

Cortex and Deep Nuclei

Brain

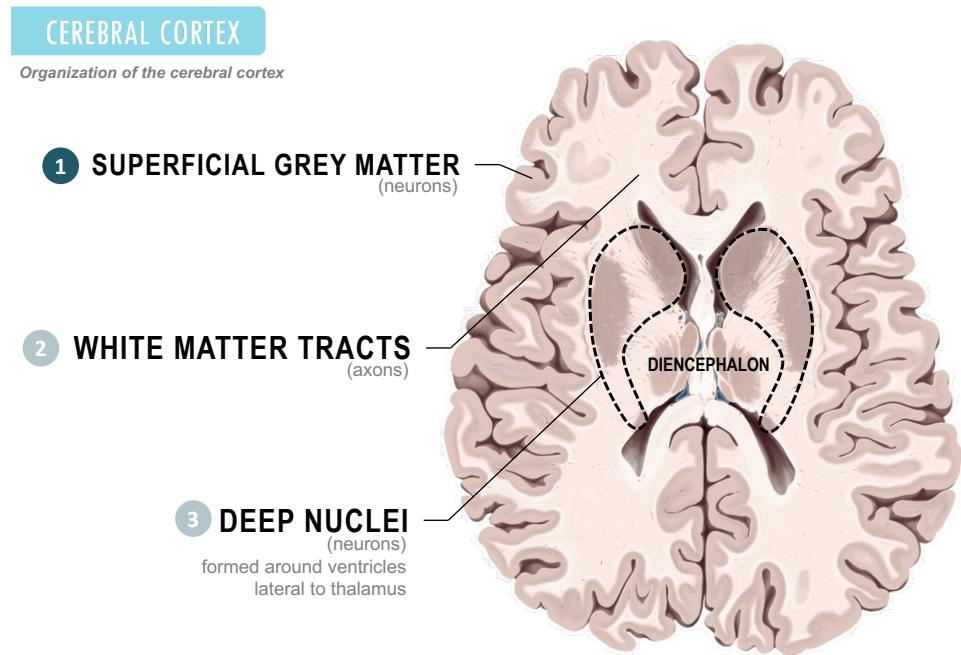
- Grey matter on outside
- White matter on inside

Spinal Cord

- Grey matter on inside
- White matter on outside

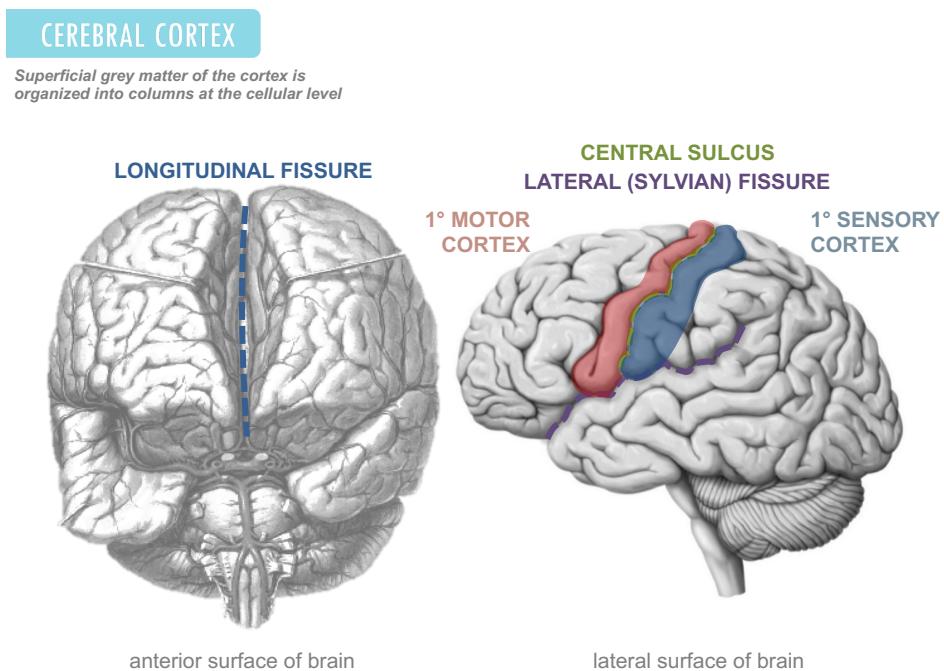
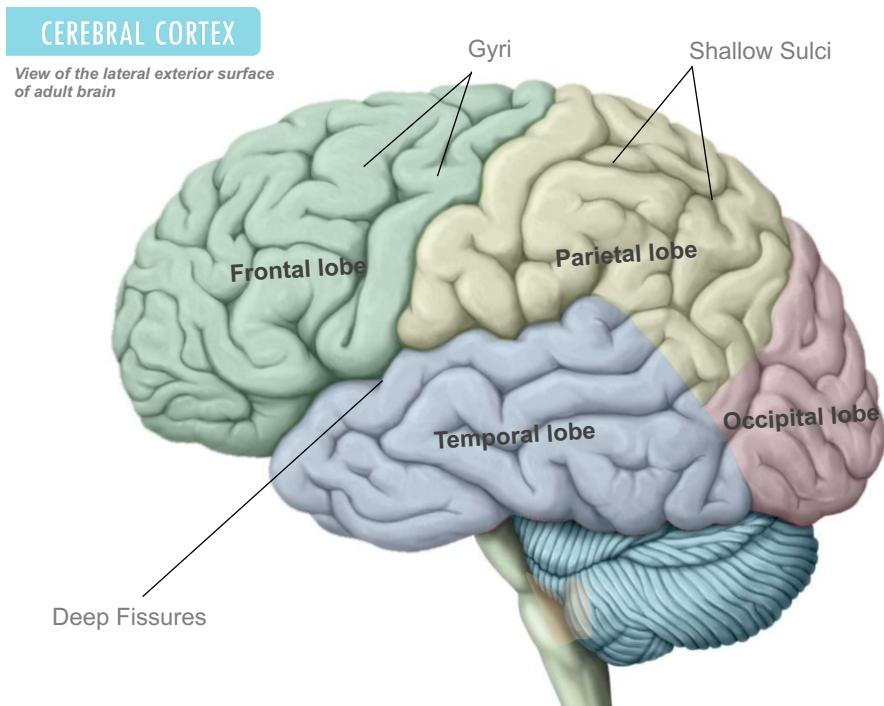
Deep grey matter

