BASAL GANGLIA

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OBJECTIVES

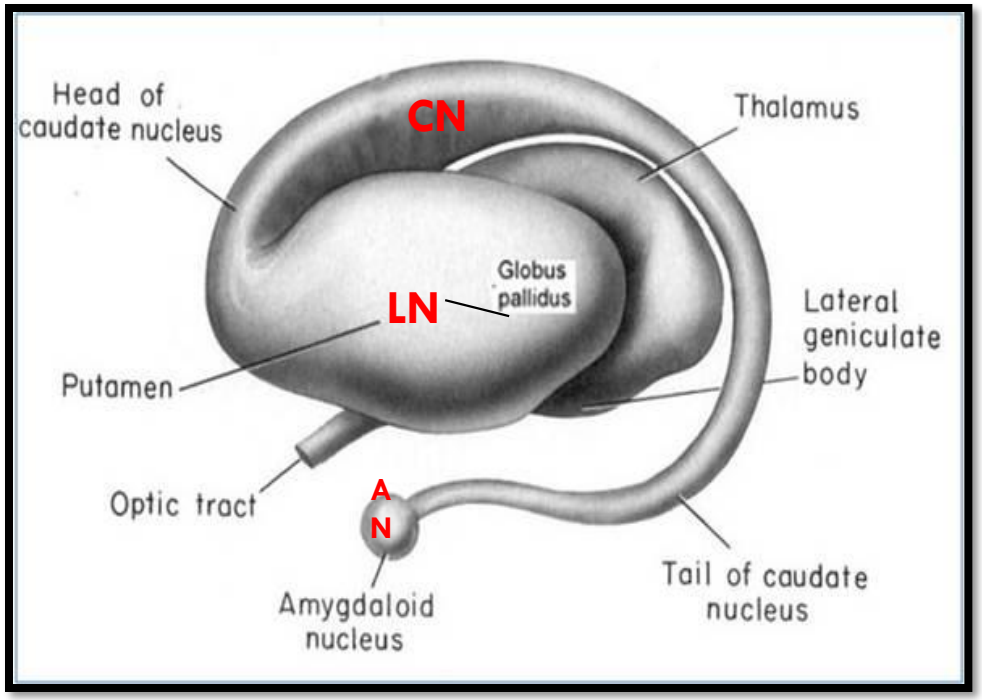
At the end of the lecture, the student should be able to:

- **Define "basal ganglia" and enumerate its *components.***
- **Enumerate parts of "Corpus Striatum" and their *important relations.***
- ***Describe the structure of Caudate and Lentiform (Putamen & Globus Pallidus) nuclei.***
- ***Differentiate between striatum & paleostriatum in term of connections.***
- ***State briefly functions & dysfunctions of Corpus Striatum.***

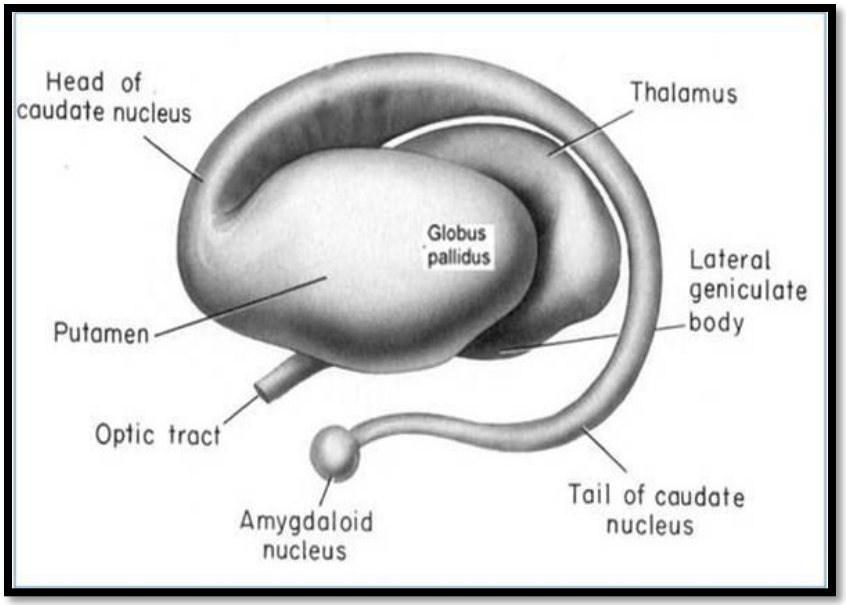
BASAL GANGLIA (NUCLEI)

- ***Group of nerve cells deeply situated in cerebral hemispheres***
- **Components:**

1. **Caudate Nucleus**
2. **Lentiform Nucleus: divided into *Putamen & Globus Pallidus***
3. **Amygdaloid Nucleus**



