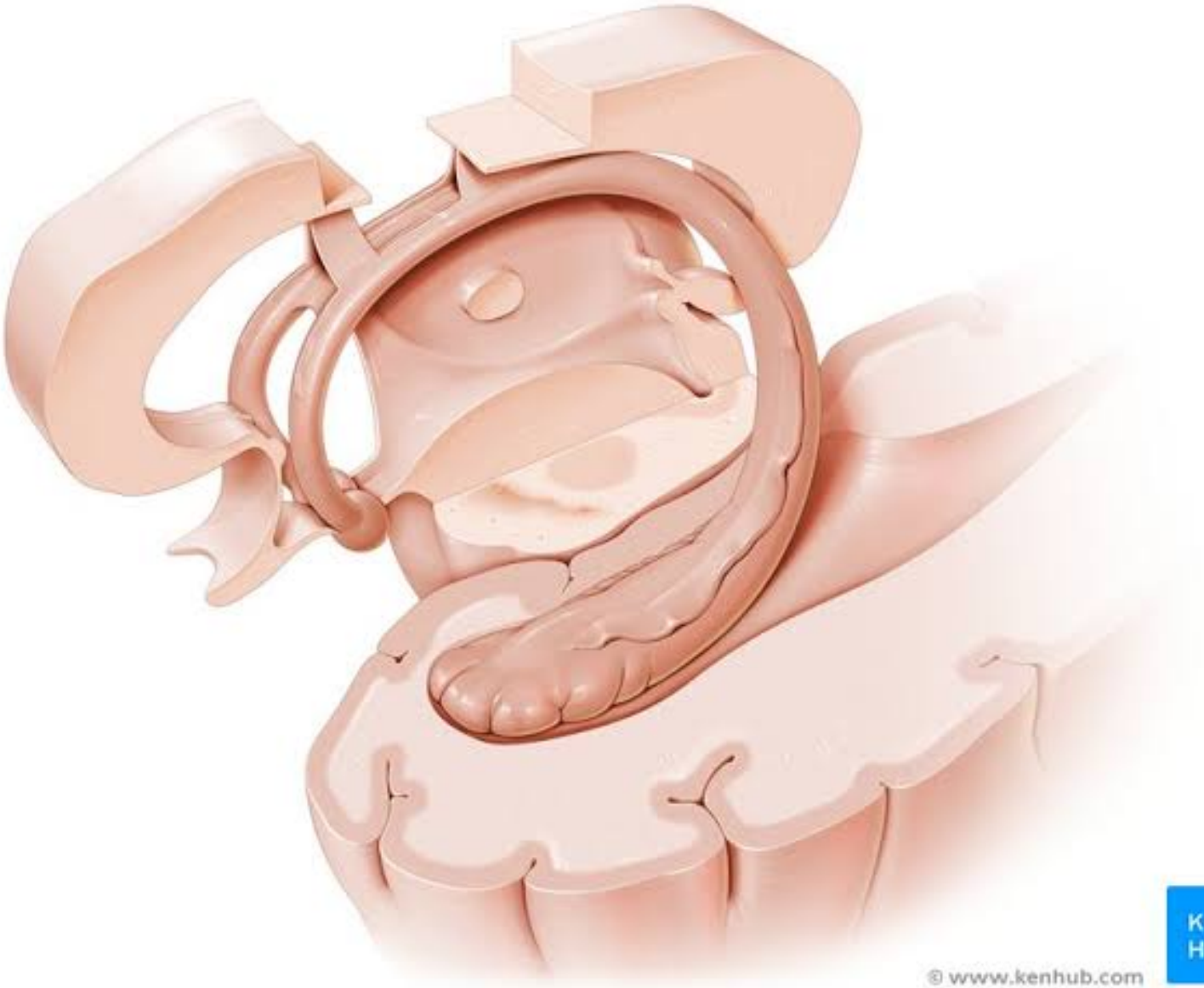

Thalamus
Hypothalamus
Pituitary gland

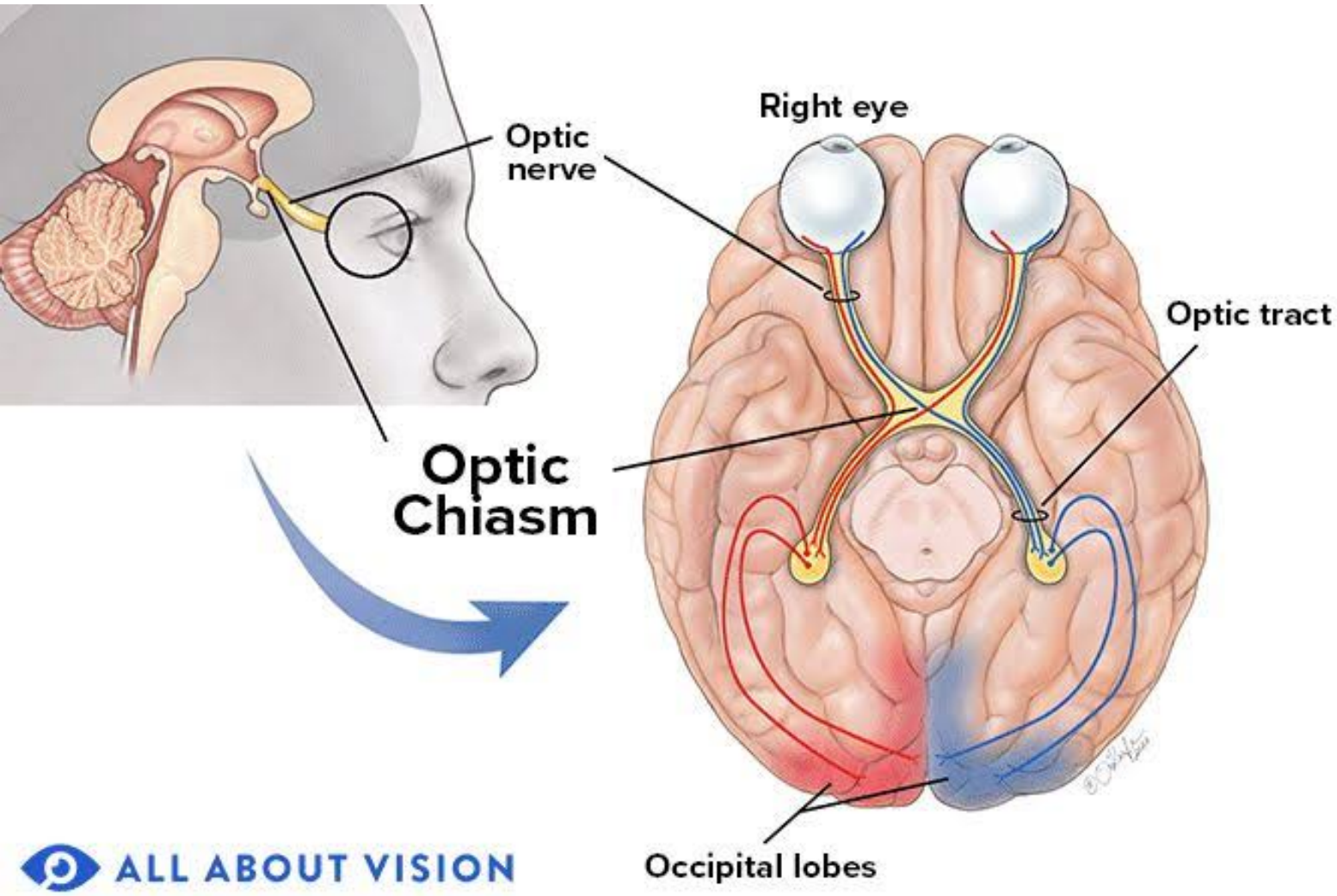


Fornix: schema

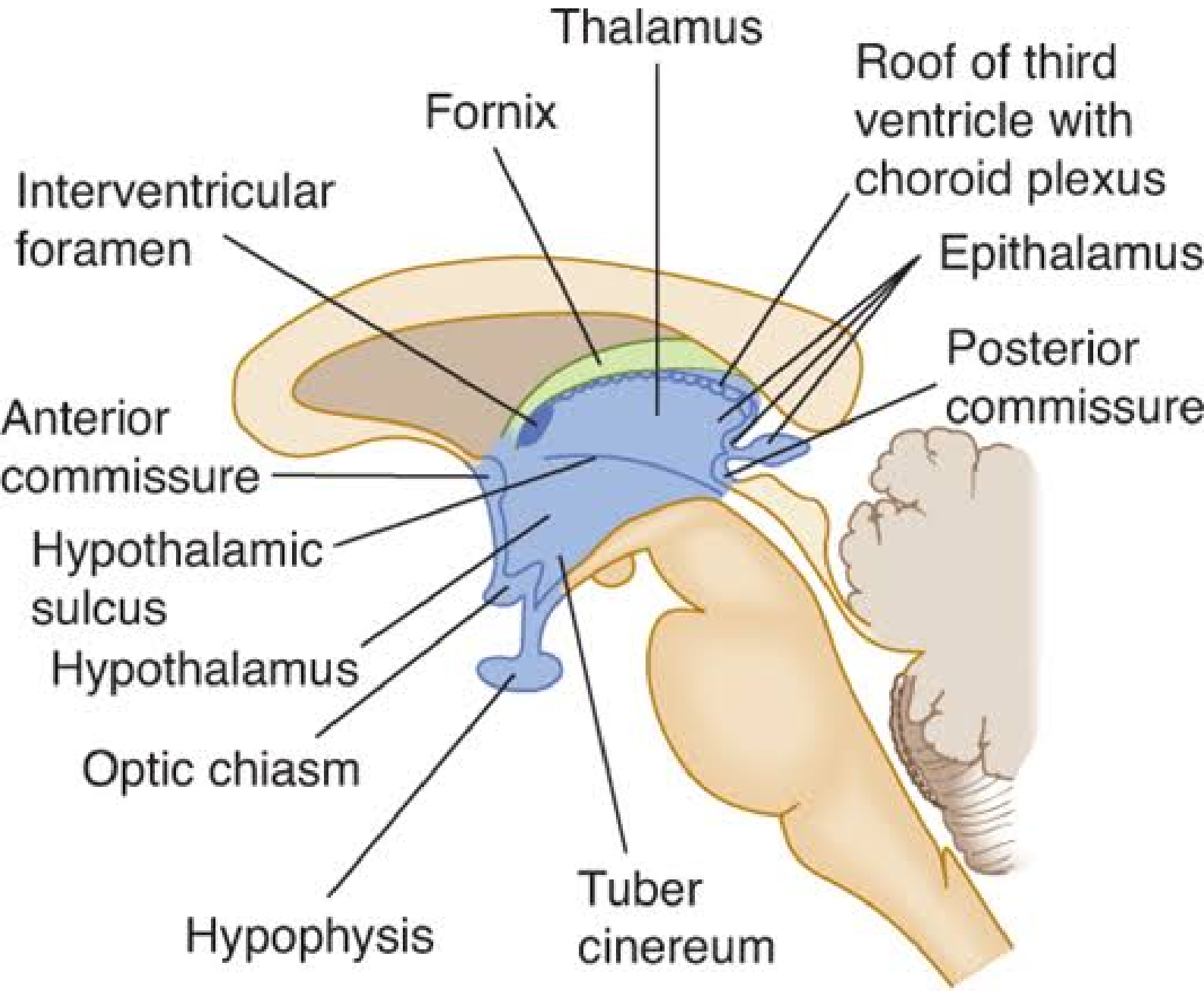



Corpus callosum
Septum pellucidum
Body of fornix
1
2
3
Column of the fornix
Precommissural fornix
Septal area
Anterior commissure
Mammillary body
Hippocampal commissure
Fimbria
Hippocampus

