

# **BASAL GANGLIA**

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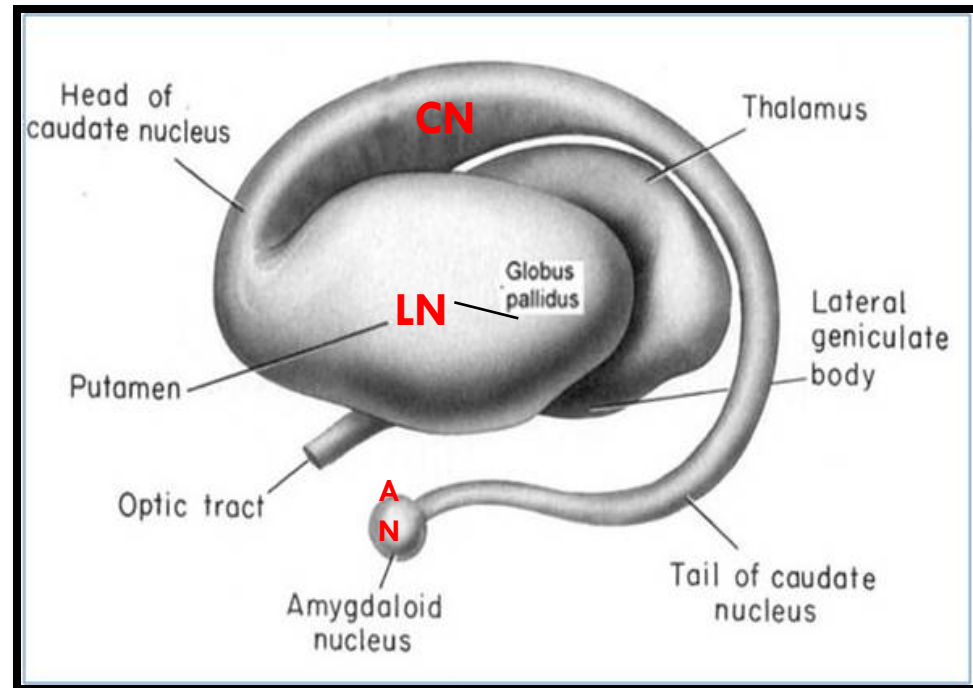
# OBJECTIVES

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

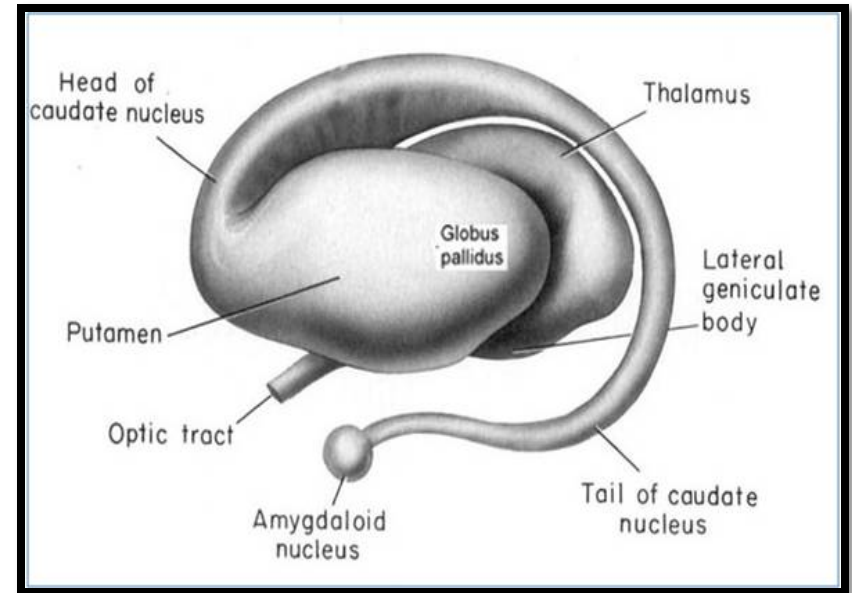
- ❑ Define “basal ganglia” and enumerate its components.
- ❑ Enumerate parts of “Corpus Striatum” and their important relations.
- ❑ Describe the structure of Caudate and Lentiform (Putamen & Globus Pallidus) nuclei.
- ❑ Differentiate between striatum & paleostriatum in term of connections.
- ❑ State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