- Thalamus
- Basal ganglia



Superficial Grey Matter

1. Deep fissures (deep grooves)
2. Shallow Sulci (shallow grooves)
3. Gyri (mounds of grey matter)



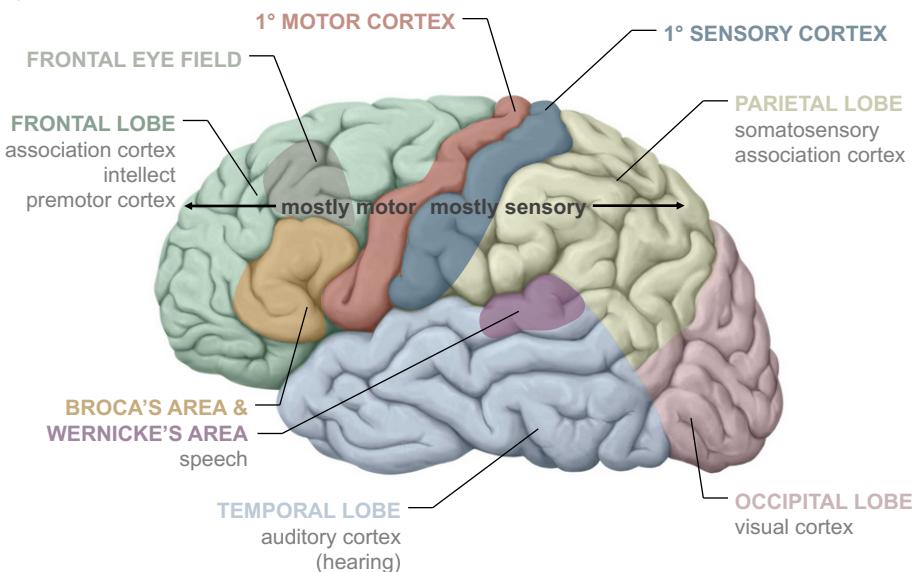
1. Longitudinal Fissure (left and right)
 2. Central Sulcus (front and back)
 3. Lateral (sylvian) fissure (temporal and frontal/parietal)
- Superficial grey matter is organized into columns

