

Basal Nuclei(Basal Ganglia)

- Sub-cortical masses of grey matter
- Embryologically- derived from Telencephalon
- Sub cortical cell stations for extra-pyramidal motor pathway

Main Function

- Organize & Co-ordinate motor movements & posture
- Major Effect – Decrease muscle tone & Inhibit unwanted muscular activity

Basal Nuclei

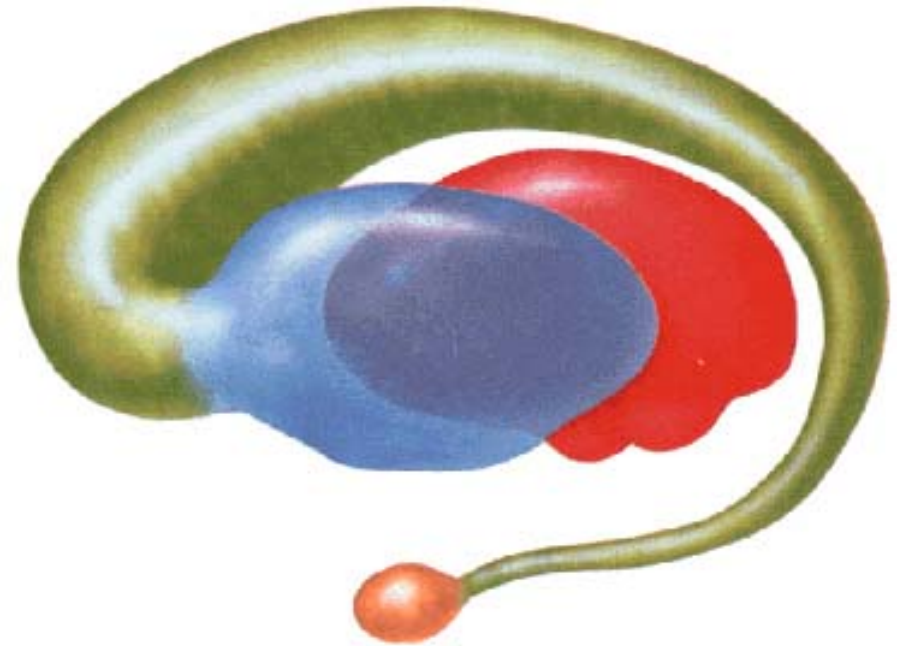
Components

1. Corpus Striatum

- Caudate nucleus (Medial part)
- Lentiform(Lenticular) Nucleus(lateral part)
 - ❖ Putamen (outer Part)
 - ❖ Globus pallidus (Inner Part)

