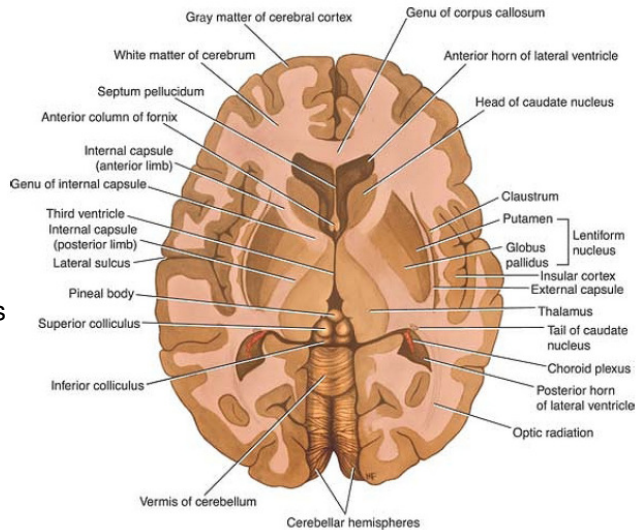


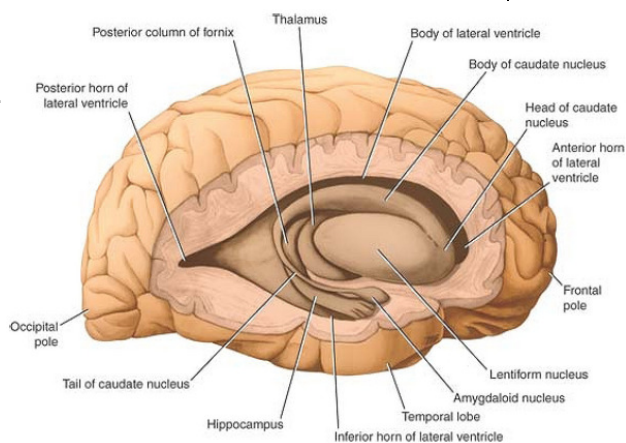
Basal nuclei

- collection of masses of gray matter situated within each cerebral hemisphere.
- **Corpus striatum**
 - Caudate nucleus
 - Lentiform nucleus
 - Putamen
 - Globus pallidus
- Amygdaloid nucleus
- Claustrum.



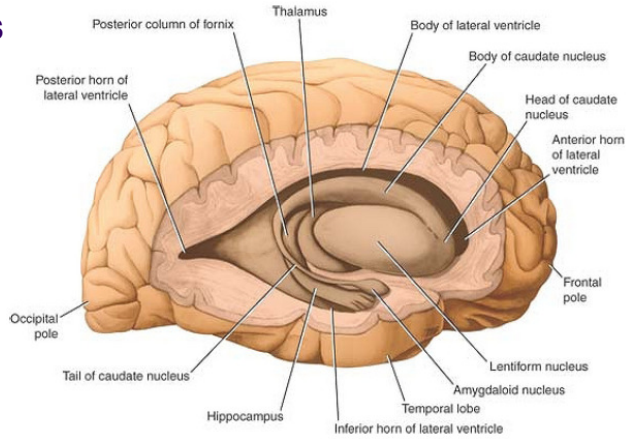
Corpus striatum

- Divided by **internal capsule** (a band of nerve fibers) **into**:
 - Caudate nucleus
 - Lentiform nucleus.
- Caudate nucleus: large C-shaped mass of gray matter, closely related to the lateral ventricle and lies lateral to the thalamus
 - Head
 - Body
 - Tail