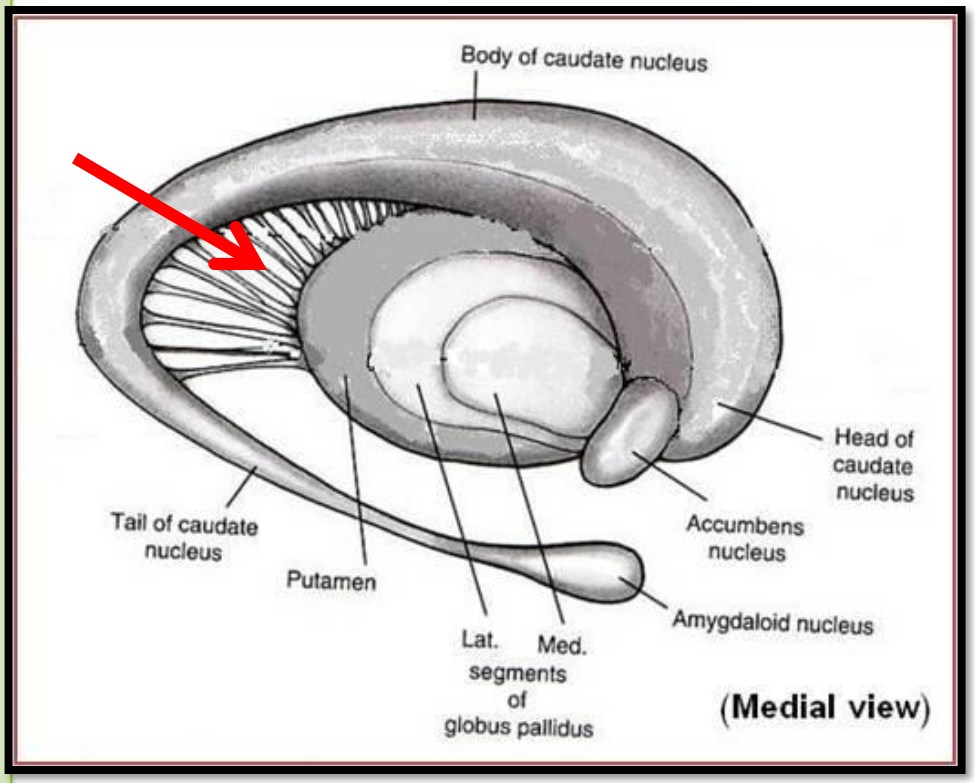
- ***Caudate & Lentiform nuclei are functionally related to each other & called "Corpus Striatum":*** **Part of *extrapyramidal motor system*, *principally involved in the control of posture and movements (primarily by inhibiting motor functions)***



Amygdaloid Nucleus (part of limbic system) is only embryologically related to Corpus Striatum

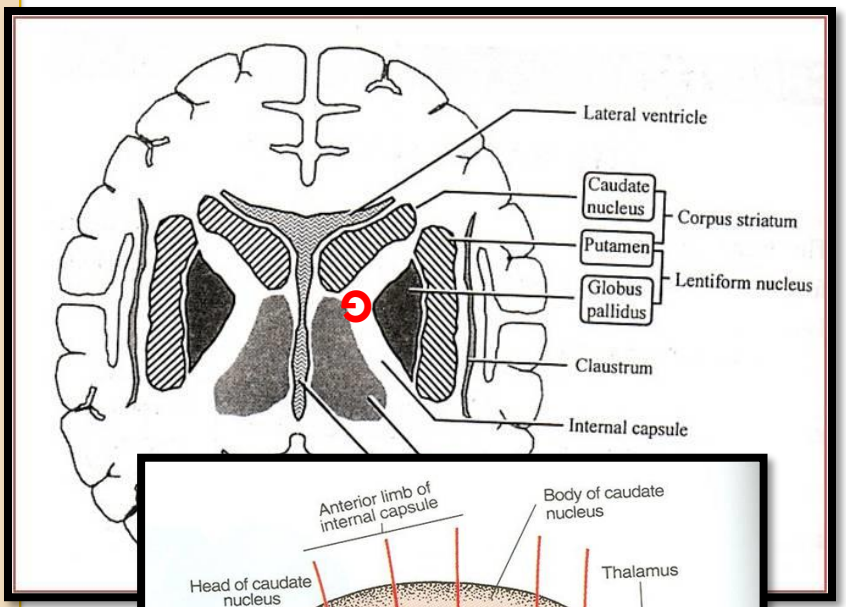
CORPUS STRIATUM (NOMENCLATURE)

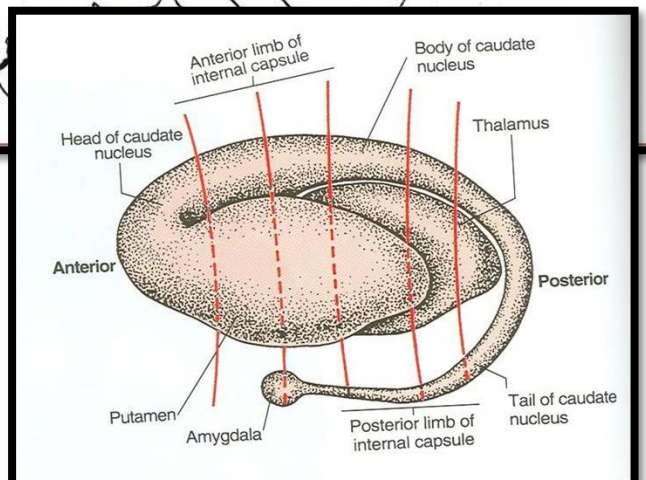
- ***Bands of grey matter pass from lentiform nucleus across the internal capsule to the caudate nucleus, giving the striated appearance hence, the name corpus striatum.***



