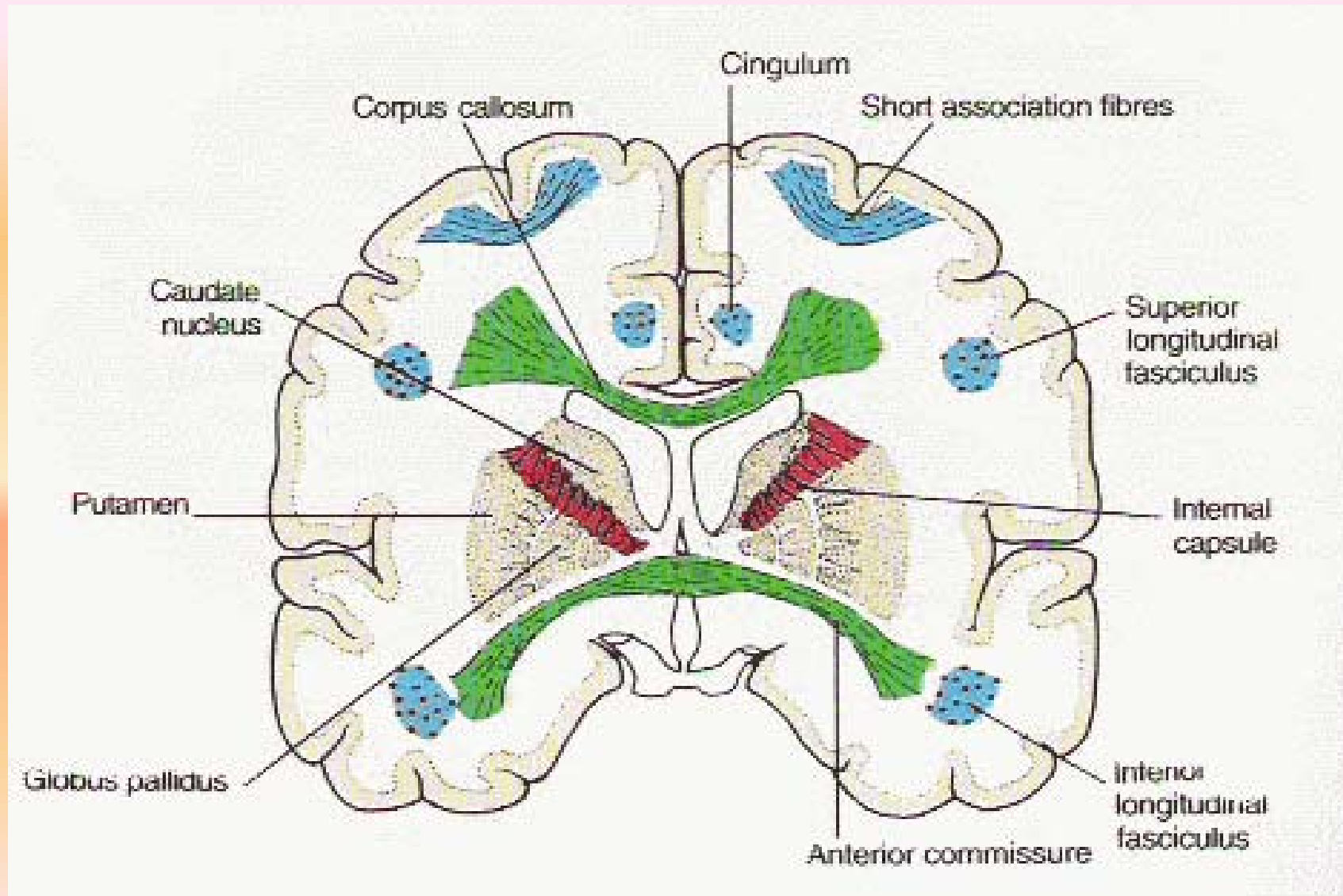


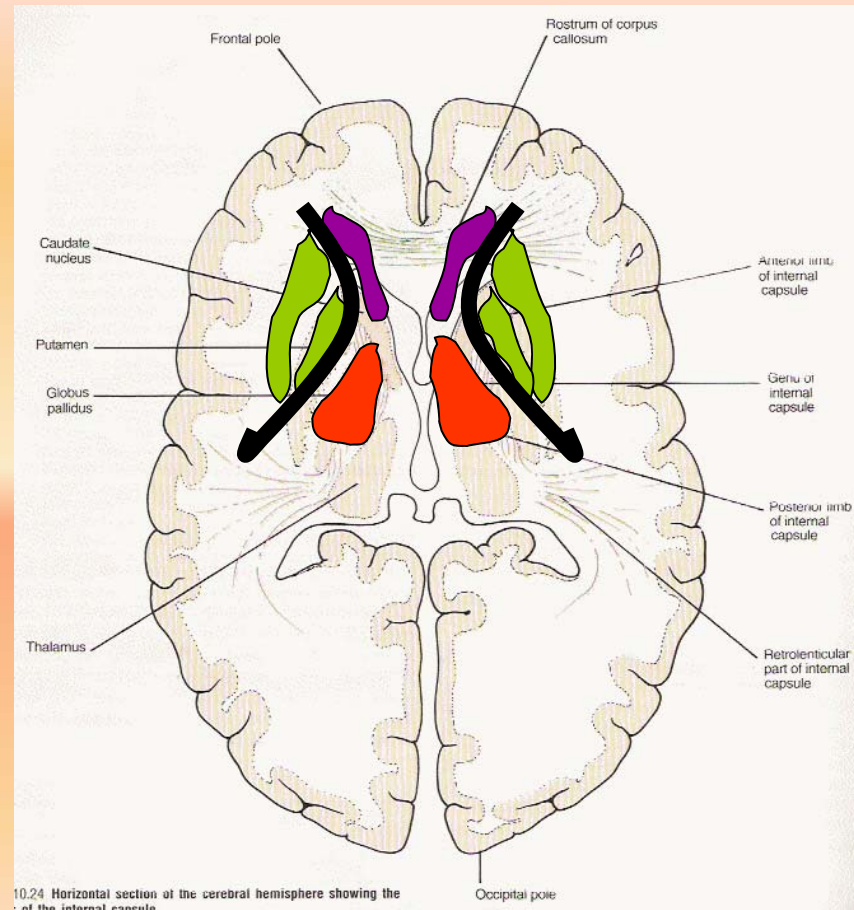
# **INTERNAL CAPSULE**

- **Projection fibres- Internal capsule**



# DEFINITION

- **Projection fibres** (white matter) between
- **caudate nucleus** and **thalamus** medially
- **lentiform nucleus** laterally



- **Internal Capsule-** A compact bundle of fibres through which the large collections of fibres pass, including-
- Thalamocortical fibres
- Corticothalamic fibres
- Corticopontine fibres
- Corticobulbar fibres
- Corticospinal fibres

- The fibres project from the **cerebral cortex** to the **various nuclei** of the **extrapyramidal system** (e.g., the putamen and caudate nucleus).
- It is a **continuous sheet of fibres** that forms the **medial boundary** of the **lenticular nucleus**.
- It continues around **posteriorly** and **inferiorly** to **partially envelop** this nucleus.
- **Inferiorly**, many of the fibres of the internal capsule **funnel** into the cerebral peduncles.

