

BASAL GANGLIA

DR JAMILA EL MEDANY

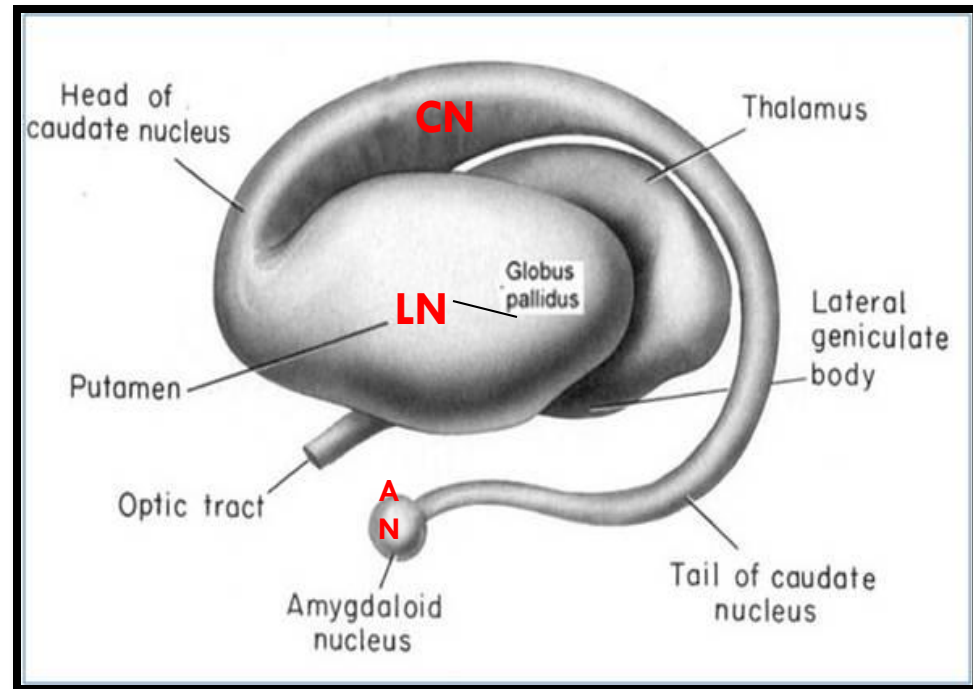
OBJECTIVES

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

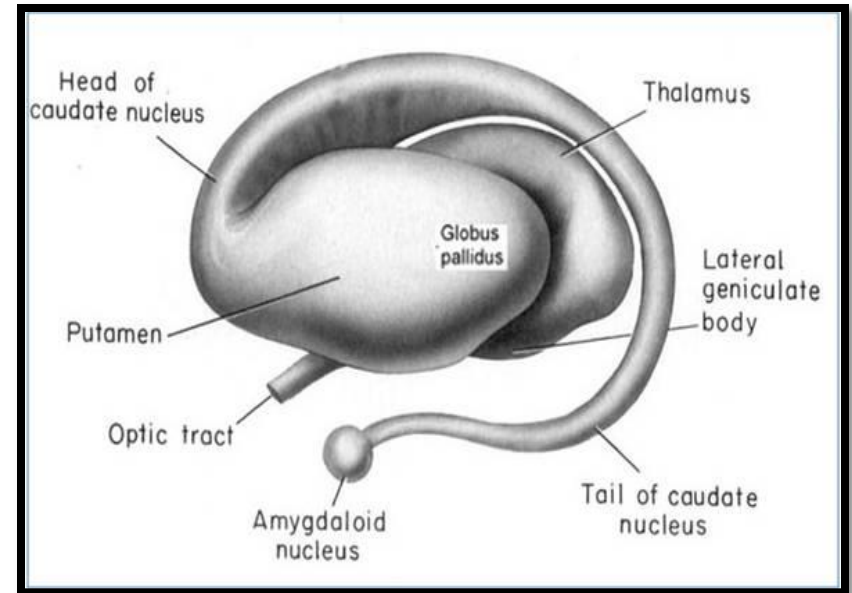
- ❑ Define “basal ganglia” and enumerate its components.
- ❑ Enumerate parts of “Corpus Striatum” and their important relations.
- ❑ Describe the structure of Caudate and Lentiform (Putamen & Globus Pallidus) nuclei.
- ❑ Differentiate between striatum & paleostriatum in term of connections.
- ❑ State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