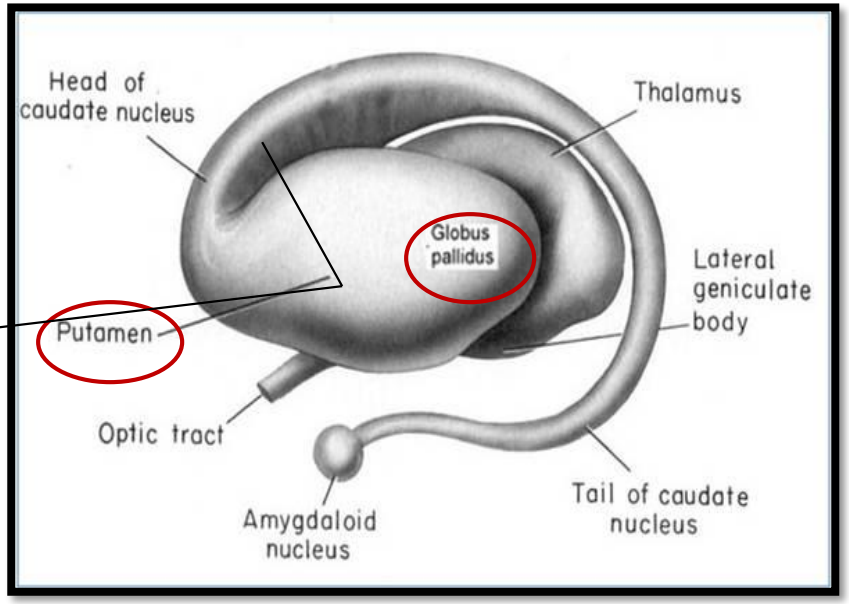
PARTS

- **LENTIFORM NUCLEUS**
- ***SHAPE:*** *three sided, wedge-shaped mass of grey matter, with a convex outer surface and an apex which lies against the genu of the internal capsule (G)*
- ***DIVISION:*** *divided into*
  1. *Larger darker lateral portion called* ***Putamen*** *(P)*
  2. *Smaller, lighter medial portion called* ***Globus Pallidus*** *(g)*



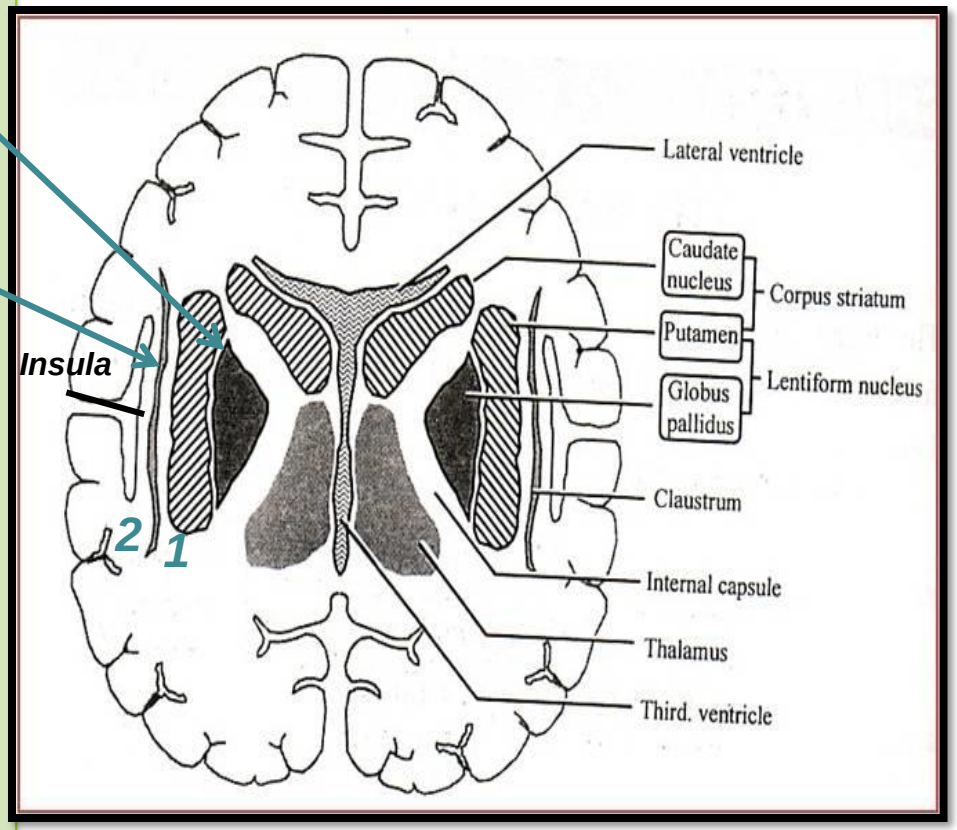


- **Putamen** is more closely related to **Caudate nucleus** (regarding development, function & connections) and together constitute the **Neostriatum** or **Striatum**.
- **Globus Pallidus** is the oldest part of corpus striatum and is called **Paleostriatum** or **Pallidum**



