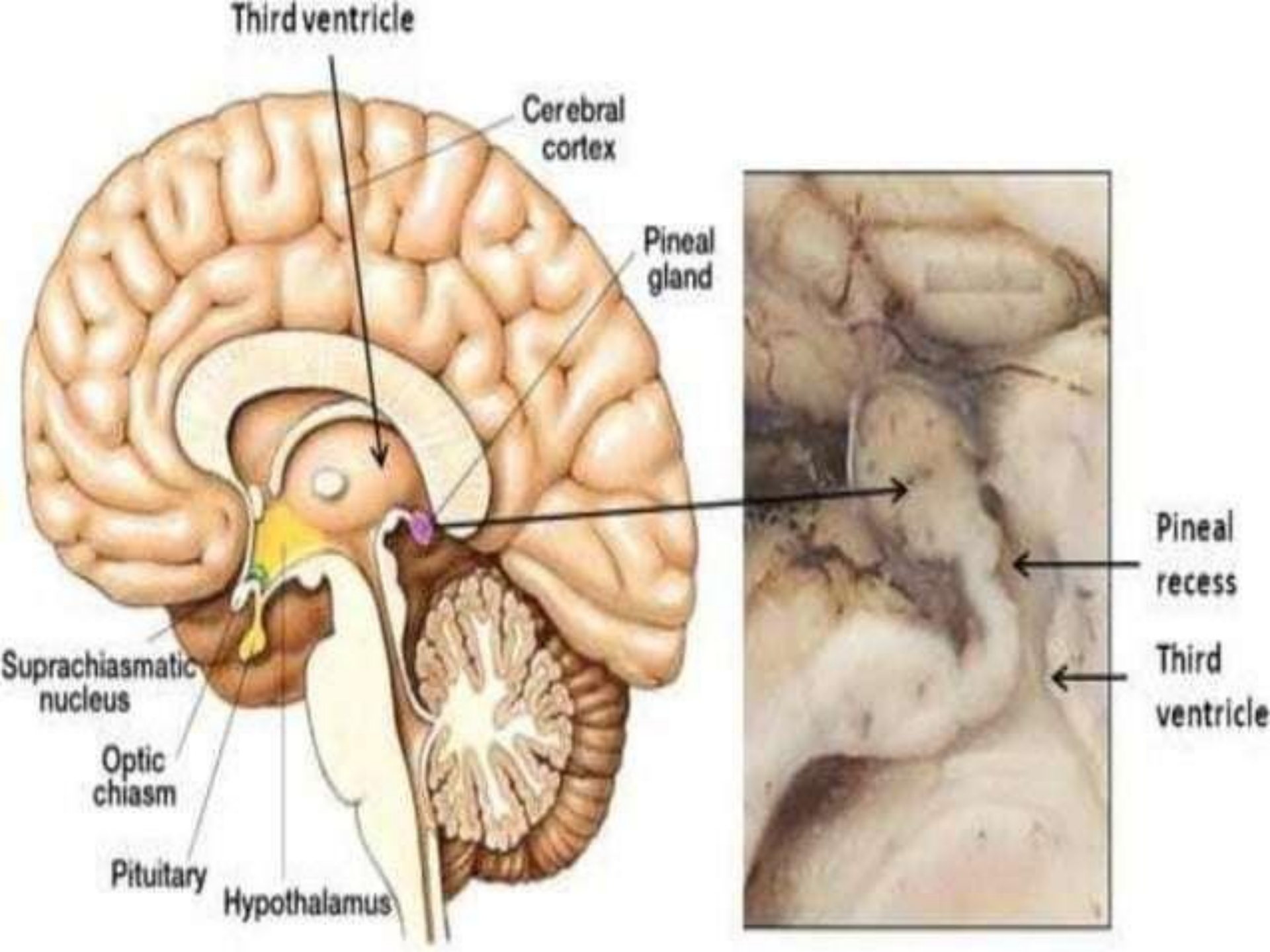
EPITHALAMUS & METATHALAMUS

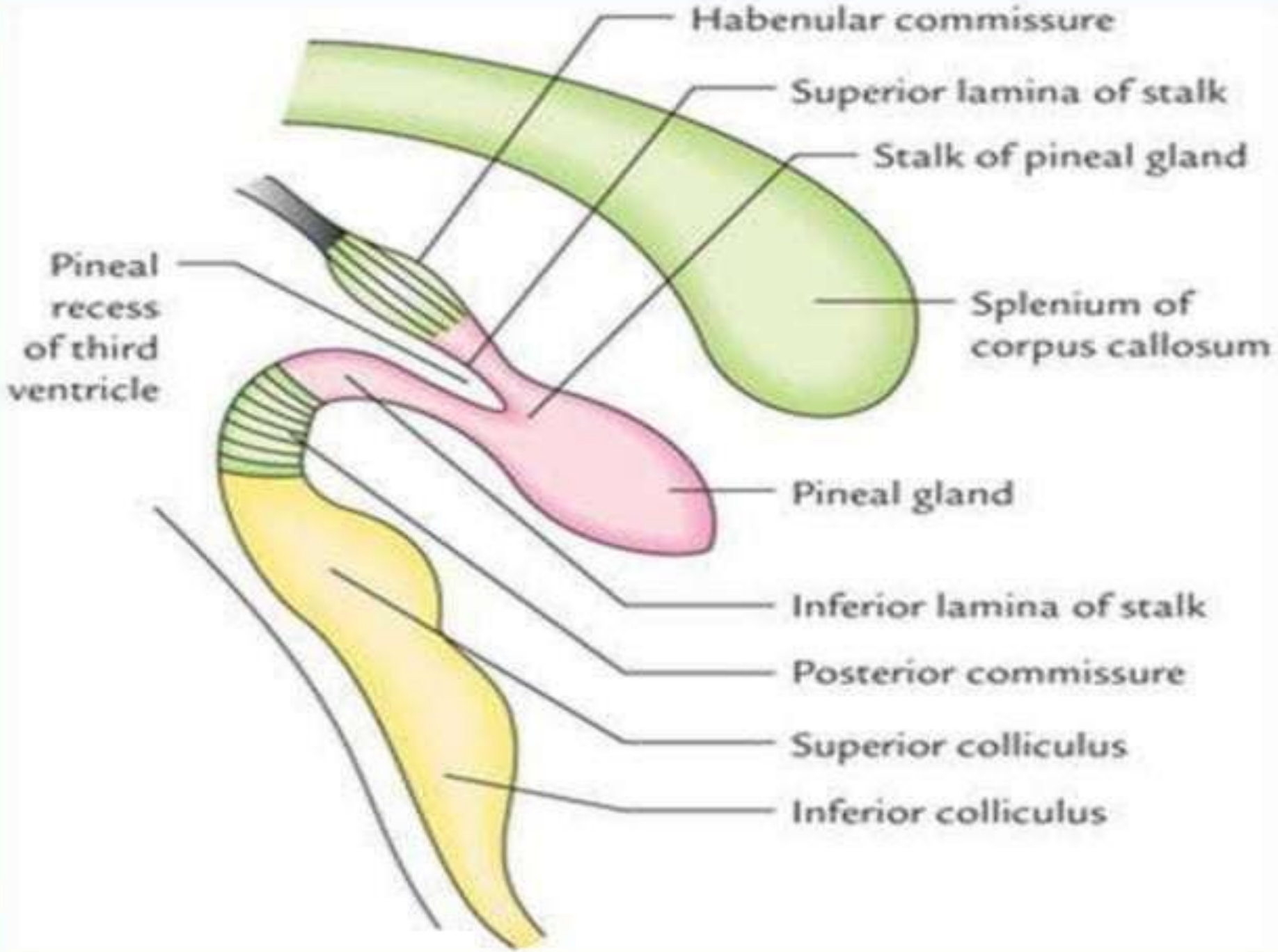
EPITHALAMUS

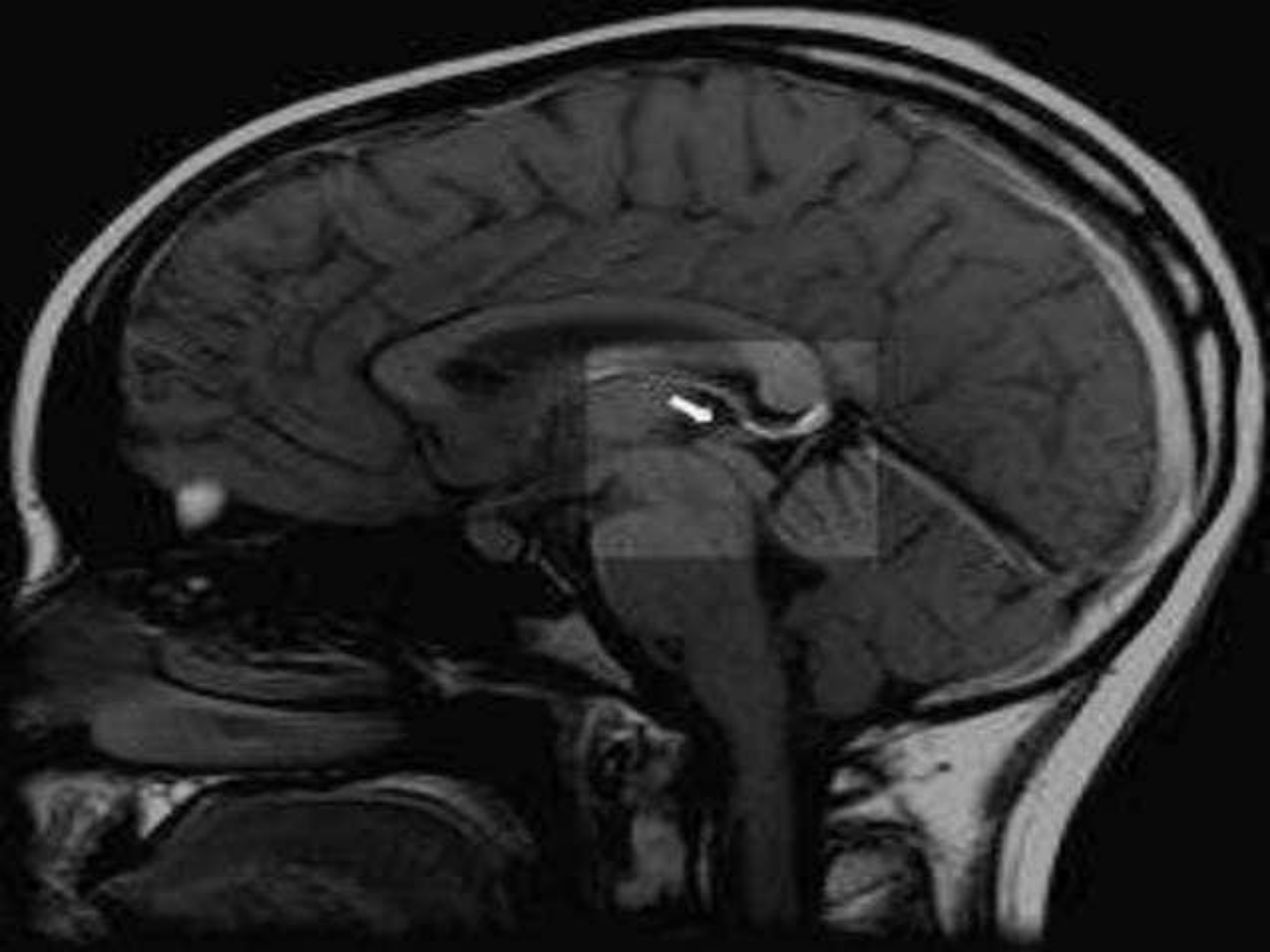
- The Epithalamus includes those structures which occupy the caudal part of roof of third ventricle.
- It comprises of
  - Pineal body/gland/epiphysis cerebri
  - Habenular nuclei
  - Habenular commissure
  - Posterior commissure