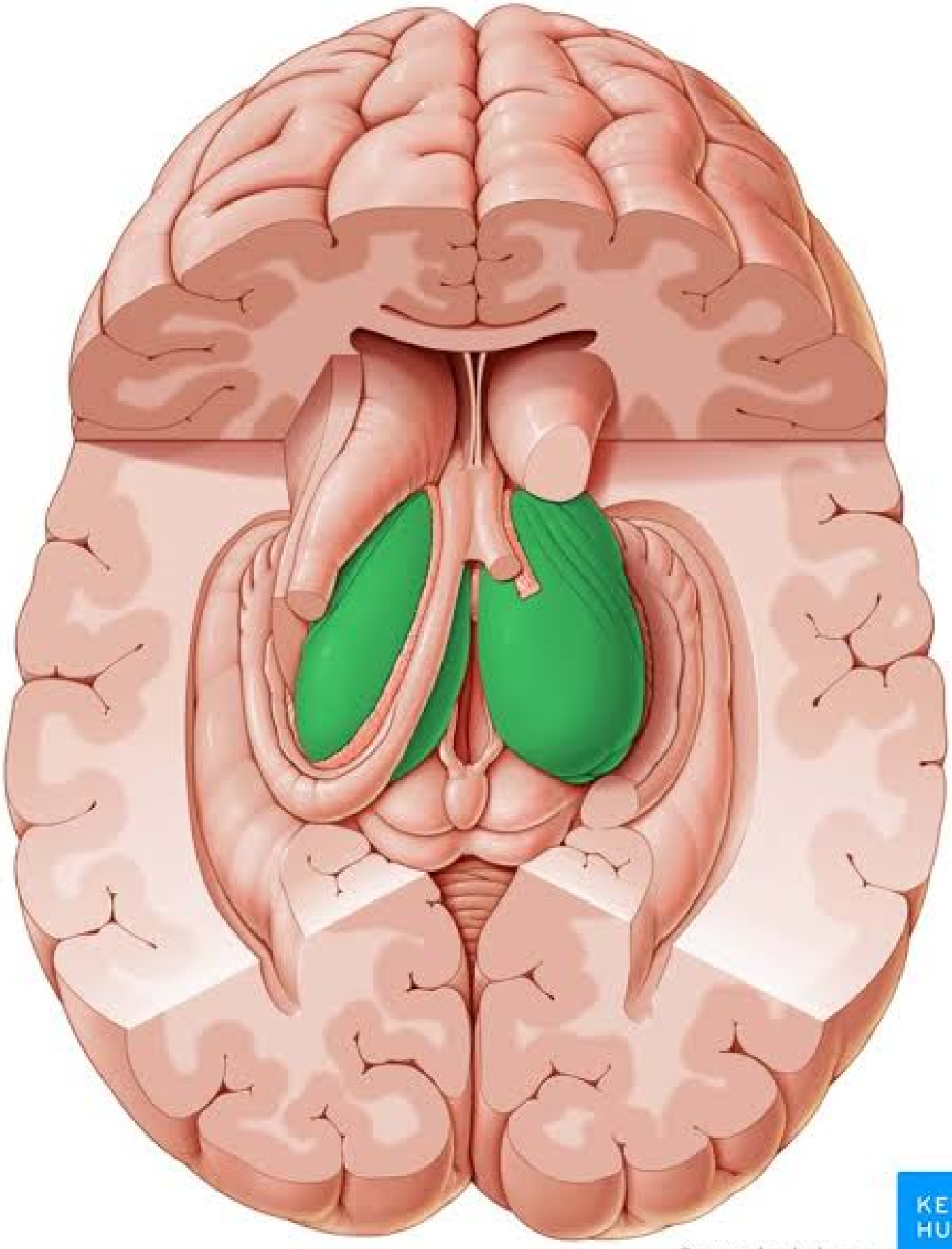


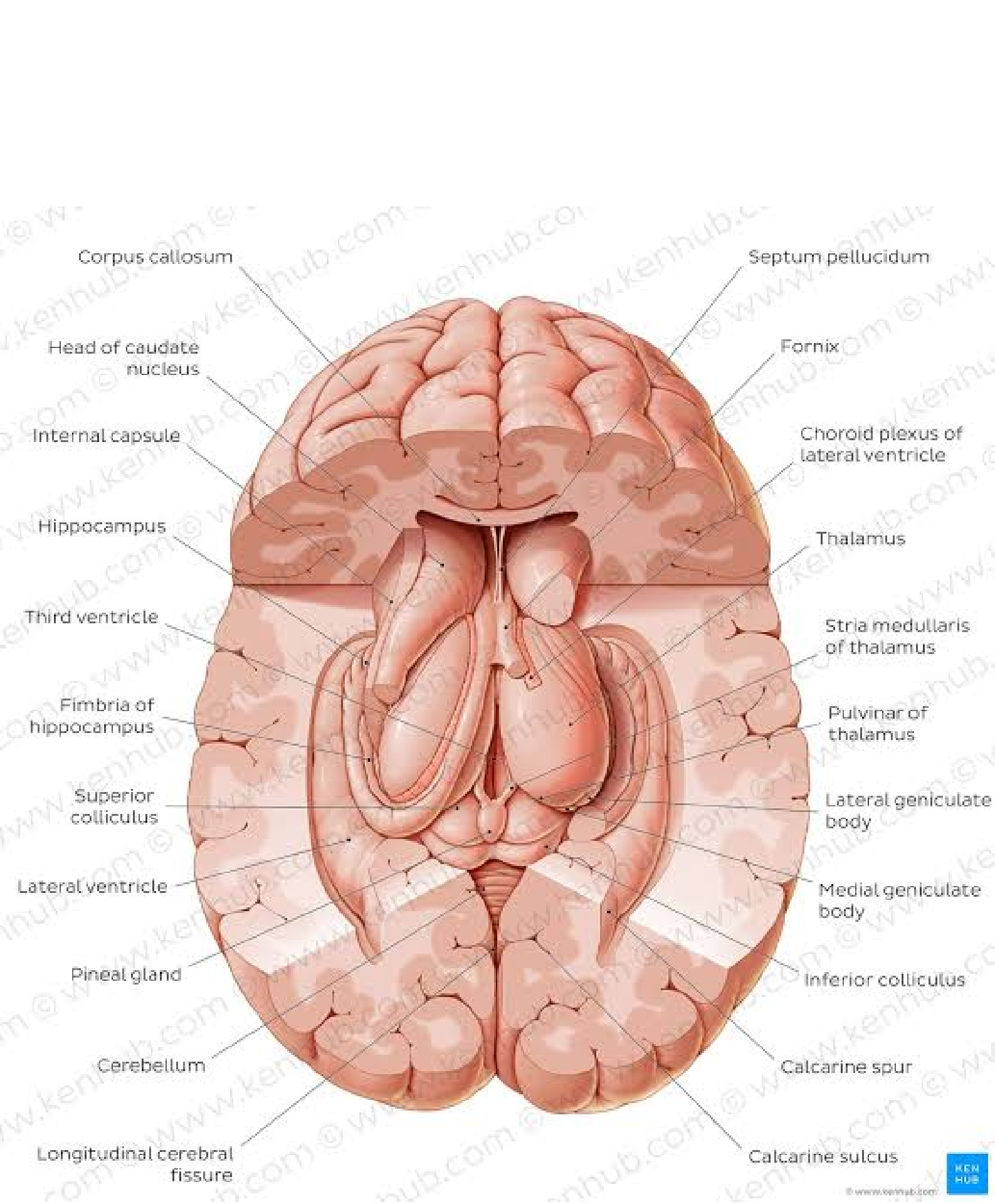


ALL ABOUT VISION

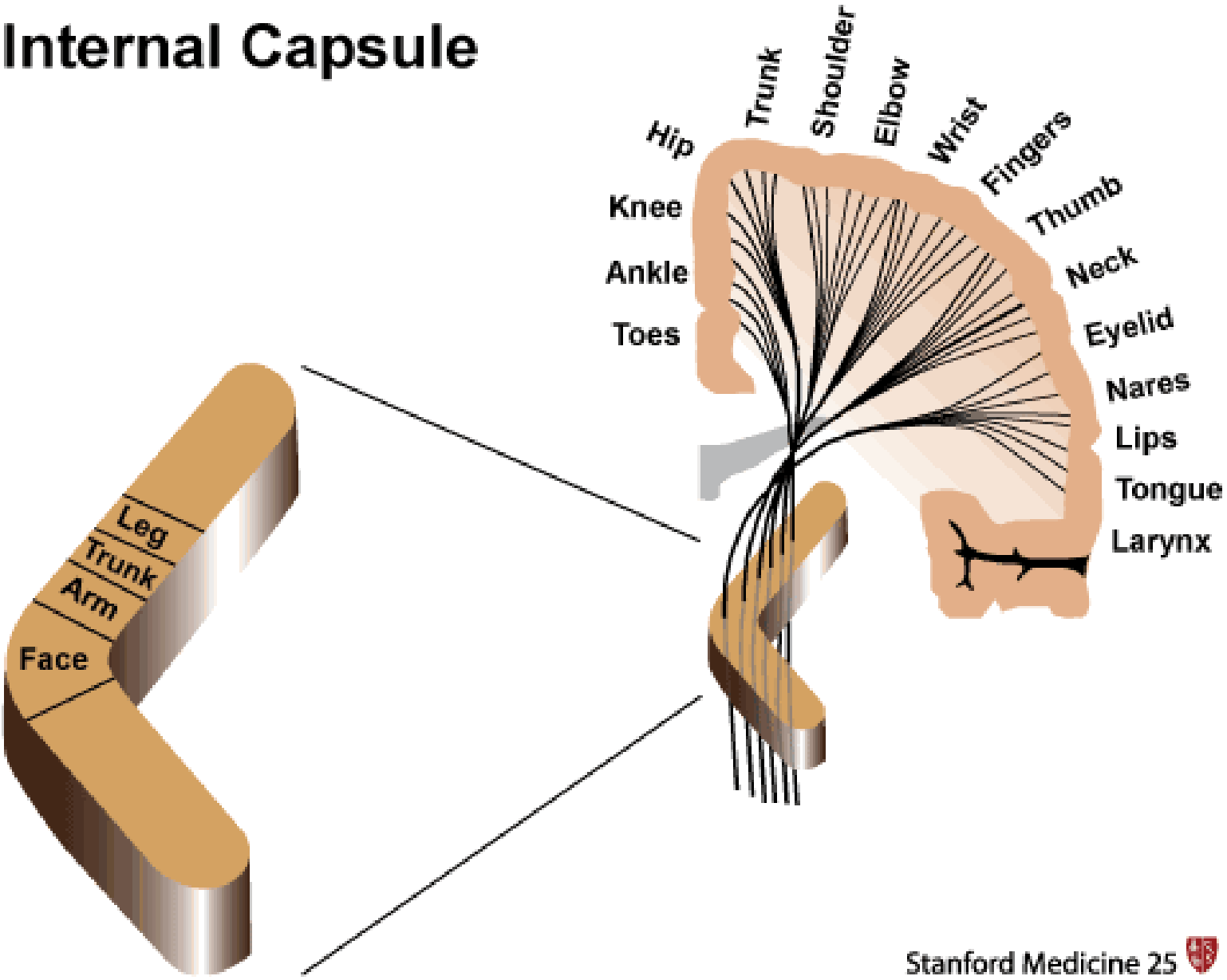


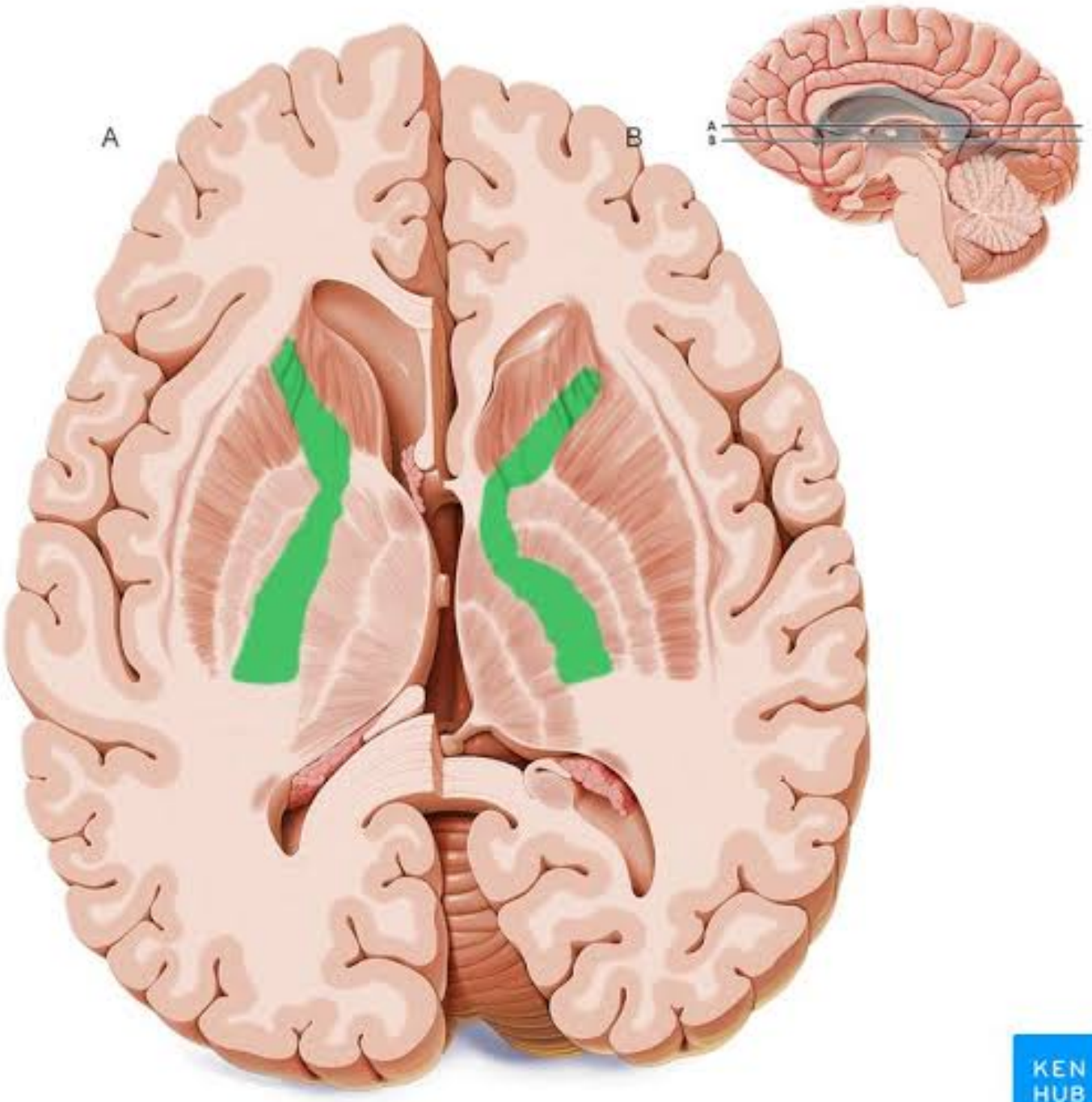
Source: Waxman SG: *Clinical Neuroanatomy: Twenty-Seventh Edition:*
www.accessmedicine.com

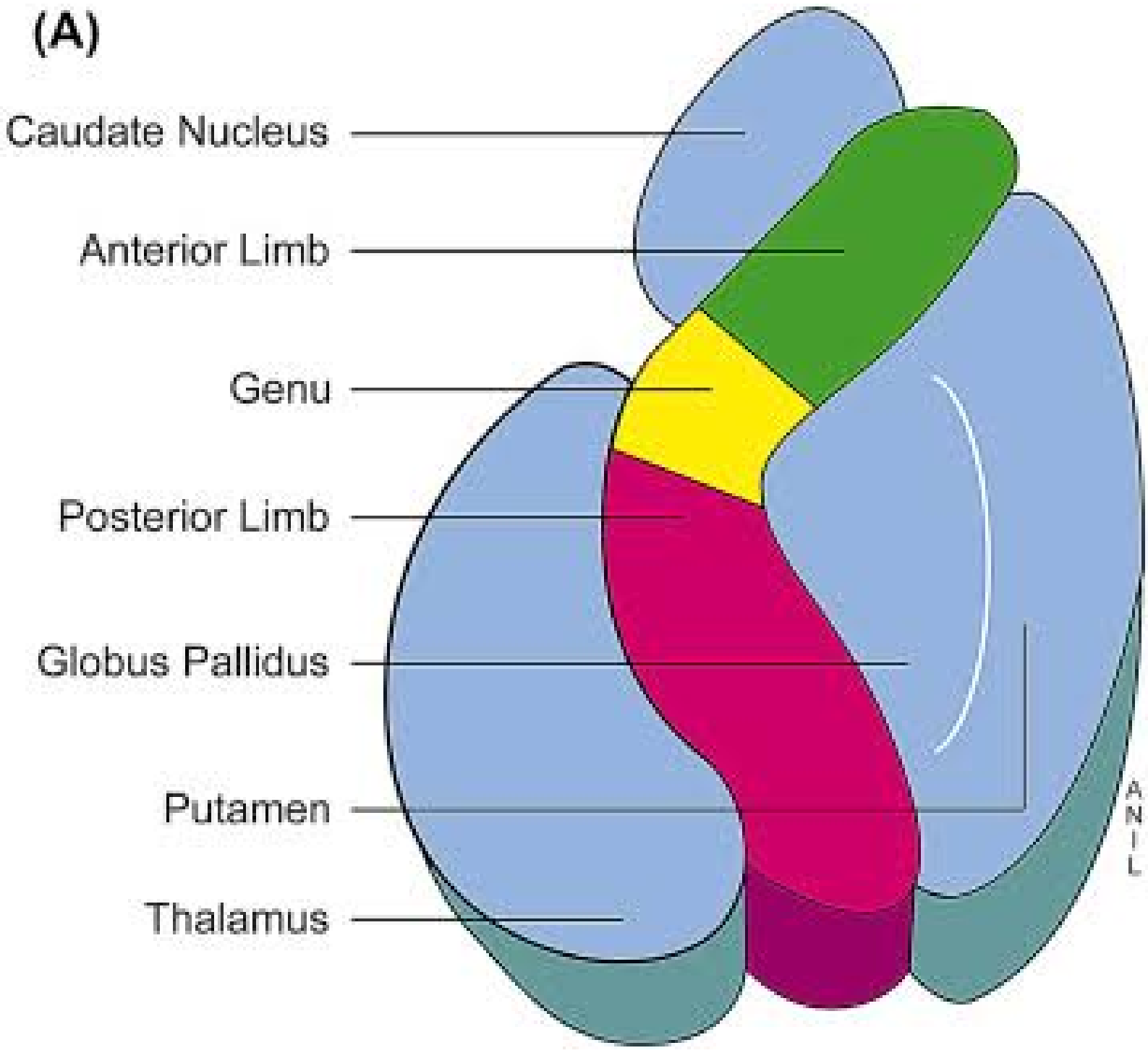


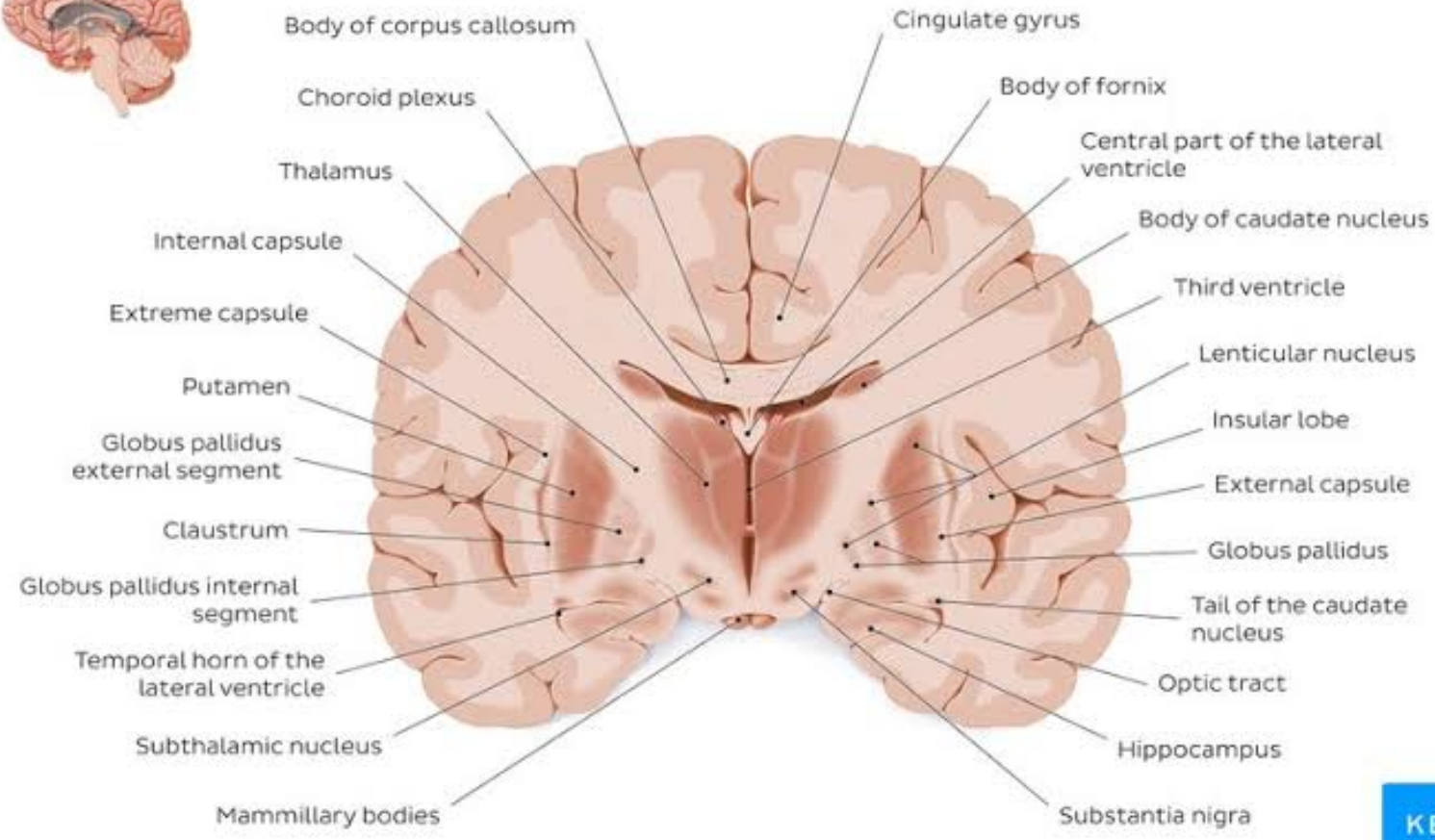

Corpus callosum
Septum pellucidum
Head of caudate nucleus
Fornix
Internal capsule
Choroid plexus of lateral ventricle
Hippocampus
Thalamus
Third ventricle
Stria medullaris of thalamus
Fimbria of hippocampus
Pulvinar of thalamus
Superior colliculus
Lateral geniculate body
Lateral ventricle
Medial geniculate body
Pineal gland
Inferior colliculus
Cerebellum
Calcarine spur
Longitudinal cerebral fissure
Calcarine sulcus

