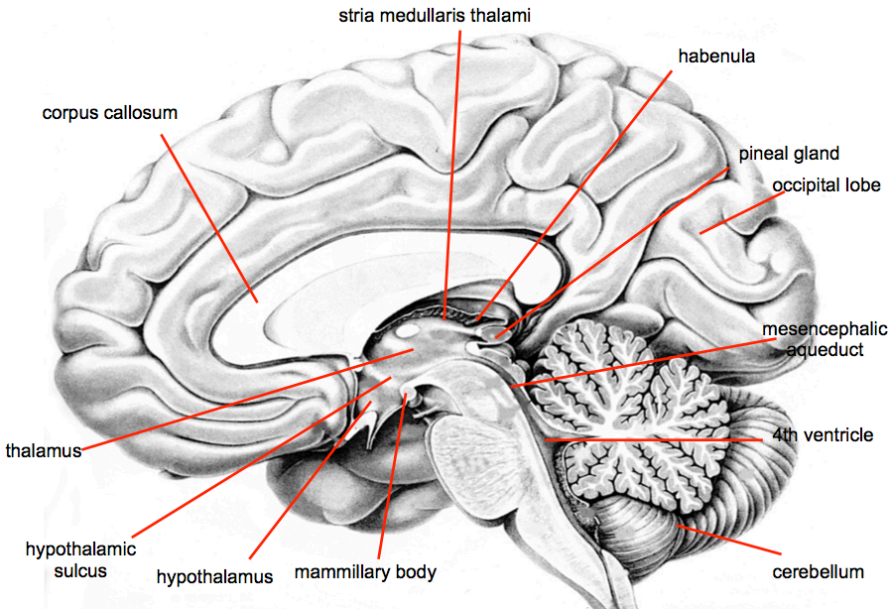
Diencephalon

- Major functions of the thalamus:

- Sensory Gateway to the cortex: Sensory information reaching the cortex must be transmitted through the thalamus (except for olfaction). All major sensory modalities relay through the thalamus (except olfaction which projects directly to the olfactory cortex and has only indirect input to the thalamus through the amygdala and hippocampus).
- Motor circuits: The thalamus is part of a motor relay system which receives input from the basal ganglia and cerebellum and relays to the motor and premotor areas. This is a modulation pathway of motor systems that supports ongoing movement (does not send direct input to lower motor neurons).
- Arousal: The brainstem and forebrain centres impose different arousal states, but the thalamus enforces them by altering cortical activity and modifies the transmission of sensory information to the cortex.
- Attention: The thalamus helps focus our attention on key information.
- Emotion and memory: Influences emotional and motivational response and memory by the limbic thalamus' mediodorsal and anterior thalamic nuclei.



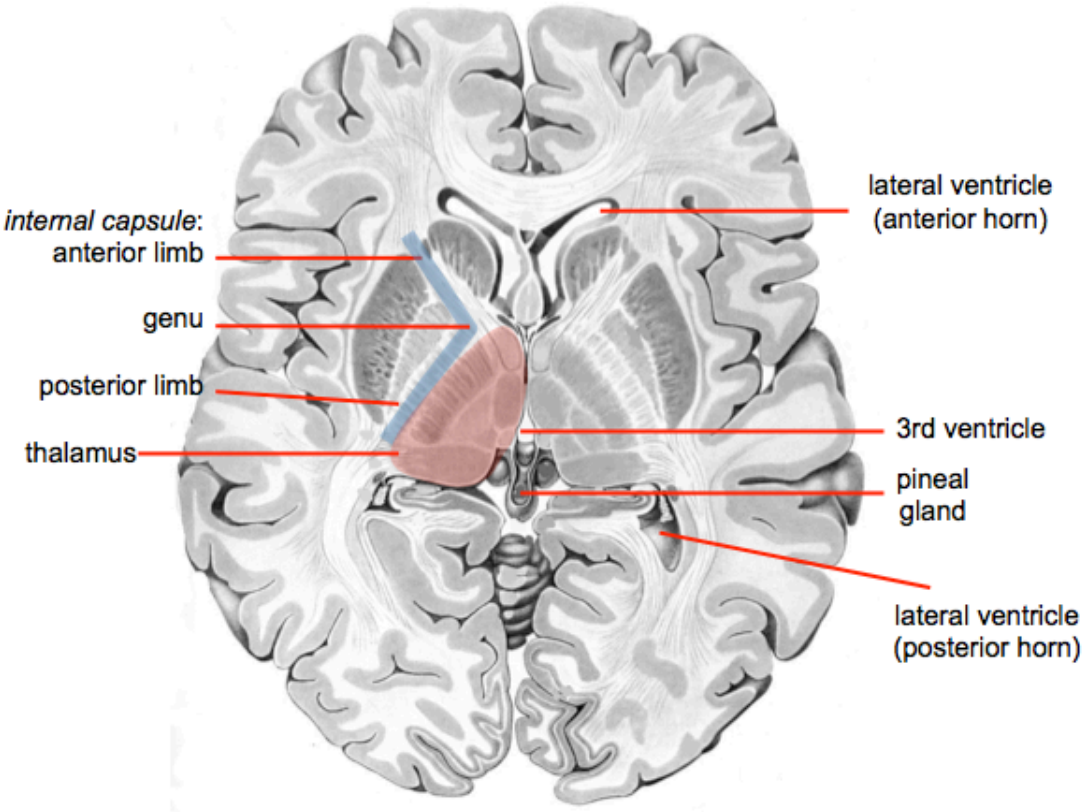
- The thalami are a large group of football-shaped nuclei at the core of the forebrain.
- The thalami and the hypothalamus form most of the wall of the 3rd ventricle.
- The interthalamic adhesion is the union point of the two thalami (on the cast, it is marked by a hole where the frame is attached to the model).

- There are 5 nuclei that are visible on the surface of the thalamus:'

  - Anterior nucleus (inside the anterior tubercle)
  - Mediodorsal nucleus (anterior and medial)
  - Pulvinar (most posterior portion of the thalamus)

- Medial and Lateral Geniculate Nuclei (inside geniculate bodies inferior to the main body of the thalamus)

- The brachia (arms) of the superior and inferior colliculi forms a connection with the thalamic and brainstem nuclei, specifically the medial and lateral geniculate nuclei.
- The medial geniculate nuclei receive input from the cochlear nuclei via the inferior colliculi. The lateral geniculate nuclei receive input from the retinae and superior colliculi.
- The pulvinar receives information from the retina directly from the superior colliculus and also from the visual and somatosensory cortex (highly visually oriented).
- The internal capsule is the major bundle of fibres carrying information to and from the cortex.
- This fibre tract forms the lateral boundary of the thalamus and separates the thalamus from the globus pallidus.
- It fans into the corona radiate which is the large fibre traffic to and from the cortex.
- Because of its essential role in transmitting motor and sensory information to and from the cortex, small lesions to the internal capsule can produce profound symptoms equivalent to a very large lesion in cortical areas.
- The internal capsule is divided into an anterior limb, posterior limb and genu (bend).



- **Hypothalamus (below the thalamus):**

  - The hypothalamus lies ventral to the thalamus and regulates several behaviours that are essential for homeostasis and reproduction.