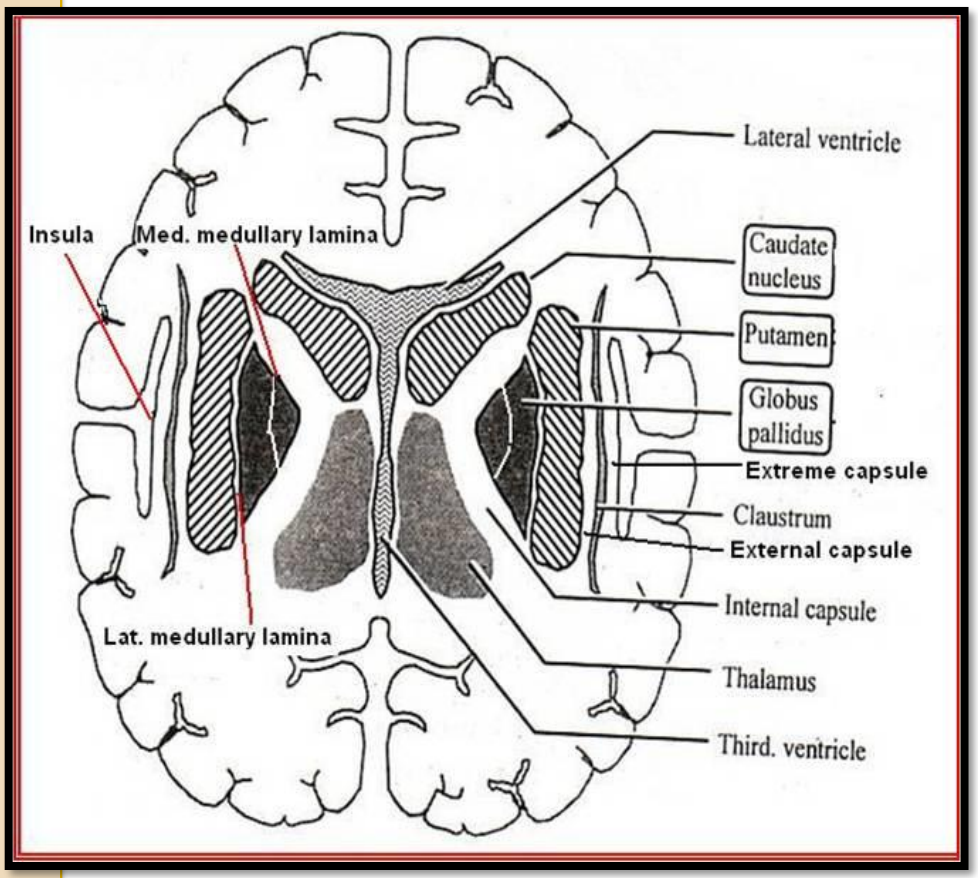
PUTAMEN

- *Separated from globus pallidus by a thin sheath of nerve fibers, the **Lateral Medullary Lamina***
- *The white matter lateral to putamen is divided, by a sheath of **grey matter**, **the Claustrum** into two layers:*
  - ***External capsule** (1) between the putamen and claustrum and*
  - ***Extreme capsule** (2) between the claustrum and the insula*



GLOBUS PALLIDUS

- Consists of two divisions, the Lateral & the Medial segments, separated by a thin sheath of nerve fibers, the **Medial Medullary lamina**.
- The medial segment is similar, in terms of cytology and connections with the pars reticulata of substantia nigra



CAUDATE NUCLEUS

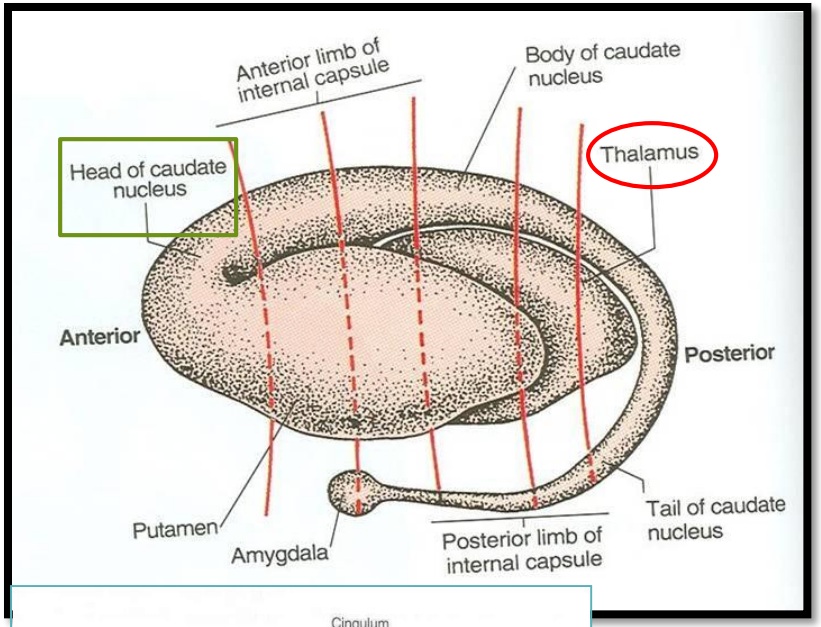
- **SHAPE:** C-shaped mass of grey matter
- **COMPONENTS:** *head, body & tail*