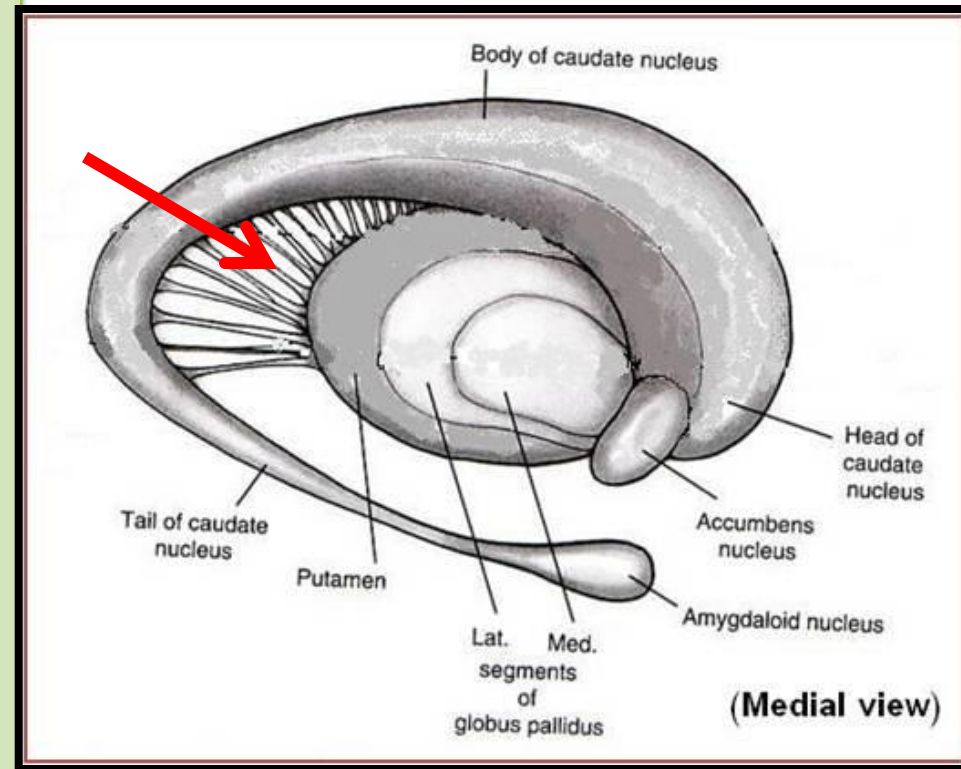
- Caudate & Lentiform nuclei are functionally related to each other & called “**Corpus Striatum**”: Part of *extrapyramidal motor system*, principally involved in the control of posture and movements (primarily by inhibiting motor functions)



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

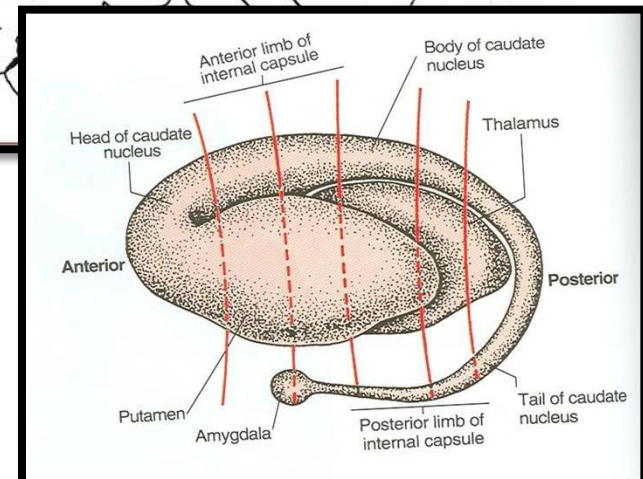
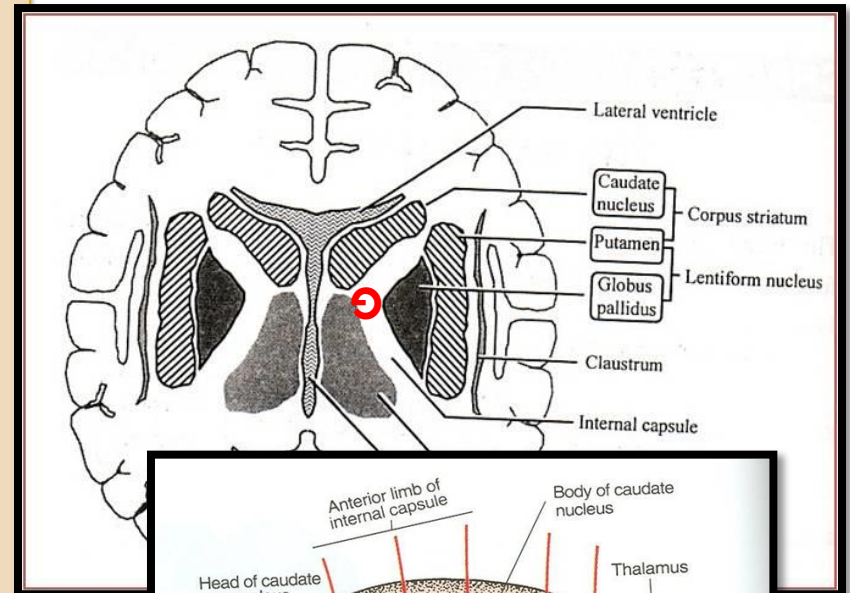
CORPUS STRIATUM (NOMENCLATURE)