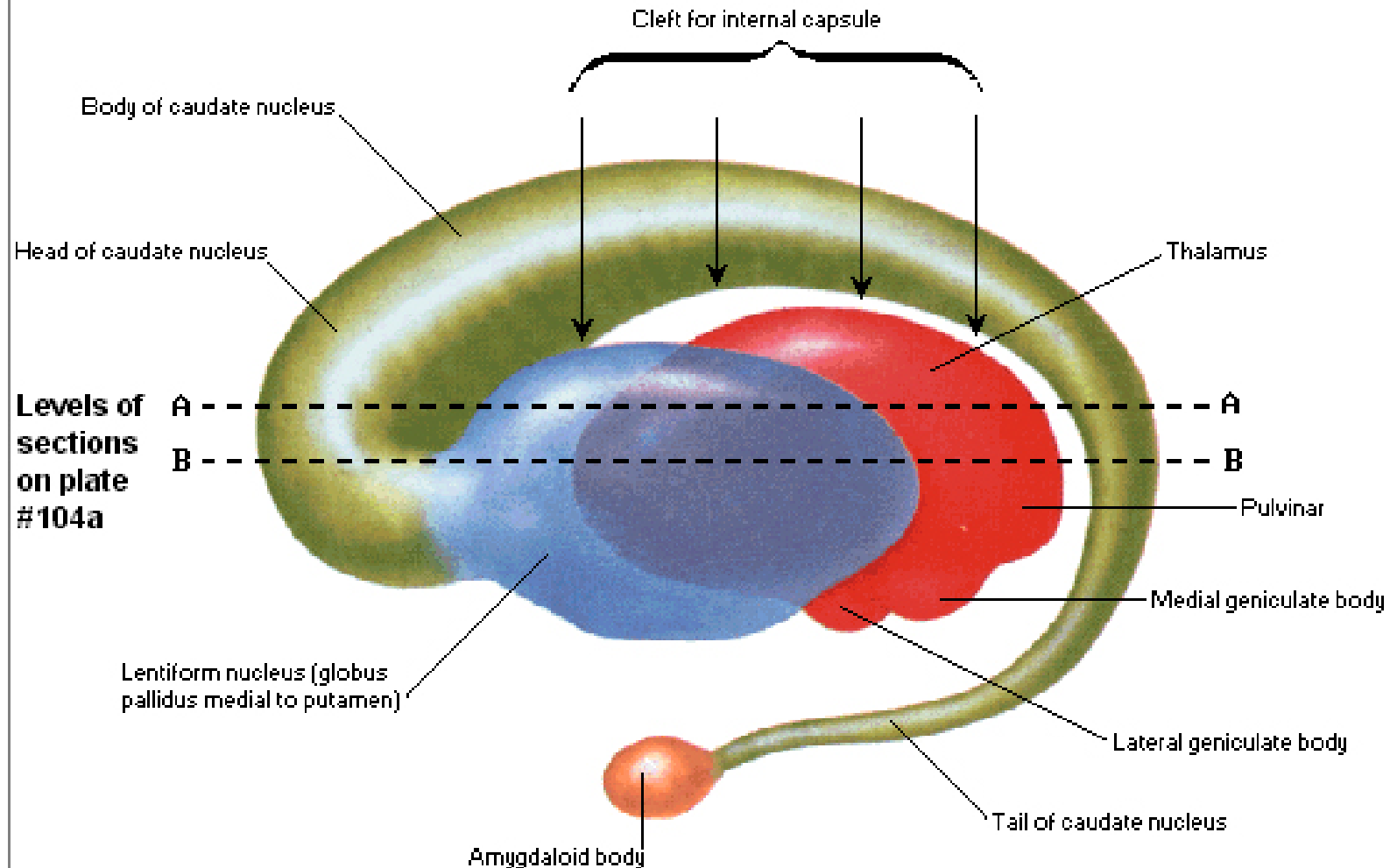
2. Amygdaloid (nuclear complex) body

3. Claustrum



Basal Ganglia - Schema