Pineal Gland/ Epiphysis cerebri

- Introduction
  - Colour
  - Size
  - Location
  - Parts

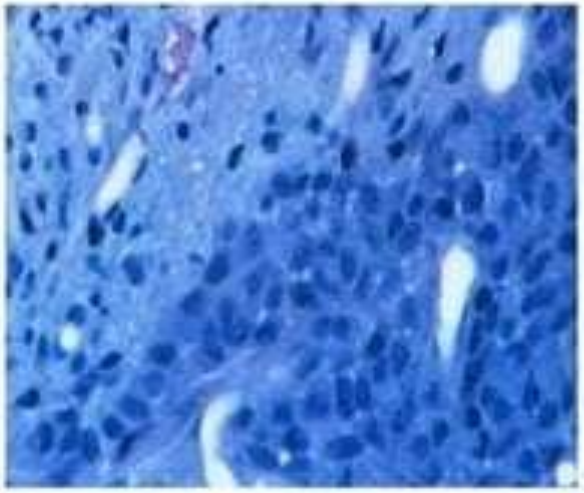

Third ventricle
Cerebral cortex
Pineal gland
Suprachiasmatic nucleus
Optic chiasm
Pituitary
Hypothalamus
Pineal recess
Third ventricle

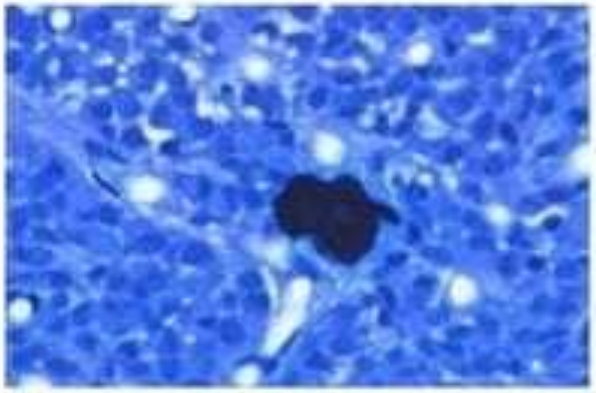

Habenular commissure
Superior lamina of stalk
Stalk of pineal gland
Pineal recess of third ventricle
Splenium of corpus callosum
Pineal gland
Inferior lamina of stalk
Posterior commissure
Superior colliculus
Inferior colliculus



Structure of pineal gland

PARENCHYME OF PINEAL GLAND





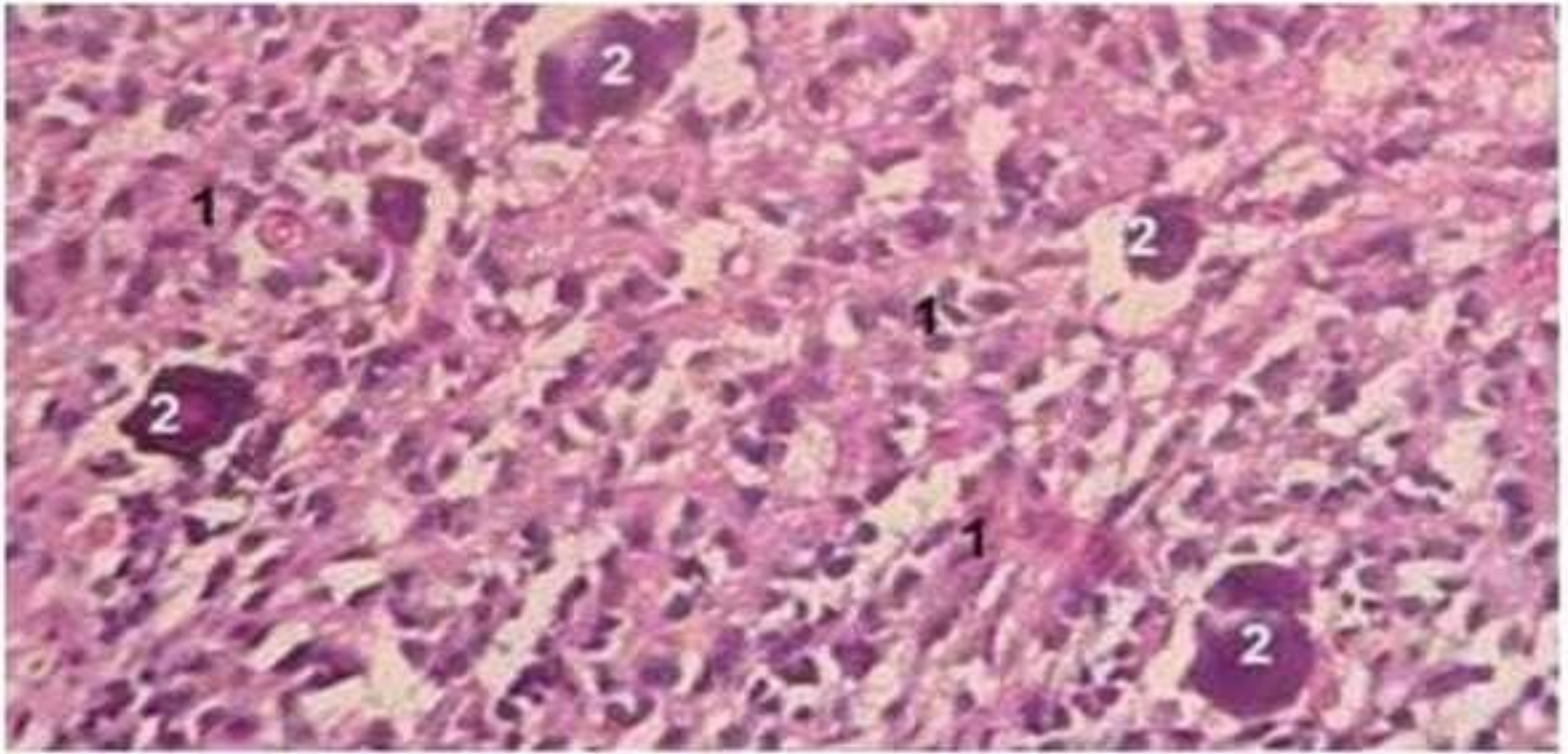
- **Pinealocytes**
  - Basophilic cells, with one. two long processed
  - Nucleus spherical
  - Cytoplasm : SER, RER, small golgi app., mitochondria and small secretory granule
  - Produce Melatonin and serotonin
- **Interstitial cells**
  - Scattered trough pinealocytes
  - Deeply staining, with long processed
  - Calcium and carbonate deposite → **CORPORA ARENACEA (BRAIN SAND)** → >> older

EPIPHYSIS (PINEAL GLAND)

Stained with haematoxylin and eosin

1 - pinealocytes

2- pineal sand (salts of calcium, magnesium and silicon



Functions of pineal gland

- Descartes described the pineal gland as the **seat of soul.**
- It has a neuroendocrine activity in regulation and modulation of the pituitary and all other endocrine organs, mostly inhibitory.
- It acts as **biological clock** for physiological and behavioural control.