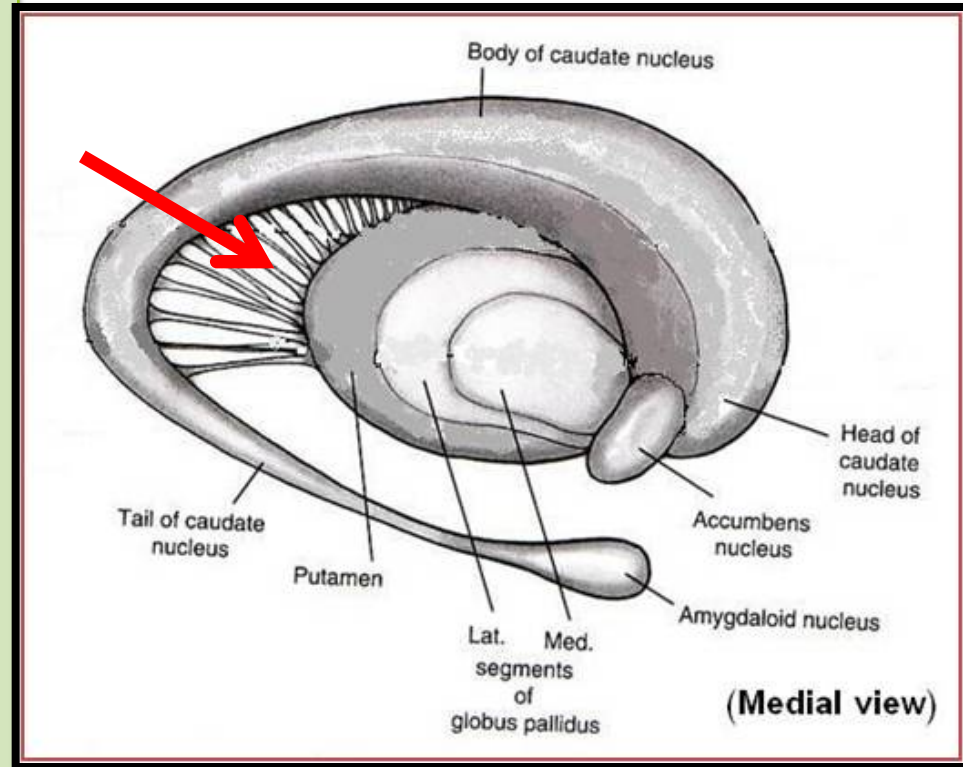


**Amygdaloid Nucleus** (part of limbic system) is only embryologically related to **Corpus Striatum**

# CORPUS STRIATUM

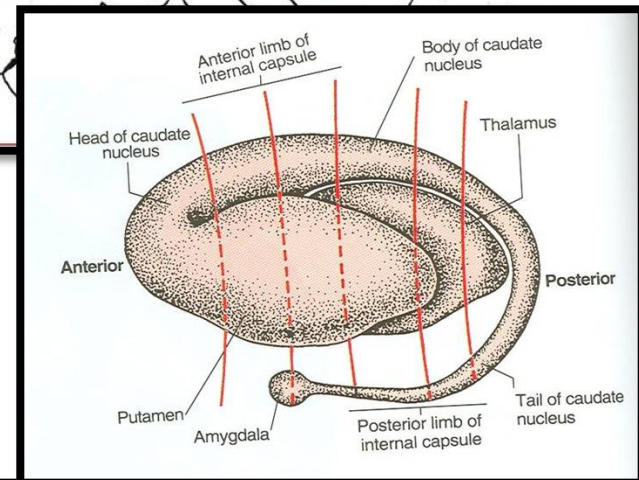
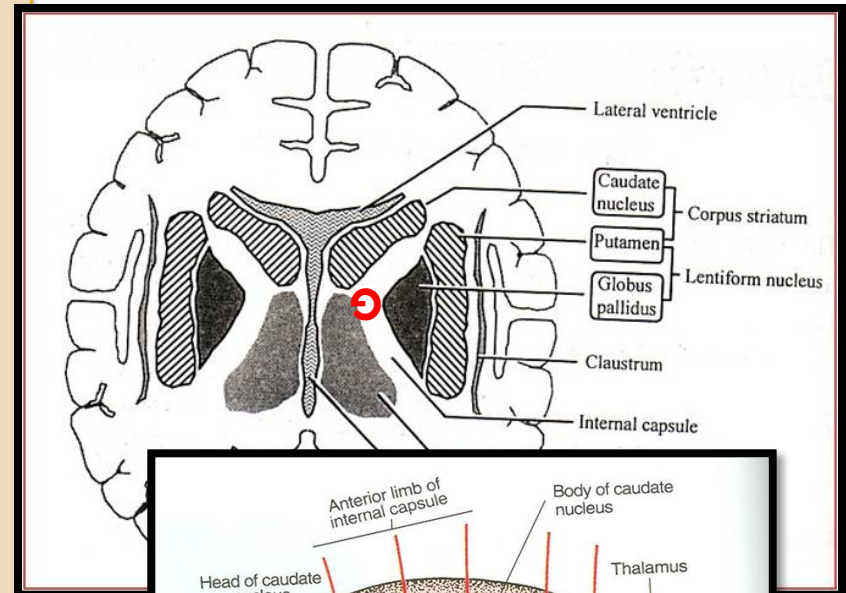
## *(Nomenclature)*

- 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***.