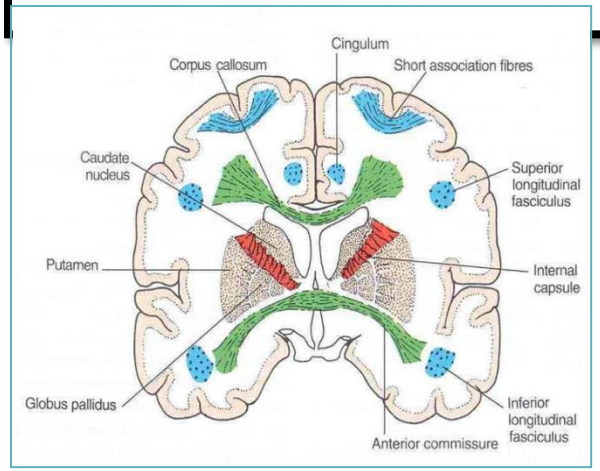
Head:

-Rounded in shape

-Lies anterior to thalamus (in frontal lobe)

-Completely separated from the putamen by the internal capsule except rostrally where it is continuous with the putamen





CAUDATE NUCLEUS

Body:

-Long & narrow

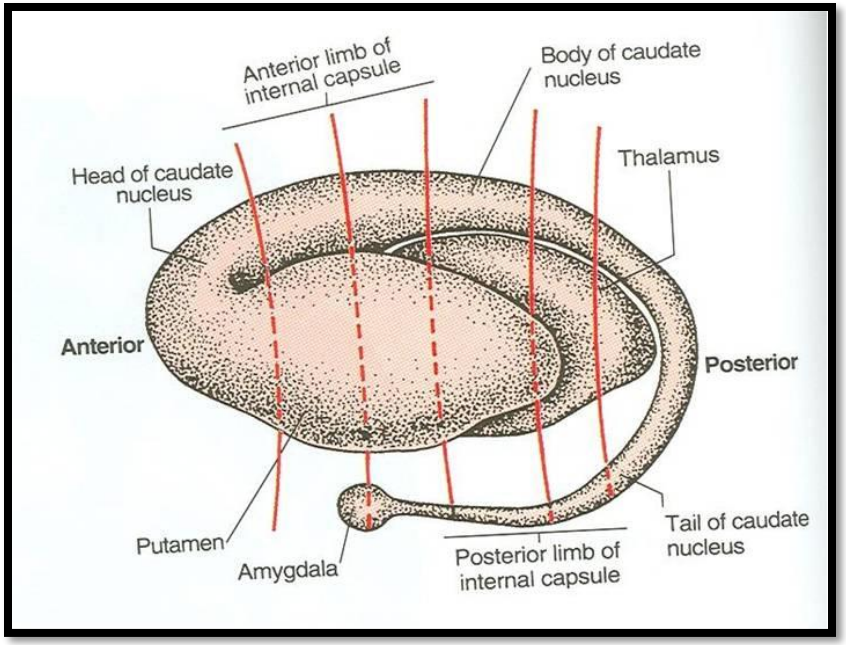
-Extends above thalamus (in parietal lobe)