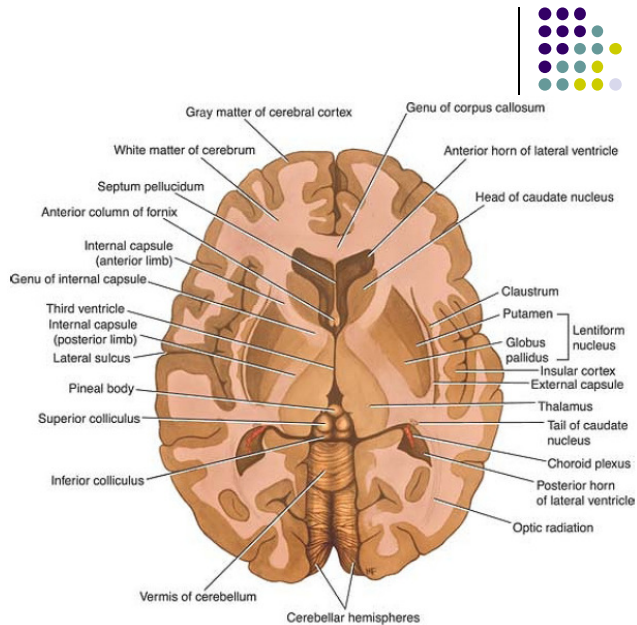
Caudate nucleus

- **Head:** large and rounded and forms the lateral wall of the anterior horn of the lateral ventricle
- **Body:** long and narrow and is continuous with the head in the region of the interventricular foramen. forms part of the floor of the body of the lateral ventricle.
- **Tail:** long and slender and is continuous with the body in the region of the posterior end of the thalamus. It follows the contour of the lateral ventricle and continues forward in the **roof of the inferior horn** of the lateral ventricle. It terminates anteriorly in the **amygdaloid nucleus**



Lentiform nucleus

- wedge-shaped mass of gray matter whose broad convex base is directed laterally and whose blade is directed medially
- **Medially:** internal capsule, which separates it from the caudate nucleus and the thalamus.
- **Laterally:** external capsule (thin sheet of white matter), which separates it from the **claustrum** (thin sheet of gray matter)



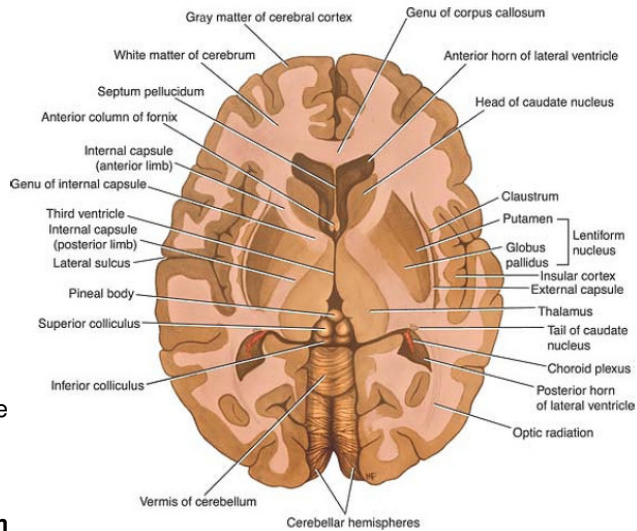
Lentiform nucleus

Divided into:

- **Putamen nucleus:** a larger, darker lateral portion
- **Globus pallidus:** inner lighter portion,
- Inferiorly at its anterior end, the putamen is continuous with the head of the caudate nucleus

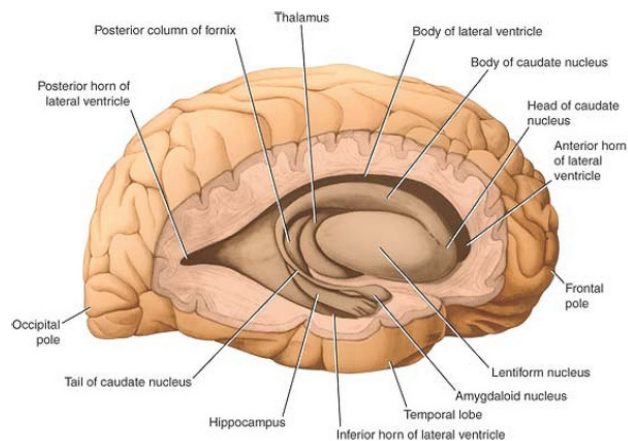
Clastrum:

- thin sheet of gray matter that is separated from the lateral surface of the lentiform nucleus by the **external capsule**
- Lateral to the claustrum** is the subcortical white matter of the insula.