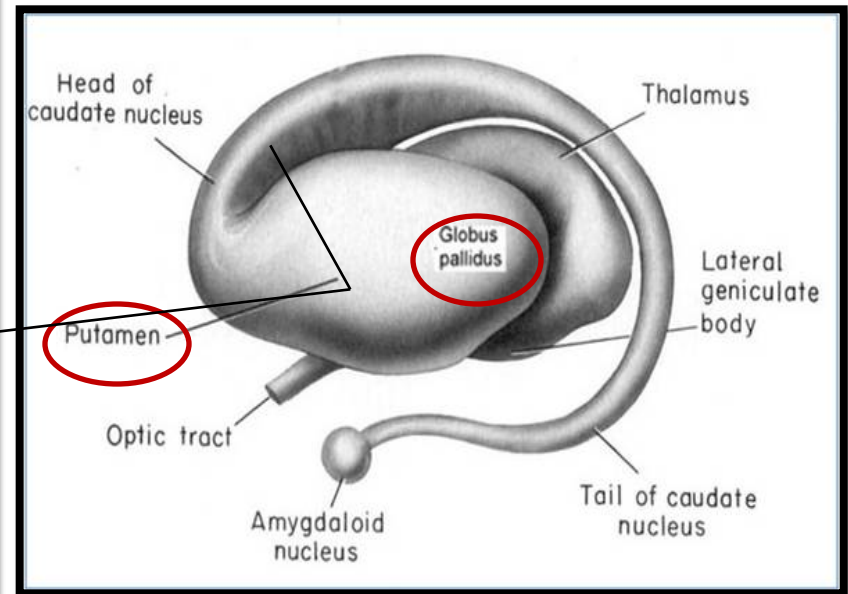
# PARTS

- ❑ **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)**



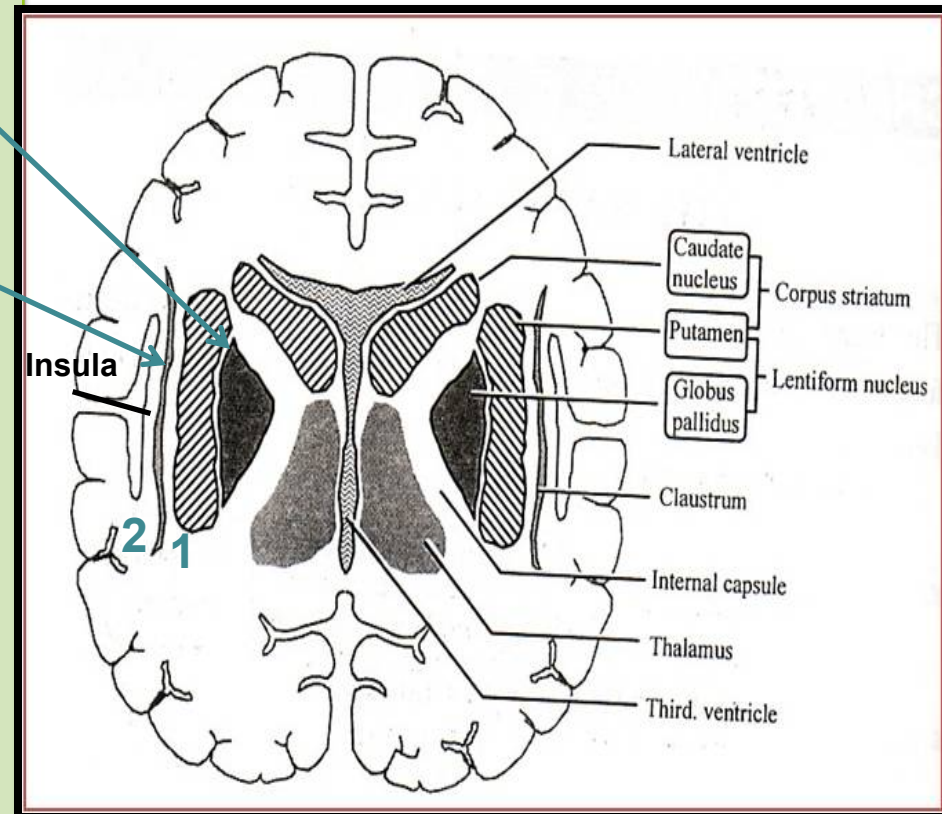
□ **Putamen** is more closely related to **Caudate nucleus** (regarding development, function & connections) and together constitute the **Neostriatum or Striatum**.