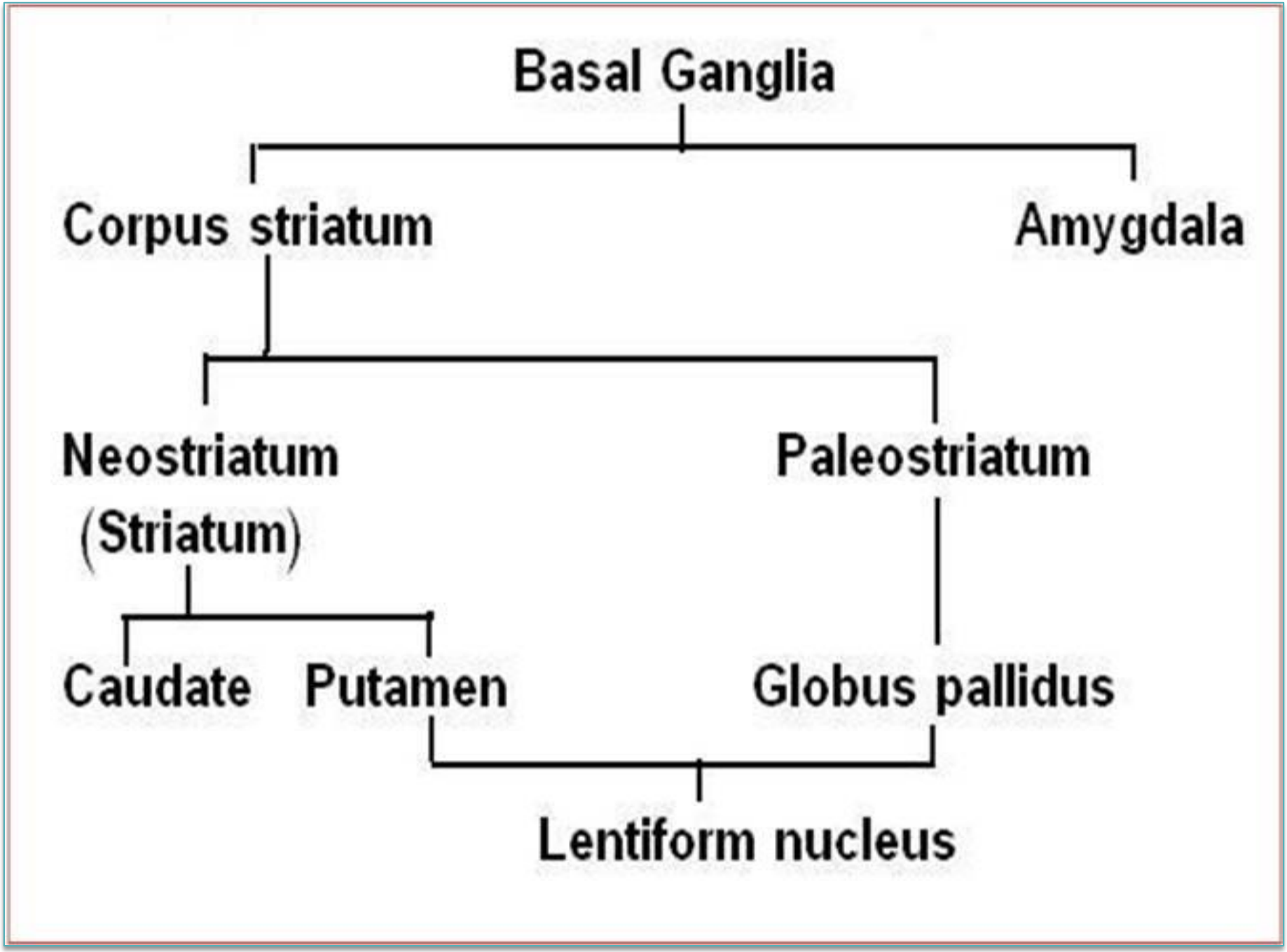
Tail:

-Long & tapering

-Descends into temporal lobe

-Continuous with Amygdaloid Nucleus




Basal Ganglia
Corpus striatum
Amygdala
Neostriatum
(Striatum)
Paleostriatum
Caudate
Putamen
Globus pallidus
Lentiform nucleus

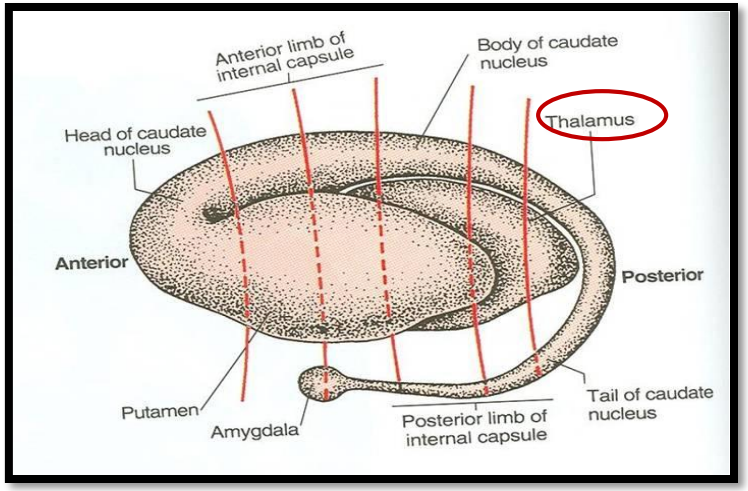
CORPUS STRIATUM (IMPORTANT RELATIONS)