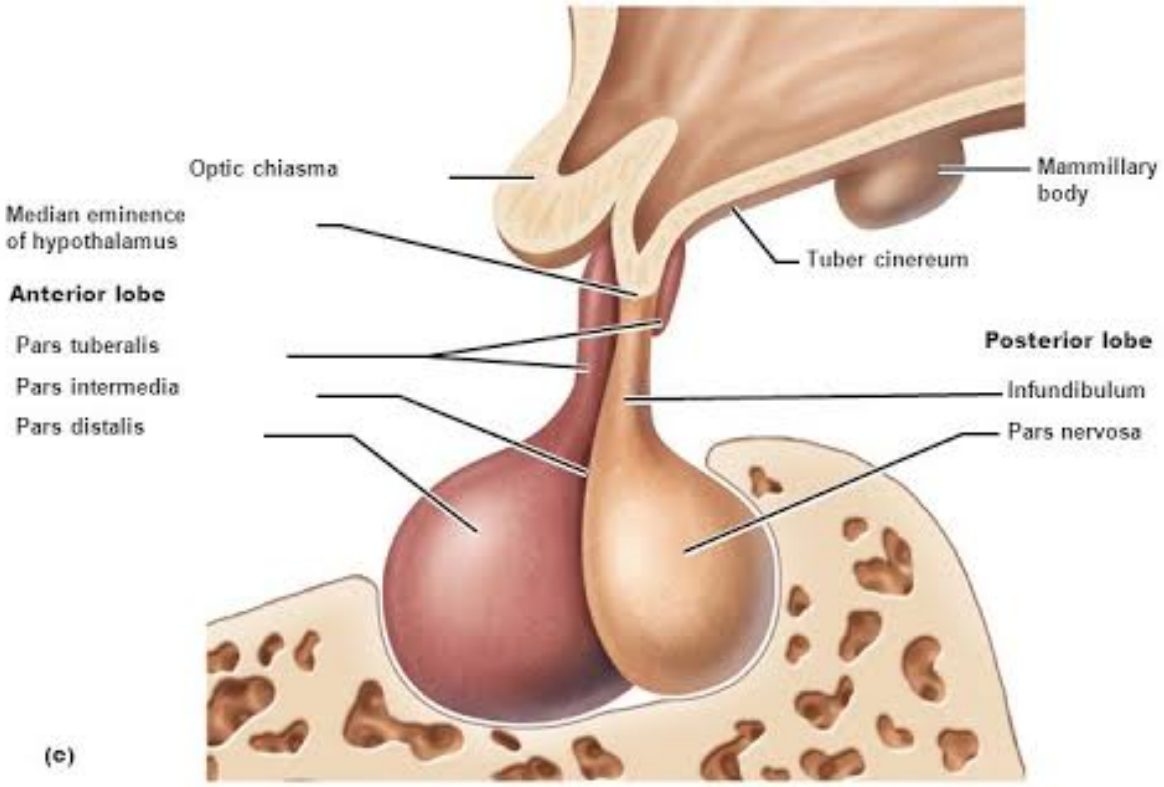
Internal Capsule

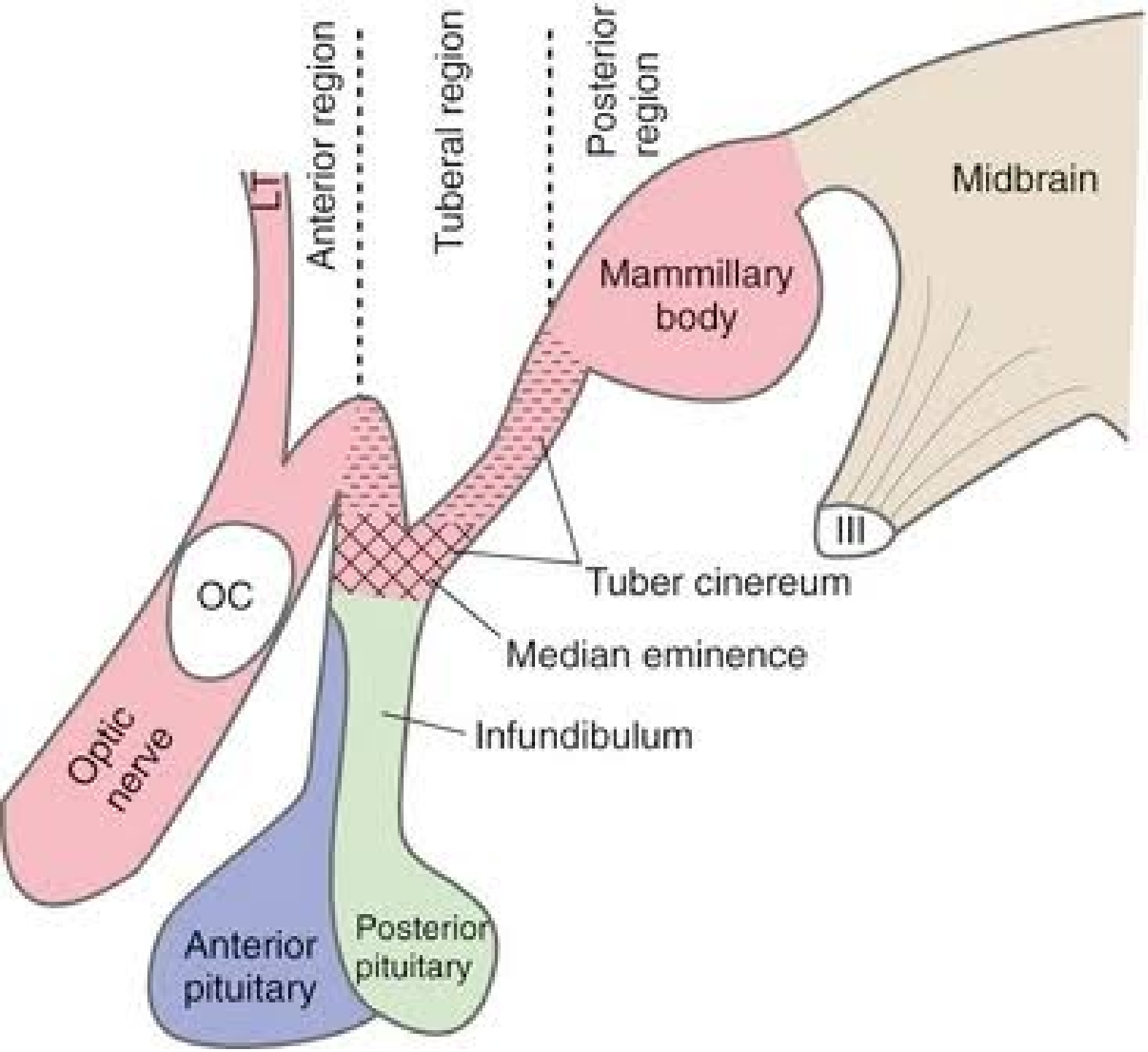


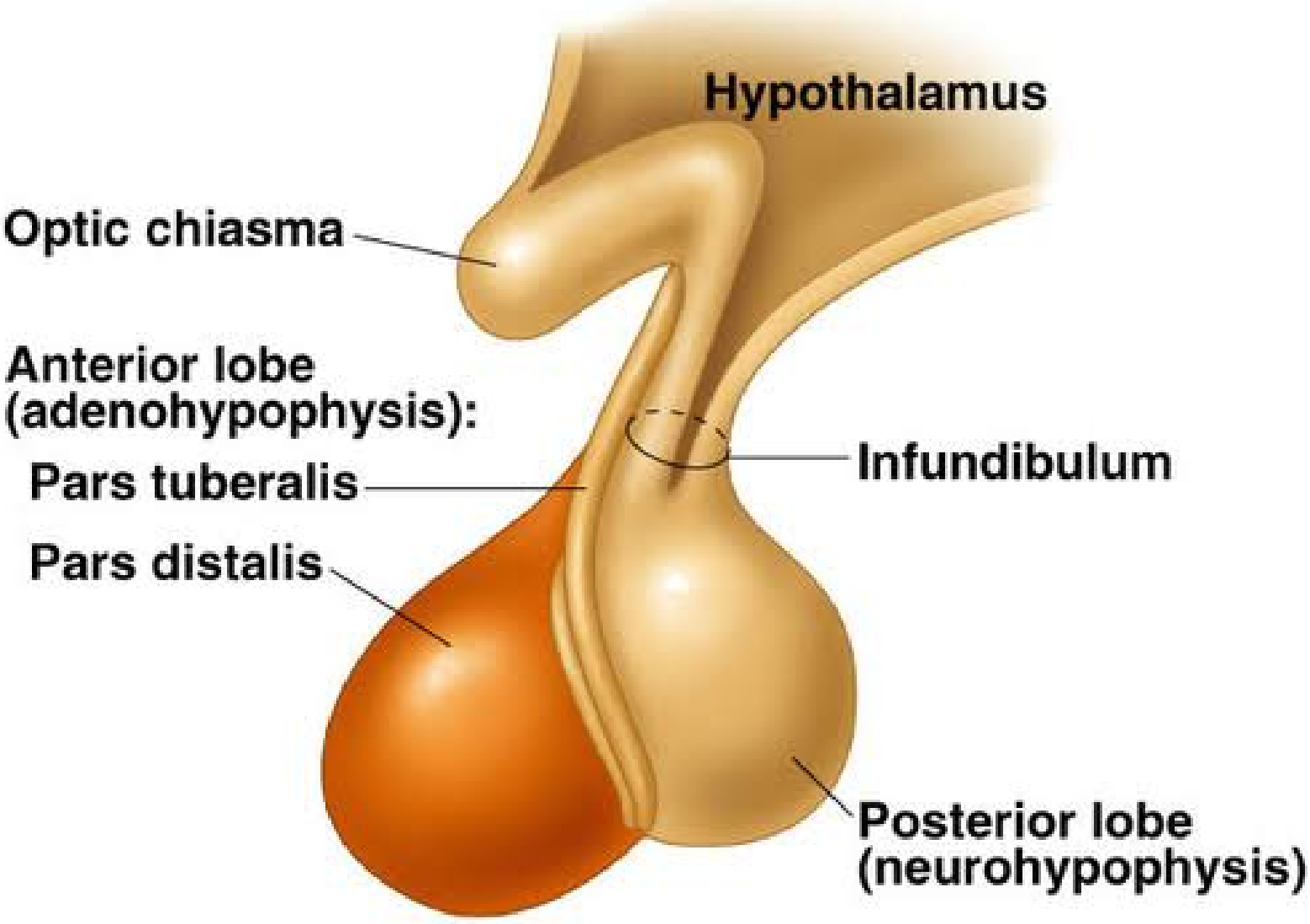


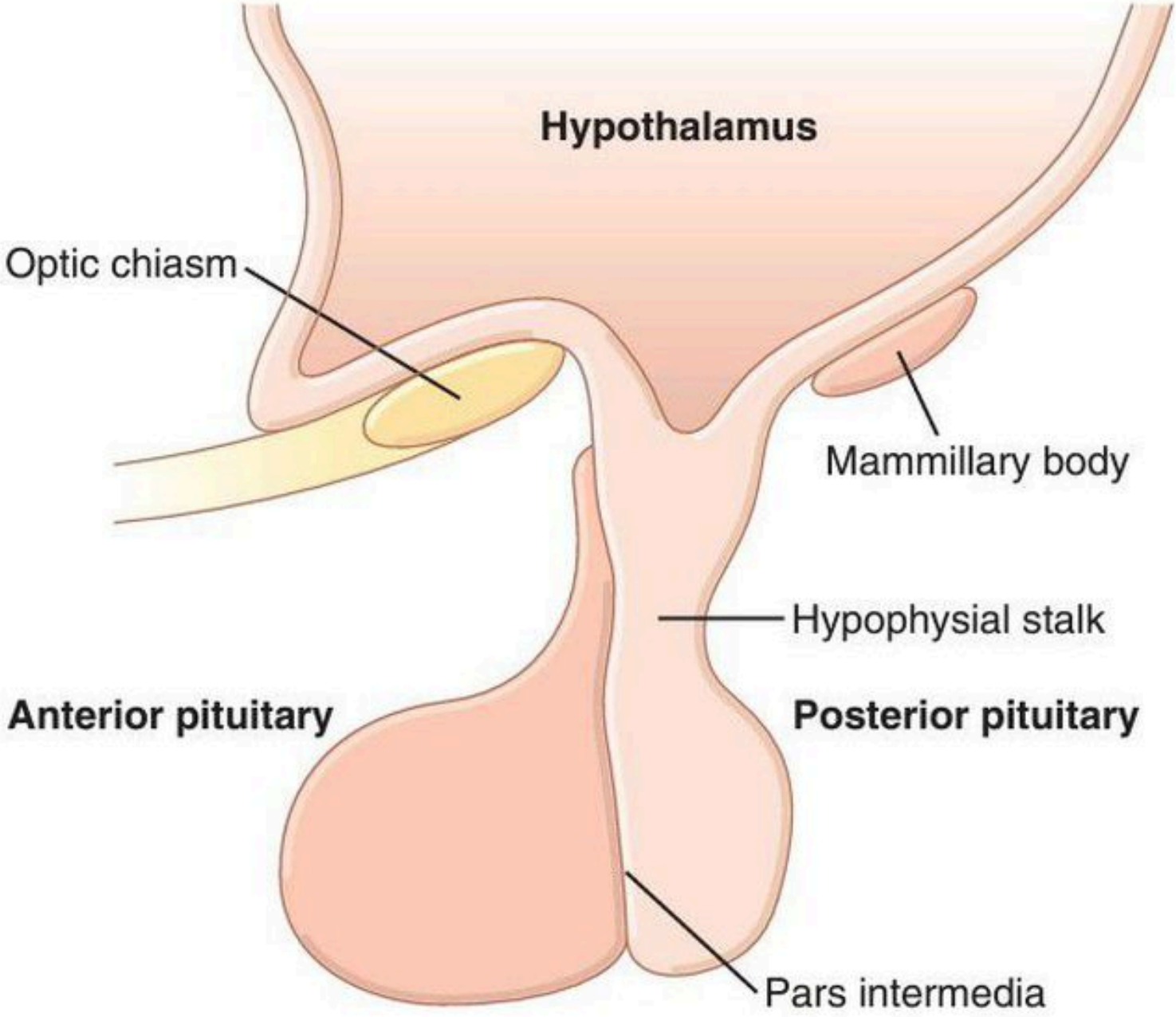

(A)
Caudate Nucleus
Anterior Limb
Genu
Posterior Limb
Globus Pallidus
Putamen
Thalamus
ANIL