□ **Globus Pallidus** is the oldest part of corpus striatum and is called **Paleostriatum or Pallidum**



# PUTAMEN

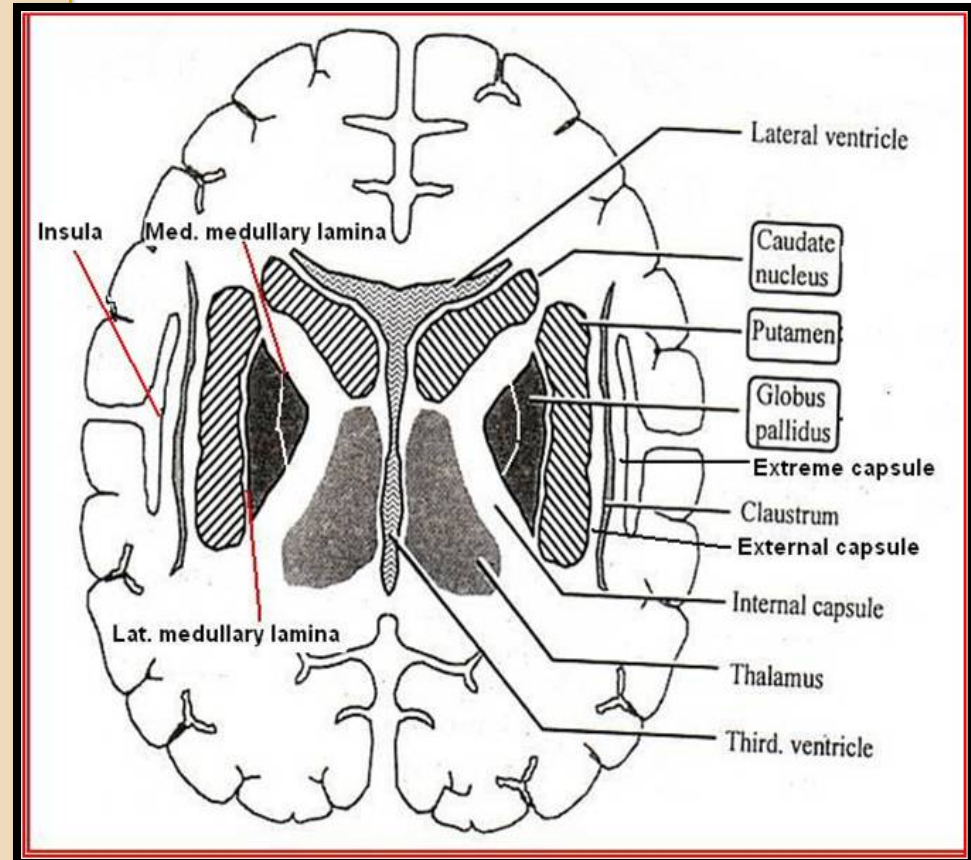
- Separated from globus pallidus by a thin sheath of nerve fibers, the **Lateral Medullary Lamina**
- The white matter lateral to putamen is divided, by a sheath of grey matter, the **Clastrum** into two layers:
  - **External capsule (1)** between the putamen and claustrum and
  - **Extreme capsule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

