

Thalamus-1

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Contents

- Case Scenario
- Basic Functional Anatomy
- Nuclei
- Connections

Case Scenario

Patient: Mr. Ramesh, 62-year-old male

History: Presented to the neurology OPD with complaints of:

- Sudden onset of **numbness and burning pain** on the **right side of the body**, including the face.
- Difficulty in recognizing objects by touch (astereognosis).
- No motor weakness.
- Symptoms began 3 weeks ago following a **minor stroke**.

Examination:

- Loss of fine touch, vibration, and proprioception on the **right face and body**.
- Intact vision, hearing, and motor strength.
- MRI reveals an **infarct in the left posterolateral thalamus**.

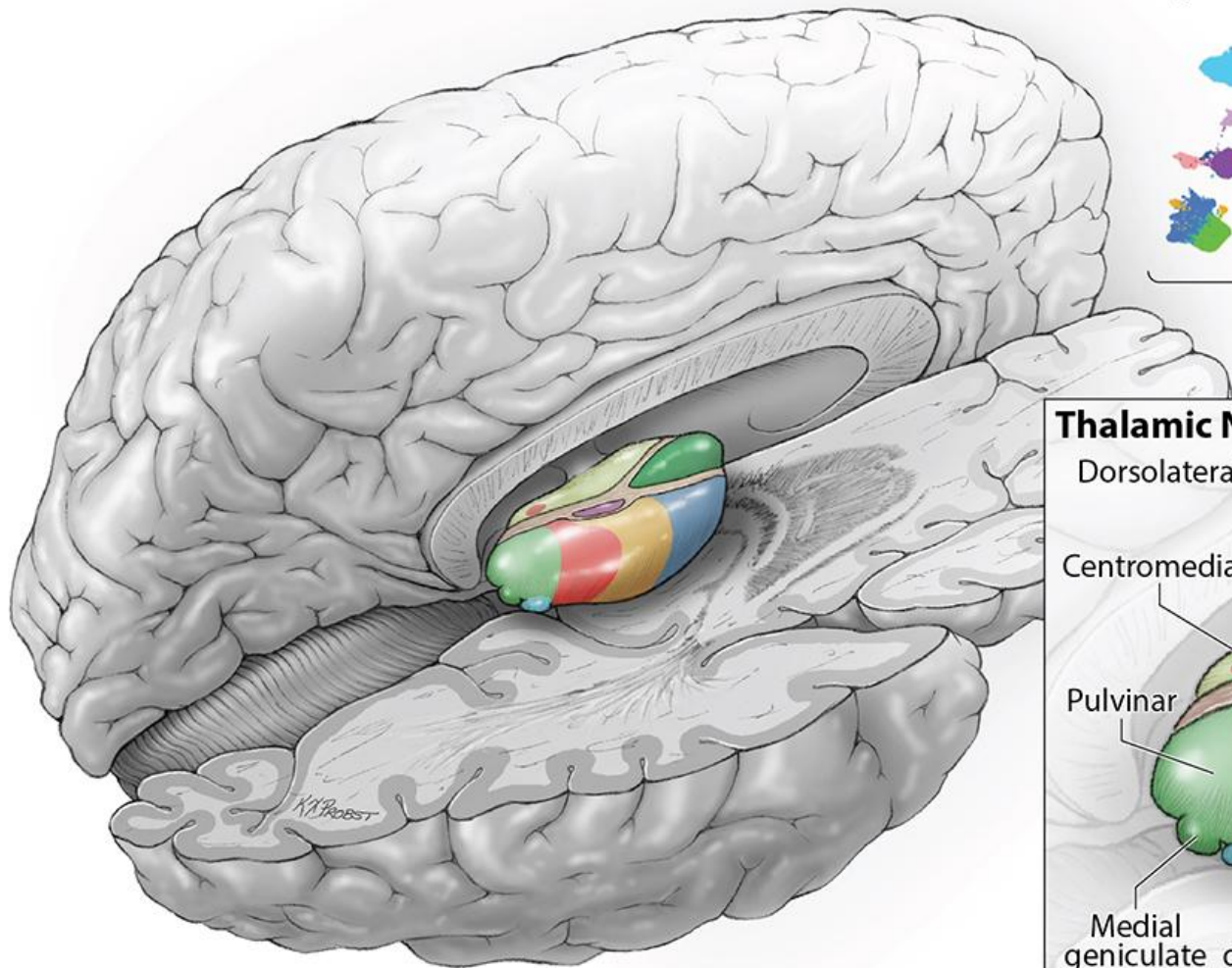
- Which **thalamic nucleus** is most likely affected in this case?
- What is the **blood supply** to this thalamic region, and which artery's occlusion might have led to this infarct?
- Trace the **somatosensory pathway** from the body and face to the cortex via the thalamus.
- Why is **only the right side** affected, and not both?
- What is the **internal capsule**, and could it have been involved if there was also weakness?