Motor located behind central sulcus

Sensory located in front of central sulcus

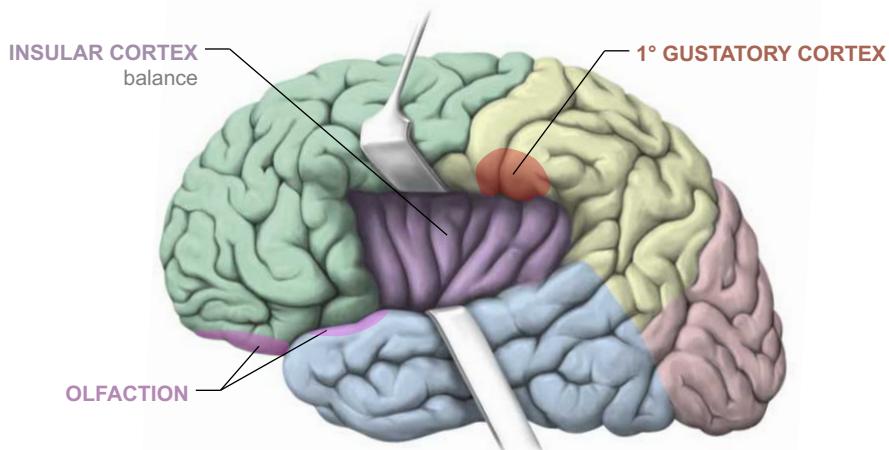
CEREBRAL CORTEX

The lobes of the cerebral cortex often have unique functions



CEREBRAL CORTEX

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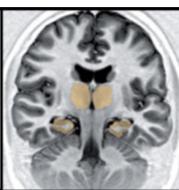
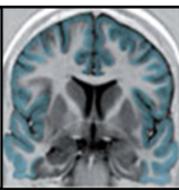
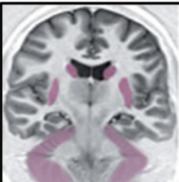
White Matter Tracts

1. Commissural Fibres – between hemispheres (e.g. corpus callosum)
2. Association fibres – between lobes (e.g. fornix)
3. Projection fibres – to different parts of the CNS (e.g. internal capsule)

Deep Nuclei – wrapped around ventricles

1. Limbic system – around inside of ventricles
 - a. Amygdala
 - i. Analyses information to determine fight or flight response
 - ii. Anger, danger, fear
 - iii. Emotional memories
 - iv. Output to hypothalamus
 - b. Hippocampus
 - i. Long term memory formation
 - ii. Output to cortex via fornix
 - c. Fornix
 - d. Mammillary bodies
 - i. Smell memories

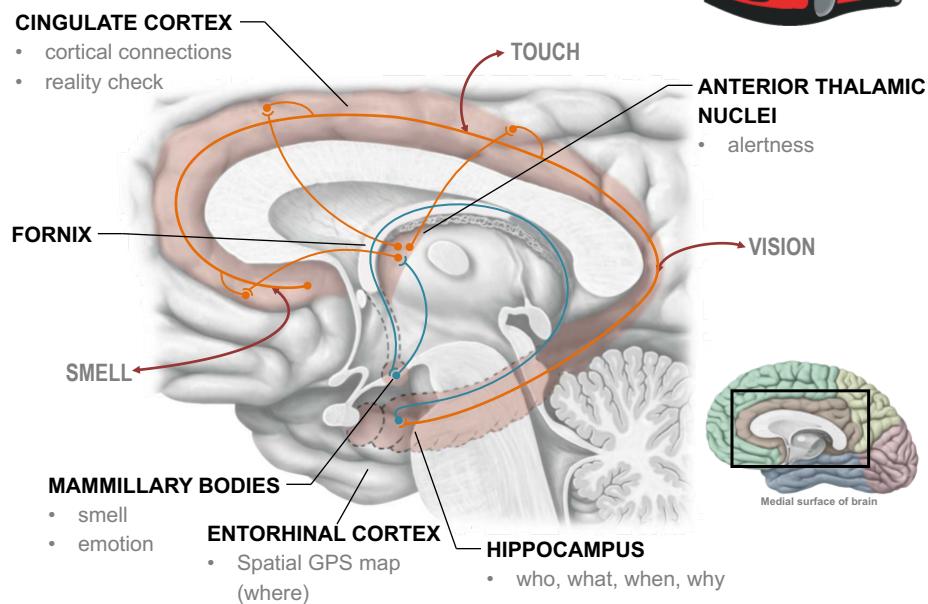
MEMORY

EPISODIC			LOCATION: medial temporal lobe (thalamus, amygdala, hippocampus) EXAMPLE: EVENT MEMORY "I got married one week ago in Australia" "I rocked that competition last weekend at Queens"
SEMANTIC			LOCATION: neocortex (auditory, somatosensory, visual cortex) EXAMPLE: FACTUAL MEMORY "Canadian geese eat for over 12 hrs a day" "The brain is the most interesting organ in the body"
PROCEDURAL			LOCATION: cerebellum & basal nuclei EXAMPLE: MUSCLE MEMORY "Riding a bike involves a combination of balance, speed and coordination" "Always save programs before turning off the computer"