- 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*.



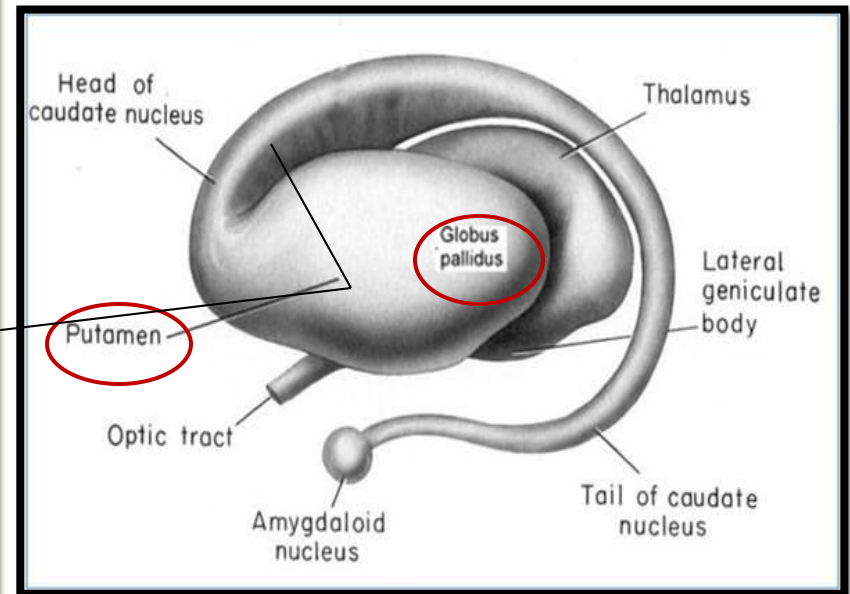
PARTS

- ❑ **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)**



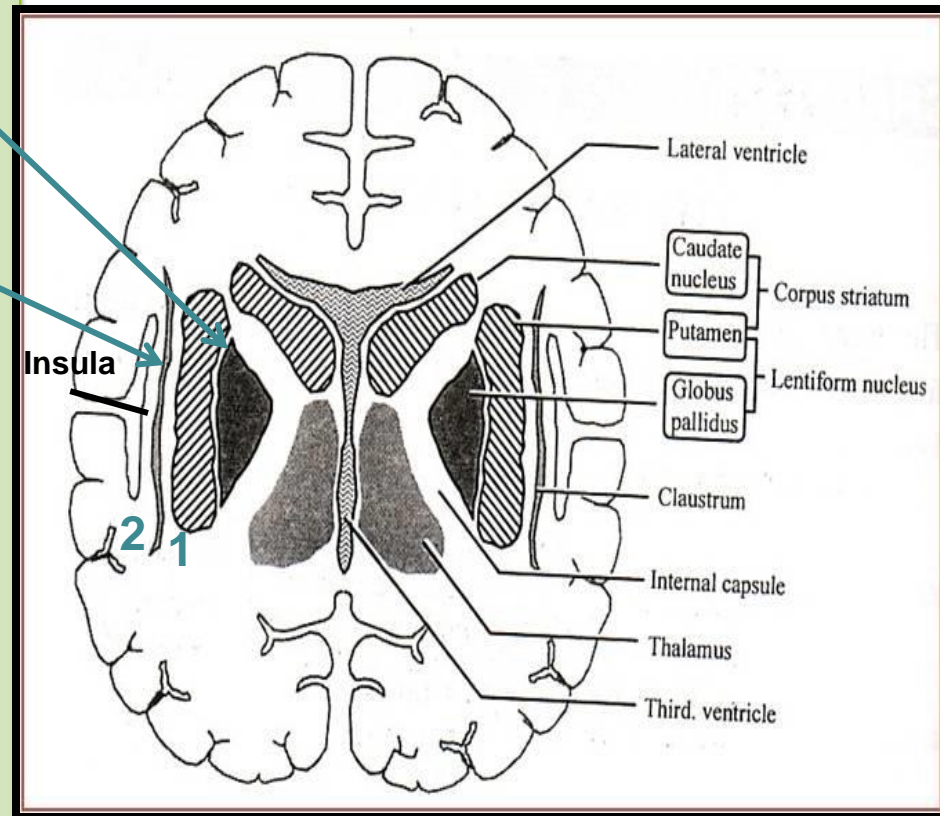
□ **Putamen** is more closely related to **Caudate nucleus** (regarding development, function & connections) and together constitute the **Neostriatum or Striatum**.