- **Superiorly**, the fibres **fan out** into the **corona radiata**.
- Here, they travel in the **cerebral white matter** to reach their **cortical origins** or **destinations**.

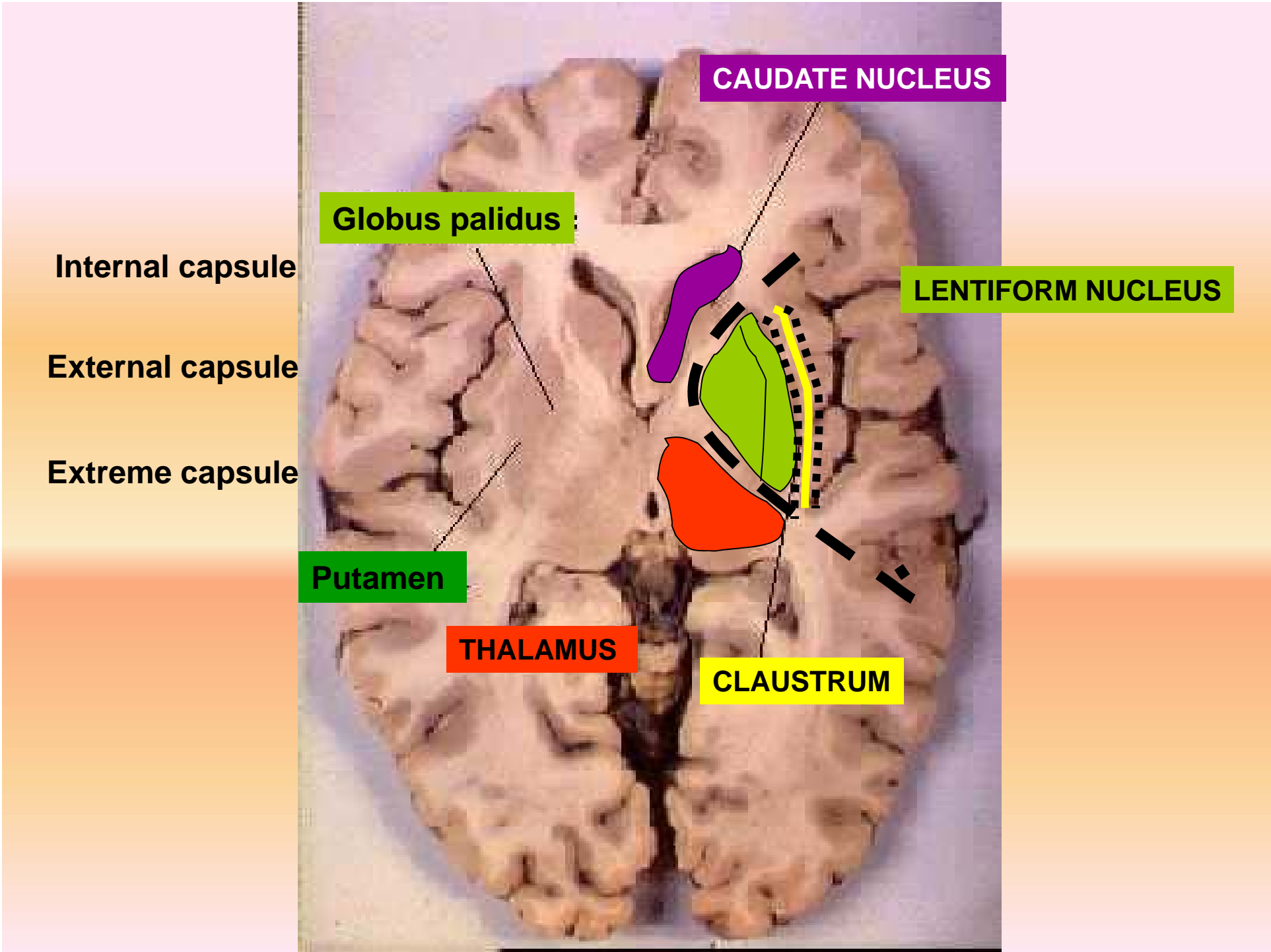
The internal capsule is **divided** into **5 regions**:

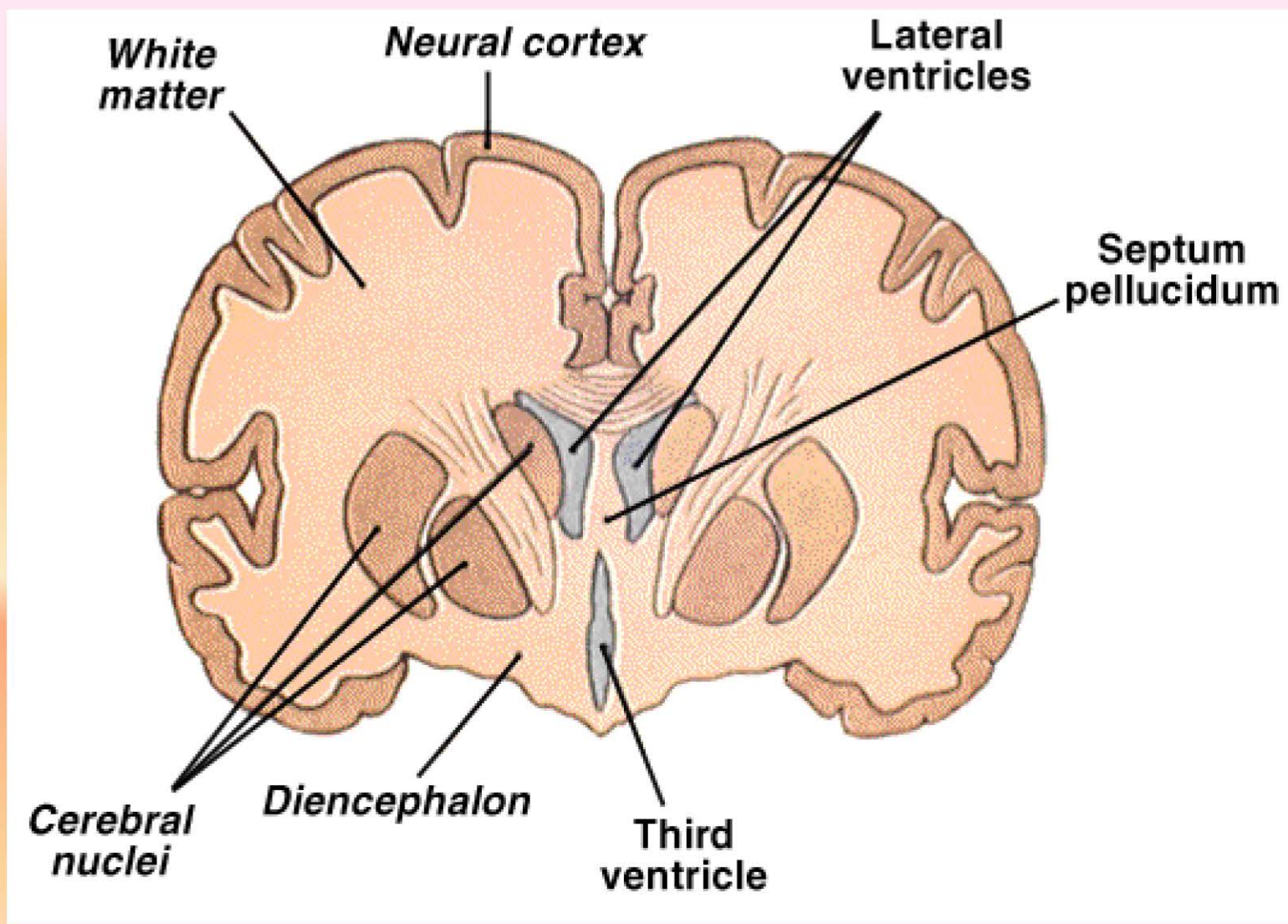
- The **anterior limb** is the portion between the **lenticular nucleus** and the **head** of the **caudate nucleus**;
- The **posterior limb** is the portion between the **lenticular nucleus** and the **thalamus**;
- The **genu** is the portion at the **junction** of the **above 2 parts** and is **adjacent** to the **interventricular foramen**;
- The **retrolenticular part** is the portion **posterior** to the **lenticular nucleus**;
- The **sublenticular part** is the portion **inferior** to the **lenticular nucleus**.

Portion	Description	Origin	Destination
Anterior Limb	Anterior thalamic radiation	<ul style="list-style-type: none"> <li>• Anterior nucleus</li> <li>• DM</li> </ul>	<ul style="list-style-type: none"> <li>• Cingulate gyrus</li> <li>• Prefrontal cortex</li> </ul>
Genu	Relays to motor areas	<ul style="list-style-type: none"> <li>• VA</li> <li>• VL</li> </ul>	<ul style="list-style-type: none"> <li>• Premotor cortex</li> <li>• Primary motor cortex</li> </ul>
Posterior Limb	<ol style="list-style-type: none"> <li>1. Motor pathways: <ul style="list-style-type: none"> <li>◦ Corticospinal tract</li> <li>◦ Corticobulbar tract</li> </ul> </li> <li>2. Somatosensory relays</li> </ol>	<ol style="list-style-type: none"> <li>1. Motor cortex</li> <li>2. VPL/VPM</li> </ol>	<ol style="list-style-type: none"> <li>1. Motor pathways: <ul style="list-style-type: none"> <li>◦ Spinal cord</li> <li>◦ Brainstem</li> </ul> </li> <li>2. Somatosensory relays: <ul style="list-style-type: none"> <li>◦ Primary somatosensory cortex</li> </ul> </li> </ol>
Retrolenticular	<ul style="list-style-type: none"> <li>• Association relay</li> <li>• Optic radiation</li> </ul>	<ul style="list-style-type: none"> <li>• Pulvinar</li> <li>• LGN</li> </ul>	<ul style="list-style-type: none"> <li>• Association cortex</li> <li>• Visual cortex</li> </ul>
Sublenticular	<ul style="list-style-type: none"> <li>• Optic radiation</li> <li>• Auditory radiation</li> </ul>	<ul style="list-style-type: none"> <li>• LGN</li> <li>• MGN</li> </ul>	<ul style="list-style-type: none"> <li>• Visual cortex</li> <li>• Auditory cortex</li> </ul>