- Explain the concept of **relay nuclei**. How do VPL and VPM nuclei function physiologically?
- How does the thalamus **modulate pain** and sensory input?
- What is **thalamic syndrome**, and how does it evolve over time?
- Why can a person lose **discriminative touch** but retain **crude touch** after such a lesion?
- Which **cortical area** receives input from the affected thalamic nuclei? How does this explain the sensory deficits?

Basic functional Anatomy



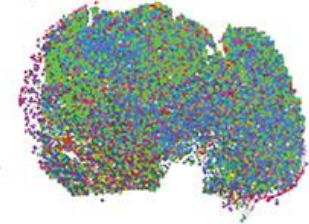
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Single-cell transcriptomics

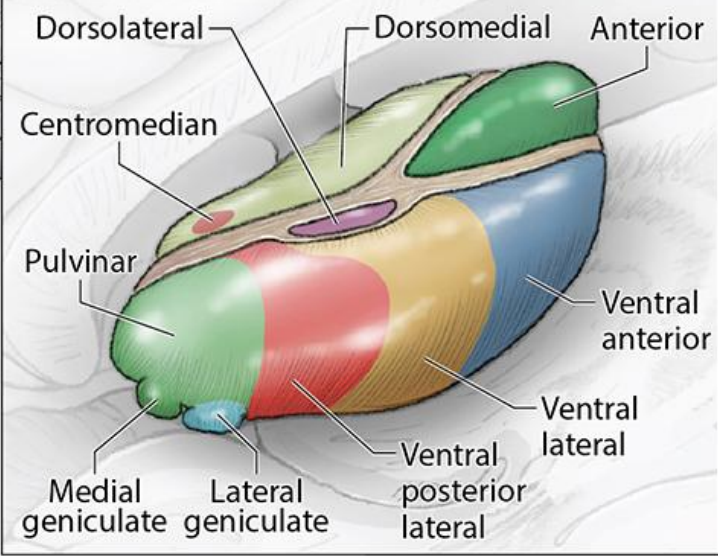