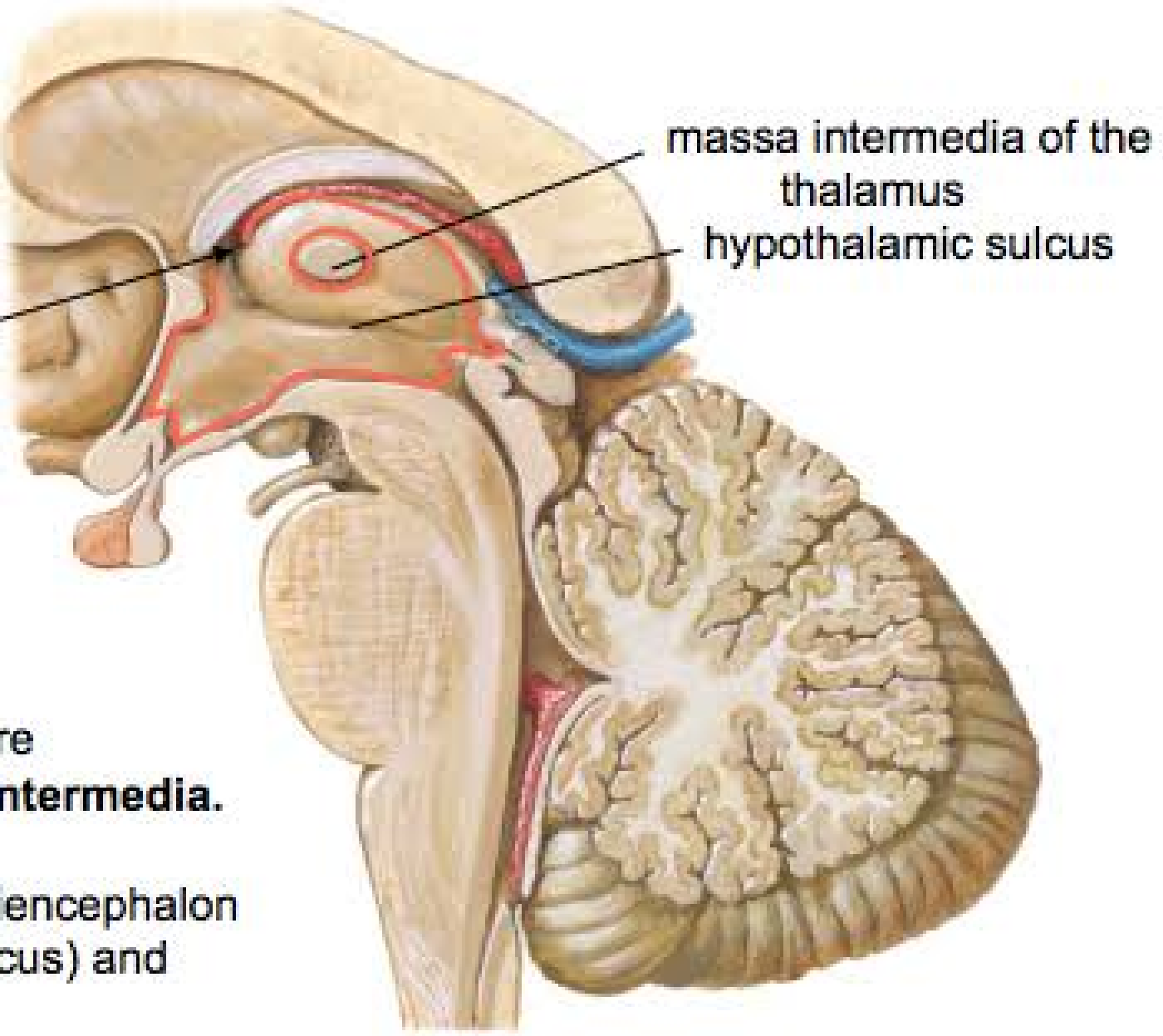





LT
Anterior region
Tuberal region
Posterior region
Midbrain
Mammillary body
III
OC
Tuber cinereum
Median eminence
Infundibulum
Optic nerve
Anterior pituitary
Posterior pituitary




Hypothalamus
Optic chiasm
Mammillary body
Hypophysial stalk
Anterior pituitary
Posterior pituitary
Pars intermedia



re
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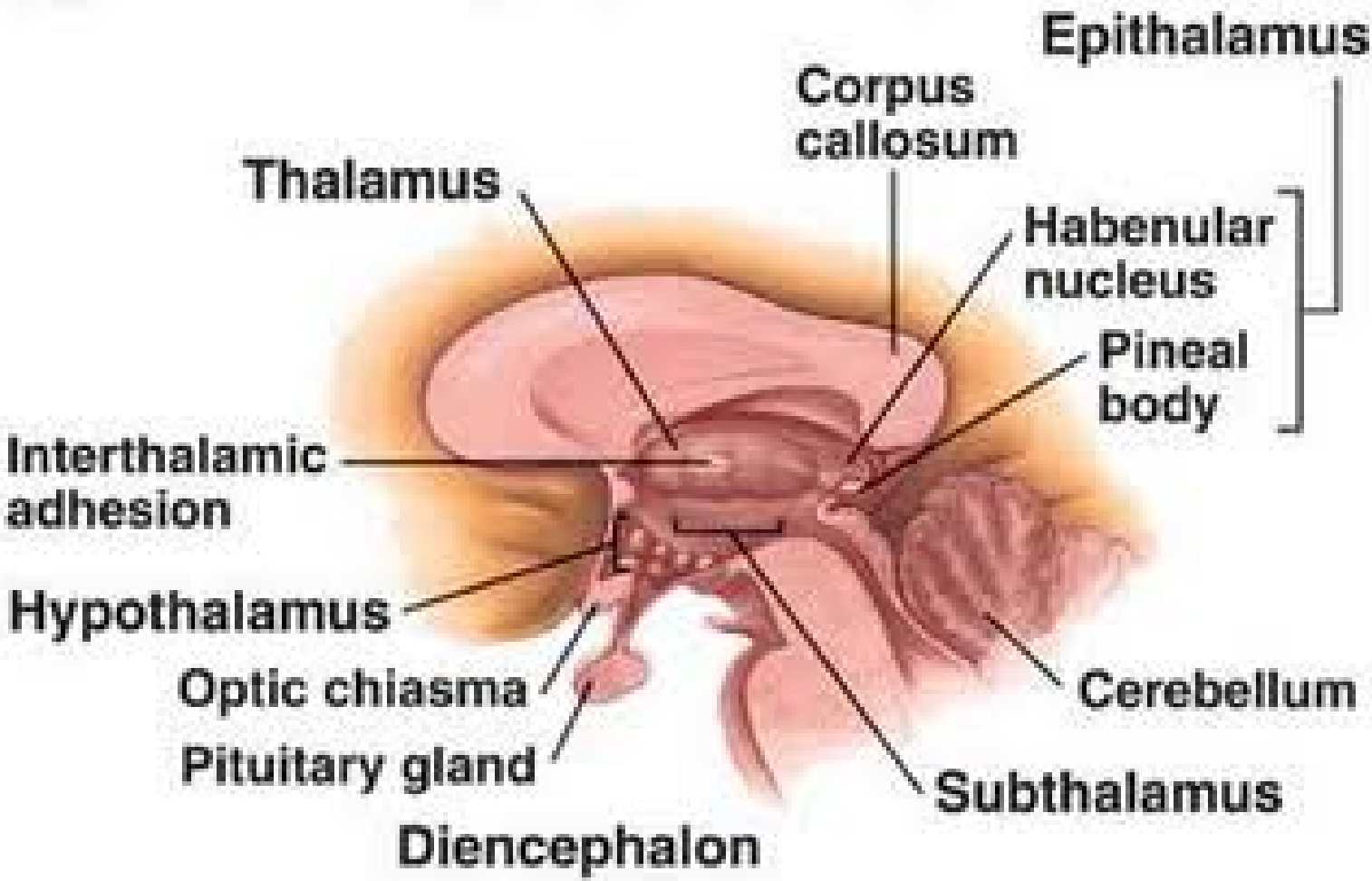
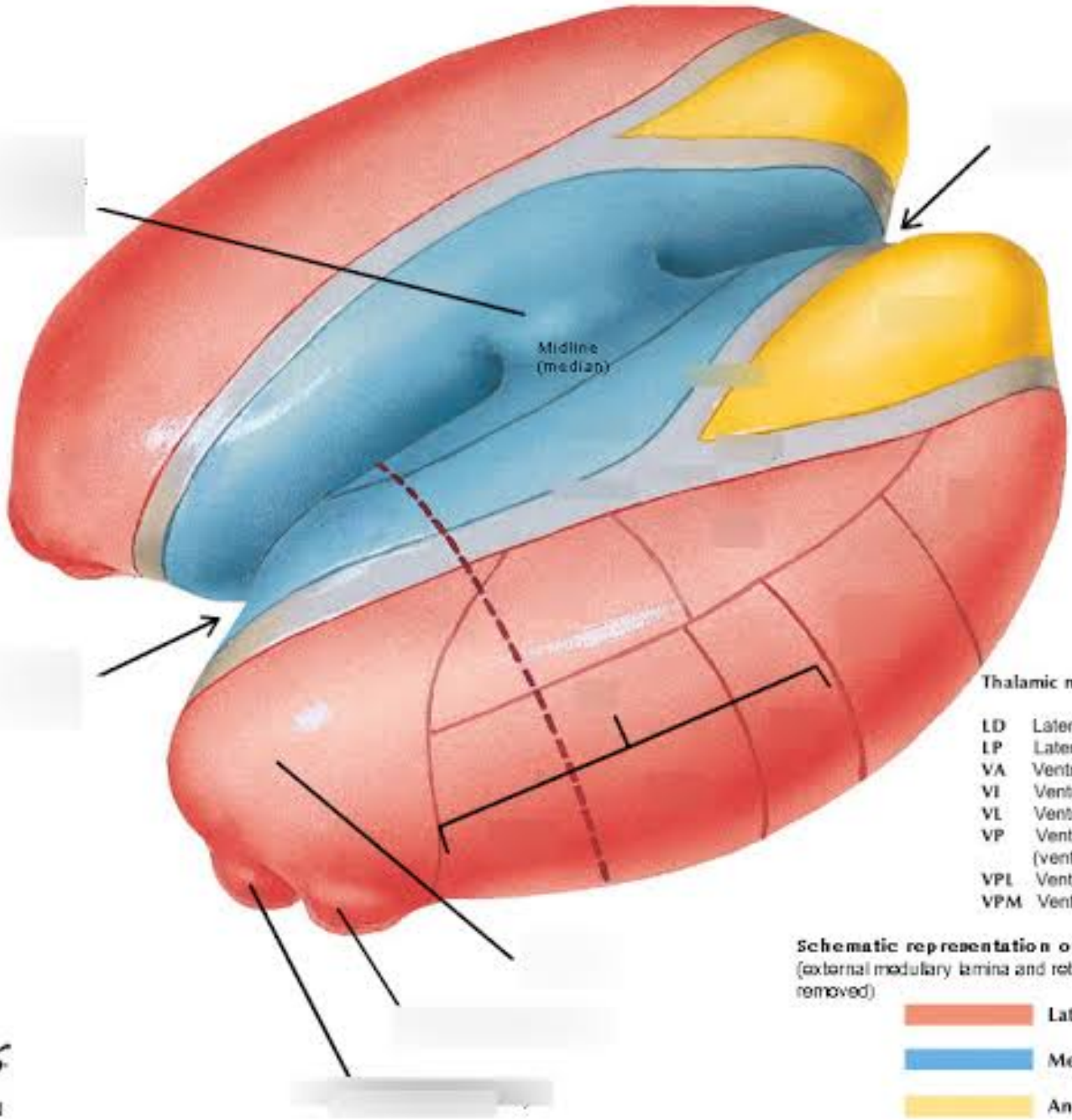
Interthalamic adhesion


Epithalamus
Corpus callosum
Thalamus
Habenular nucleus
Pineal body
Interthalamic adhesion
Hypothalamus
Optic chiasma
Pituitary gland
Diencephalon
Cerebellum
Subthalamus

Thalamic Nuclei



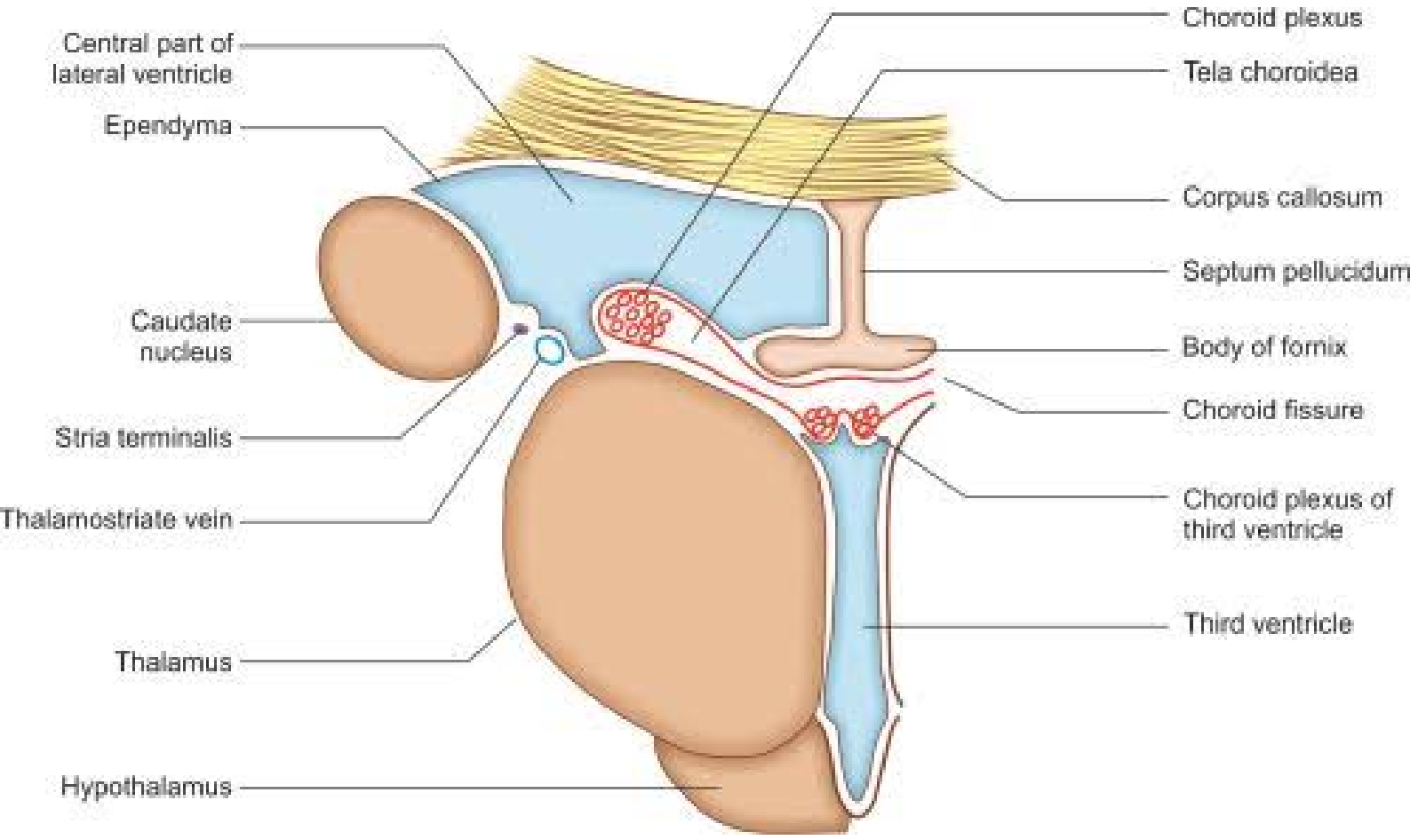
Thalamic nuclei

LD	Lateral dorsal
LP	Lateral posterior
VA	Ventral anterior
VI	Ventral intermedial
VL	Ventral lateral
VP	Ventral posterior (ventrodorsal)
VPL	Ventral posterolateral
VPM	Ventral posteromedial

Schematic representation of thalamus
(external medullary lamina and reticular nuclei removed)

- Lateral cell mass
- Medial cell mass
- Anterior cell mass

F. Netter M.D.
©IBN


Central part of lateral ventricle
Ependyma
Caudate nucleus
Stria terminalis
Thalamostriate vein
Thalamus
Hypothalamus
Choroid plexus
Tela choroidea
Corpus callosum
Septum pellucidum
Body of fornix
Choroid fissure
Choroid plexus of third ventricle
Third ventricle