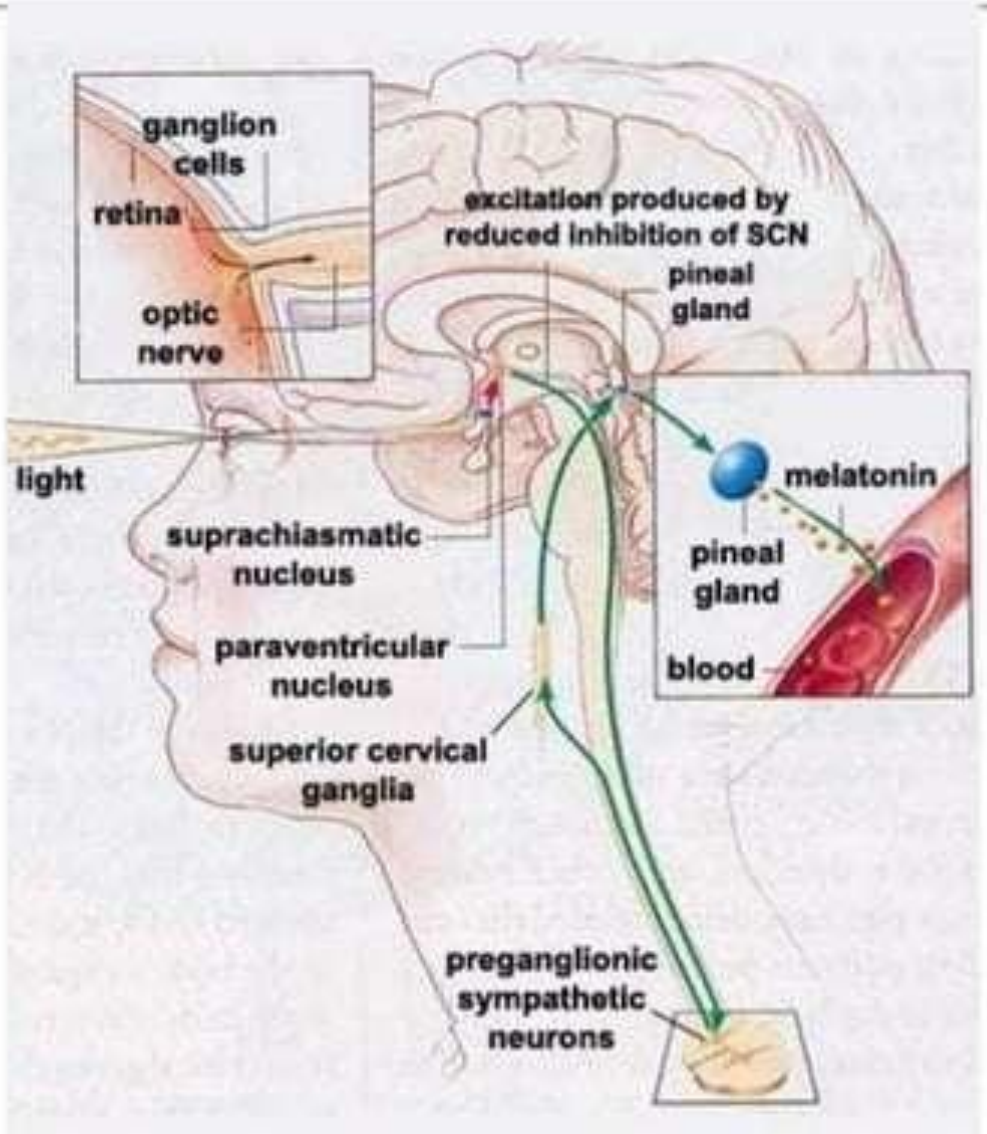
Functions- cont…

- It secretes a hormone, **melatonin** which inhibits secretion of gonadotrophins (GnRH) from hypothalamus. Thus, it has inhibitory effect on the reproductive system (sexual maturity). The melatonin is produced at night and its production falls during day time. *Melatonin probably holds back the reproductive development until a suitable age has reached by inhibiting the secretion of gonadotro-phic hormones*.