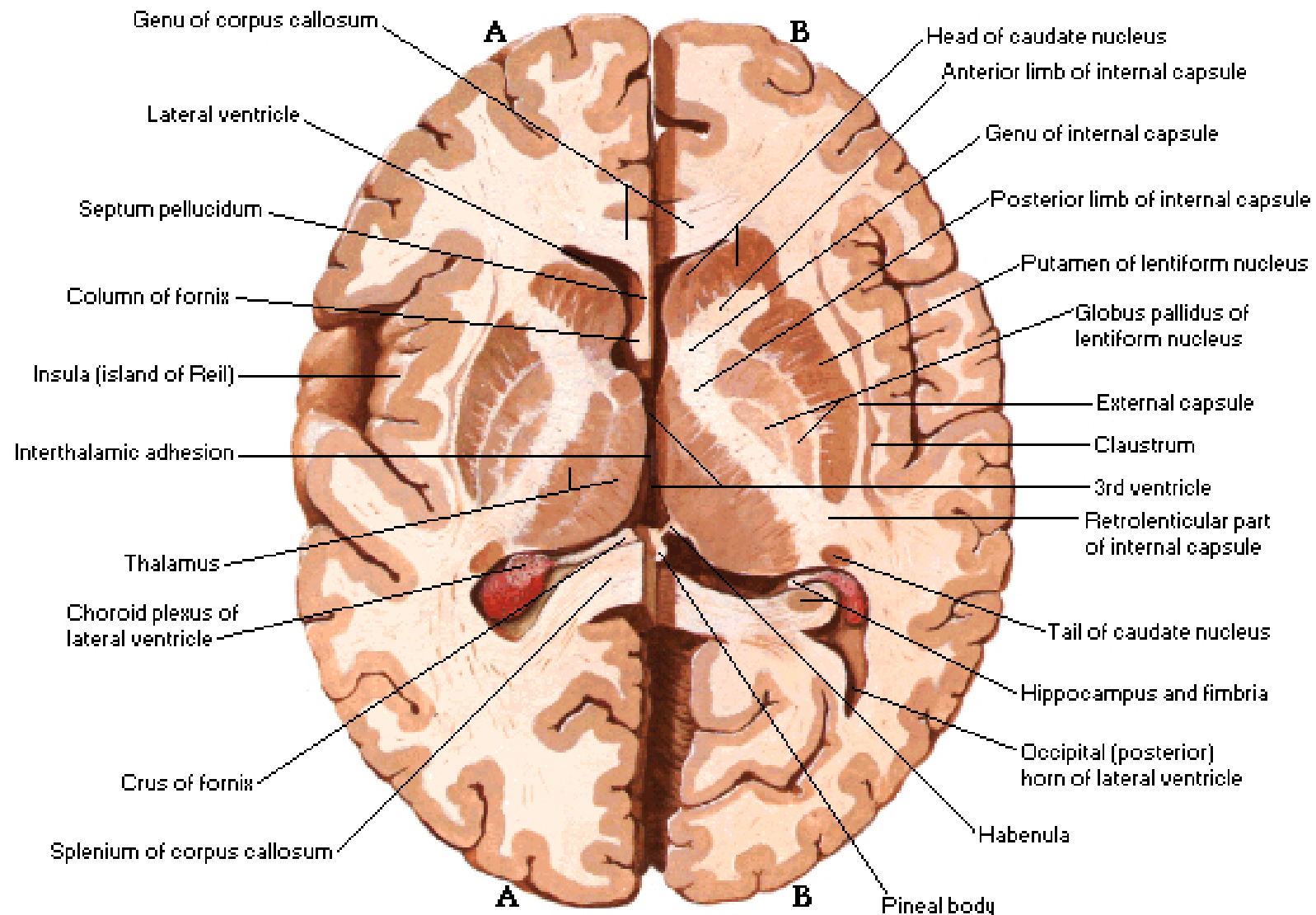
Left Lateral View



Interrelationship of thalamus, lentiform nucleus, caudate nucleus and amygdaloid body