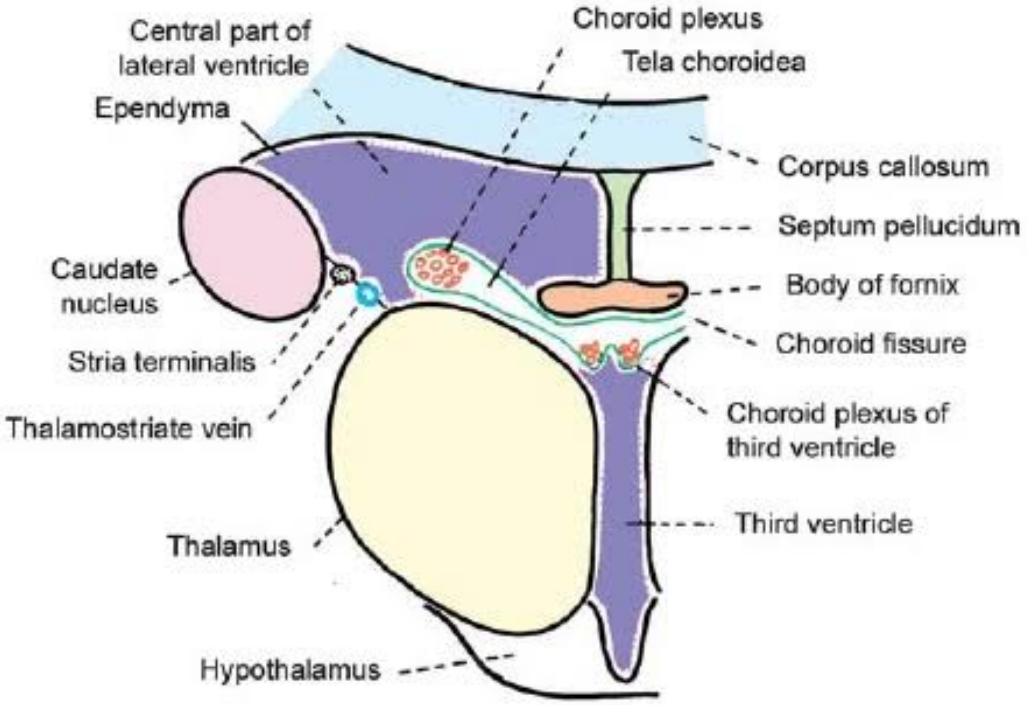
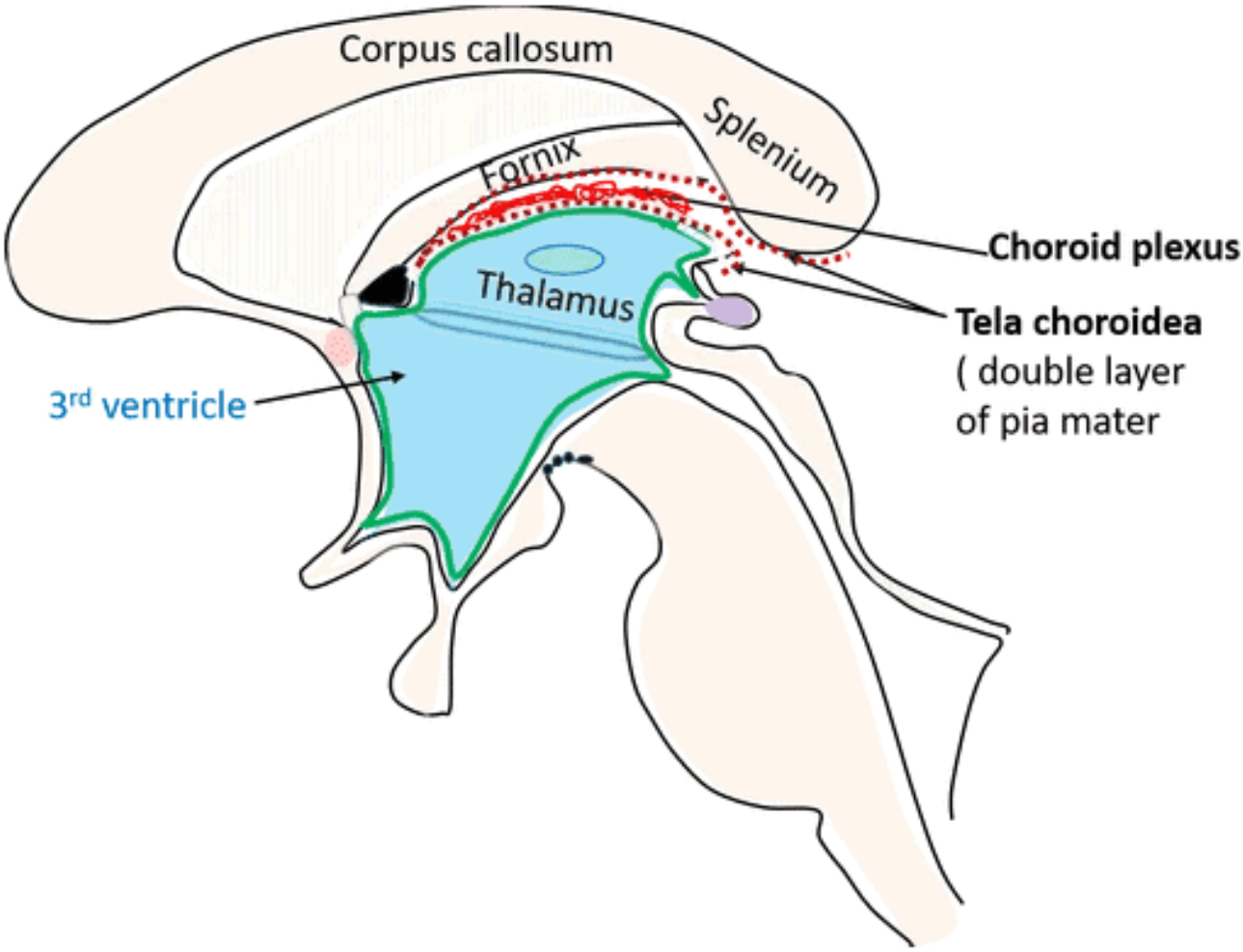
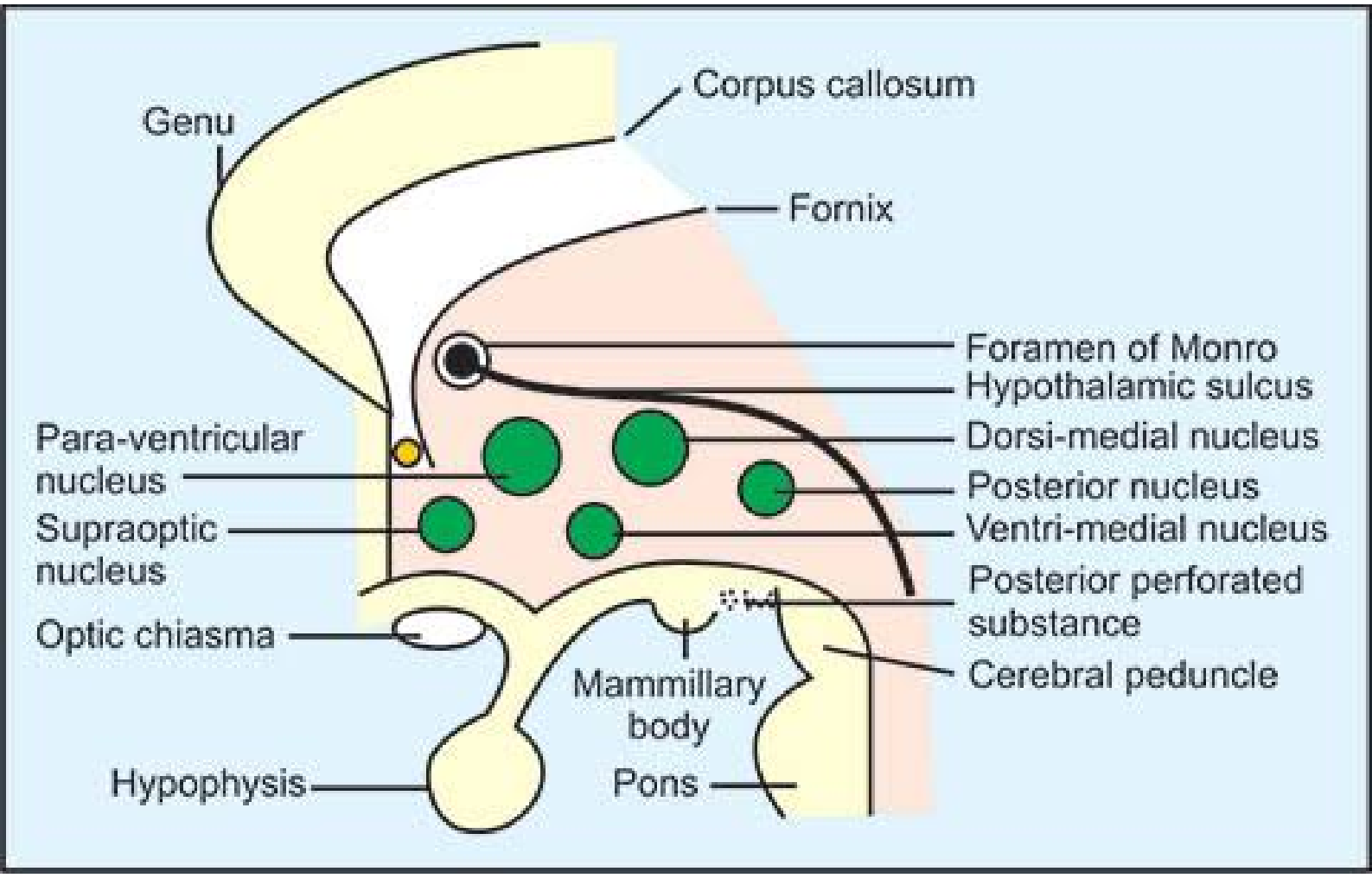
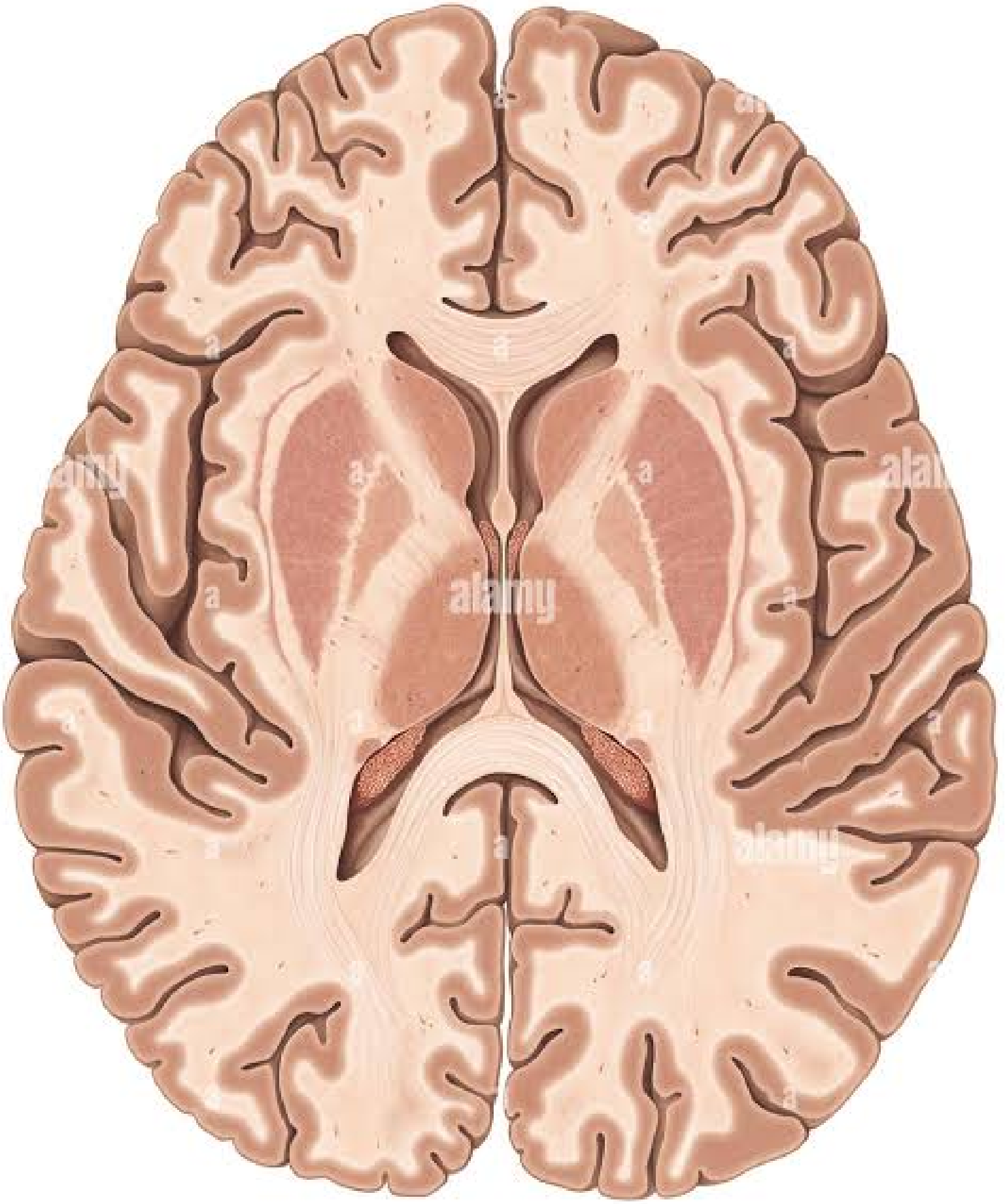
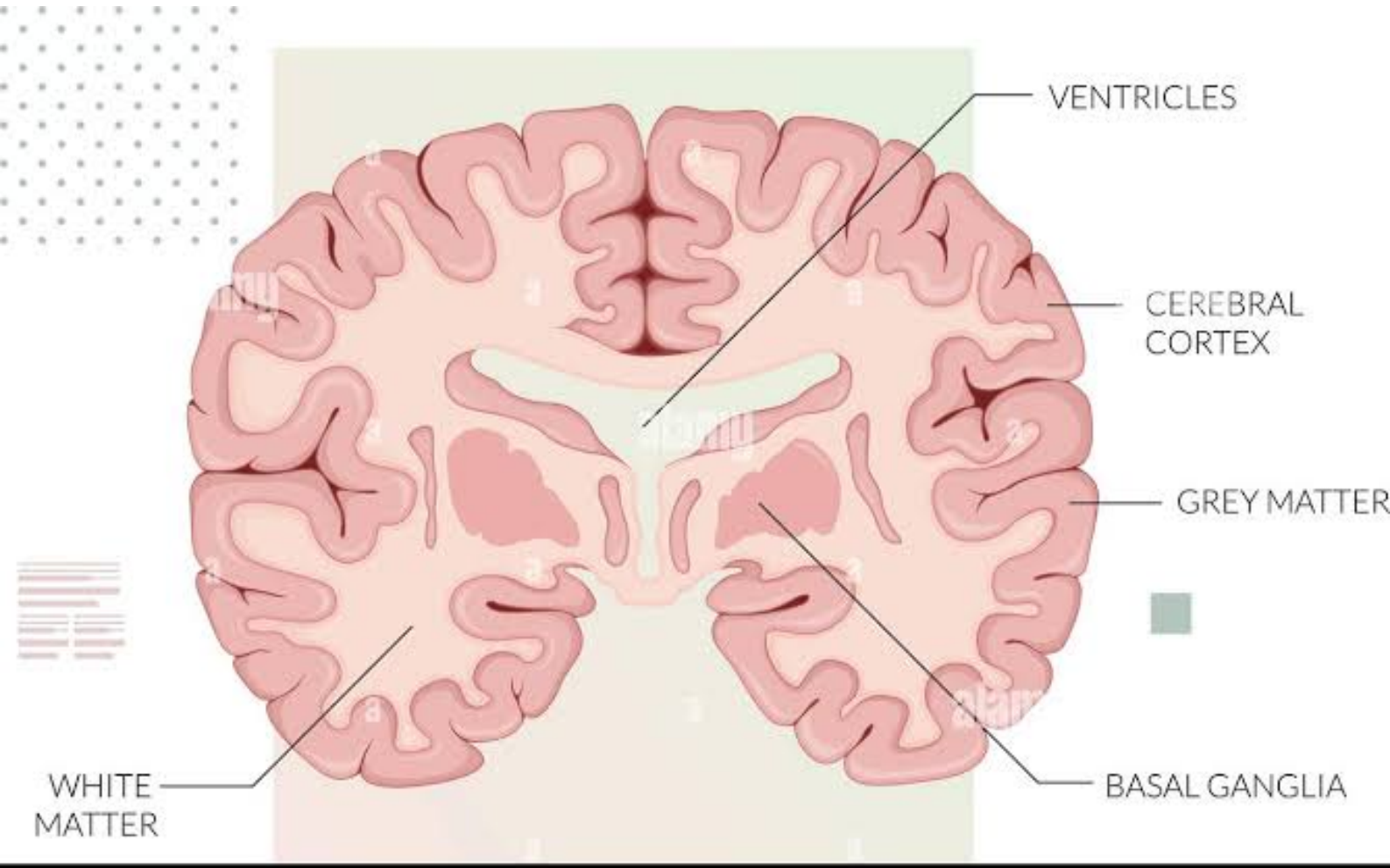