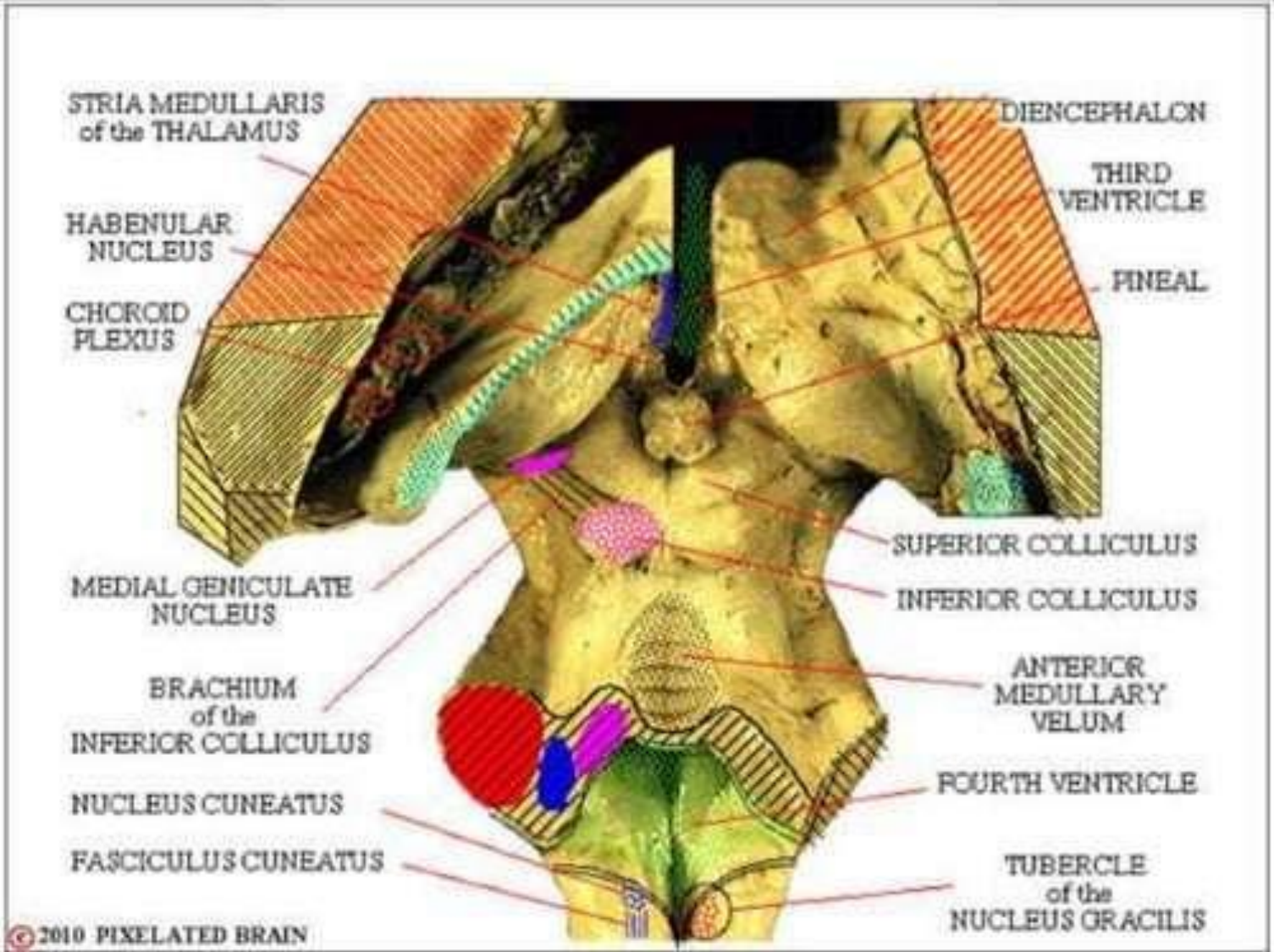
Unique features of pineal gland

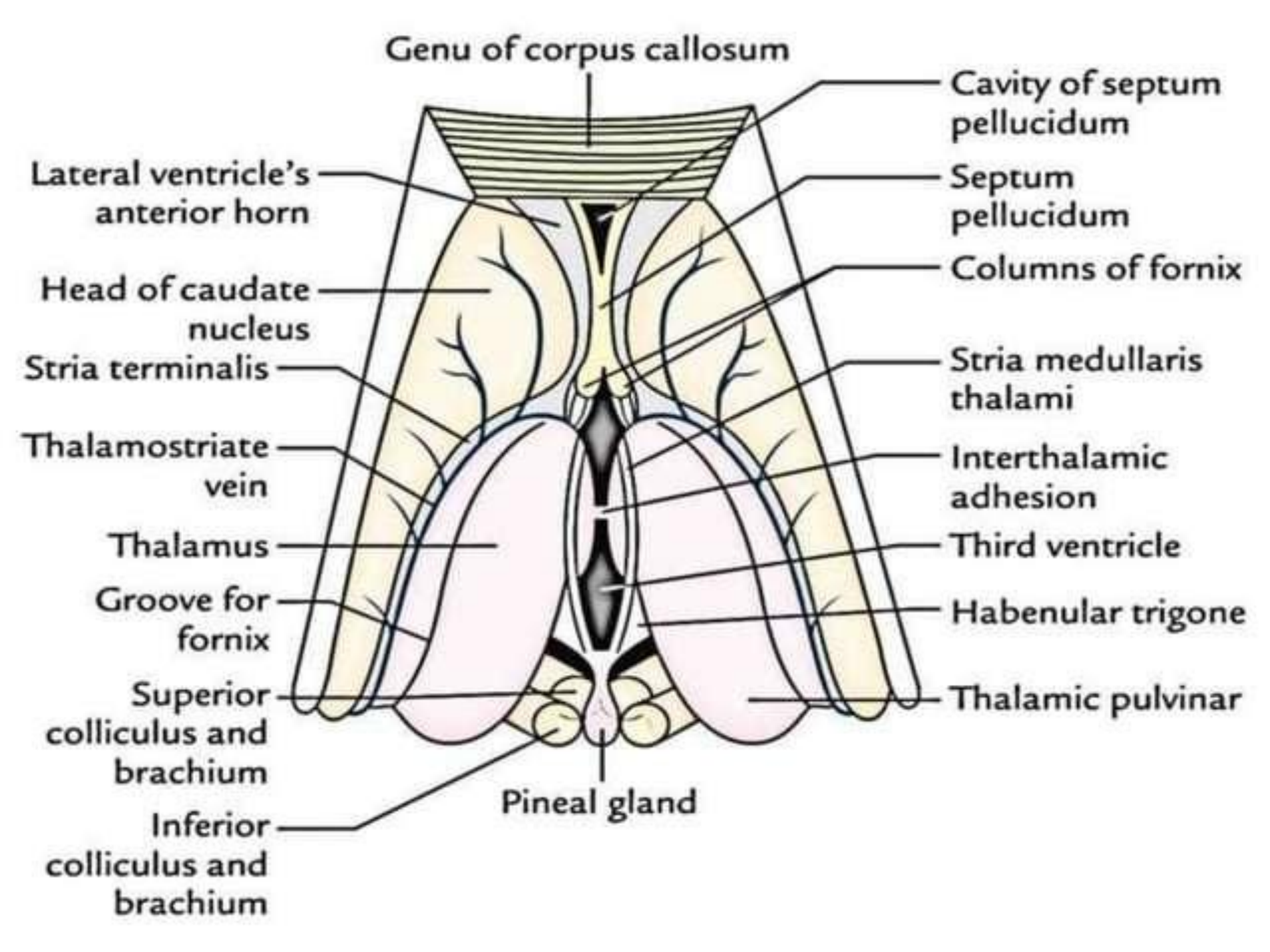
- Pineal gland is the only part of the brain, which has no nerve cells in it.
- It is the only part of the brain which is supplied by a nerve (nervus conarii) which arises from outside the brain.

