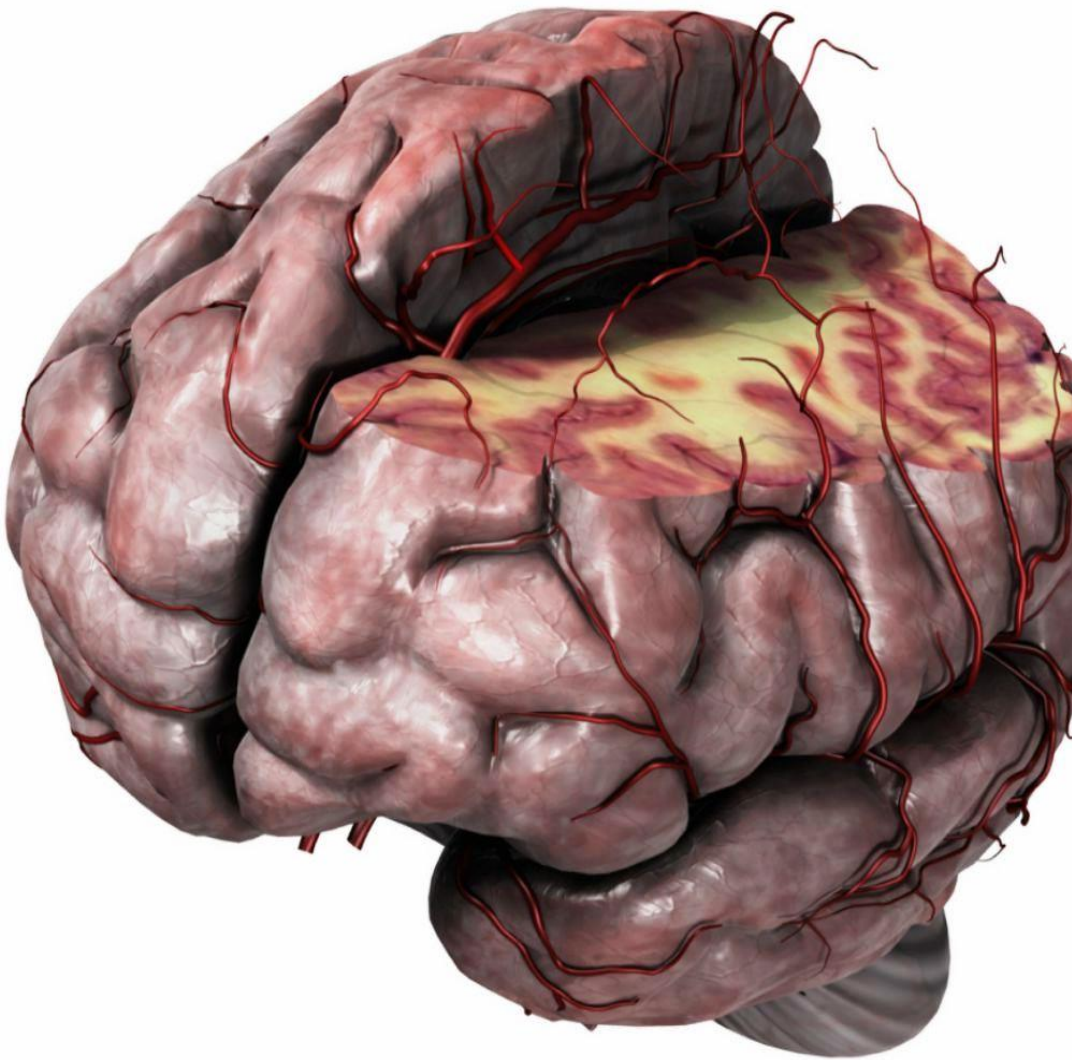


# CEREBRAL WHITE MATTER



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# TYPES

## A-association fibers :-

fibers connect different cortical areas of the same cerebral hemisphere. to integrate the functions of these areas