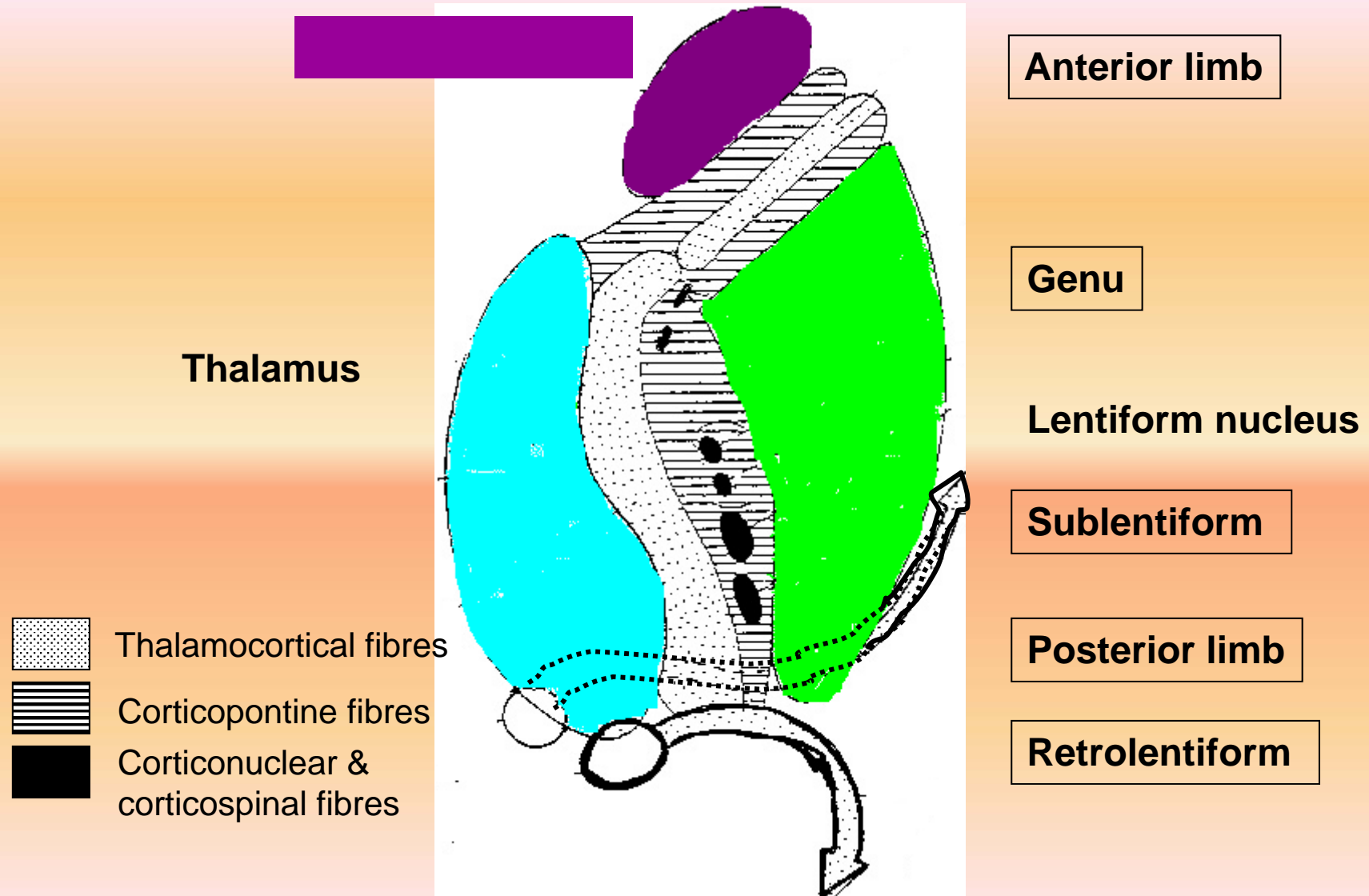
Portion	Descending fibres	Ascending fibres	Radiations
Anterior Limb	<ul style="list-style-type: none"> <li>•Frontopontine</li> <li>•Frontothalamic</li> </ul>	Thalamofrontal	Anterior thalamic radiation
Genu	<ul style="list-style-type: none"> <li>•Frontopontine</li> <li>•Corticonuclear</li> </ul>	Fibres carrying somesthetic sensations from thalamus (VP nu.) to postcentral gyrus	Superior or Dorsal thalamic radiation
Posterior Limb	<ul style="list-style-type: none"> <li>•Frontopontine</li> <li>•Corticospinal</li> <li>•Corticorubral</li> <li>•Corticoreticular</li> <li>•Pariethalamic</li> </ul>	<ul style="list-style-type: none"> <li>•Thalamoparietal fibres</li> <li>•Subthalamic fasciculus</li> </ul>	
Retrolenticular	<ul style="list-style-type: none"> <li>•Parietopontine</li> <li>•Occipitopontine</li> <li>•Corticorubral</li> <li>•Occipitohalamic</li> </ul>	<ul style="list-style-type: none"> <li>•Optic radiation</li> <li>•Thalamo-occipital</li> <li>•Thalamo-parietal</li> </ul>	Posterior or Caudal thalamic radiation
Sublenticular	<ul style="list-style-type: none"> <li>•Parietopontine</li> <li>•Temporopontine</li> <li>•Temporohalamic</li> </ul>	<ul style="list-style-type: none"> <li>•Acoustic radiation</li> <li>•Thalamotemporal</li> </ul>	Inferior thalamic radiation