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



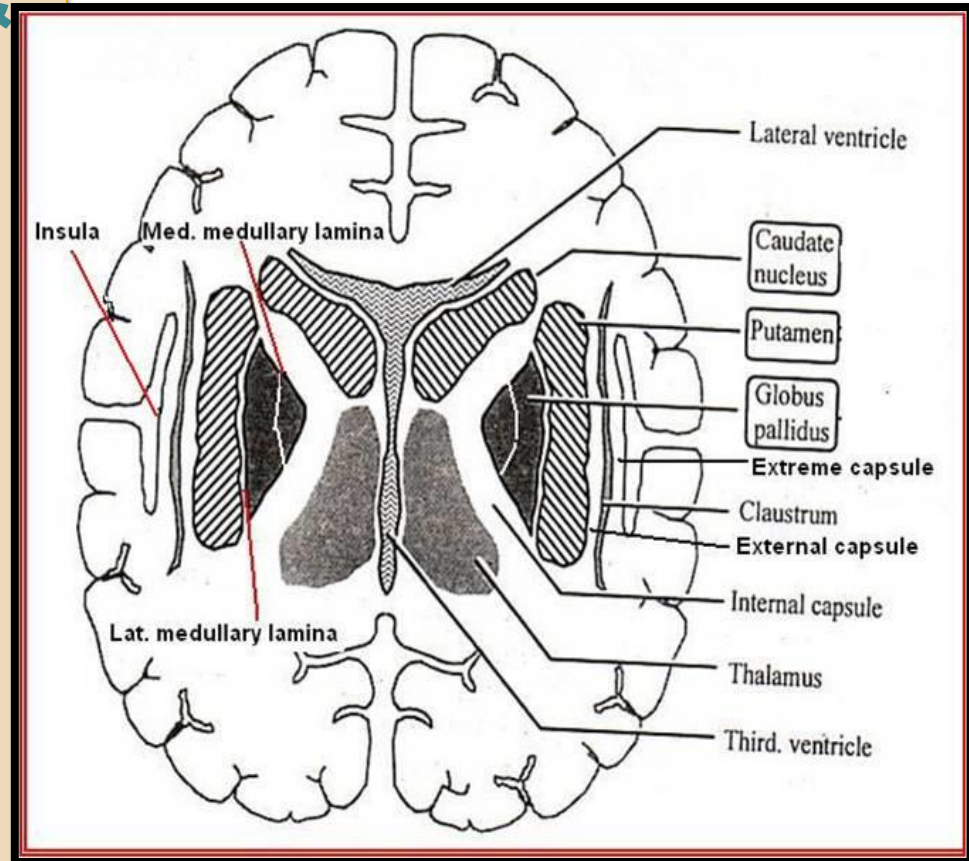
PUTAMEN

- 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**

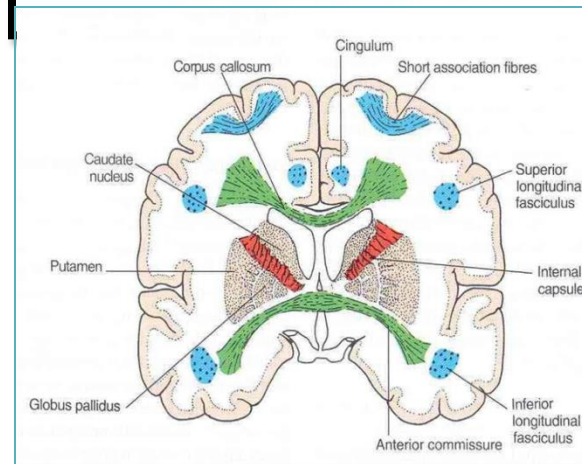