## B-commissural fibers :-

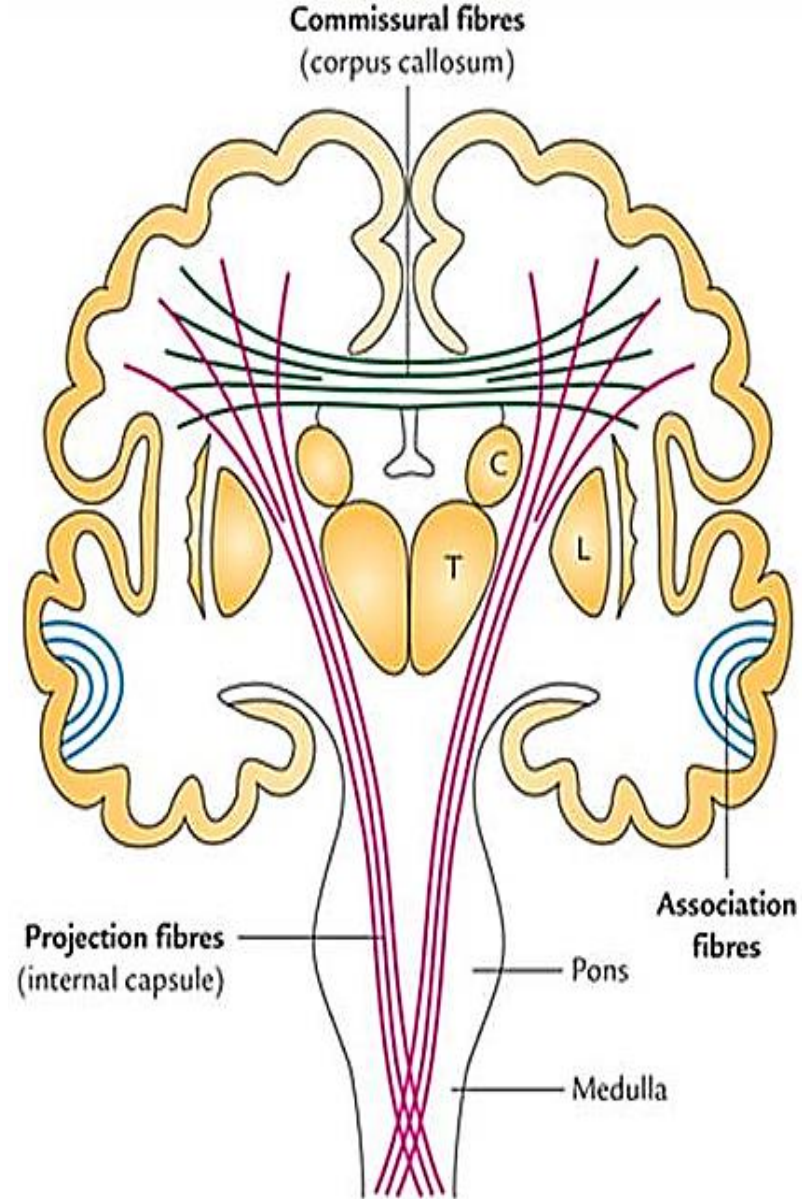
Fibers connect identical cortical areas of both cerebral hemispheres.

So these fibers cross the midline

For coordination between both sides

## C- projection fibers :-

Fibers connect the cerebral cortex with lower centers they are either ascending (afferent) or descending (efferent) for integration of cerebral cortex with these parts