Neural pathway for pineal gland

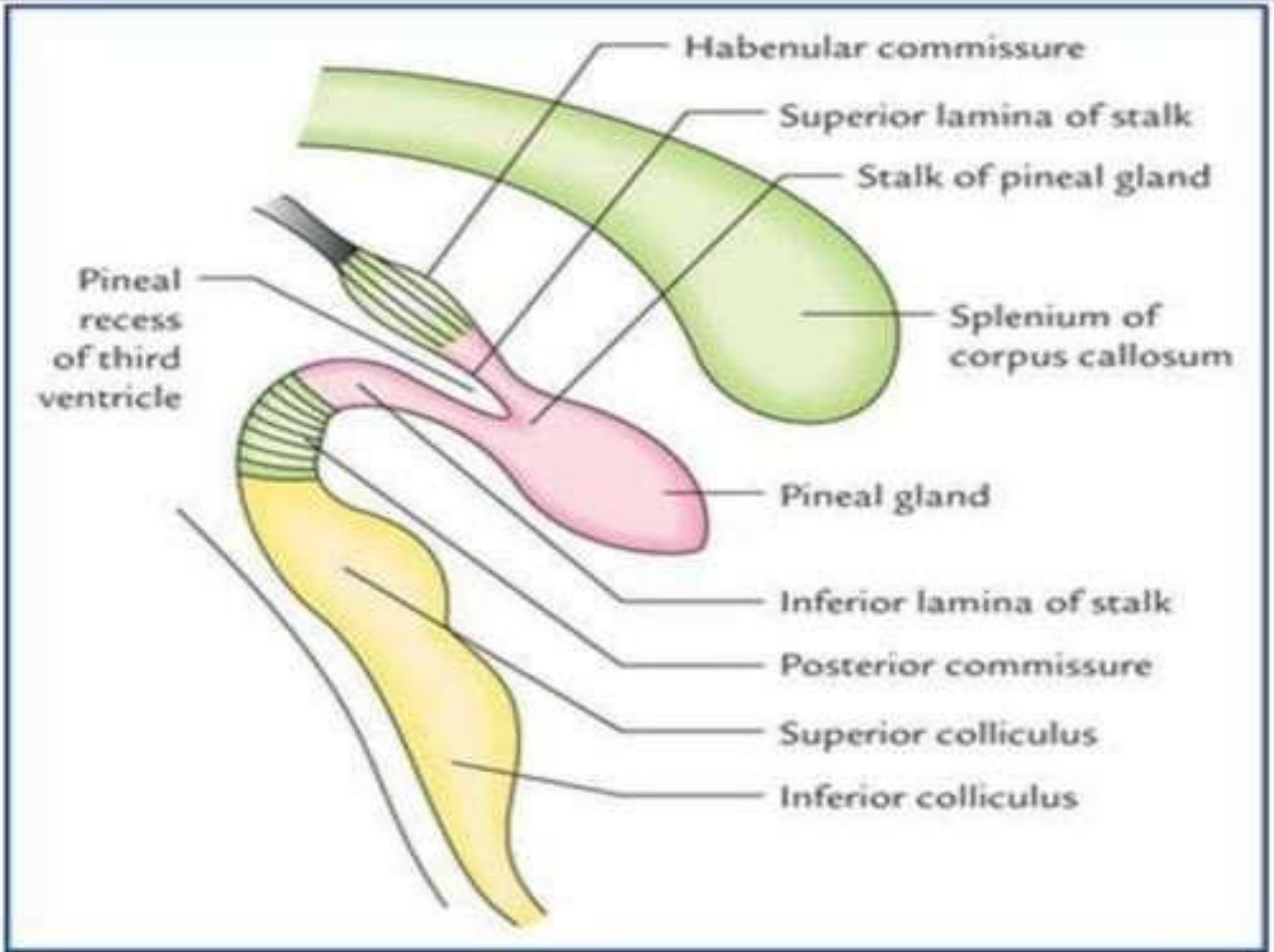


Habenular Nucleus

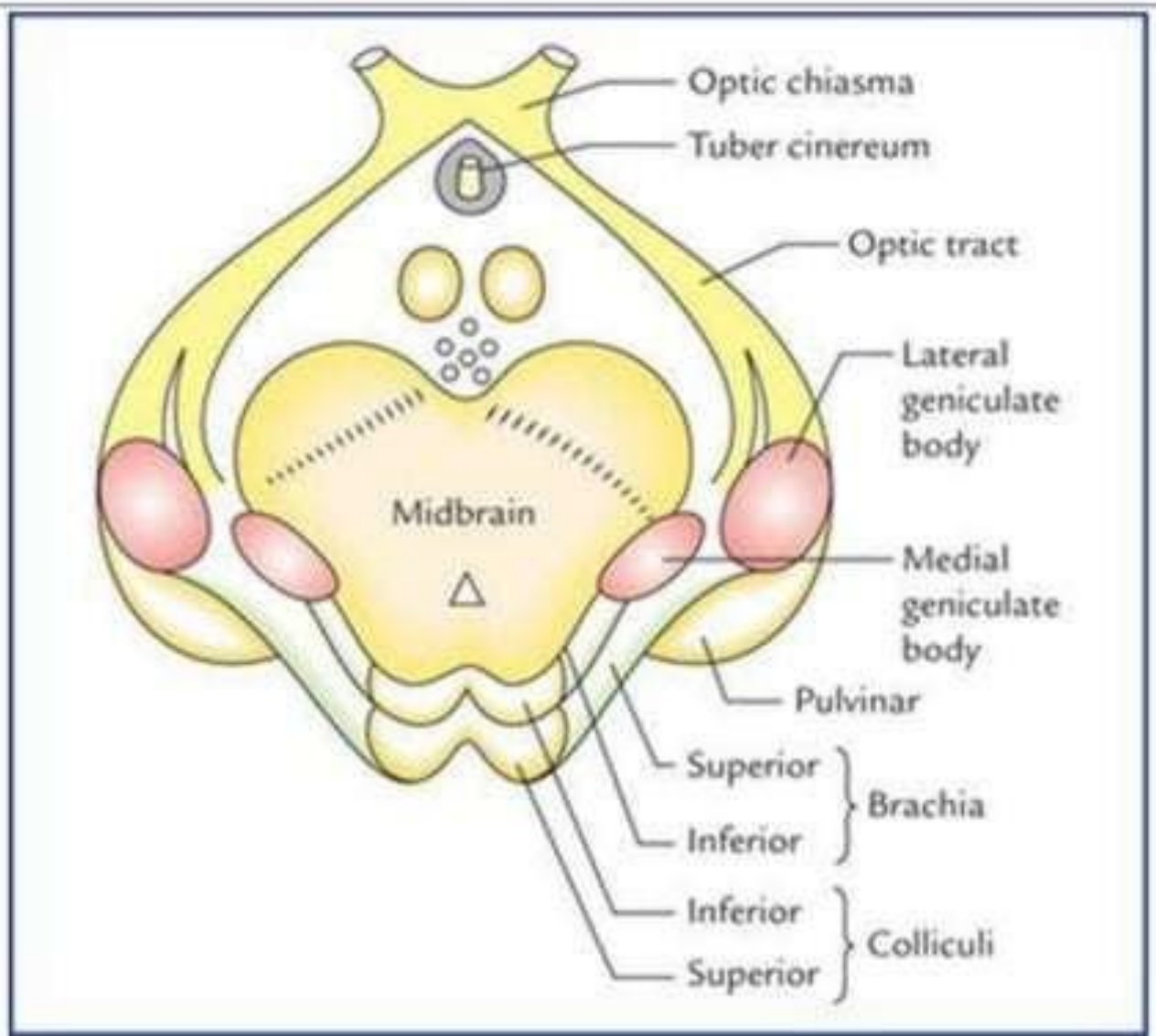



Genu of corpus callosum
Cavity of septum pellucidum
Lateral ventricle's anterior horn
Septum pellucidum
Head of caudate nucleus
Columns of fornix
Stria terminalis
Stria medullaris thalami
Thalamostriate vein
Interthalamic adhesion
Thalamus
Third ventricle
Groove for fornix
Habenular trigone
Superior colliculus and brachium
Thalamic pulvinar
Pineal gland
Inferior colliculus and brachium