Basal Ganglia

Horizontal Sections through Cerebrum



Basal Nuclei

- Striatum- caudate nucleus + Putamen
- Pallidum- Globus pallidus

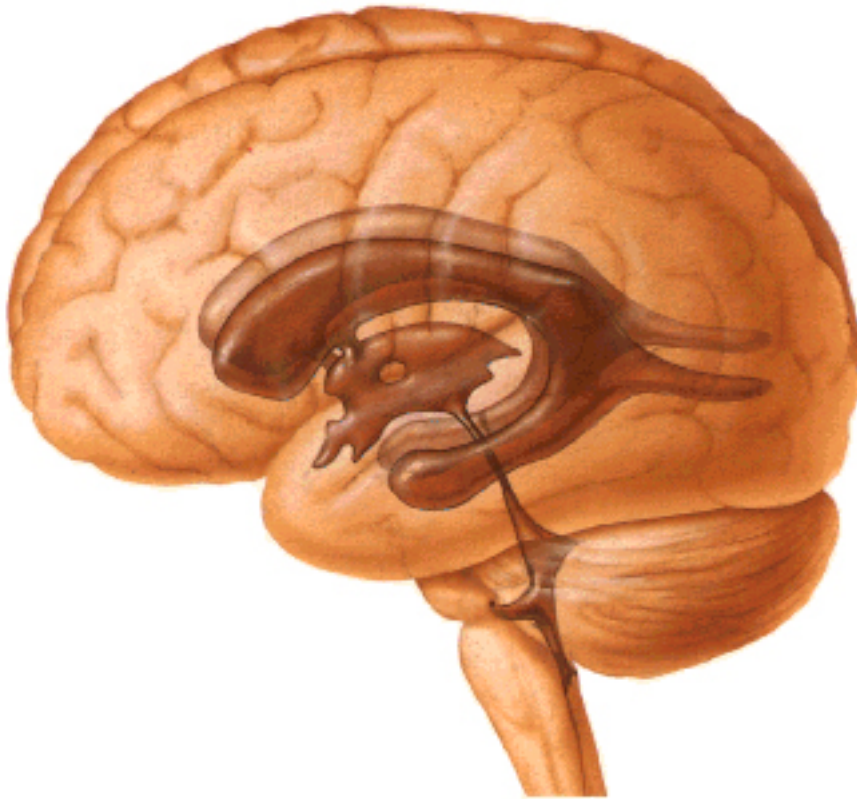
By Evolution

Archistriatum- Amygdaloid complex- oldest

Paleostriatum- Globus pallidus

Neostriatum- Caudate nucleus + Putamen

Ventricles of Brain
Left Lateral Phantom View



Lateral Ventricle

Central part

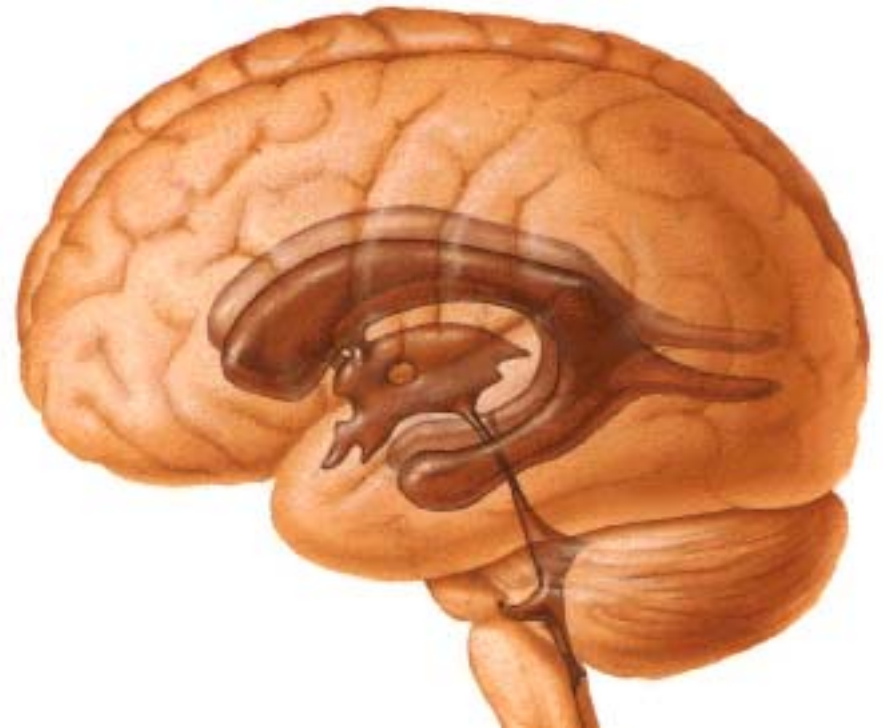
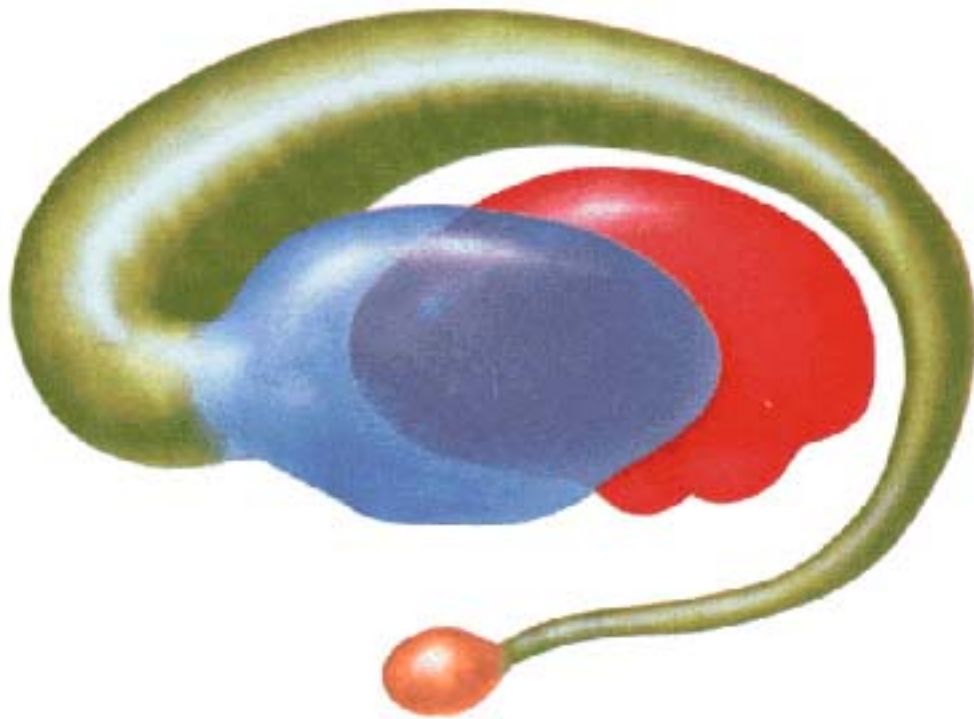
Ant. Horn