Spatial transcriptomics

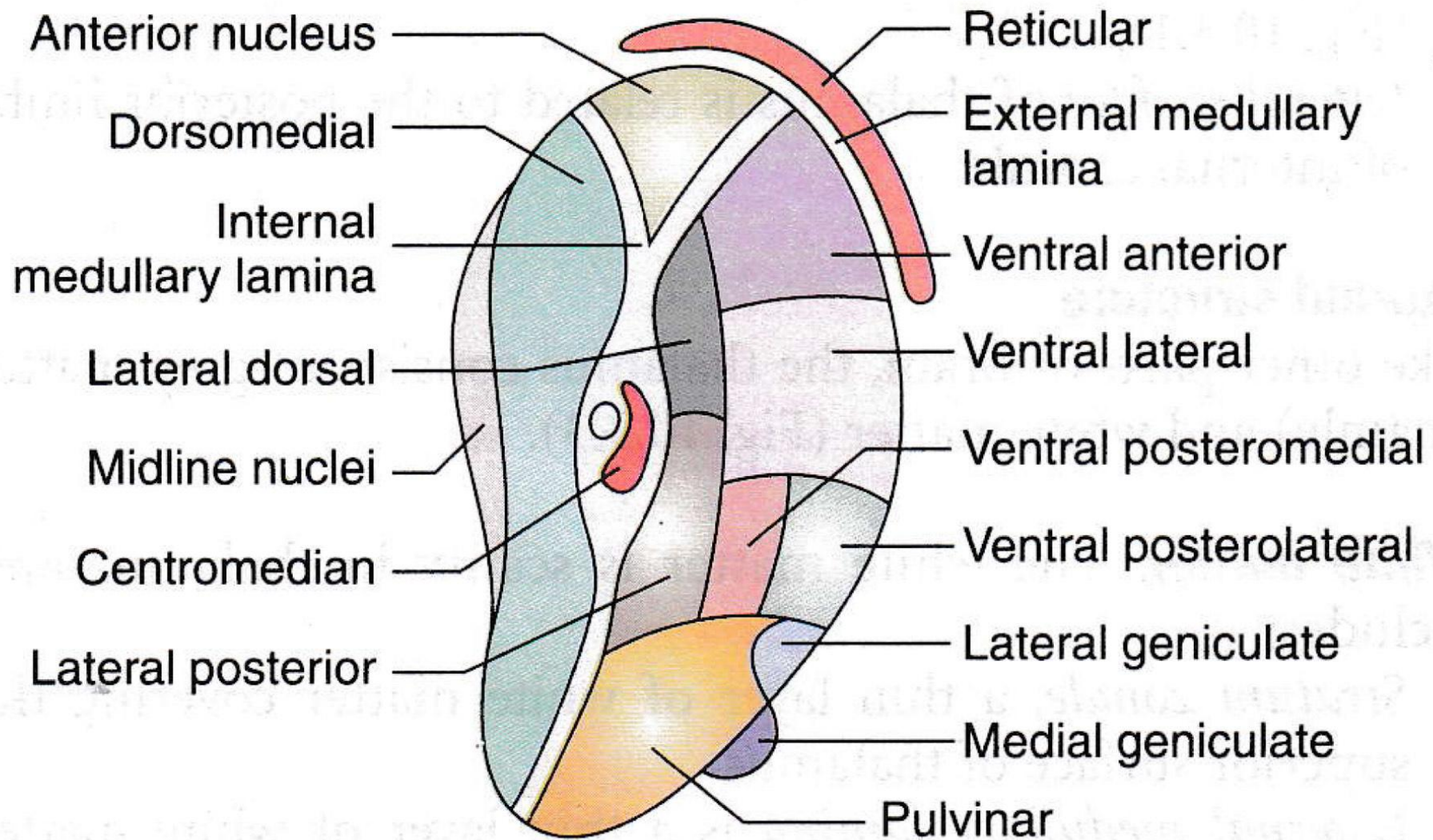


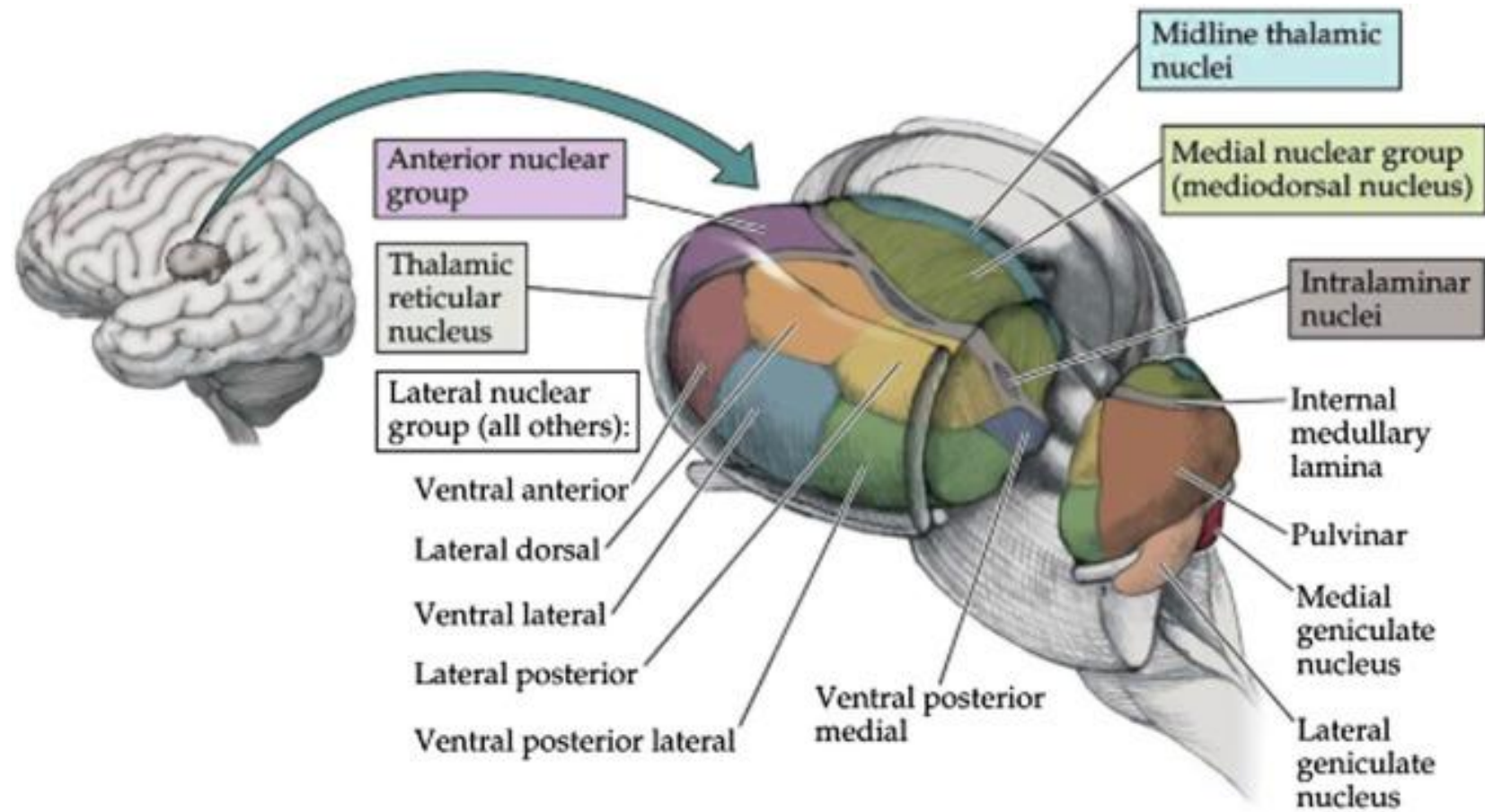
Spatial localization of cell types

Thalamic Nuclei



Nuclei





Functional Classification

- Non specific nuclei
- Specific nuclei

- **Non specific nuclei**

- Midline Nuclei
- Centro-median nucleus