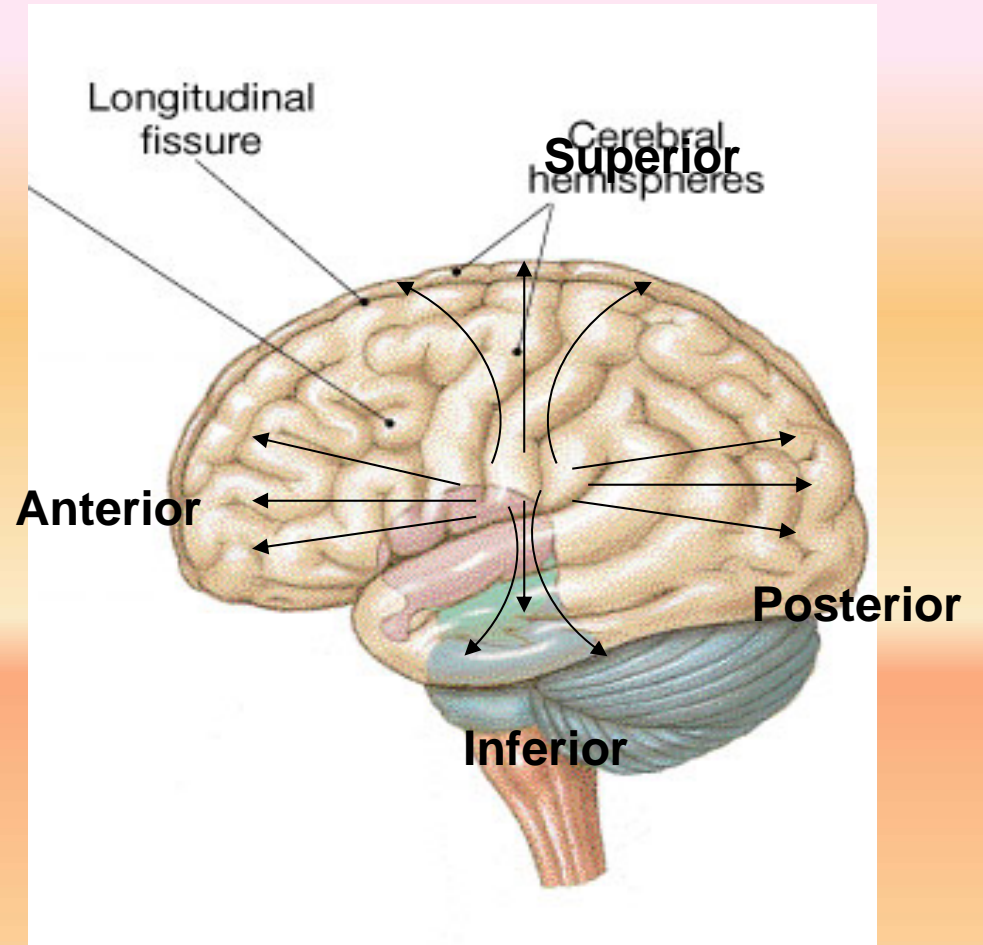






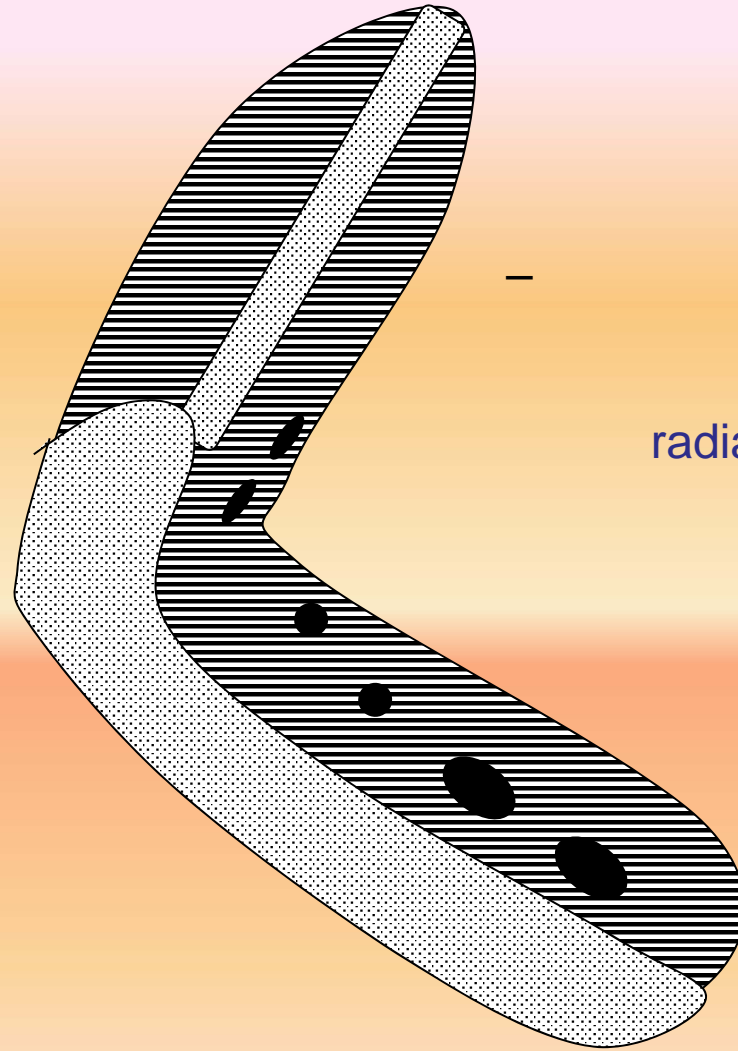
# Parts of internal capsule





# Thalamic radiation

- **Thalamocortical fibres**
  - Thalamic nuclei -project to ipsilateral cerebral cortex (except for reticular nucleus)
- **Reach neocortex**
- **Located entirely within internal capsule**
- **Superior**-from ventral nucleus
  - Becomes corona radiata
- **Anterior**-from anterior & medial nuclei
- **Posterior**-from optic radiation
- **Inferior**-from auditory radiation