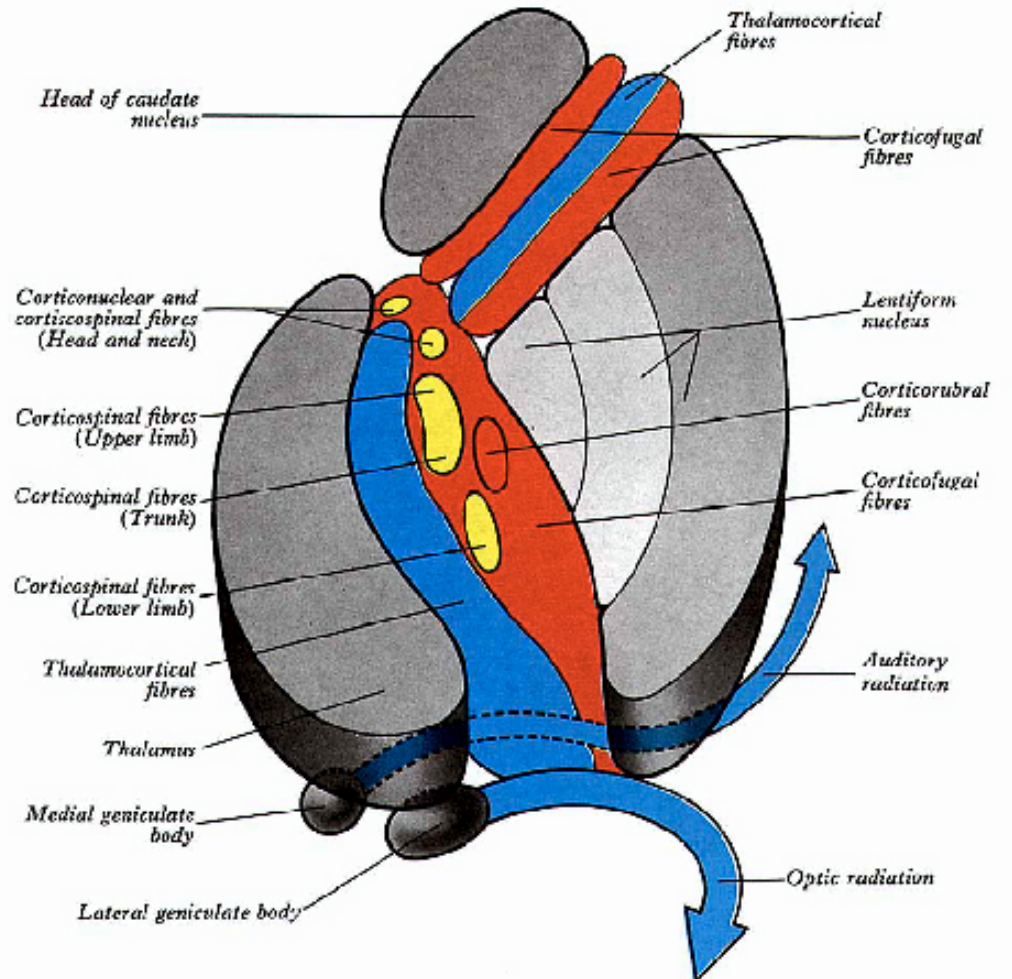
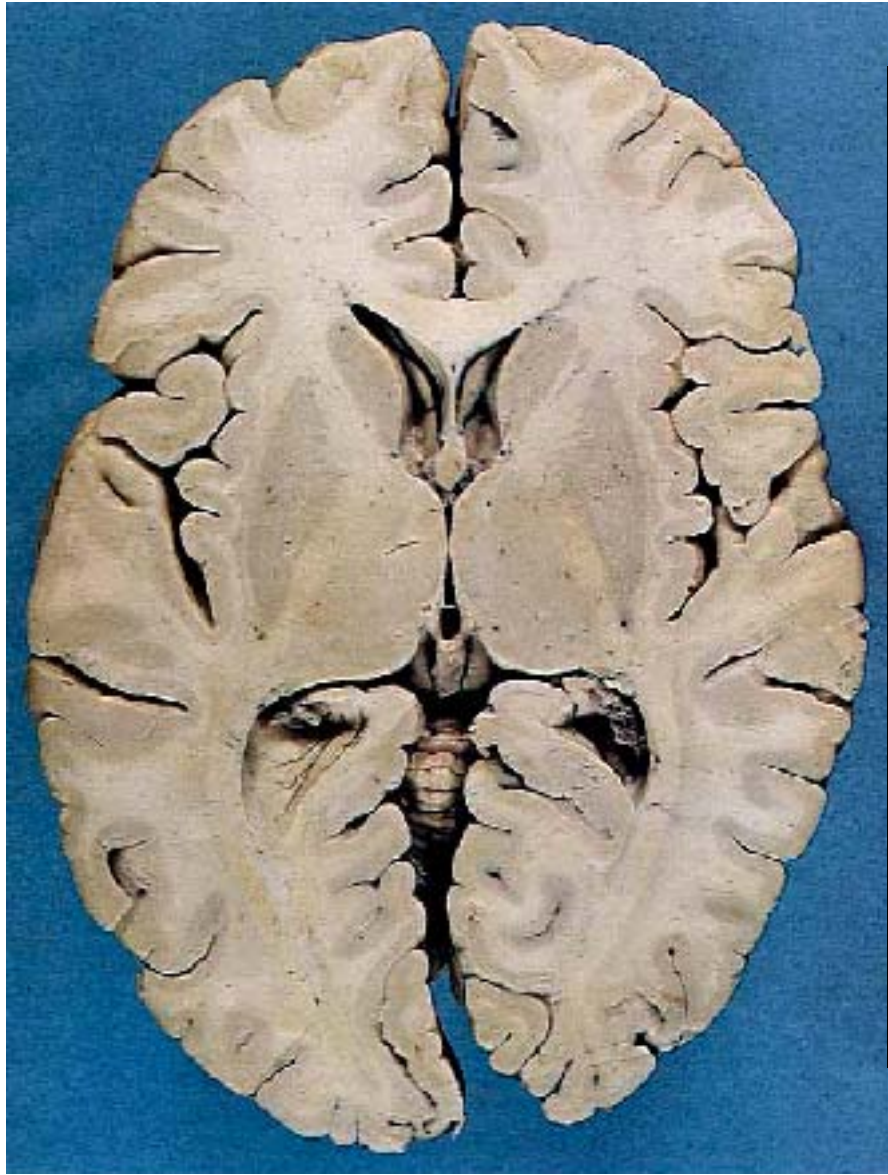
Post. Horn