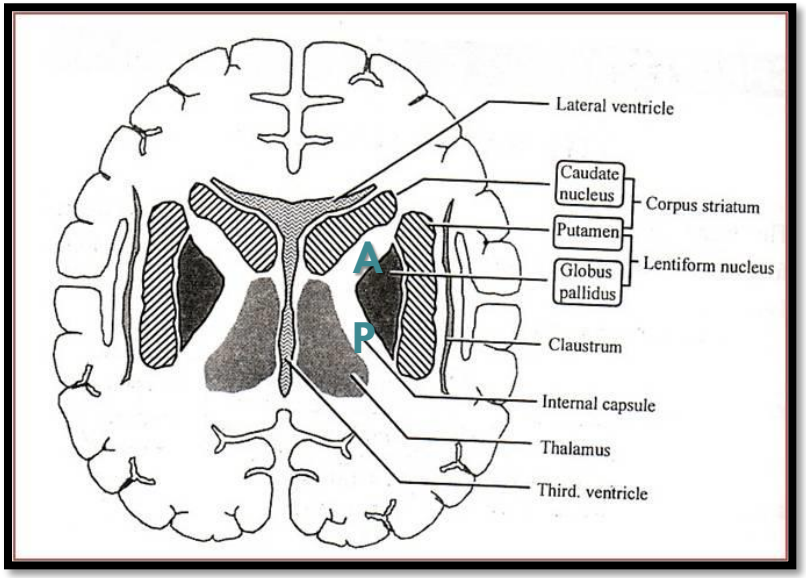
Head of Caudate Nucleus lies:

- **Anterior** to thalamus
- **Medial** to Lentiform & separated from it by *anterior limb of internal capsule* (A)

Lentiform Nucleus:

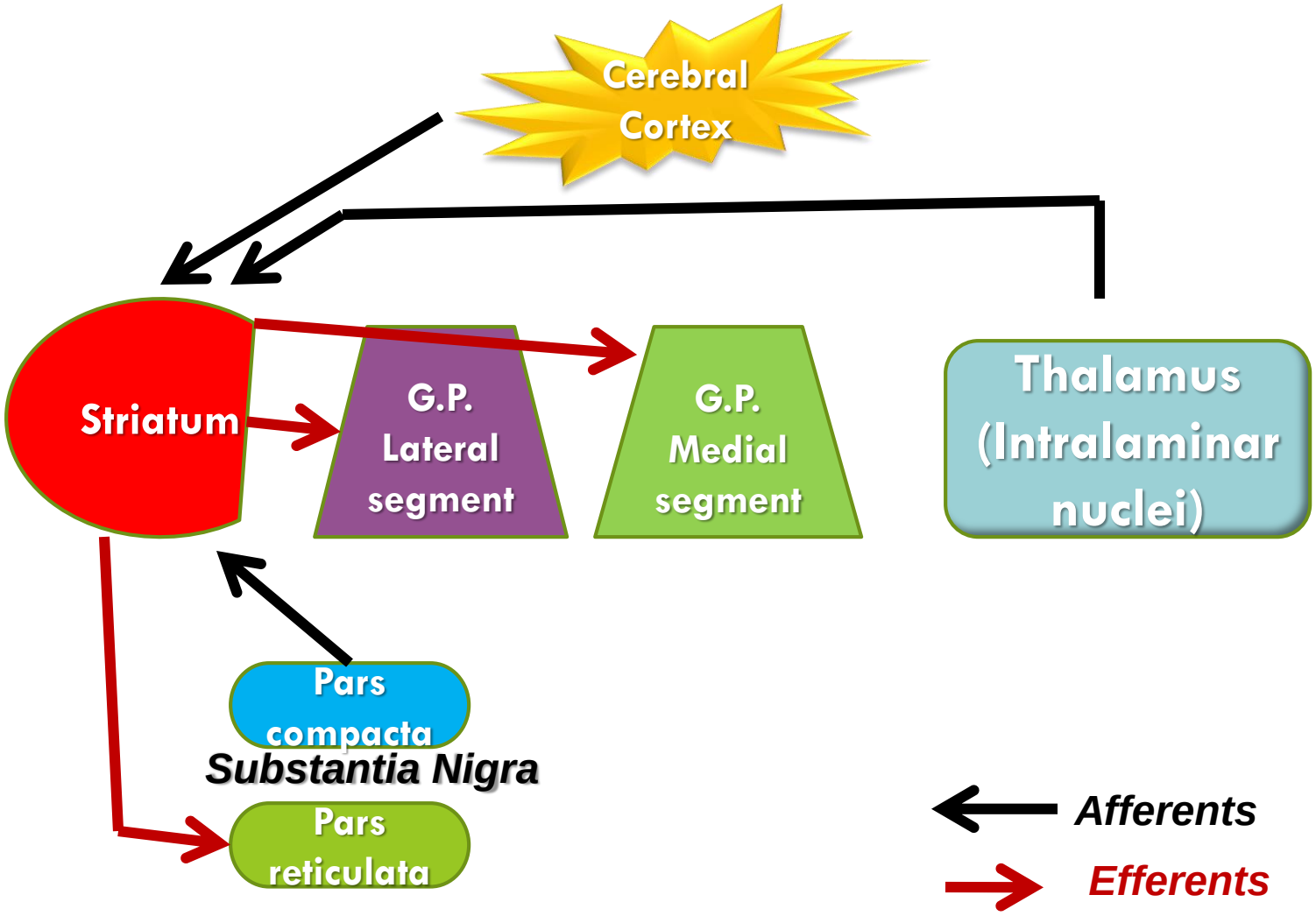
- **Lateral** to thalamus & separated from it by *posterior limb of internal capsule* (P)