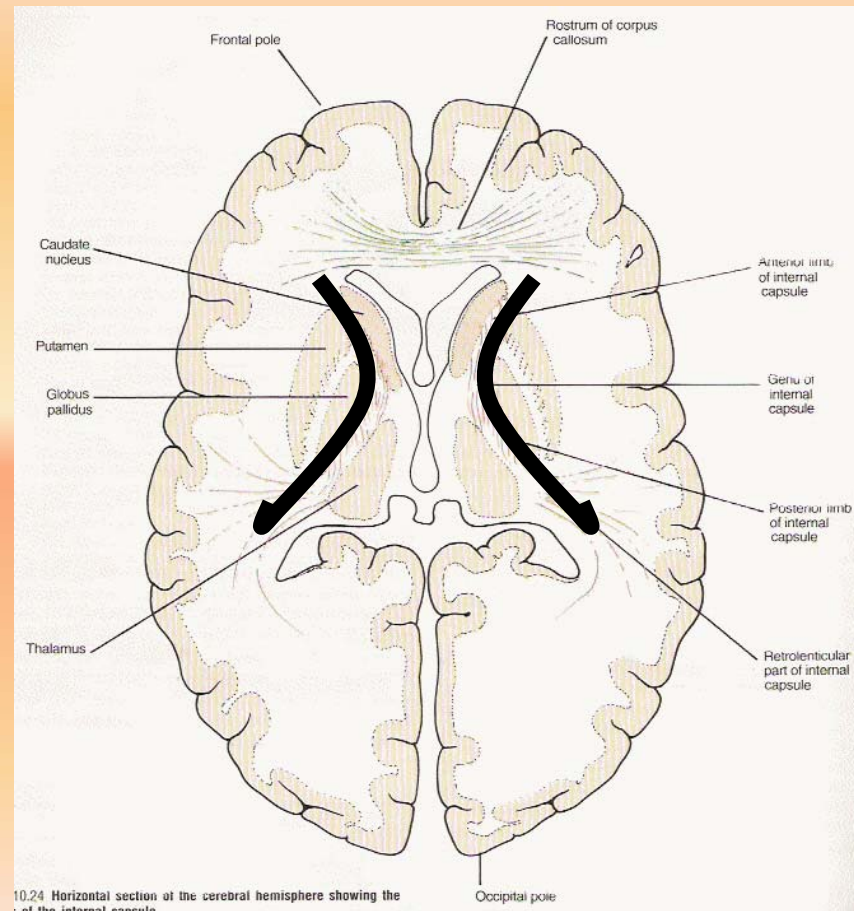
radiation

corticospinal fibres

# BLOOD SUPPLY

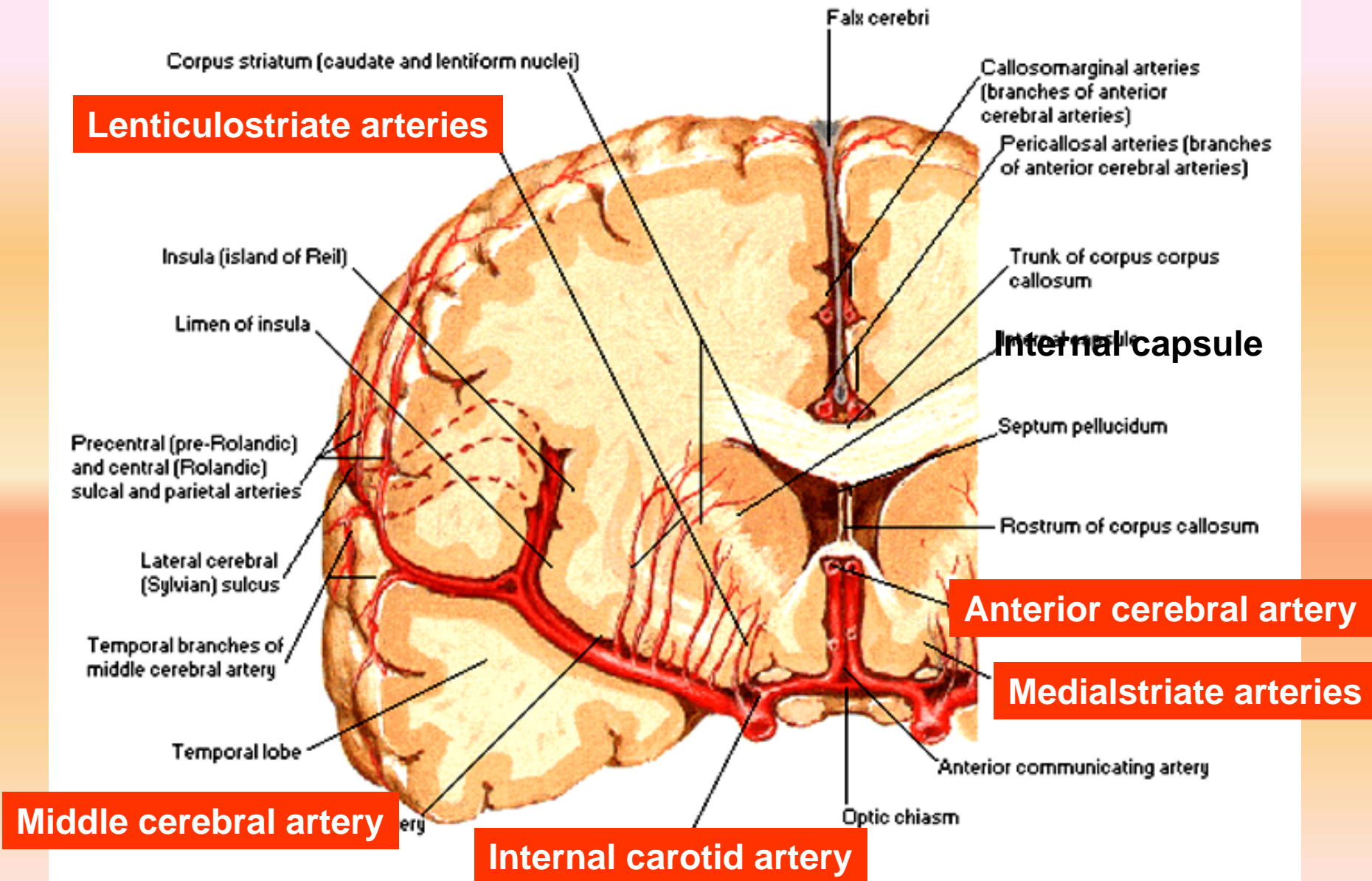
- Lateral striate fr middle cerebral artery
  - Ant limb
  - Genu
  - Post limb
  - Basal ganglia
- Medial striate fr anterior cerebral artery
  - Ant limb
  - Genu
  - Basal ganglia
- Ant choroidal fr internal carotid
  - Post limb
  - Retrolenticular part