Inferior horn

Caudate Nucleus

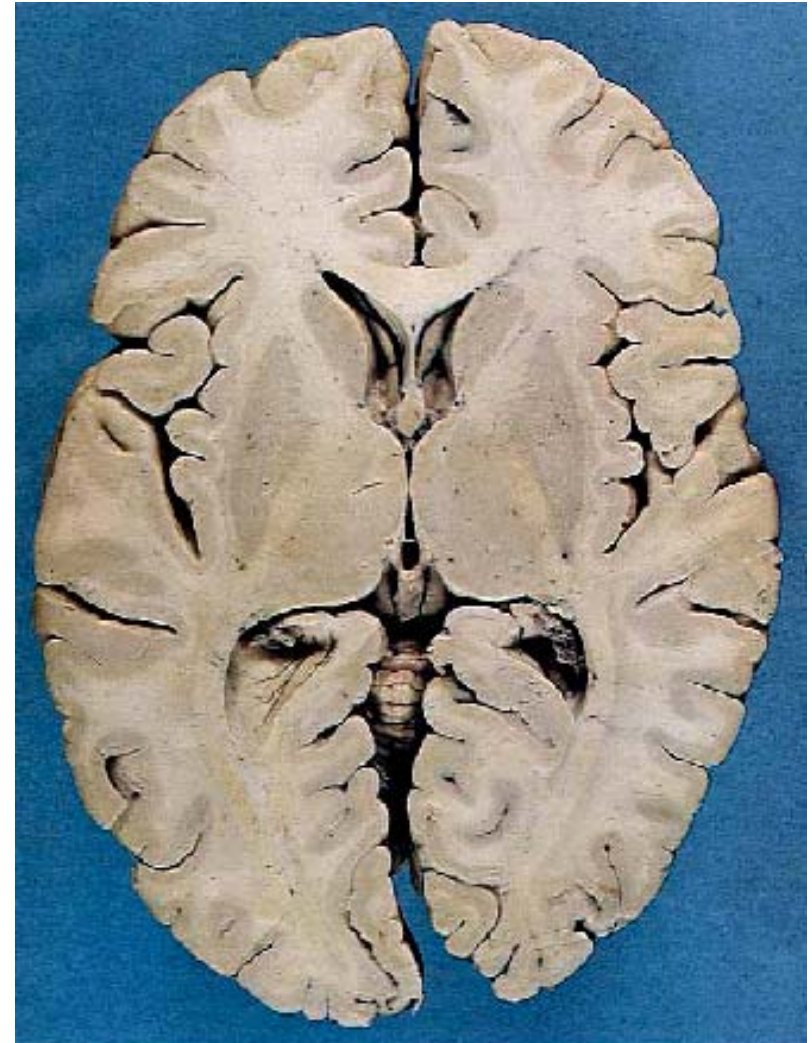
- C (comma) Shaped arched band of Grey matter
- Lie in curvature of lateral ventricle
- Head , Body & tail