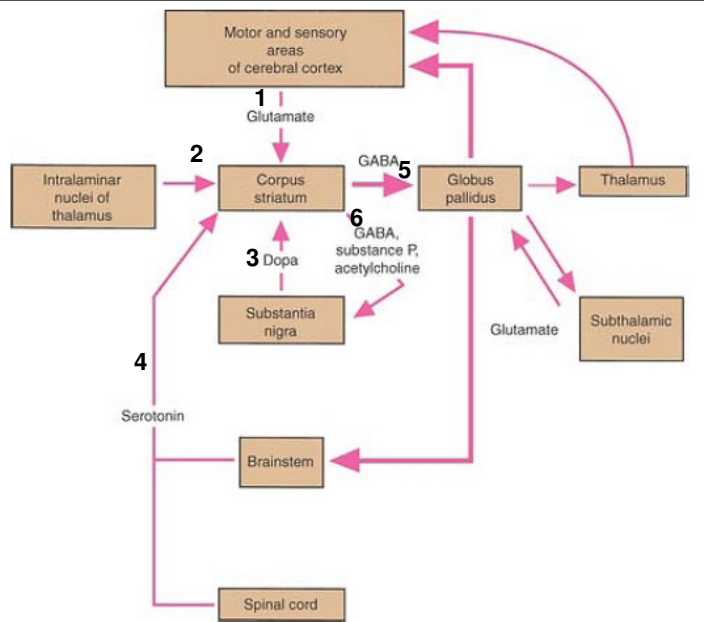
Amygdaloid nucleus

- Situated partly anterior and partly superior to the tip of the inferior horn of the lateral ventricle
- It is fused with the tip of the tail of the caudate nucleus, which has passed anteriorly in the roof of the inferior horn of the lateral ventricle



Connections of basal ganglia

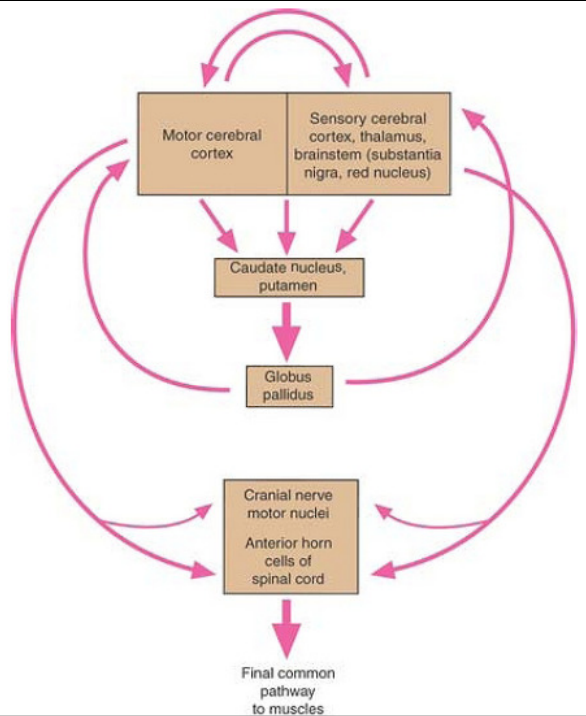
- 1- Corticostriate Fibers
- 2- Thalamostriate Fibers
- 3- Nigrostriate Fibers (inhibitory)
- 4- Brainstem Striatal Fibers (inhibitory)
- 5- Striatopallidal Fibers
- 6- Striatonigral Fibers



Note: They receive no direct input from or output to the spinal cord.