## HORIZONTAL SECTION



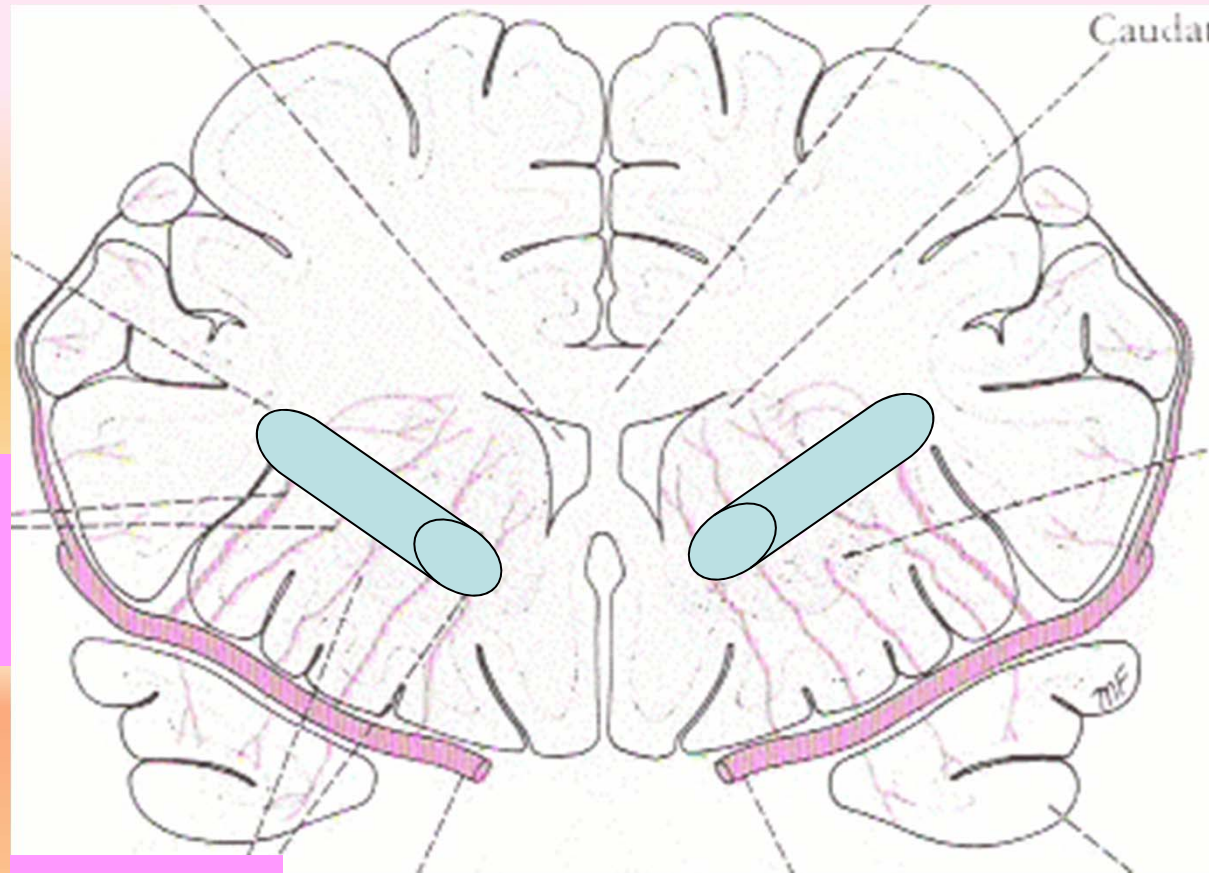
# Arteries of Brain

## FRONTAL SECTION CORONAL SECTION



\* most commonly arises distal to anterior communication artery





**Lateral  
striate  
- MCA**

**Medial  
striate  
ACA**

**Left  
middle  
cerebral  
artery**

**Right  
middle  
cerebral  
artery**

# ANTERIOR LIMB

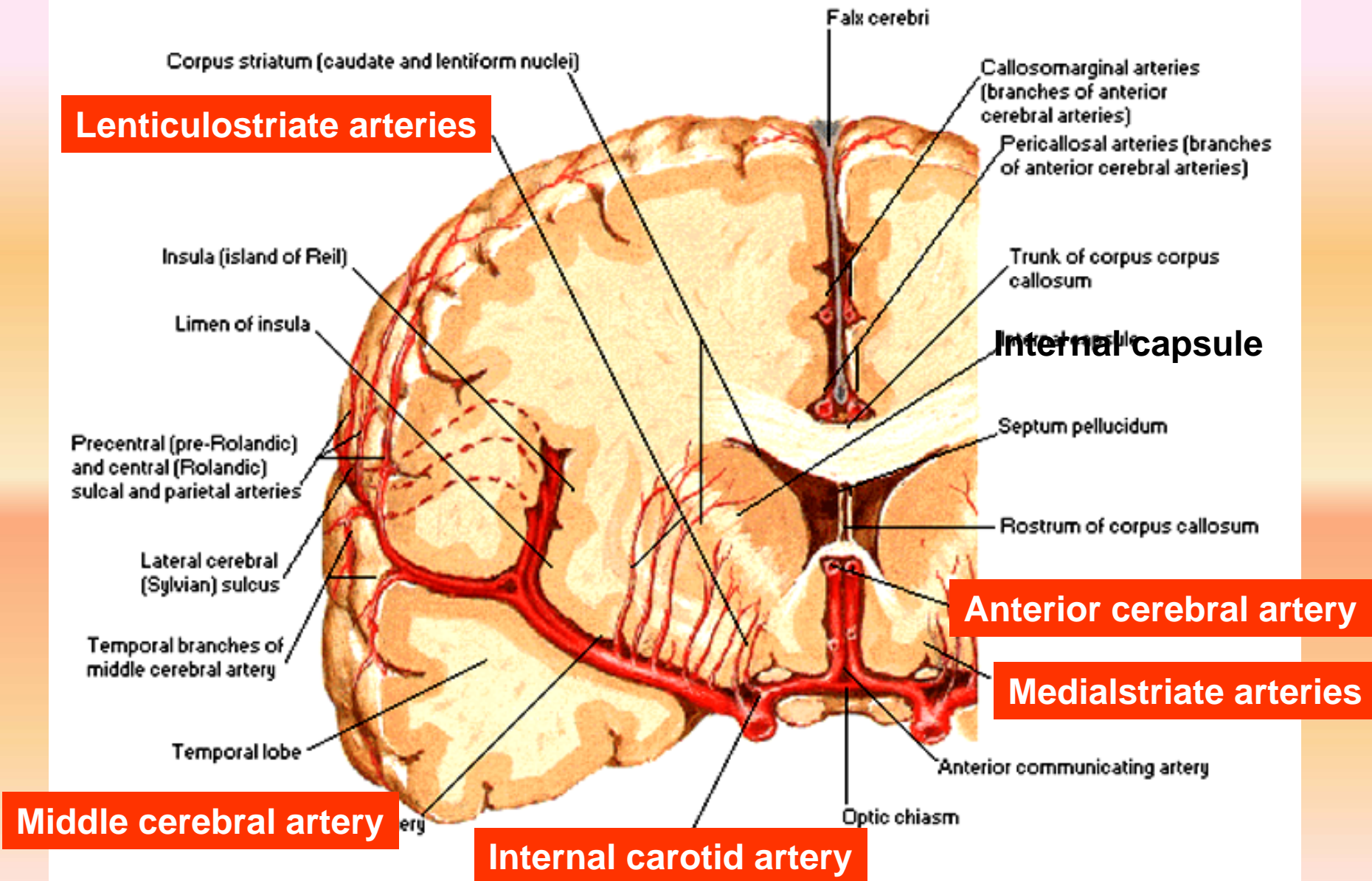
- Ant cerebral artery through medial striate br.
- Middle cerebral artery through lateral striate and lenticulostriate br.
  - pass through the lentiform N to supply the striate

# GENU

- Ant cerebral artery through medial striate br.
- Middle cerebral artery through lateral striate and lenticulostriate br.
- Branches of internal carotid artery

# Arteries of Brain

## FRONTAL SECTION CORONAL SECTION



\* most commonly arises distal to anterior communication artery

# POSTERIOR LIMB

- Middle cerebral artery through lateral striate and lenticulostriate br.
  - *Charcot's artery of cerebral haemorrhage*
- Anterior choroidal artery, direct branch of internal carotid artery
  - Long and slender, thus has tendency to get thrombosis