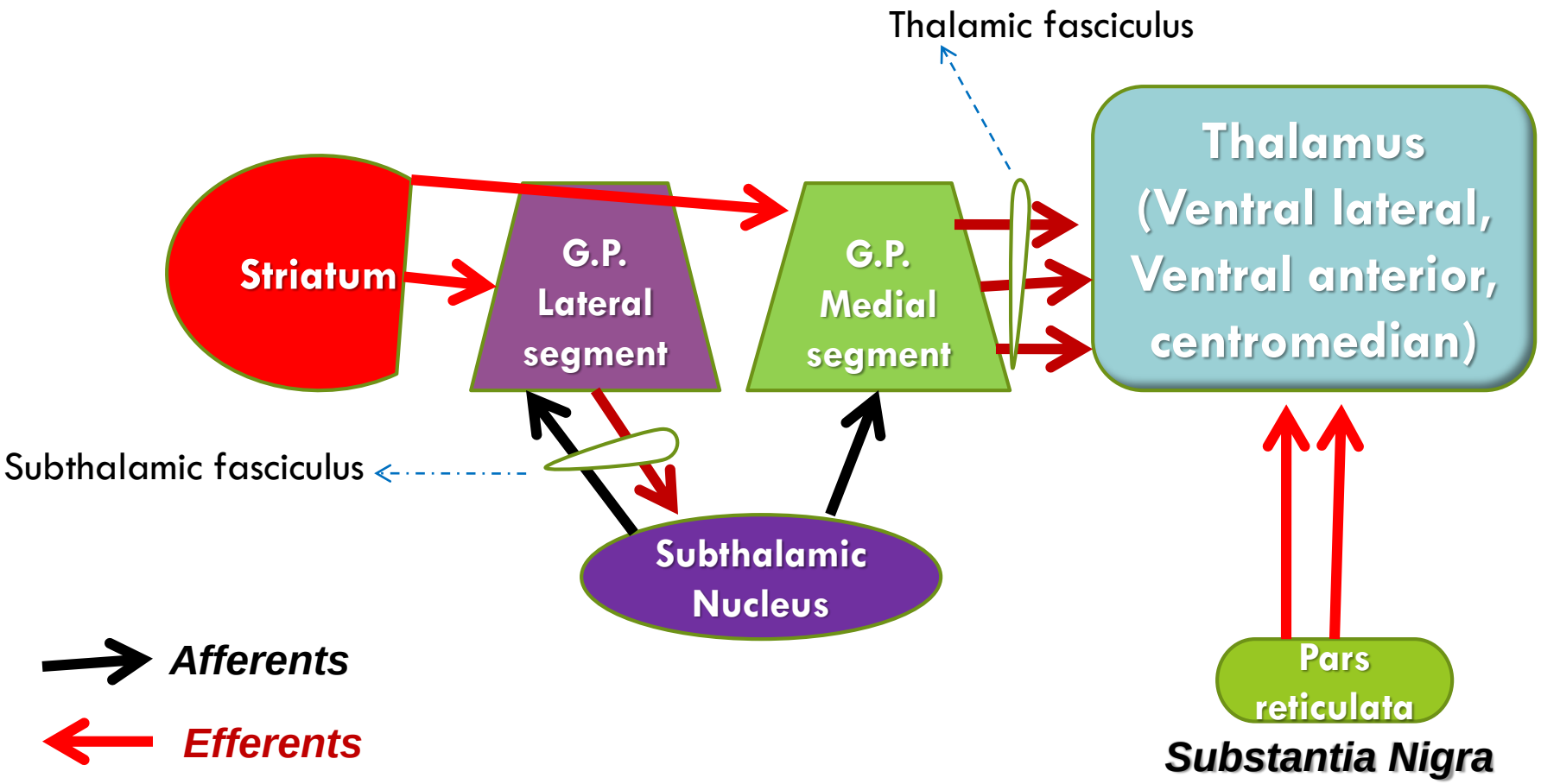
STRIATUM (CAUDATE & PUTAMEN)

"The input portion of Corpus striatum"



PALEOSTRIATUM (GLOBUS PALLIDUS)

"The output portion of corpus striatum: medial segment of G.P. + Pars Reticulata of S.N."



CORPUS STRIATUM
FUNCTION

- **The corpus striatum assists in regulation of voluntary movement and learning of motor skills as they:**
- ***Facilitate behavior and movement that are required and appropriate.***
- ***Inhibit unwanted or inappropriate movement.***

DYSFUNCTION

- *Its dysfunction* ***does NOT cause:*** ***paralysis, sensory loss or ataxia***
- *It leads to:*
  I. ***Abnormal motor control: emergence of abnormal, involuntary movements (dyskinesias)***
  II. ***Alteration in muscle tone: hypertonia/hypotonia***