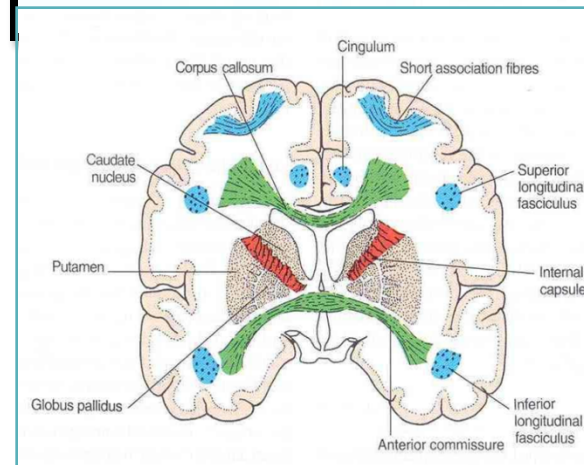
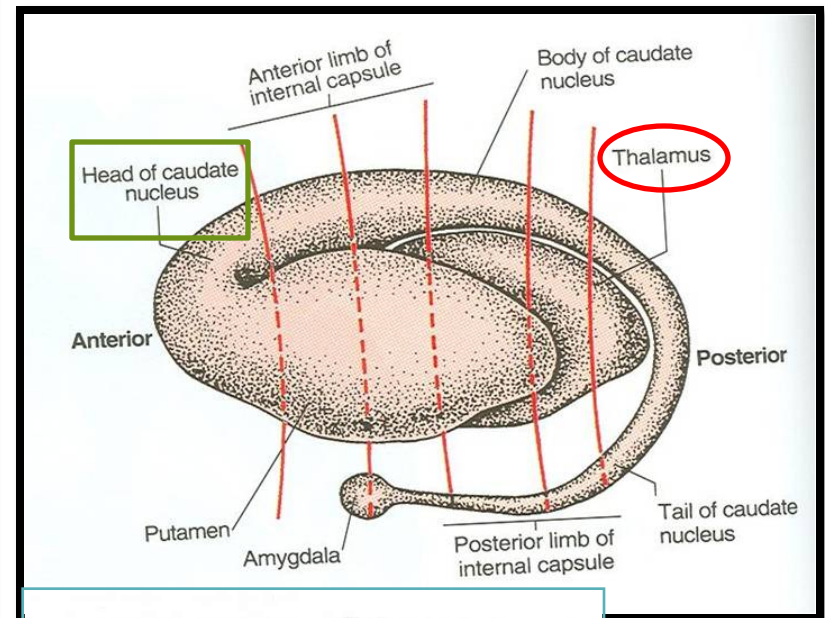