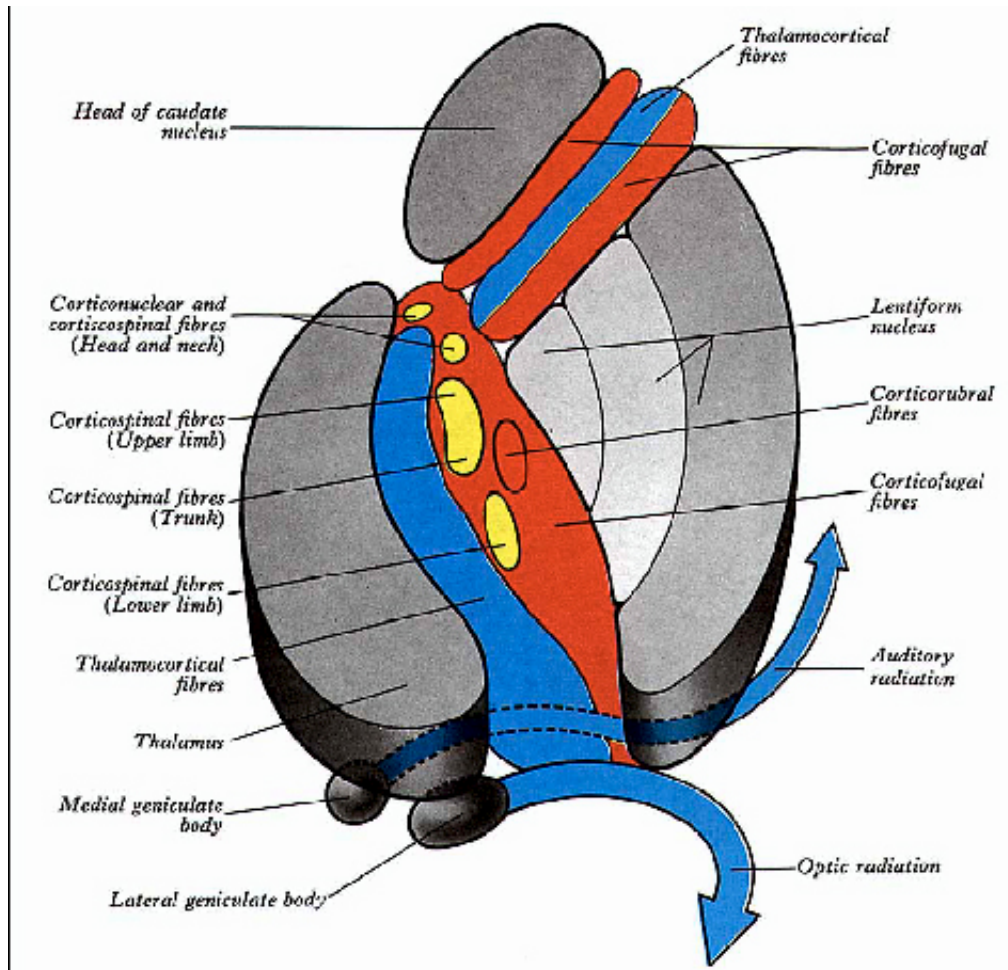




Head of Caudate Nucleus

- Rounded large ant. end in front of Inter-ventricular foramen
- Bulges into floor & lateral wall of Ant. horn of lat. Ventricle





Relations

• Laterally

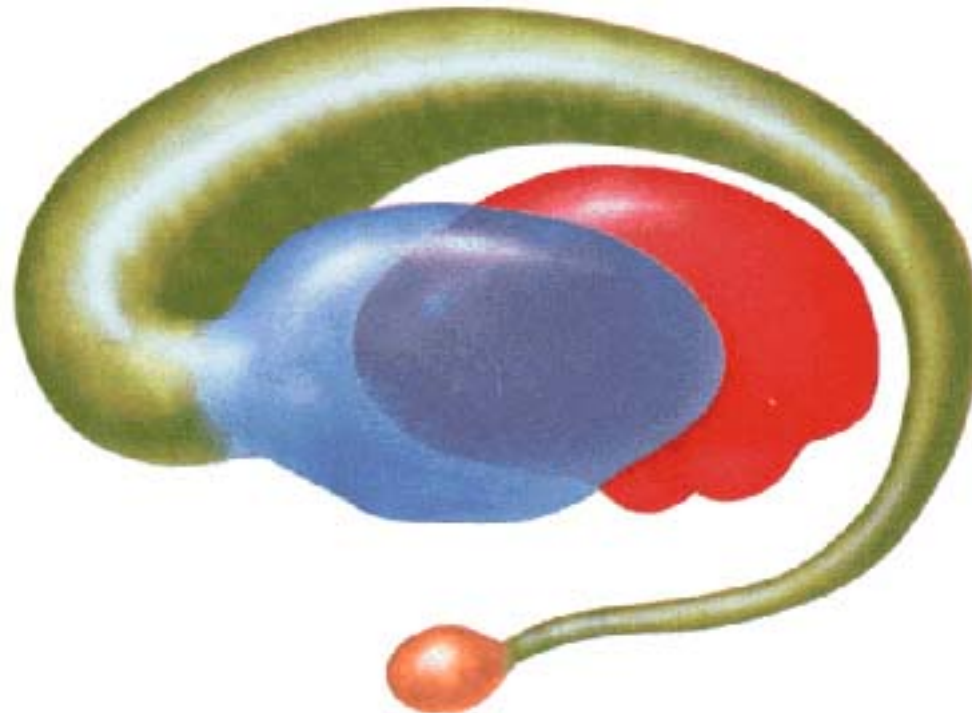
- Ant. Limb of internal capsule
- - Lentiform nucleus separated by ant. Limb