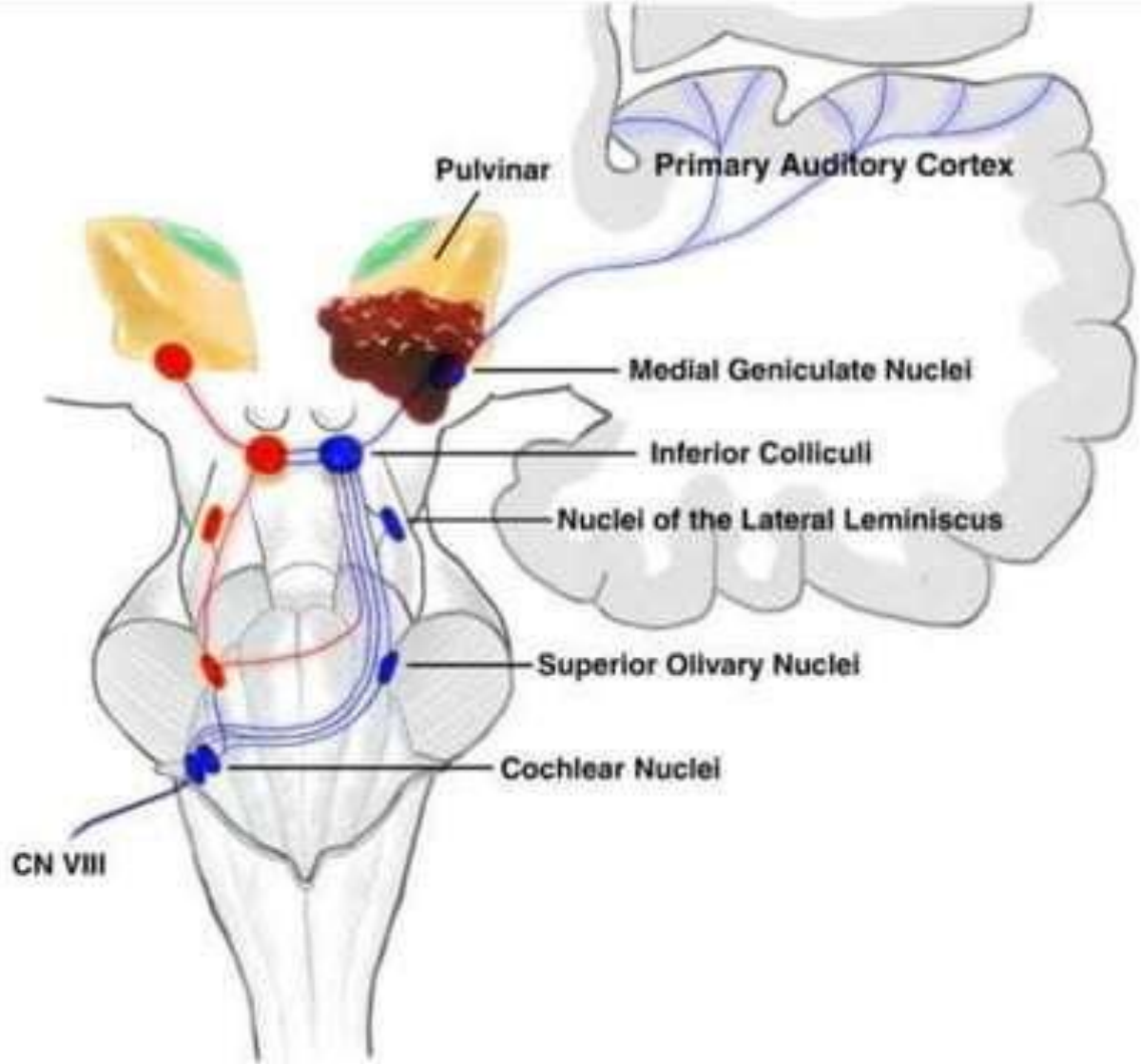
Commissure of pineal gland



METATHALAMUS



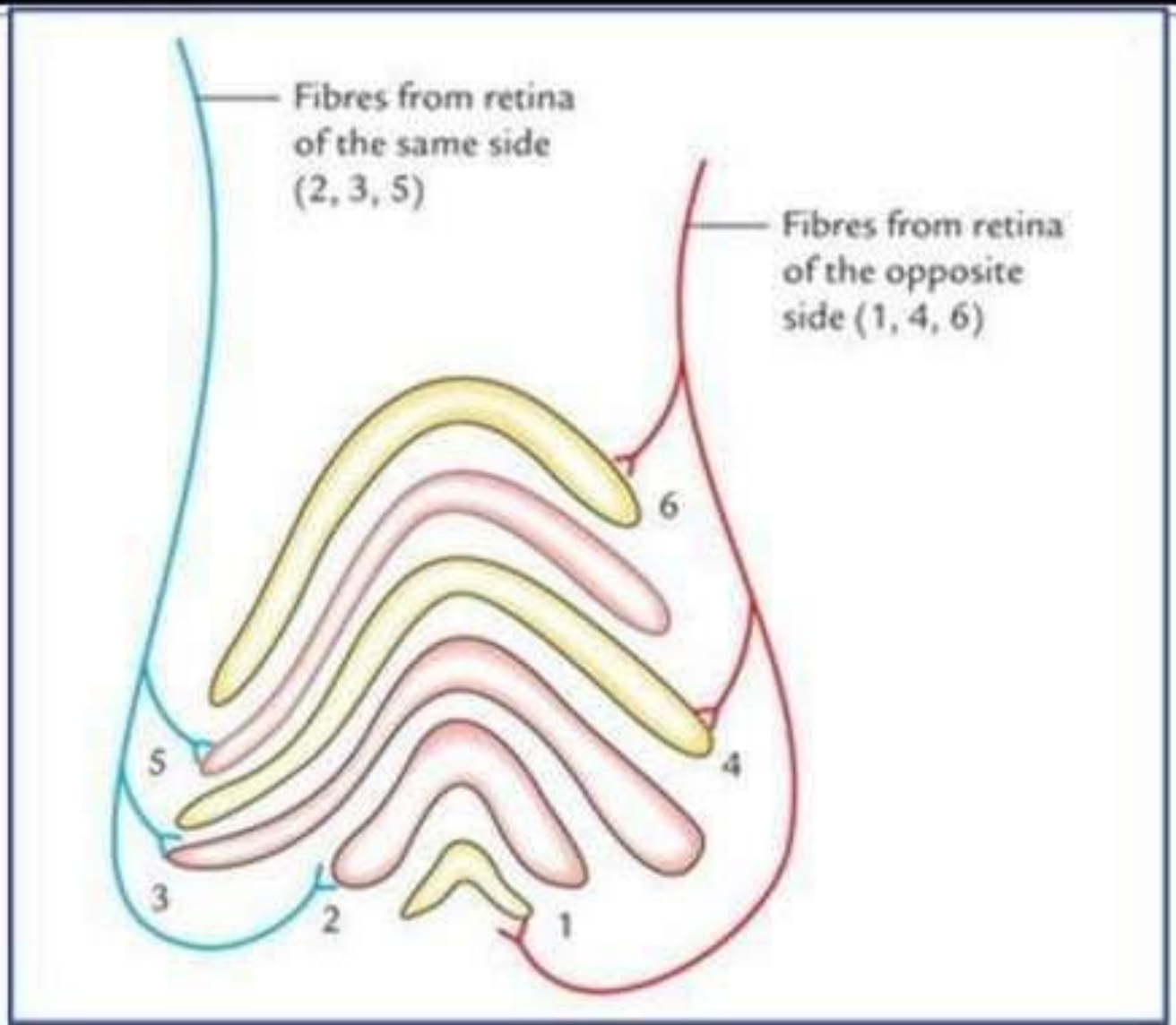
Medial Geniculate body



Connections of MGB

- ***Afferents:*** Auditory pathways through lateral lemniscus either directly or after relay in the inferior colliculus. These fibres pass through brachium of inferior colliculus (inferior brachium).
- ***Efferents:*** Geniculocortical fibres project as **auditory radiation** through sublentiform part of internal capsule to the primary auditory area in the temporal lobe (area 41, 42).

Lateral geniculate body



Connections of LGB

- ***Afferents:*** Lateral root of the optic tract consisting of most of the retinal fibres of both the eyes (temporal fibres of the same side and nasal fibres of the opposite side).
- ***Efferents:*** Geniculocalcarine fibres project as the **optic radiation** through retrolentiform part of internal capsule to the visual cortex of the occipital lobe (areas 17, 18, and 19).

Comparison between the medial and lateral geniculate bodies

Medial geniculate body	Lateral geniculate body
Oval-shaped collection of grey matter on the inferior aspect of the pulvinar	Bean-shaped collection of grey matter on the inferior aspect of inferior aspect of the pulvinar
Hilum absent No lamination	Hilum present Consists of 6 laminae, numbered 1 to 6 from ventral surface to dorsal surface
Destruction of medial geniculate on one side has little or no effect on hearing	Destruction of lateral geniculate body on one side produces blindness in the opposite half of the field of vision
Last relay station on the auditory pathway	Last relay station on the optic pathway
Sends auditory impulse through auditory radiation to the auditory area of the temporal lobe	Sends visual impulses through optic radiation to the visual radiation to the cortex of the occipital lobe

Applied Anatomy

- Lesion of pineal gland- Precocious Puberty
- Calcification of Pineal Gland

Precocious Puberty

- **precocious puberty** is **puberty** occurring at an unusually early age.
  - Central
  - Pheripheral

- Precocious puberty signs and symptoms include development of the following before age 8 in girls and before age 9 in boys.
- Breast growth and first period in girls
- Enlarged testicles and penis, facial hair and deepening voice in boys
- Pubic or underarm hair
- Rapid growth
- Acne
- Adult body odor

Calcification of pineal gland

- Calcification of the pineal gland is typical in young adults, and has been observed in children as young as two years of age. The internal secretions of the pineal gland inhibit the development of the reproductive glands because when it is severely damaged in children, development of the sexual organs and the skeleton are accelerated.


thank you