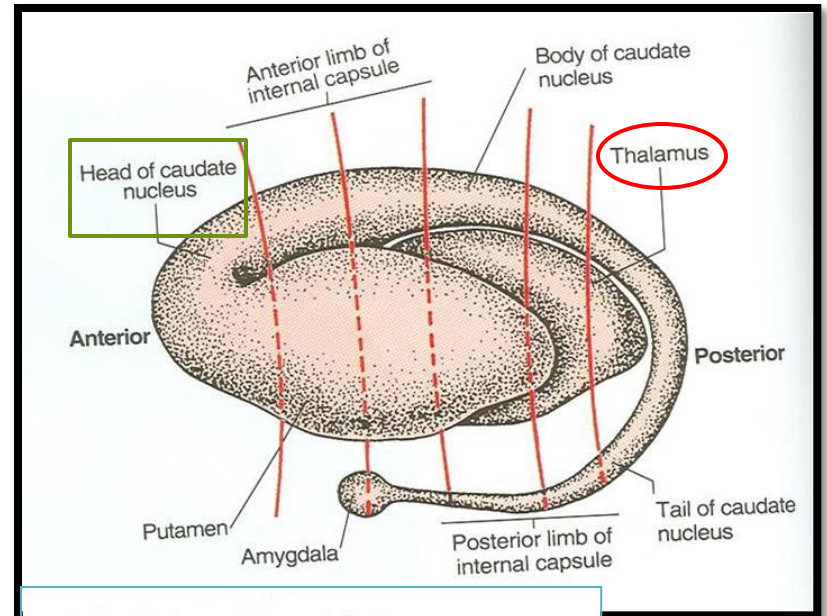


CAUDATE NUCLEUS

- **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



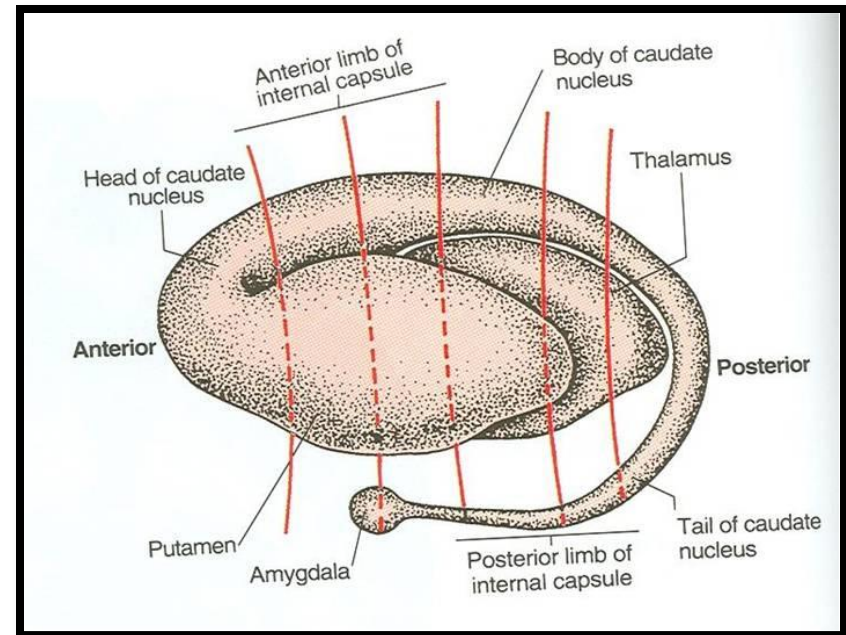
CAUDATE NUCLEUS

Body:

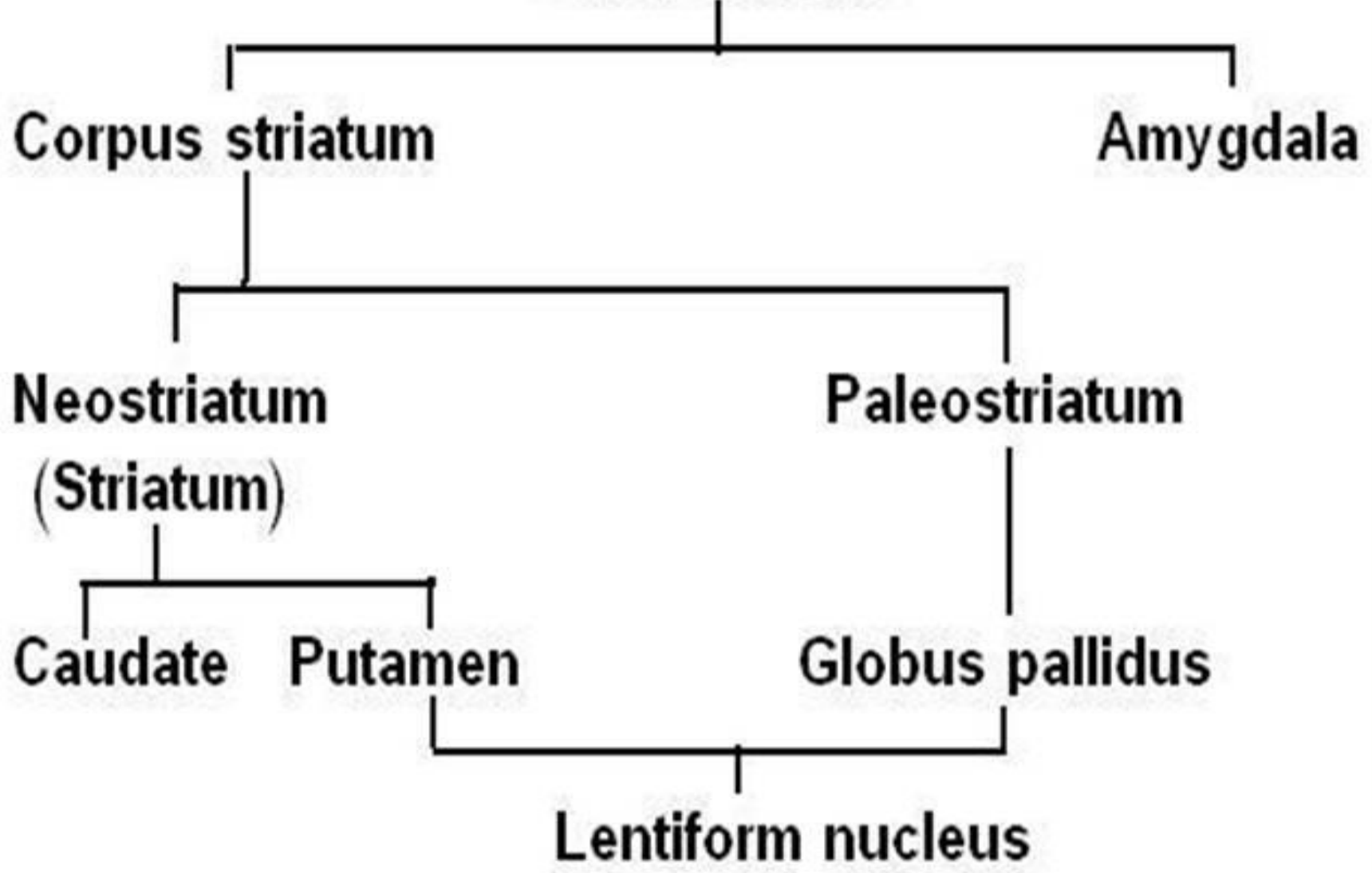
- Long & narrow
- Extends above thalamus (in parietal lobe)

Tail:

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



Basal Ganglia



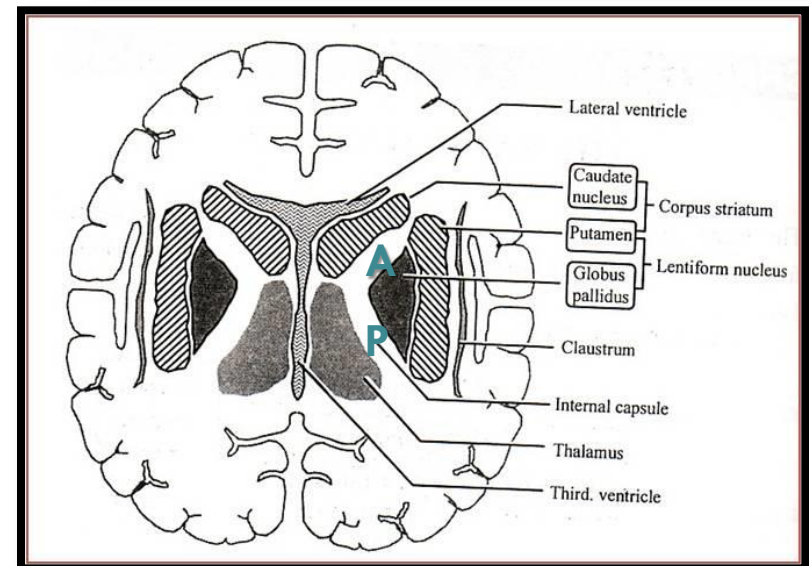
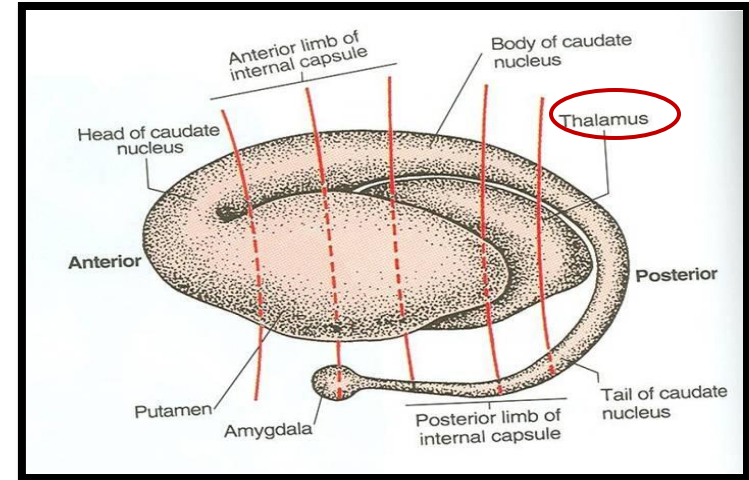
CORPUS STRIATUM (IMPORTANT RELATIONS)