# CAUDATE NUCLEUS

- **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



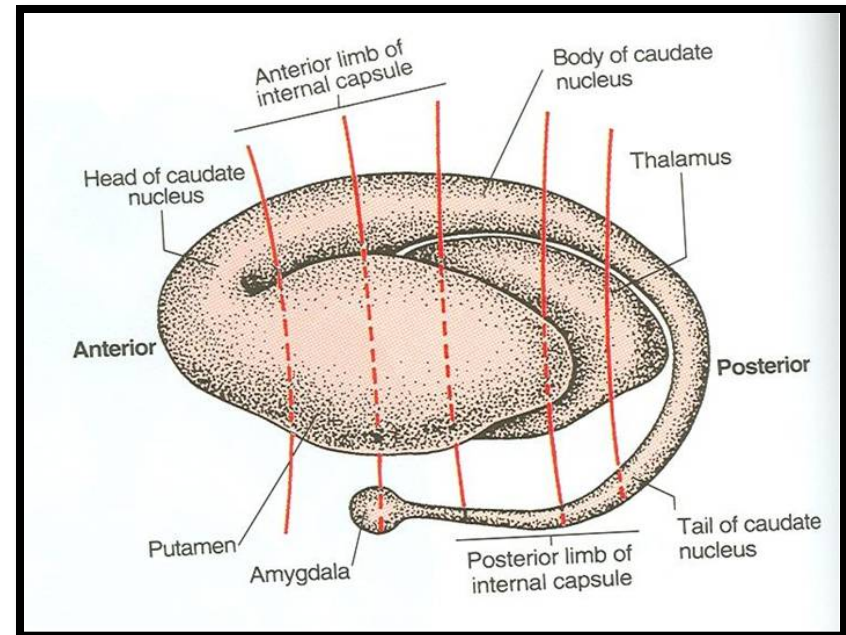
# CAUDATE NUCLEUS

## Body:

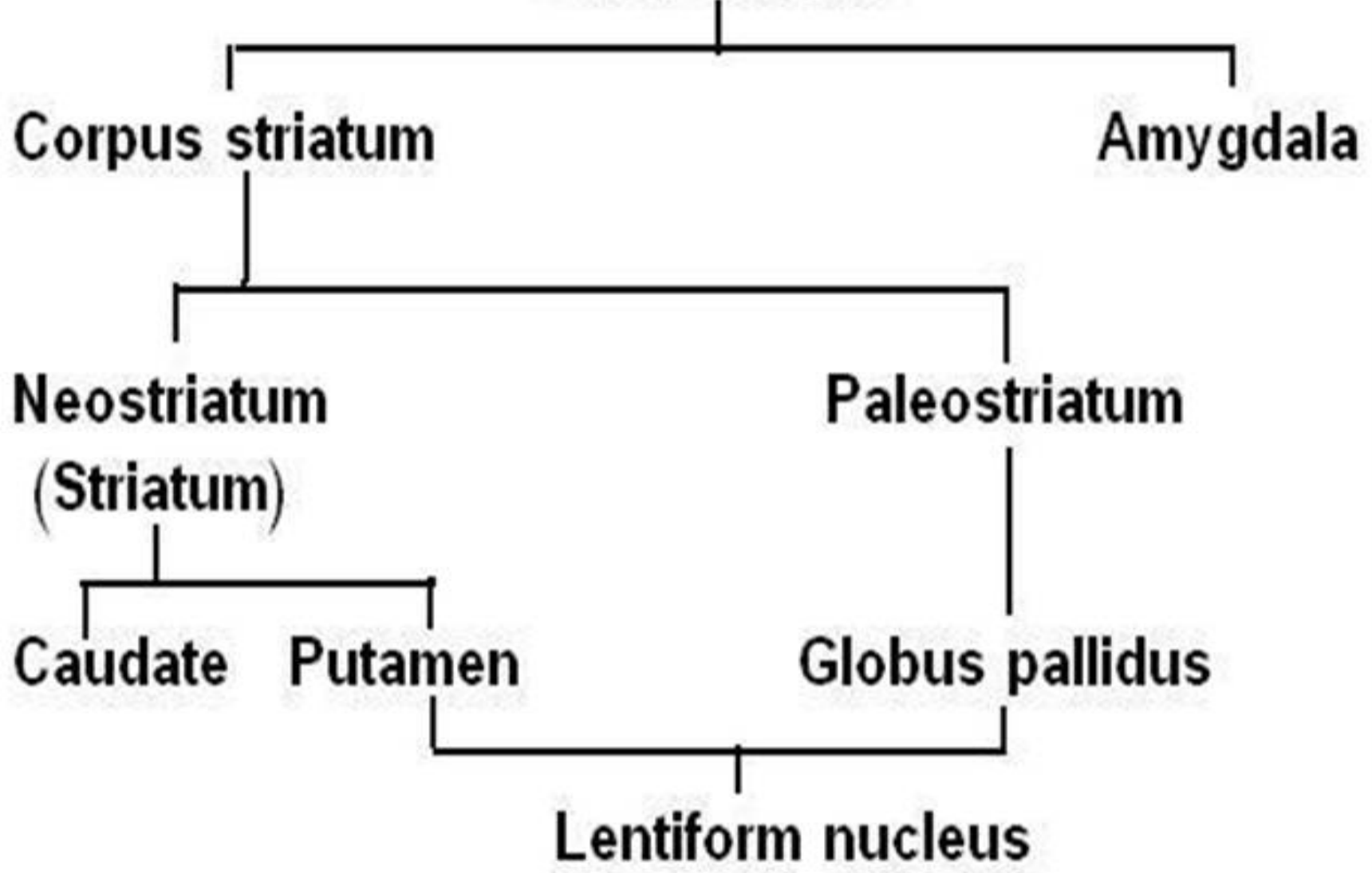
- Long & narrow
- Extends above thalamus (in parietal lobe)