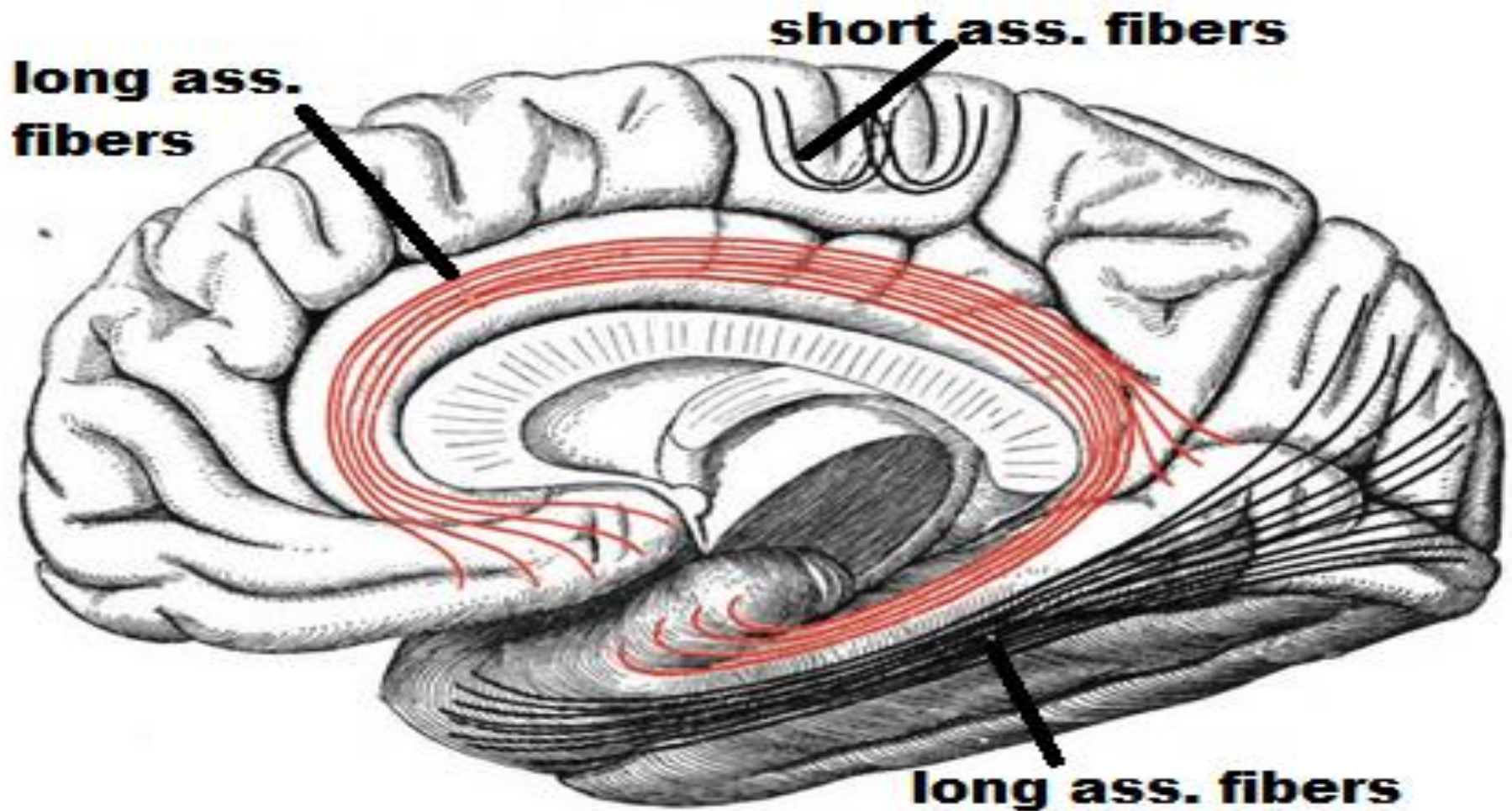


# ASSOCIATION FIBERS

## Types:

**A-short:** connect adjacent gyri together

**B-long:** connect distant gyri of different lobes (will be discussed)

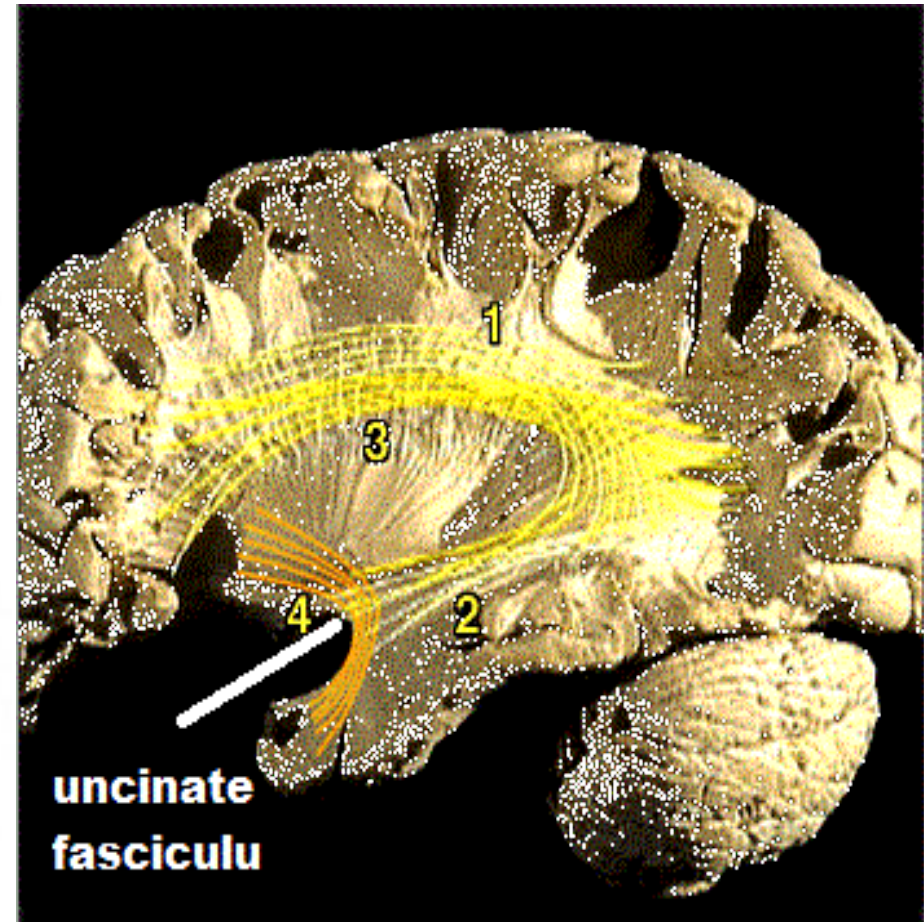