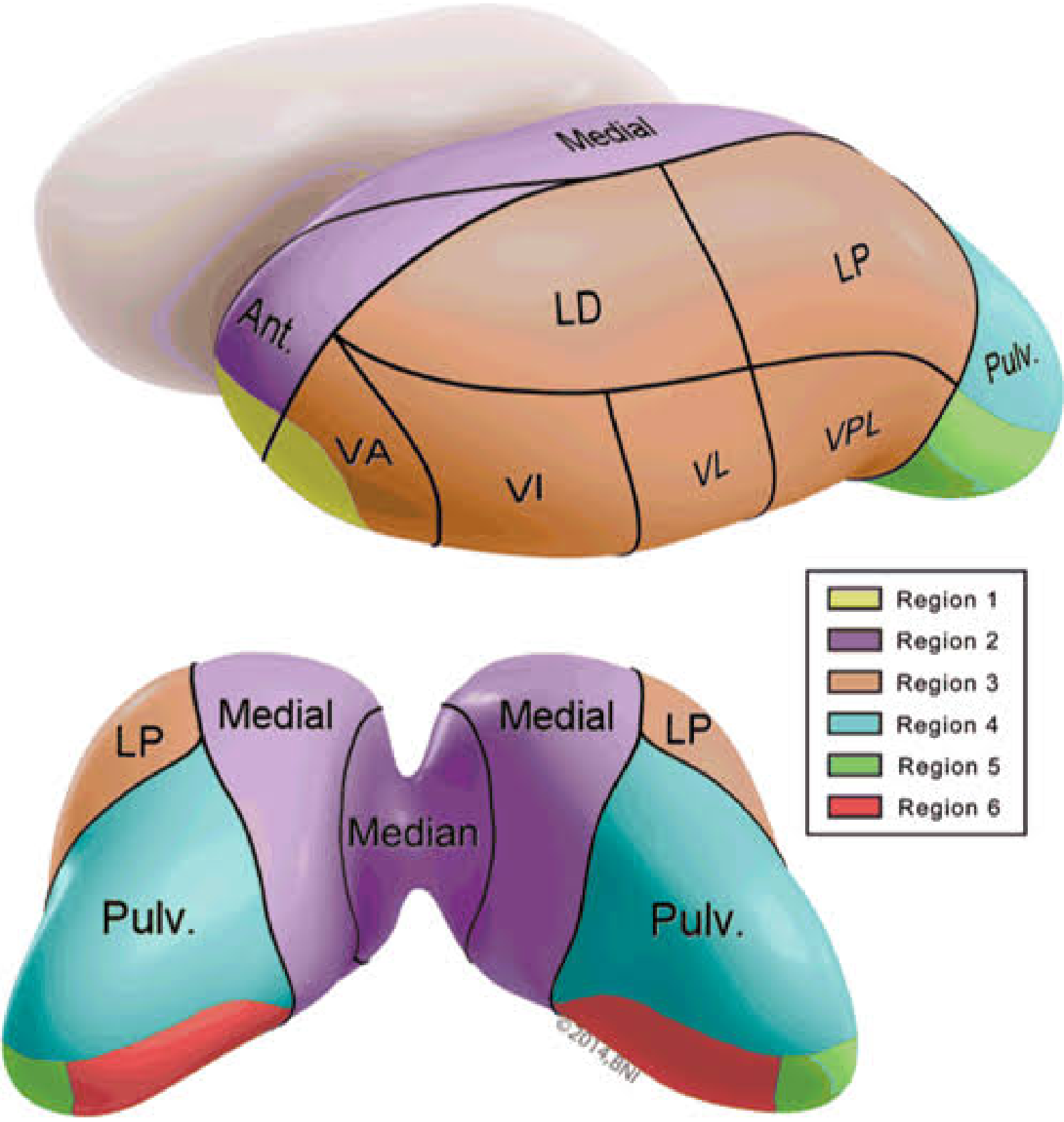
Fig. 20.2. Boundaries of the central part of the lateral ventricle and of the third ventricle. Note the relationship of the tela choroidea and the choroid plexuses to these ventricles.

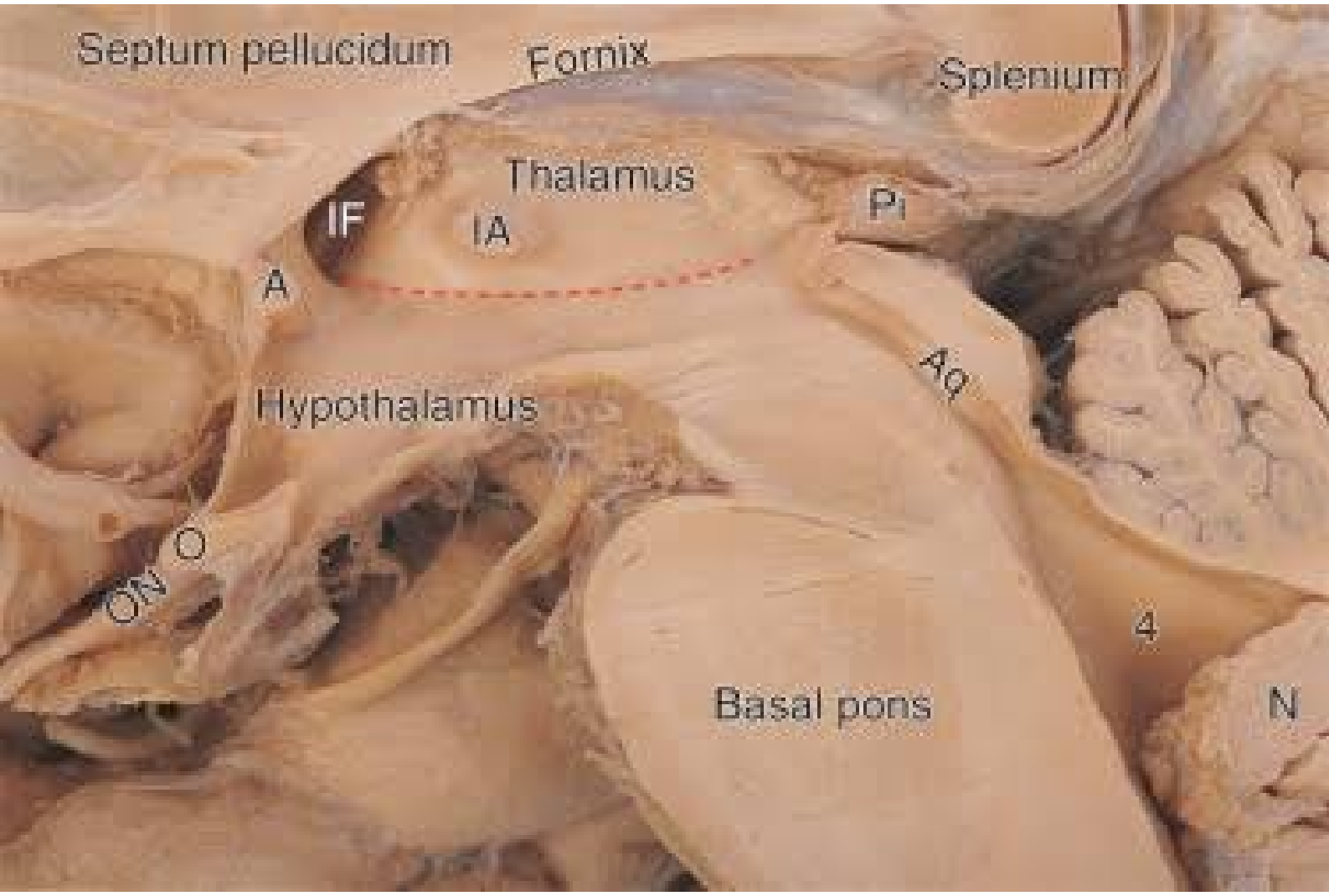

Corpus callosum
Splenium
Fornix
Choroid plexus
Thalamus
Tela choroidea
(double layer
of pia mater
3rd ventricle

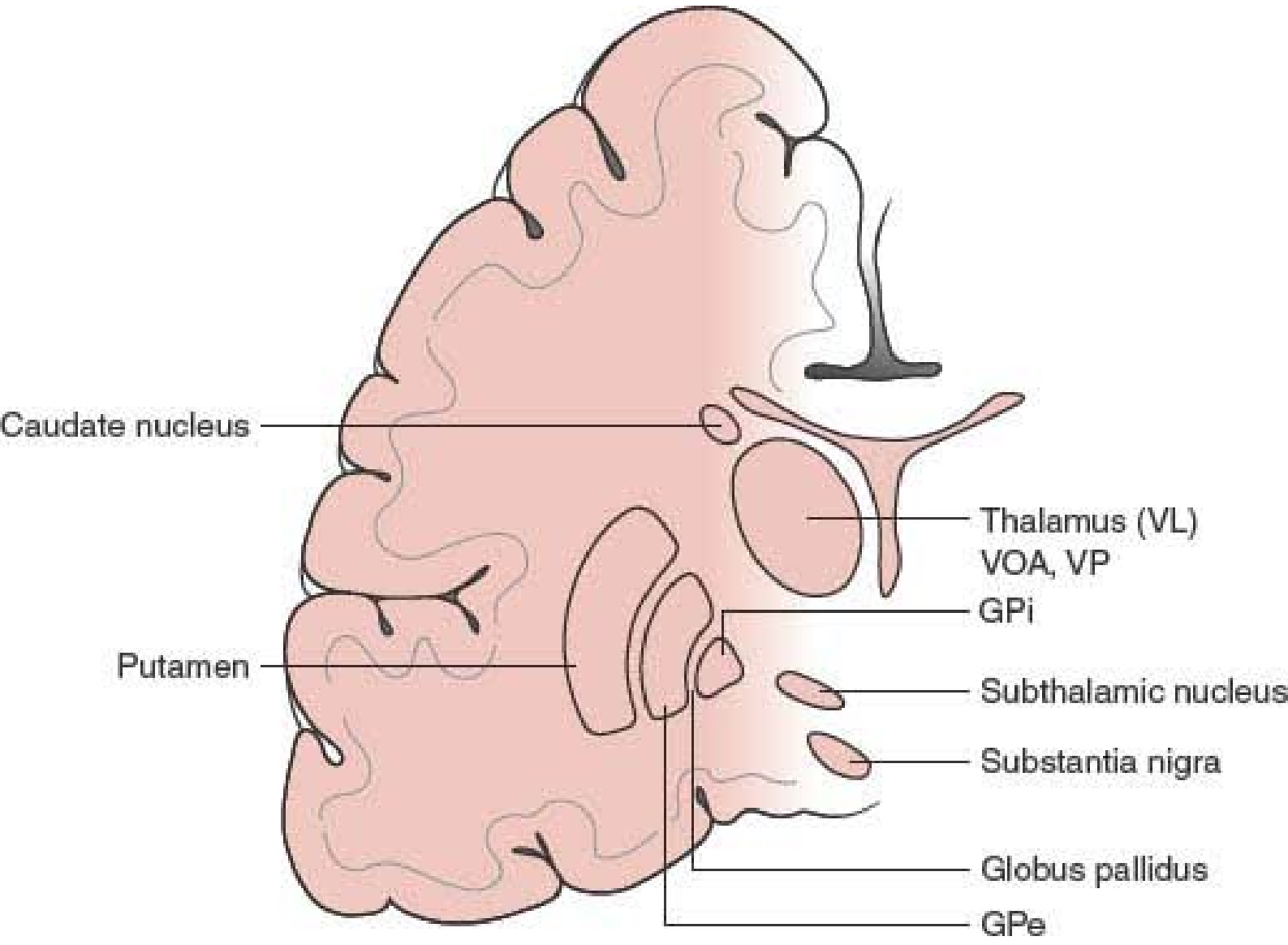

Genu
Corpus callosum
Fornix
Foramen of Monro
Hypothalamic sulcus
Dorsi-medial nucleus
Posterior nucleus
Ventri-medial nucleus
Posterior perforated substance
Cerebral peduncle
Para-ventricular nucleus
Supraoptic nucleus
Optic chiasma
Mammillary body
Hypophysis
Pons