MEMORY

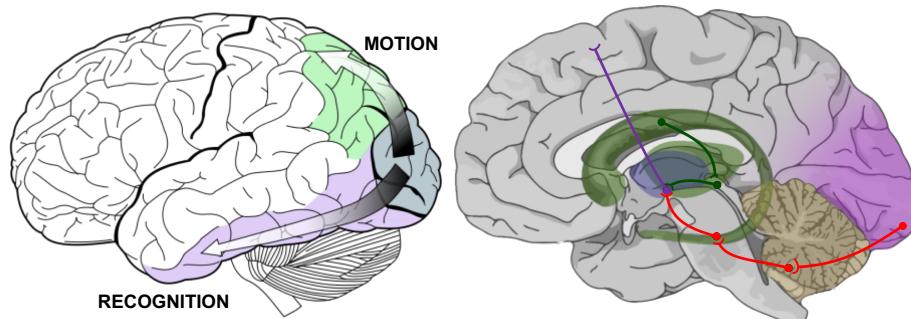
The Loop of Papez

EPISODIC MEMORY



MEMORY

PROCEDURAL MEMORY



VISION, BALANCE, POSITION → CEREBELLUM → THALAMUS → PREMOTOR CORTEX
EARLY EXPERIENCE → BASAL NUCLEI → THALAMUS → PREMOTOR CORTEX

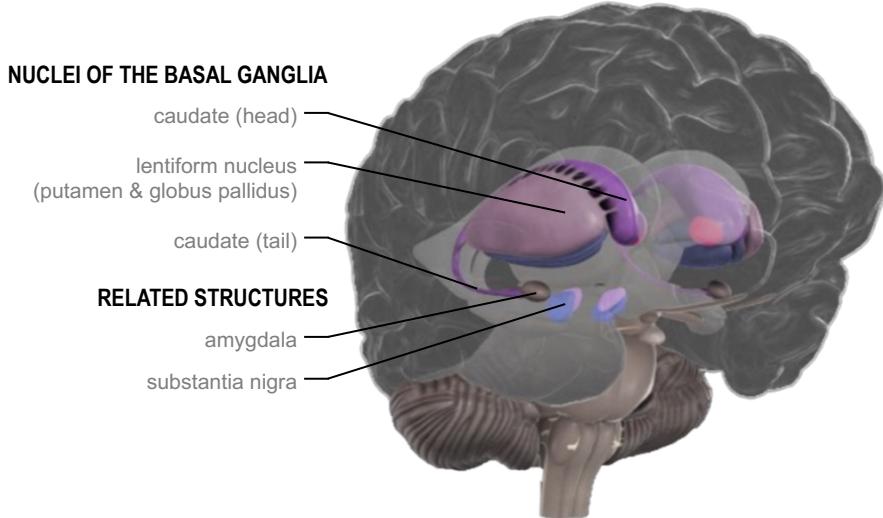
Chooses the best plan to send to cortex

2. Basal nuclei – around outside of ventricles

- a. Caudate
- b. Lentiform nuclei
- c. (amygdala)

BASAL NUCLEI

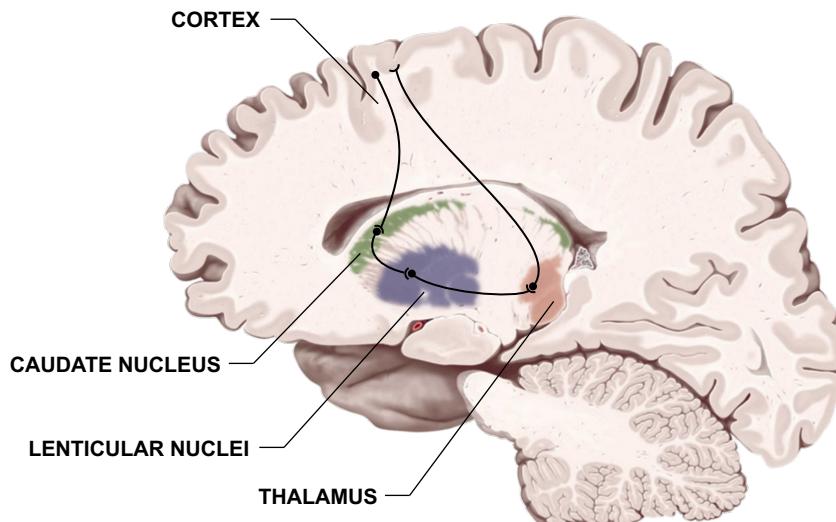
- Initiate, coordinate and stops motor movements
- Eliminates unnecessary movements
- Skills memory (slow, stereotypical movements i.e. walking)



BASAL NUCLEI

FEEDBACK:

Cortex → Caudate → Lenticular Nuclei → Thalamus → Cortex
(in and out – FAST)



CEREBRAL CORTEX

Sensorimotor organization of the precentral and postcentral gyri

There are more sensory and motor cortical neurons dedicated to the upper and lower limbs than the trunk