Head of Caudate Nucleus lies:

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

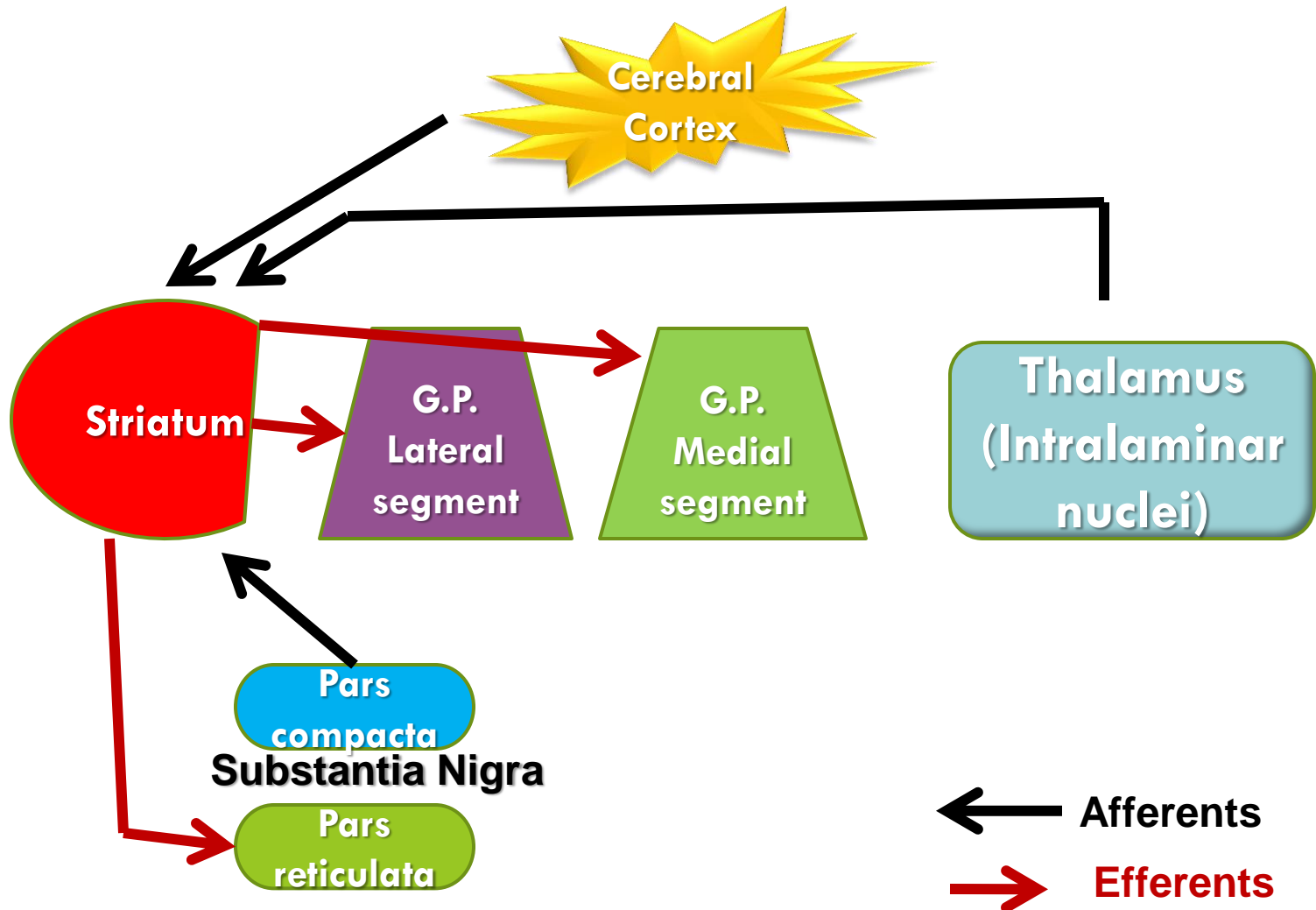
Lentiform Nucleus:

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



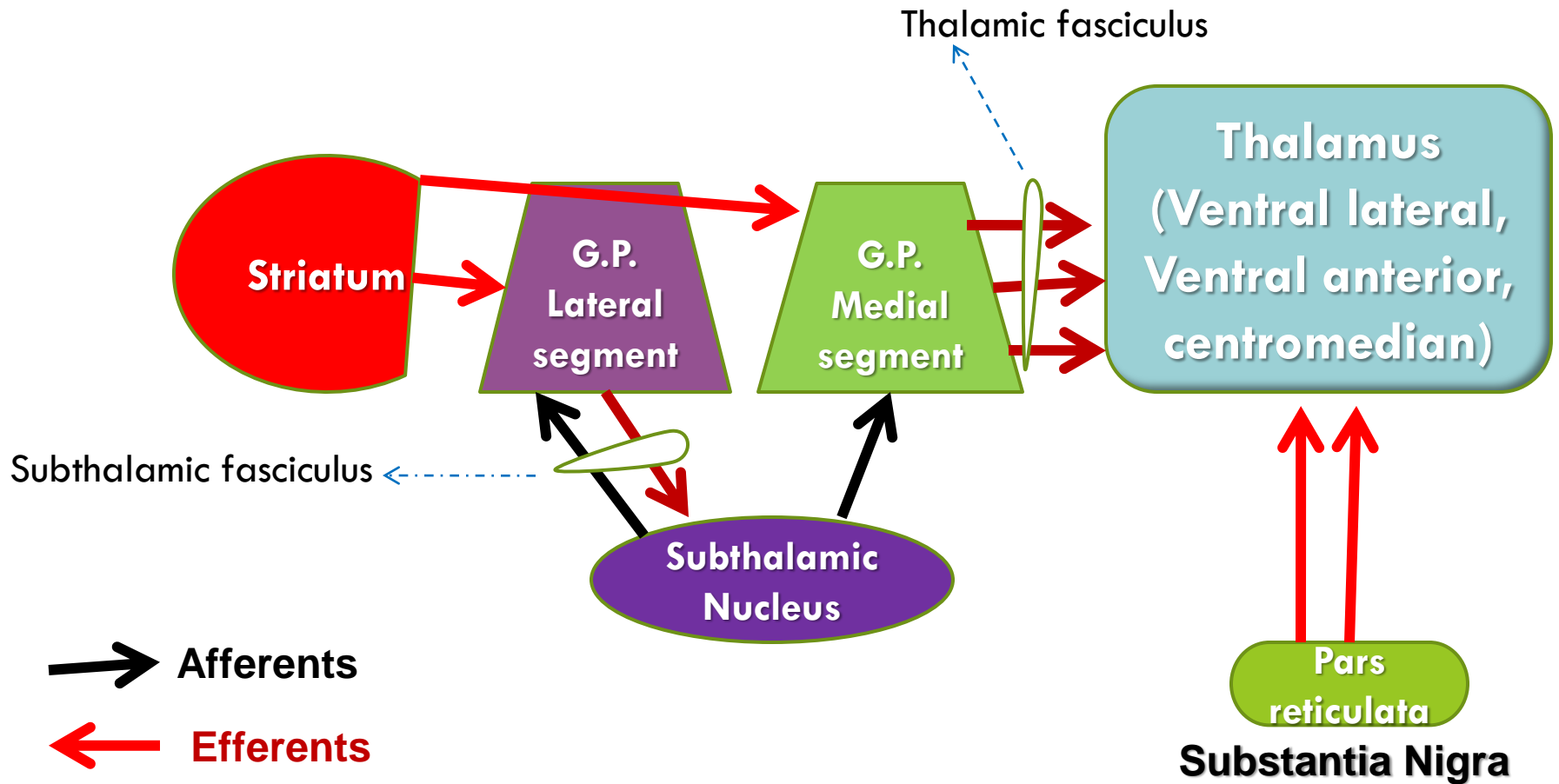
STRIATUM (CAUDATE & PUTAMEN)

“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