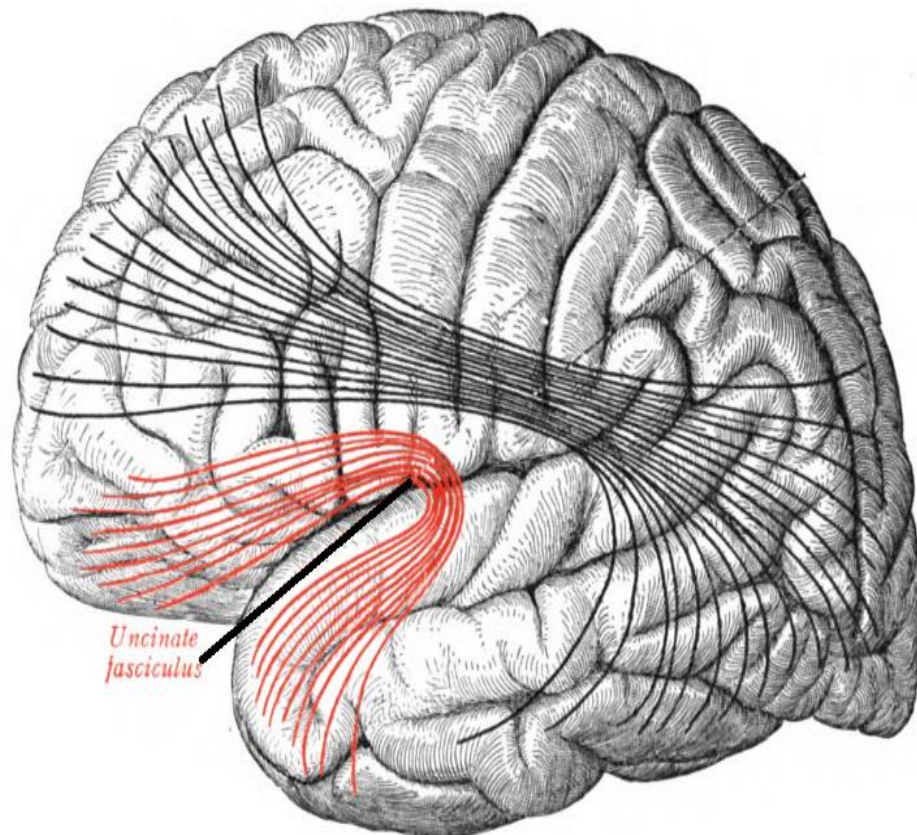


# ASSOCIATION FIBERS

## 1-uncinate fasciculus: U shaped

-begins at the orbital gyri of frontal lobe, then arches over the stem of lateral sulcus to end in ant. part of temporal lobe