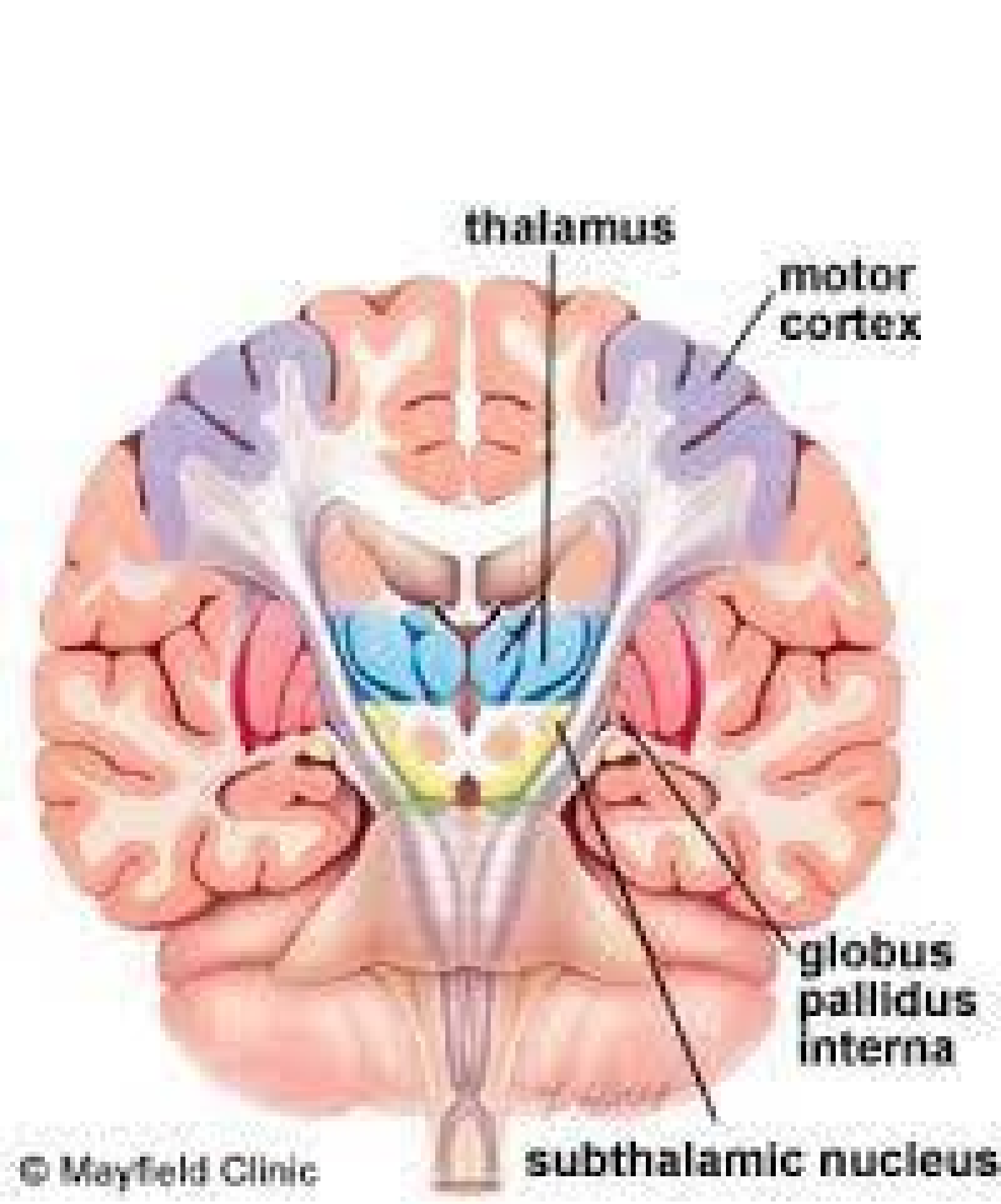


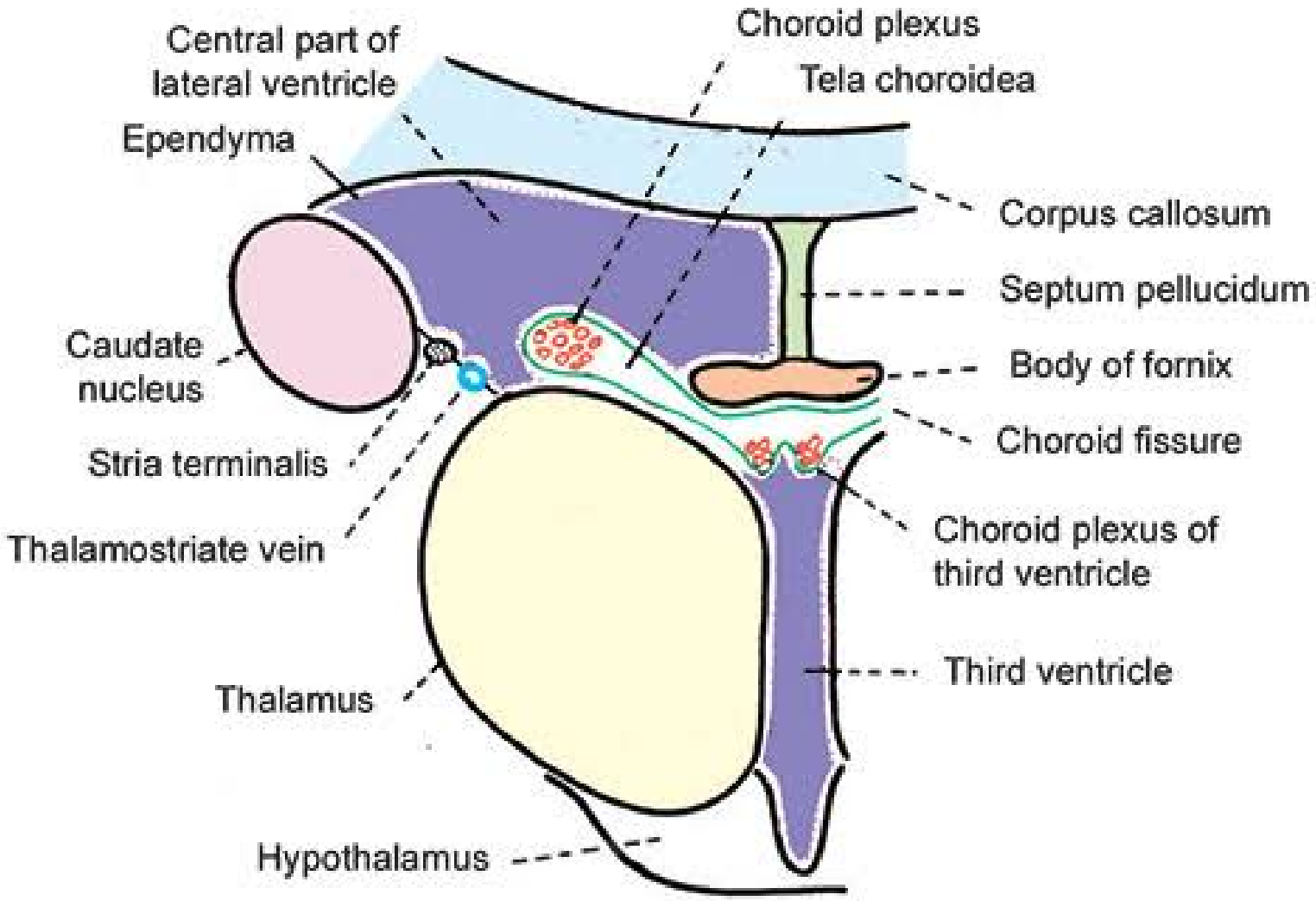


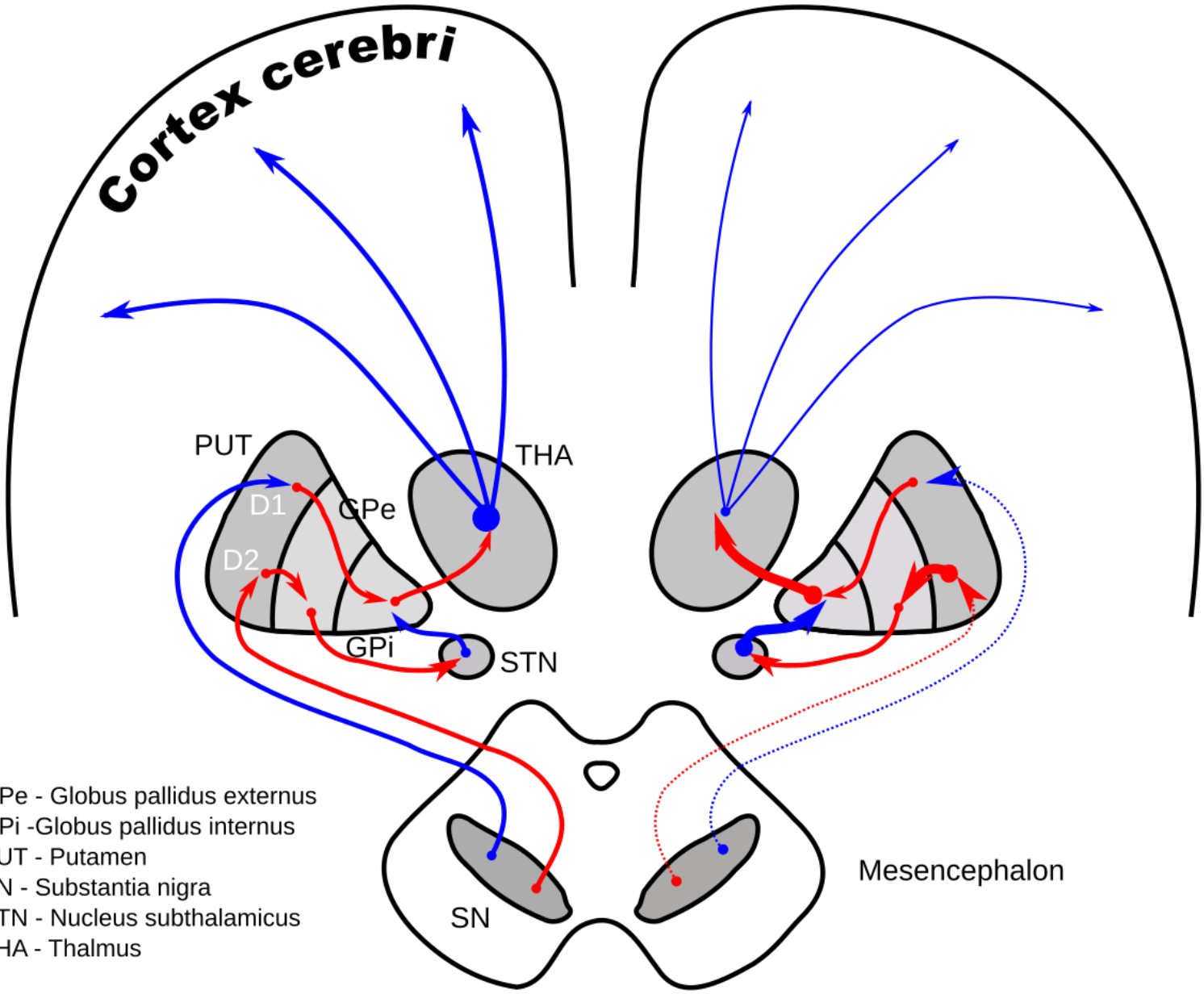

Medial
Ant.
LD
LP
Pulv.
VA
VI
VL
VPL
Region 1
Region 2
Region 3
Region 4
Region 5
Region 6
LP
Medial
Medial
LP
Median
Pulv.
Pulv.
©2014 BNI


Septum pellucidum
Fornix
Splenium
Thalamus
IF
IA
A
Pi
Aq
Hypothalamus
O
ON
4
Basal pons
N

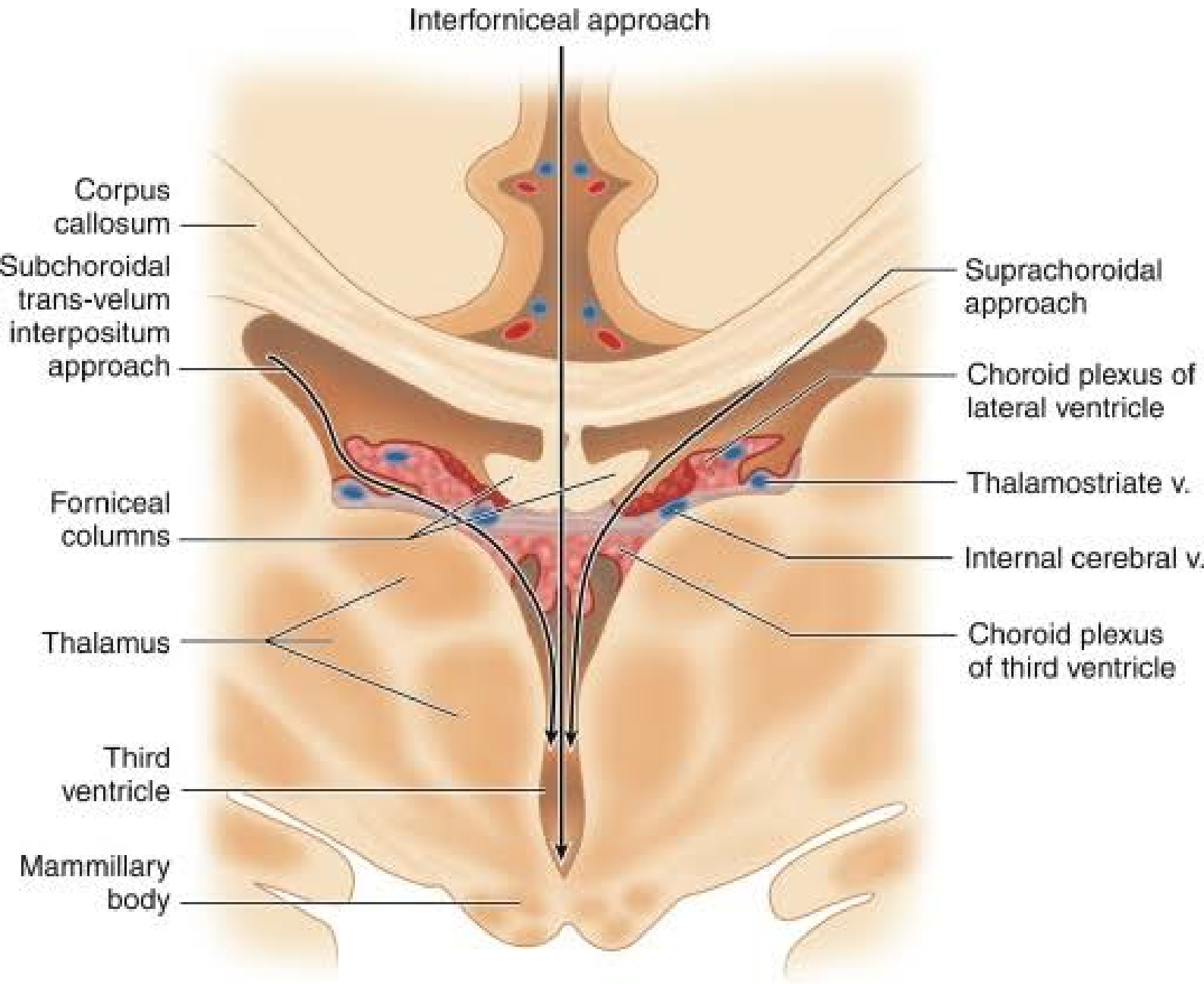

Caudate nucleus
Thalamus (VL)
VOA, VP
GPi
Putamen
Subthalamic nucleus
Substantia nigra
Globus pallidus
GPe

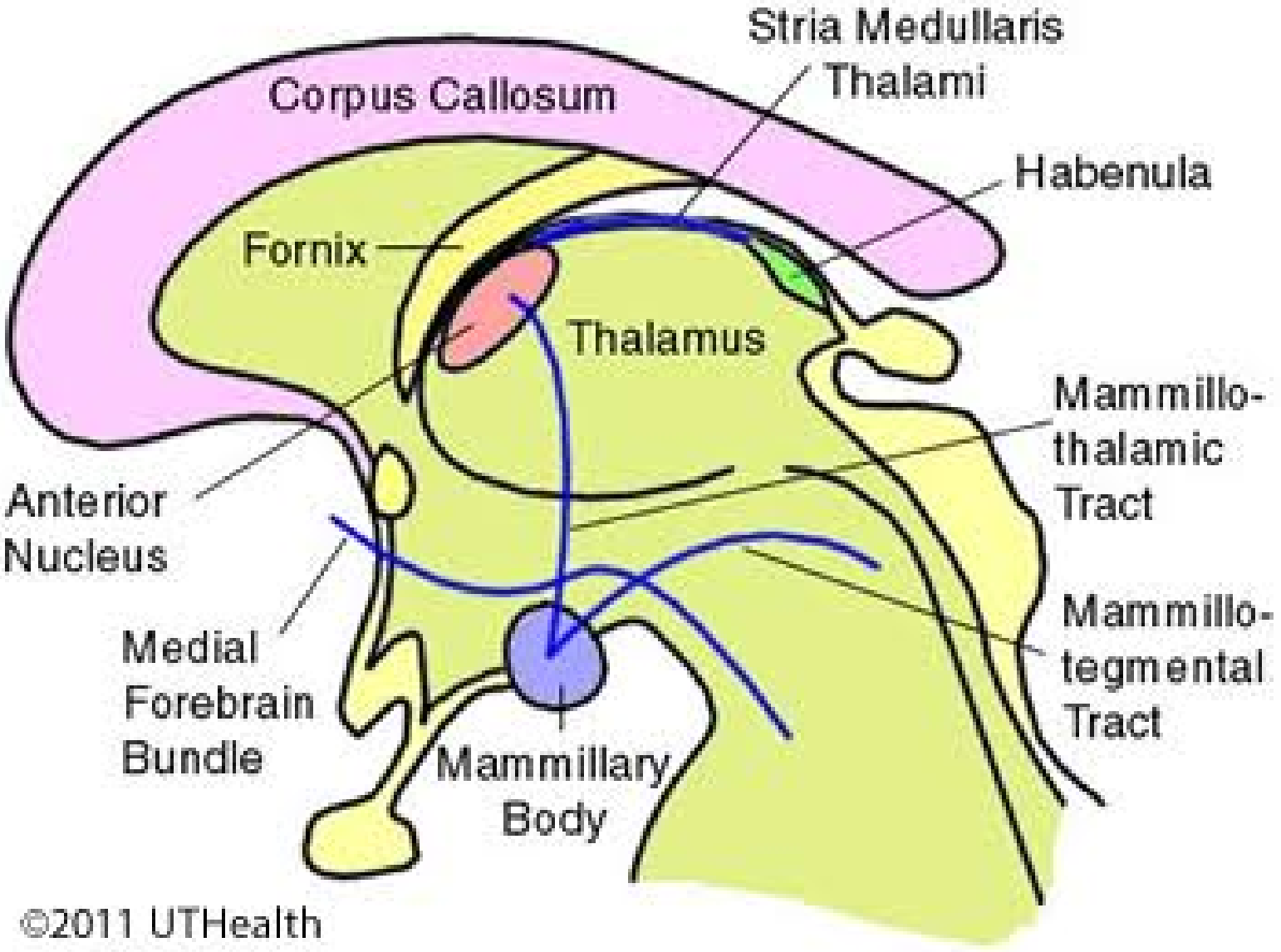

thalamus
motor cortex
globus pallidus interna
subthalamic nucleus
© Mayfield Clinic


Central part of lateral ventricle
Choroid plexus
Tela choroidea
Ependyma
Corpus callosum
Septum pellucidum
Caudate nucleus
Body of fornix
Choroid fissure
Stria terminalis
Thalamostriate vein
Choroid plexus of third ventricle
Third ventricle
Thalamus
Hypothalamus