• Below the ant limb –

band of grey matter connect head with putamen of lentiform nucleus

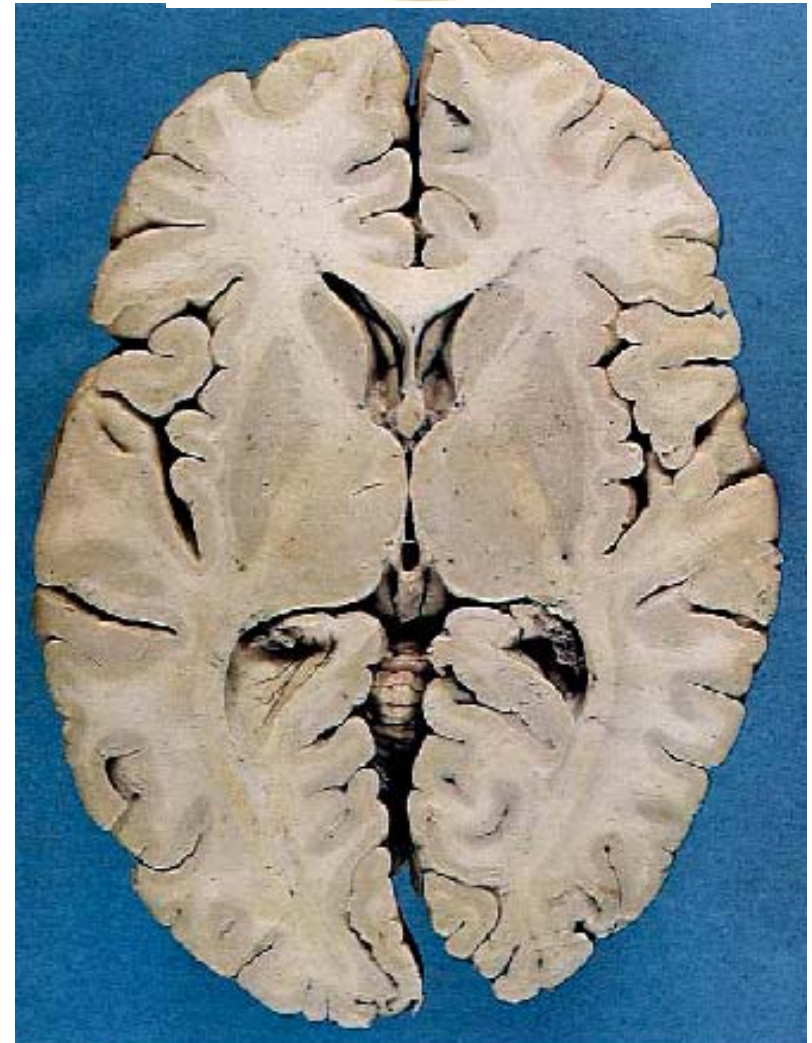
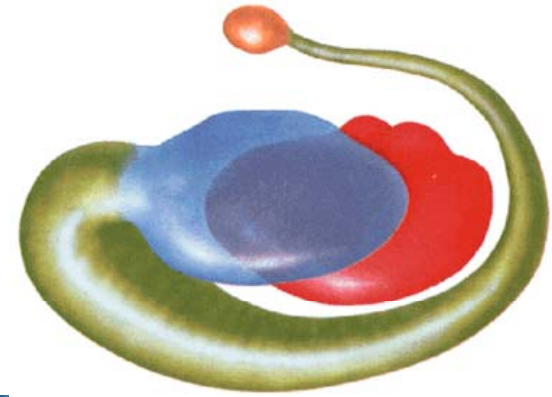
Body of Caudate Nucleus

- Long narrow tapering
- Form floor of central part of lateral ventricle
- Separated from thalamus by stria terminalis & thalamostriate vein



Tail of Caudate Nucleus

- Long slender , run downward & forward
- Form roof of inferior horn of lateral ventricle
- Terminates anteriorly in the amygdaloid body
- Related above with Thalamus , seperated by sublenticular part of internal capsule
- & Globus pallidus seperated by external capsule



Lentiform (lenticular) nucleus

- Bi-convex (Lens shaped) mass of grey matter
- Convexity more pronounced on medial side



Lentiform (lenticular) nucleus

- Divided by an External medullary lamina into an outer larger part (**Putamen**) – Dark in colour
- & an inner smaller part (**Globus pallidus**) – slightly pale appearance
- **G. pallidus** – subdivided by internal medullary lamina into Outer & inner segments



Lentiform (lenticular) nucleus

Relations – from within outwards

- Covered by thin sheet of white matter called external capsule
- Thin sheet of grey matter (Caudate) which lie outside the external capsule
- White & grey matter of the Putamen



Clastrum

- Thin Sheet of Grey Matter
- Traced below & front ,
Clastrum is continuous with
Anterior perforated substance &
Amygdaloid body
- Clastrum may be derived from
detached part of Insular cortex
or from Corpus striatum or from
both
- Connections & Functions – not
properly known



Amygdaloid body (Archistriatum)

- Almond shaped mass of grey matter in temporal lobe
- Lie antero-superior to the tip of inferior horn
- Situated deep to uncus
- Developmentally related to basal nuclei but functionally included in limbic system

Basal Nuclei (striatum) - Connections

Afferent

- Cerebral cortex (Mostly Ipsilateral) -Cortico-striate
- Thalamus – from centromedian , Intra-laminar & midline nuclei- Thalamo-striate
- Substantia Nigra – Nigro-striate (pars Copacta) – Dopaminergic

Efferent

Mostly striato-pallidal

Some to thalamic nuclei & S.nigra-pars reticularis
(striato-nigral)

Basal Nuclei

Functions

- Controls automatic associated movements – swinging of arms during walking
- Planning & programming of voluntary movements
- Determine rapidity & length of movement
- Decrease & regulate muscle tone & inhibit unwanted muscular activity – smoothening of voluntary motor activity of body
- Control reflex muscular activity

Applied Anatomy

- Increased muscle tone

Parkinsons disease- depletion of dopamine in substantia nigra & neo-striatum

- Abnormal involuntary movements

Huntingtons Chorea – decreased GABA in striato-nigral fibres

- Athetosis
- Hemibellism