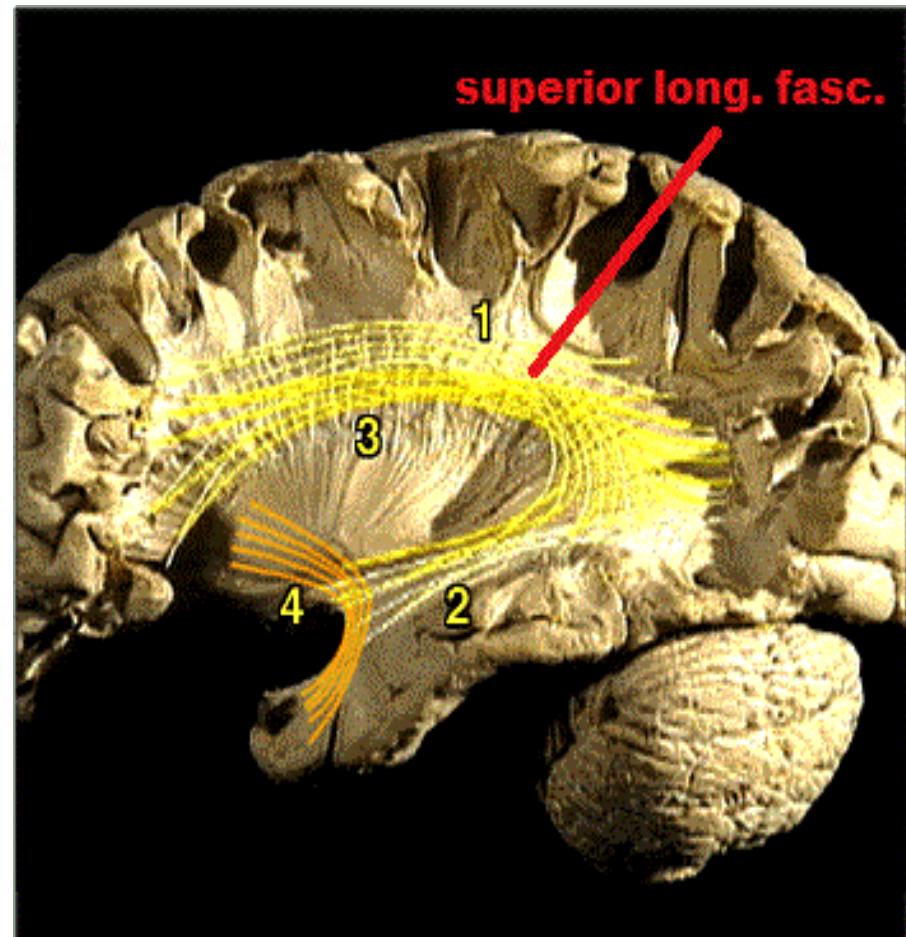
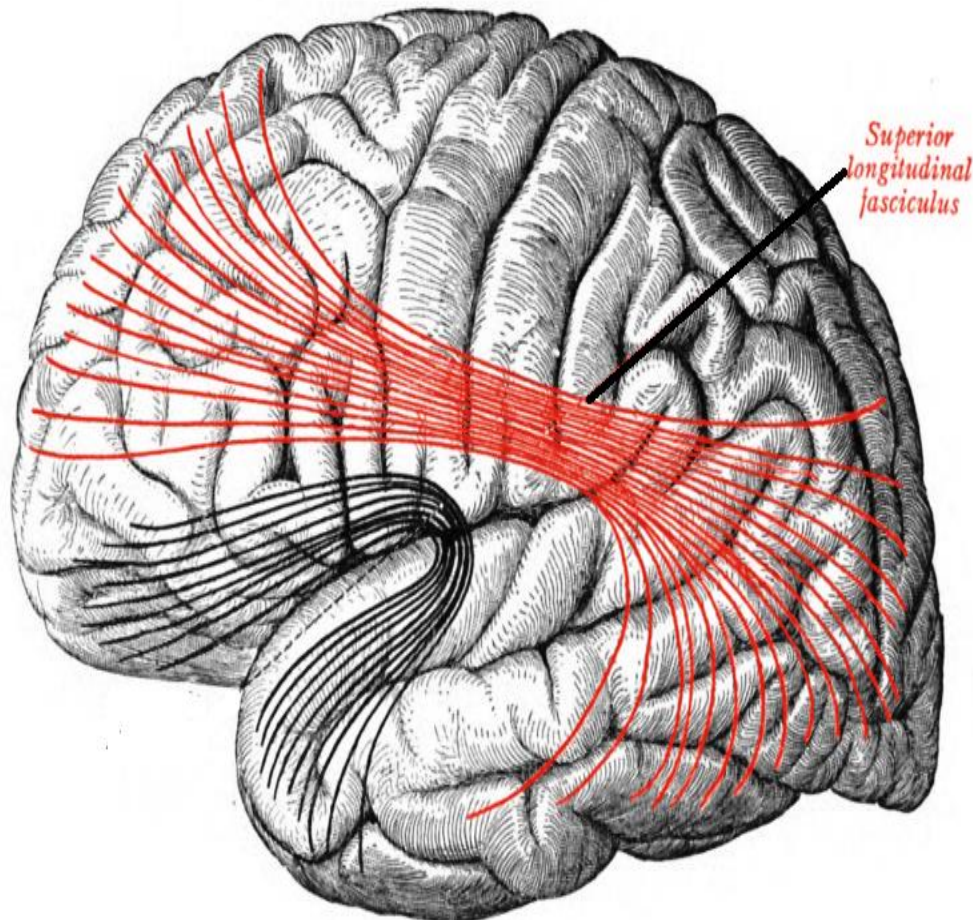
-it connects orbital gyri of frontal lobe & motor speech areas with the cortex of ant. part of temporal lobe