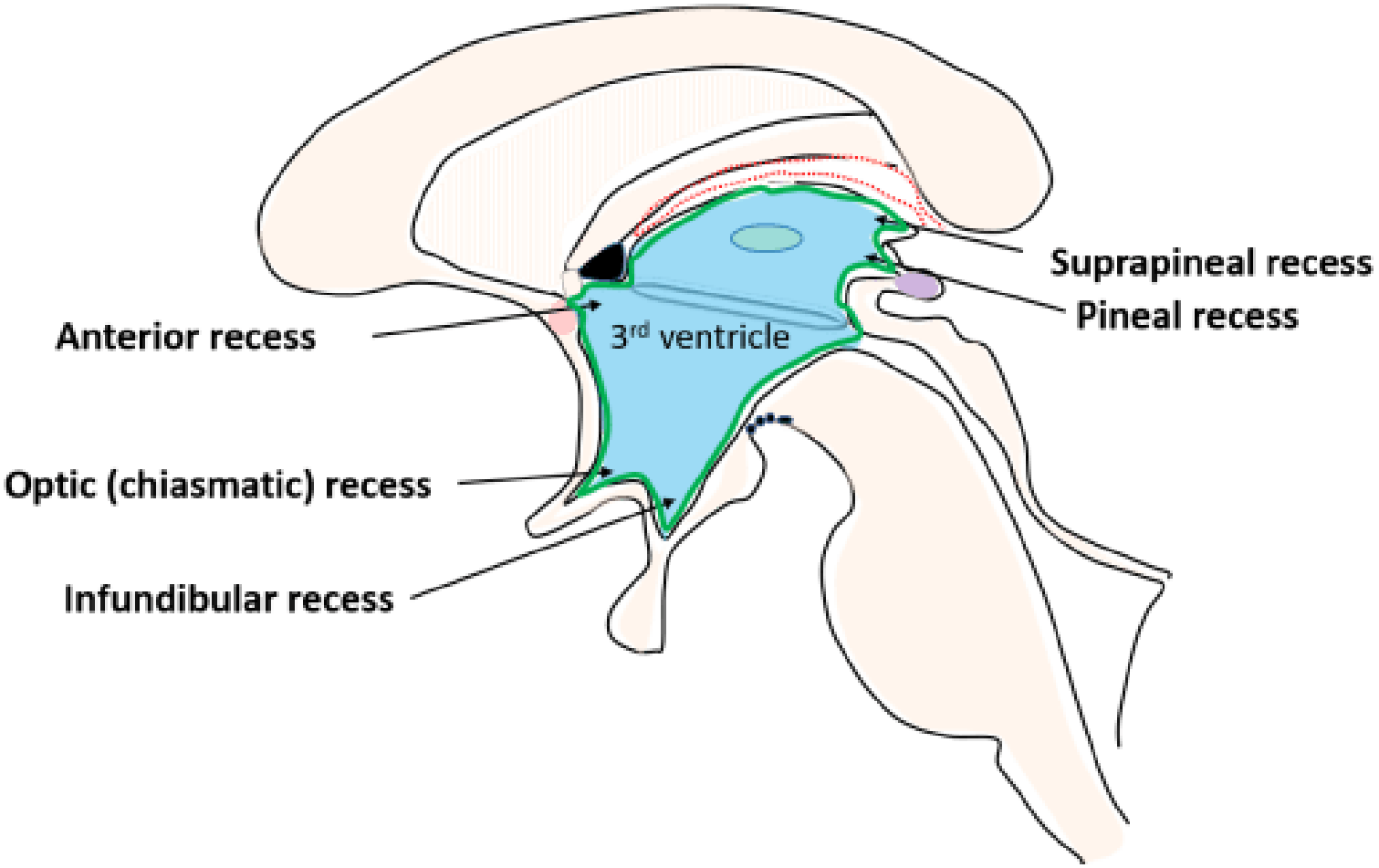


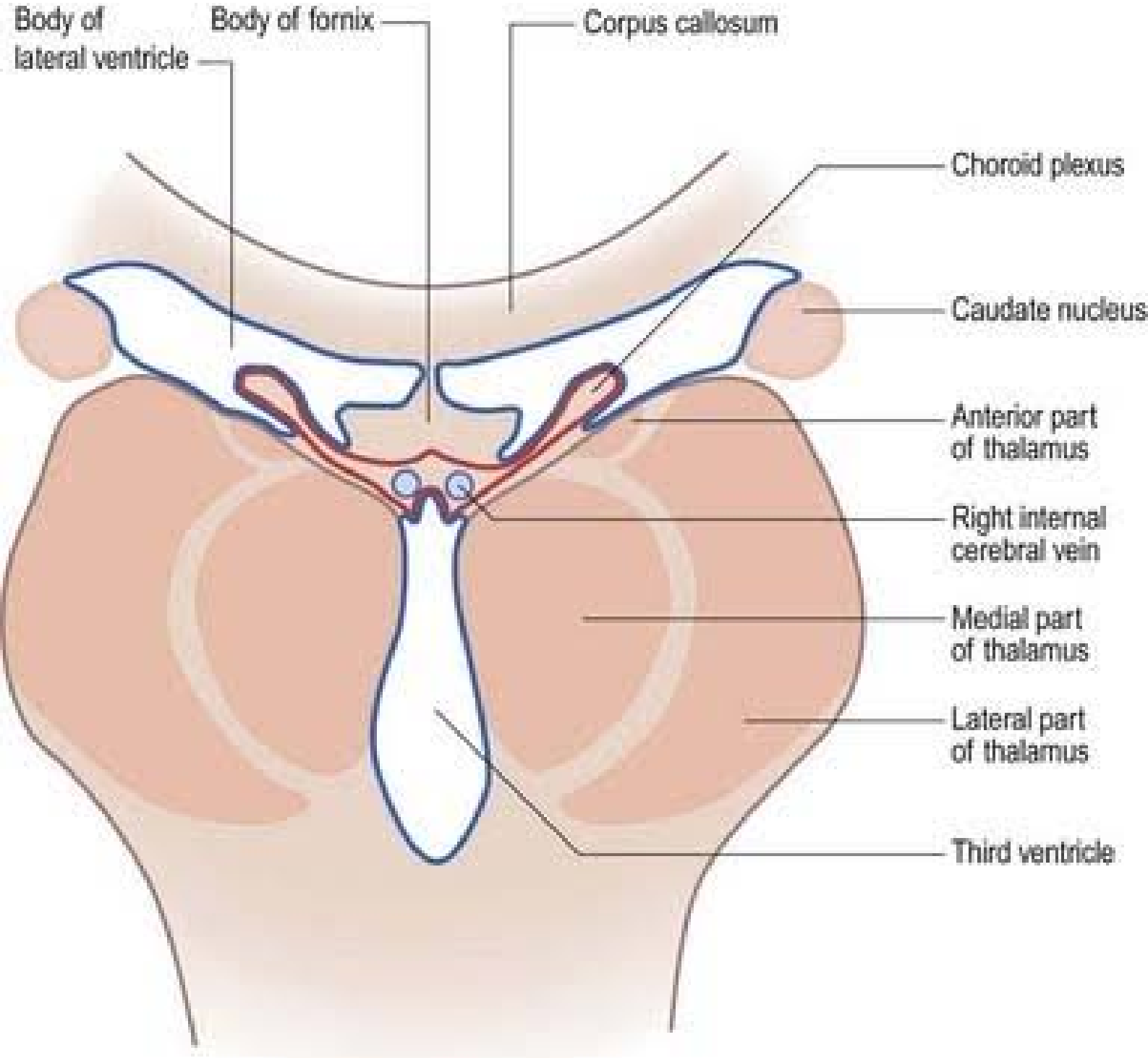
GPe - Globus pallidus externus
GPi -Globus pallidus internus
PUT - Putamen
SN - Substantia nigra
STN - Nucleus subthalamicus
THA - Thalmus

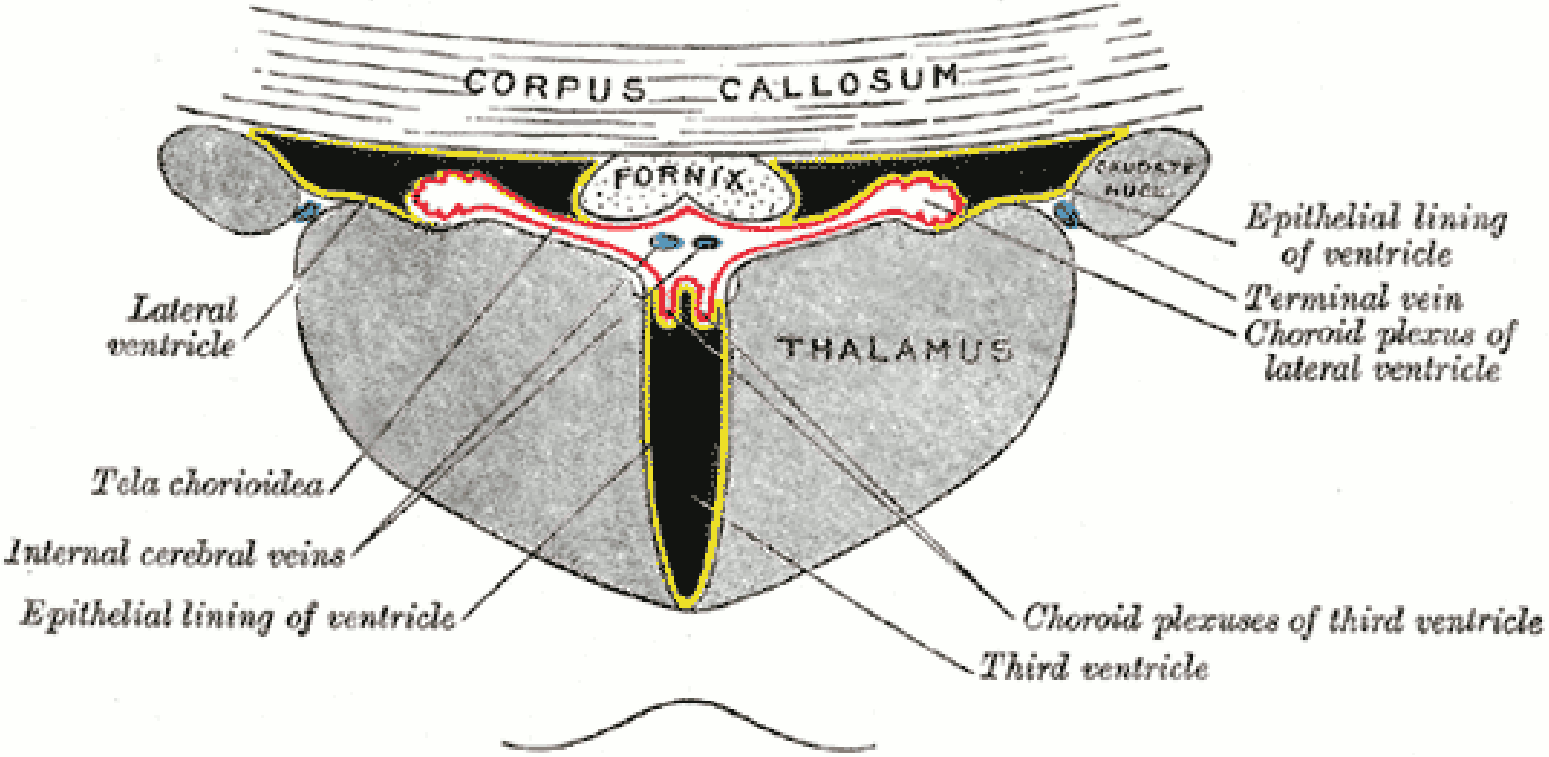

Interforniceal approach
Corpus callosum
Subchoroidal trans-velum interpositum approach
Forniceal columns
Thalamus
Third ventricle
Mammillary body
Suprachoroidal approach
Choroid plexus of lateral ventricle
Thalamostriate v.
Internal cerebral v.
Choroid plexus of third ventricle

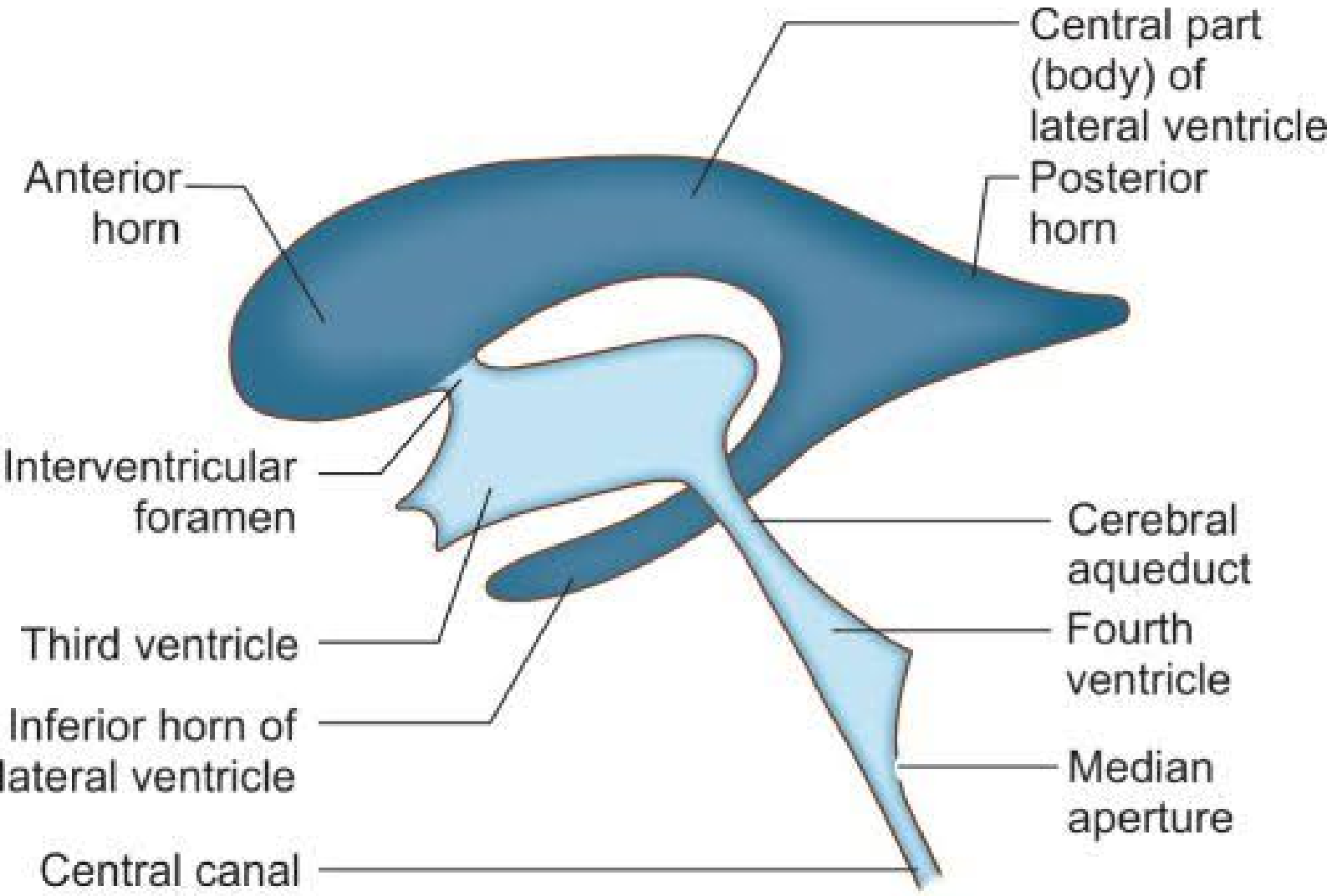


Recesses of Third ventricle




Body of lateral ventricle
Body of fornix
Corpus callosum
Choroid plexus
Caudate nucleus
Anterior part of thalamus
Right internal cerebral vein
Medial part of thalamus
Lateral part of thalamus
Third ventricle


CORPUS CALLOSUM
FORNIX
CAUDATE NUCL.
THALAMUS
Epithelial lining of ventricle
Terminal vein
Choroid plexus of lateral ventricle
Lateral ventricle
Tela chorioidea
Internal cerebral veins
Epithelial lining of ventricle
Choroid plexuses of third ventricle
Third ventricle


Central part (body) of lateral ventricle
Anterior horn
Posterior horn
Interventricular foramen
Cerebral aqueduct
Third ventricle
Fourth ventricle
Inferior horn of lateral ventricle
Median aperture
Central canal