Functions of basal ganglia

- assist in the regulation of voluntary movement and the learning of motor skills.
- help prepare for the movements achieved by controlling the axial and girdle movements of the body and the positioning of the proximal parts of the limbs



Huntington disease

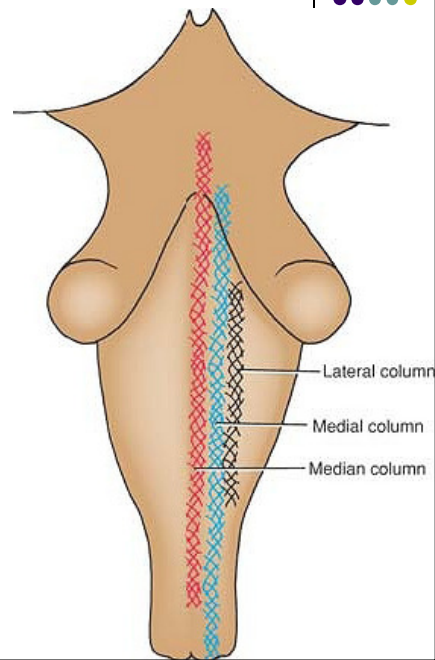
- Inherited disease, single gene defect on chromosome 4.
- degeneration of the GABA-secreting, substance P secreting, and acetylcholine-secreting neurons of the **striatonigral-inhibiting pathway**. This results in the dopa-secreting neurons of the substantia nigra becoming overactive; thus, the nigrostriatal pathway inhibits the caudate nucleus and the putamen
- This inhibition produces the abnormal movements seen in this disease.

Huntington disease

- Signs and symptoms:
 - 1- **Choreiform movements:** first appear as involuntary movements of the extremities and twitching of the face (facial grimacing). Later, patient becomes immobile and unable to speak or swallow.
 - 2- **Progressive dementia:** occurs with loss of memory and intellectual capacity.
- Computed tomography scans show enlarged lateral ventricles due to degeneration of the caudate nuclei.
- **Sydenham chorea**
 - Disease of childhood associated with rheumatic fever
 - The host's antibodies attack the membranes of the neurons of the basal ganglia
 - Symptoms: rapid, irregular, involuntary movements of the limbs, face, and trunk.

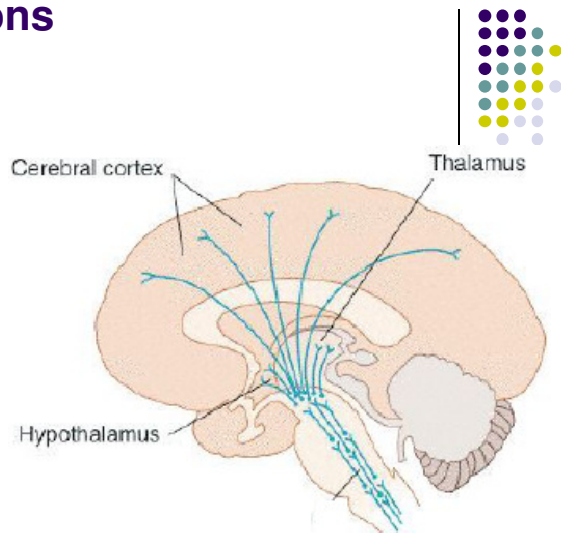
Reticular Formation

- Complex network of interconnected circuits of neurons
- Long dendrites
- Extend from the spinal cord through the medulla, the pons, the midbrain, the subthalamus, the hypothalamus, and the thalamus.
- Three longitudinal columns:
 - **Medial column:** intermediate-size neurons
 - **Medial column:** large neurons
 - **Lateral column:** small neurons



Afferent Projections

- **Spinal cord:**
 - Spinoreticular tracts
 - Spinothalamic tracts
 - Medial lemniscus.
- **Cranial nerve nuclei:**
 - Vestibular
 - Acoustic
 - visual pathways
- **Cerebellum:** cerebelloreticular pathway
- **Subthalamic, hypothalamic, and thalamic nuclei and from the corpus striatum and the limbic system,**
- **Primary motor cortex and primary somesthetic cortex**



Efferent Projections

- **Spinal cord:**
 - Reticulospinal tract
- **Midbrain**
 - Reticulobulbar tracts
- Sympathetic outflow
- Craniosacral parasympathetic outflow
- The cerebellum, the red nucleus, the substantia nigra, the tectum, and the nuclei of the thalamus, subthalamus, and hypothalamus.
- Most regions of the cerebral cortex