**INTERNAL CAPSULE**

**CAUDATE NUCLEUS**

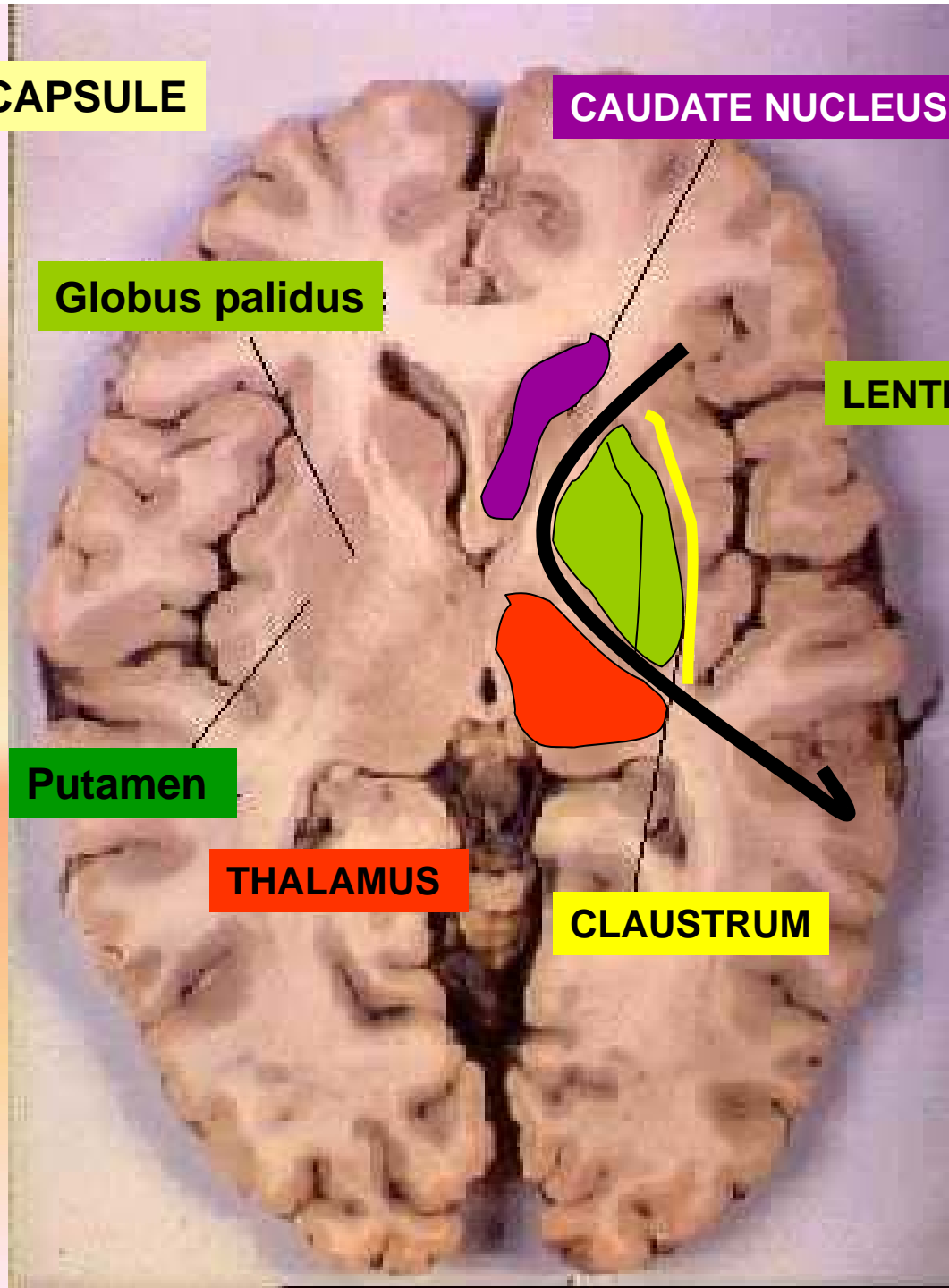
**Globus pallidus :**

**LENTIFORM NUCLEUS**

**Putamen**

**THALAMUS**

**CLAUSTRUM**



**EXTERNAL CAPSULE**

**CAUDATE NUCLEUS**

**Globus pallidus :**

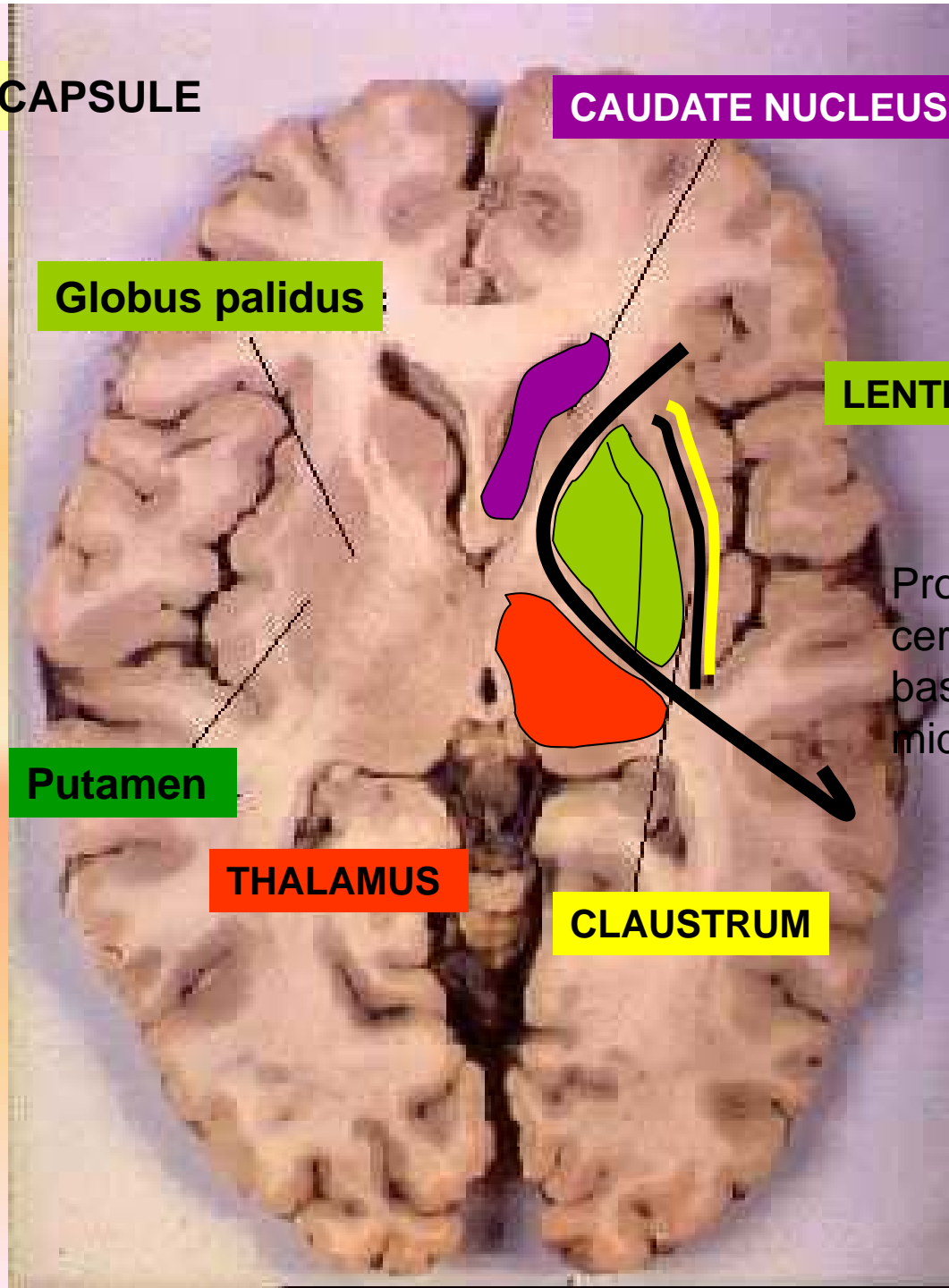
**LENTIFORM NUCLEUS**

Projection fibres from cerebral cortex to basal ganglia and midbrain

**Putamen**

**THALAMUS**

**CLAUSTRUM**



# APPLIED ANATOMY

- Microaneurysm to lenticulostriate arteries -
  - contralateral side of the body –
    - Hemiplegia
    - Impaired sensation
    - Paralysis of lower half of face
- Thrombosis – recurrent br of ACA
  - contralateral side of the body –
    - Upper limb
    - Paralysis of lower half of face
- Anterior choroidal artery
  - may be symptomless – collateral circulation