## Tail:

- Long & tapering
- Descends into temporal lobe
- Continuous with Amygdaloid Nucleus



# Basal Ganglia



# CORPUS STRIATUM

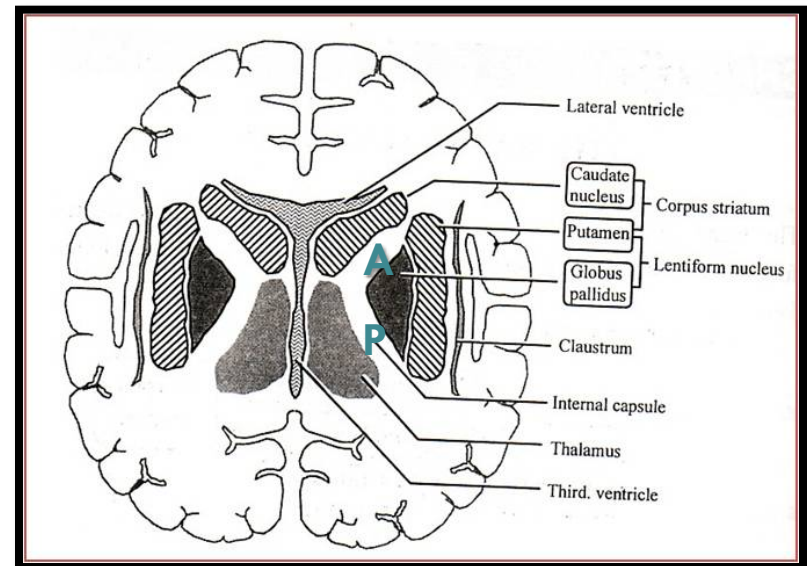
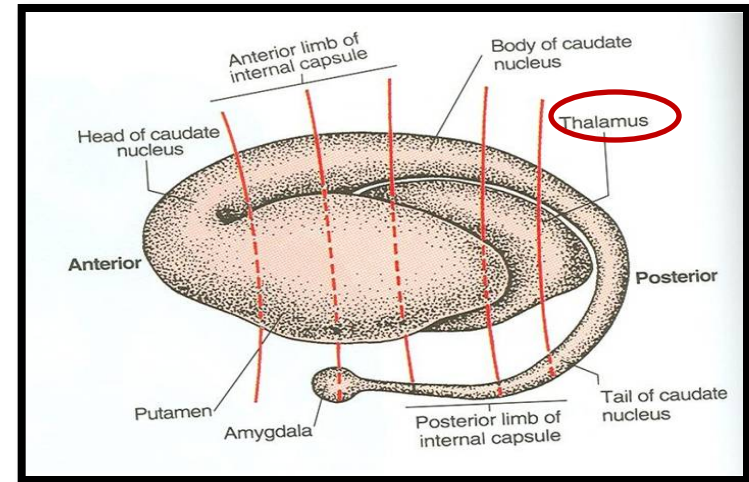
## (Important relations)