Specific nuclei

I. Specific sensory relay nuclei. These include:

1. MGB
2. LGB
3. Posteroventral group of nuclei

II. Motor control nuclei. These include:

1. Ventrolateral (VL) group of nuclei
2. VA nucleus

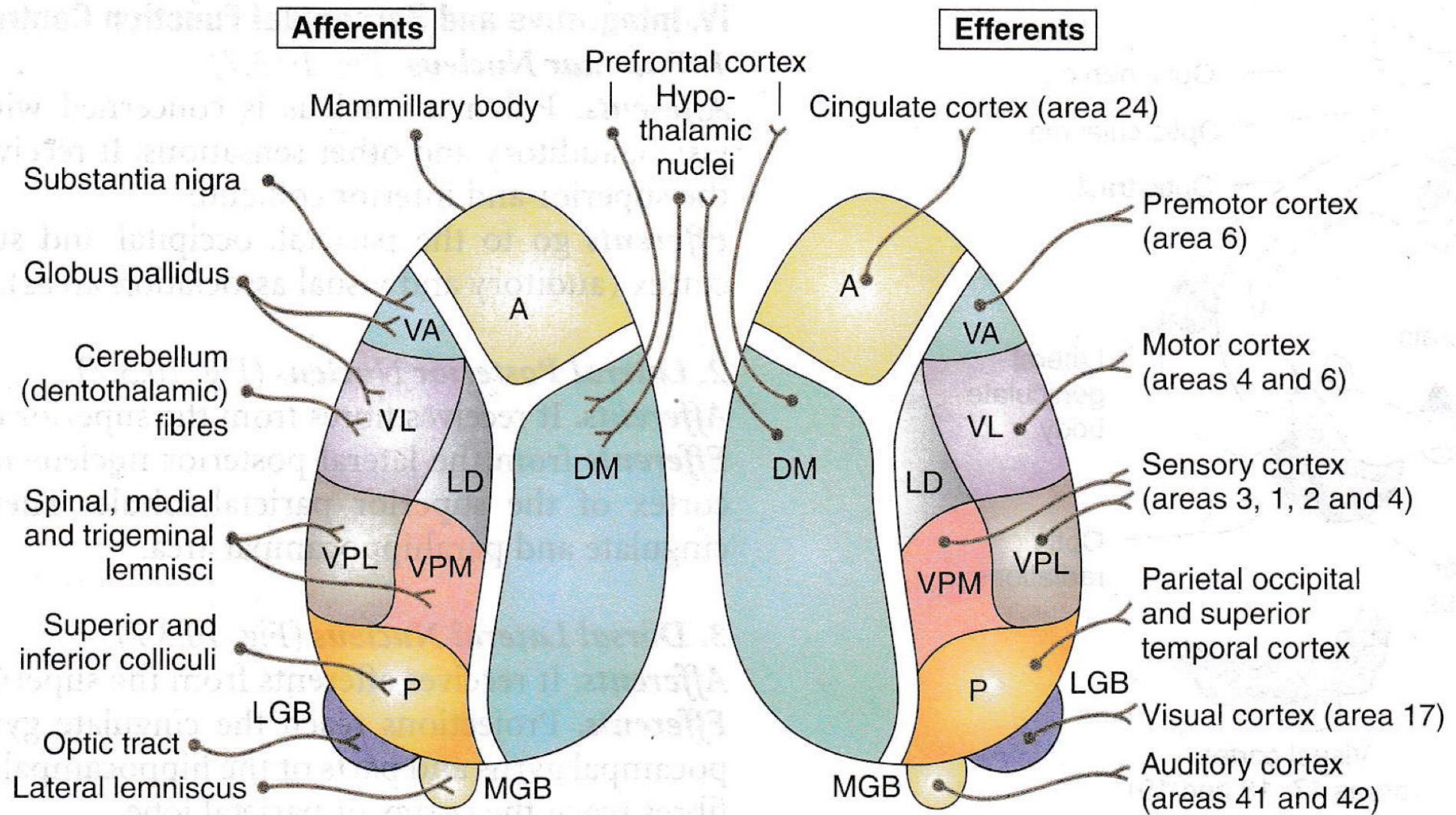
III. Visceral efferent control nuclei. These include:

1. Anterior group of nuclei
2. Dorsomedial nucleus

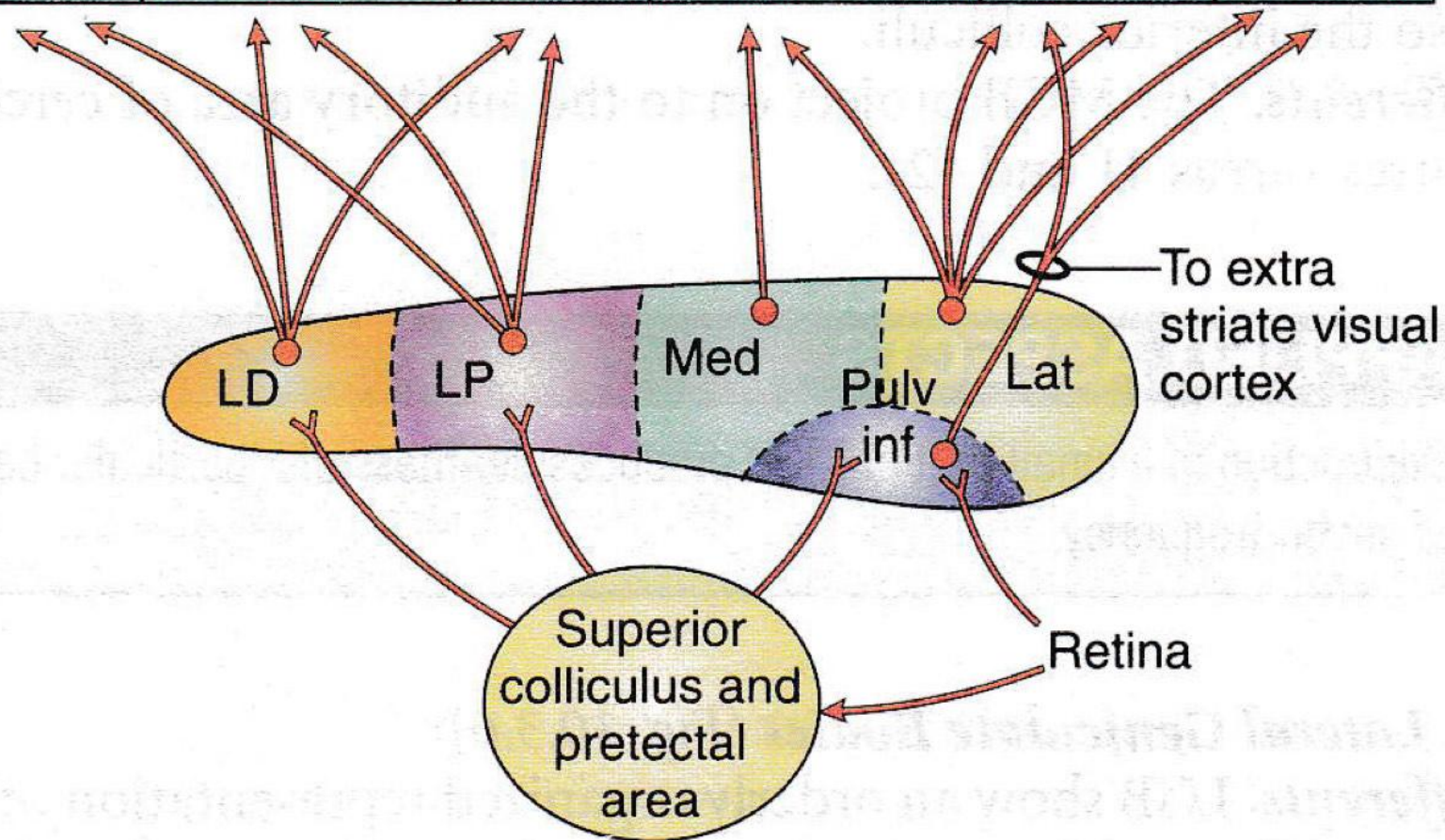
IV. Integrative and perceptual function control nuclei:

1. Pulvinar nucleus
2. Lateral posterior nucleus
3. Dorsal lateral nucleus

Connections



CEREBRAL CORTEX					
Gyrus cinguli	Parahippocampal gyrus	Parietal lobe	Prefrontal and orbitofrontal	Temporal lobe	Occipital lobe



Thank You