**Head of Caudate Nucleus**  
**lies:**

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

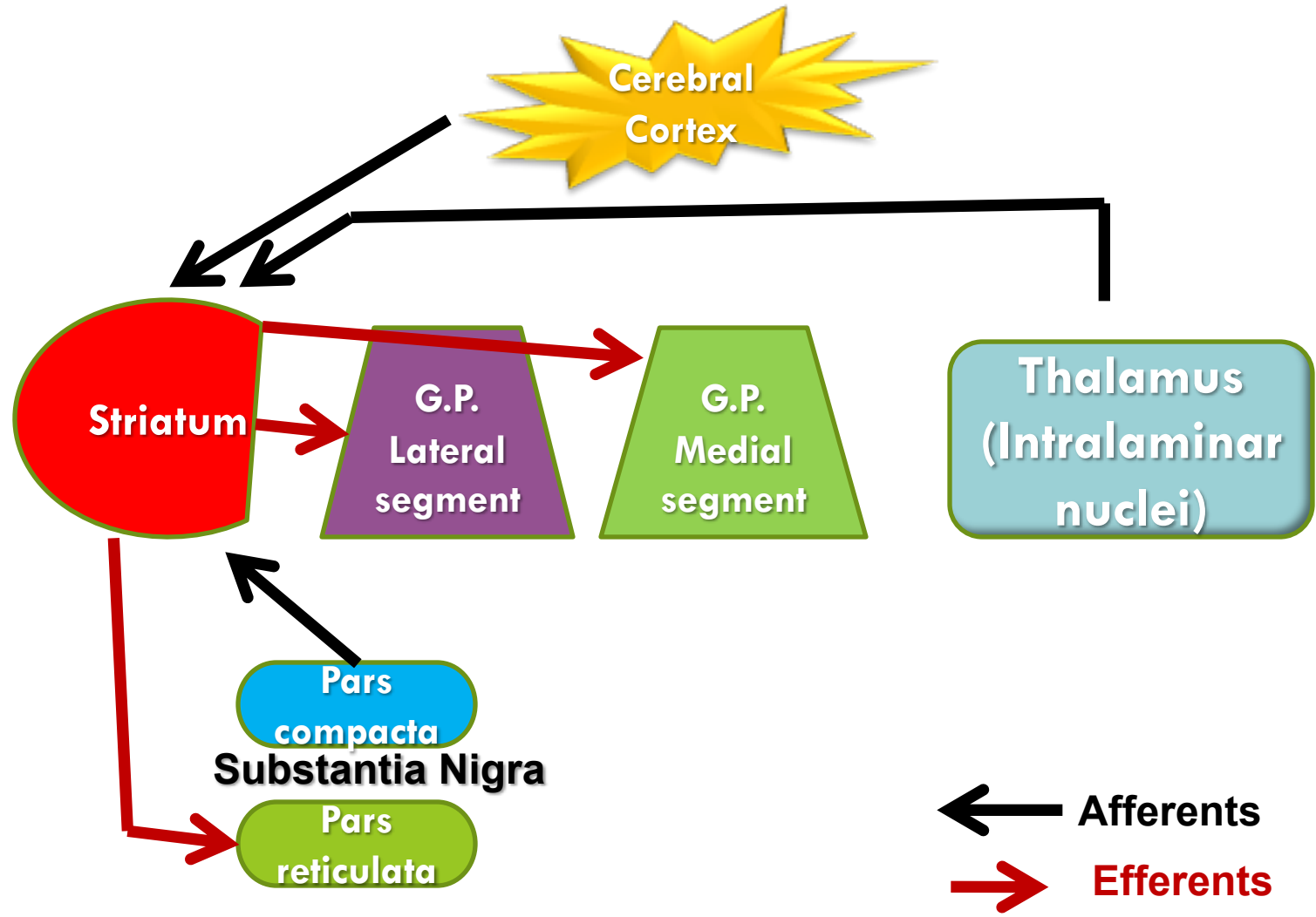
**Lentiform Nucleus:**

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



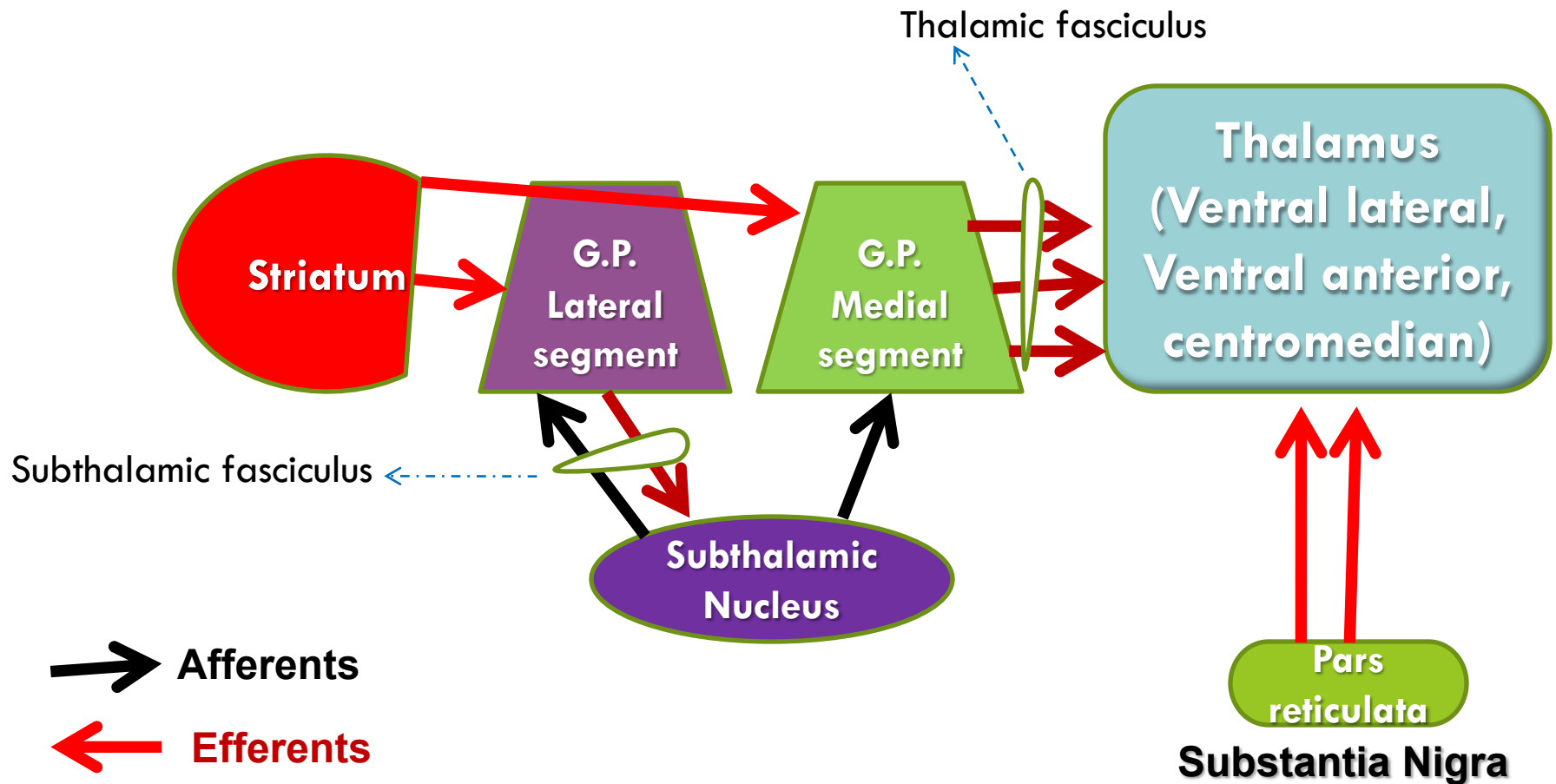
# STRIATUM (CAUDATE & PUTAMEN)

*“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