# ASSOCIATION FIBERS

## 2-superior longitudinal fasciculus: largest

- begins in frontal lobe and run backward to reach the occipital lobe , then curve to enter temporal lobe
- connect frontal, occipital & temporal cortical areas



# ASSOCIATION FIBERS

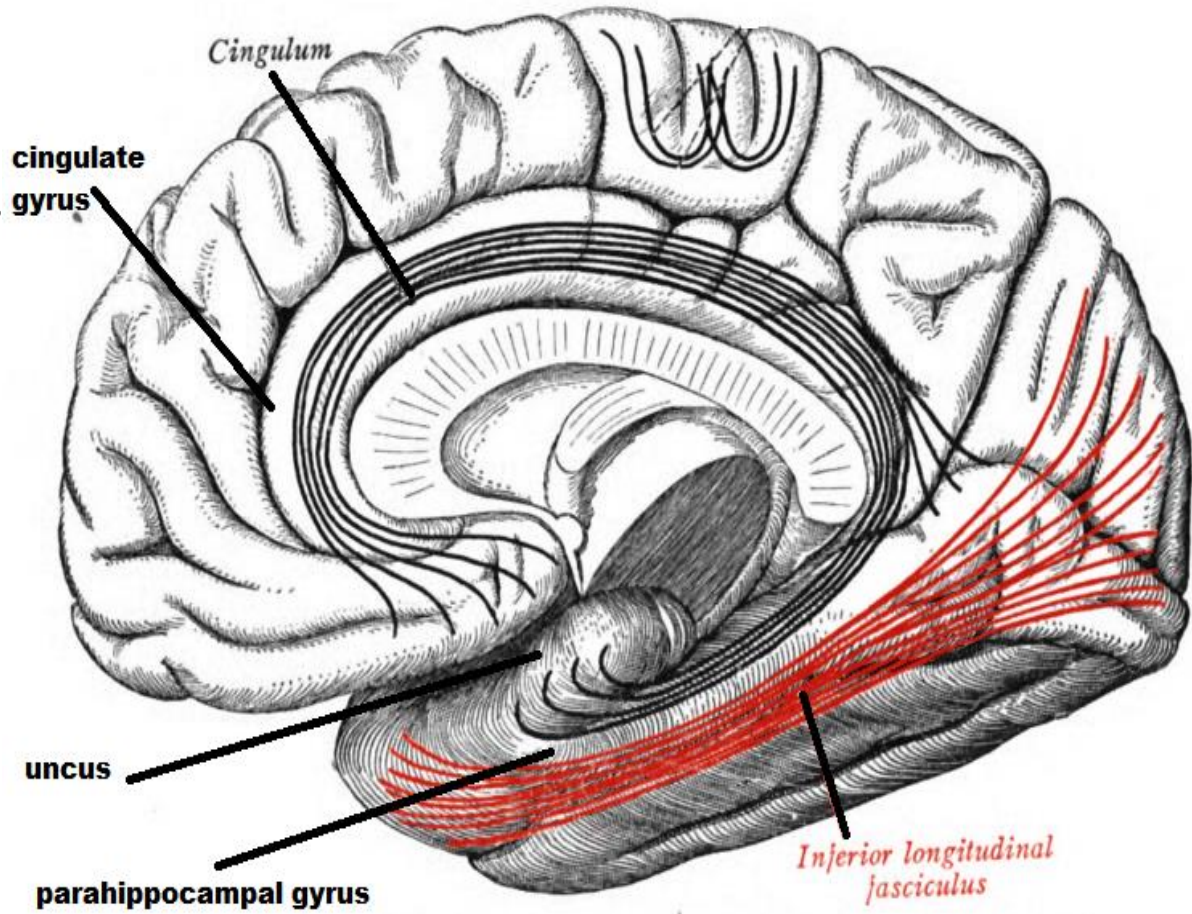
## 3-inferior longitudinal fasciculus:

Begins at occipital lobe and run forward to reach the temporal lobe

## 4-cingulum:

Begins at ant. perforated substance

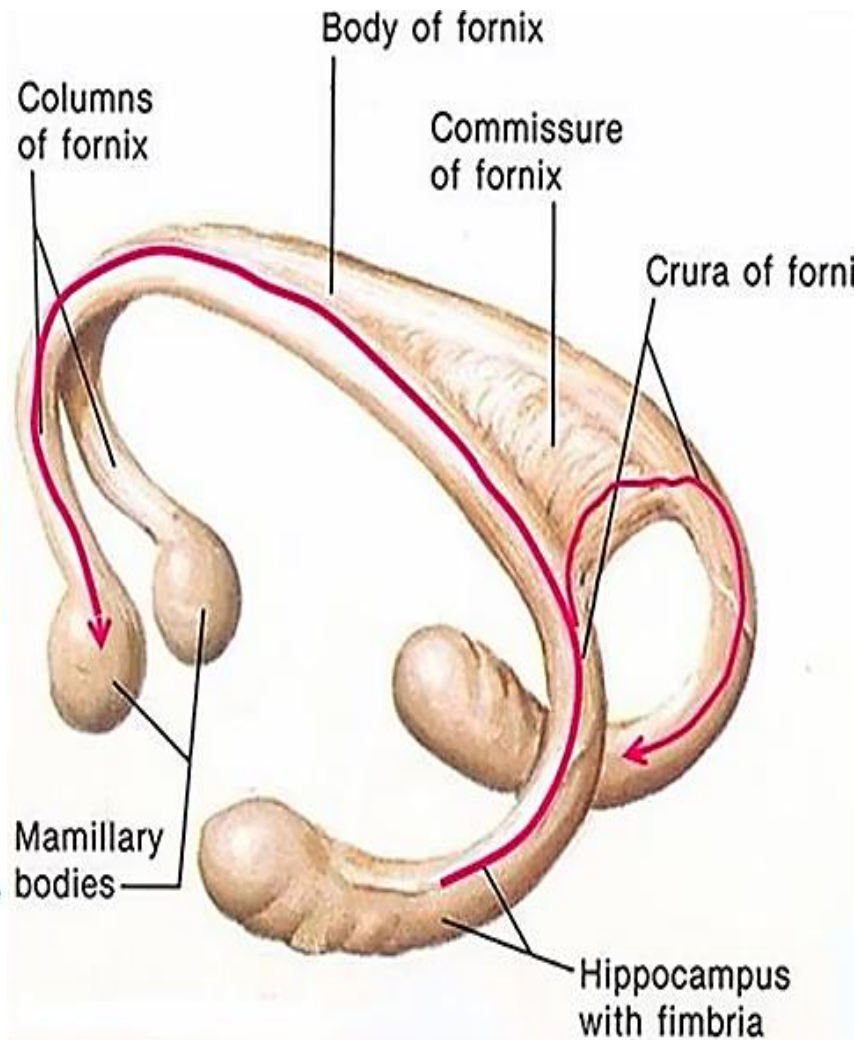
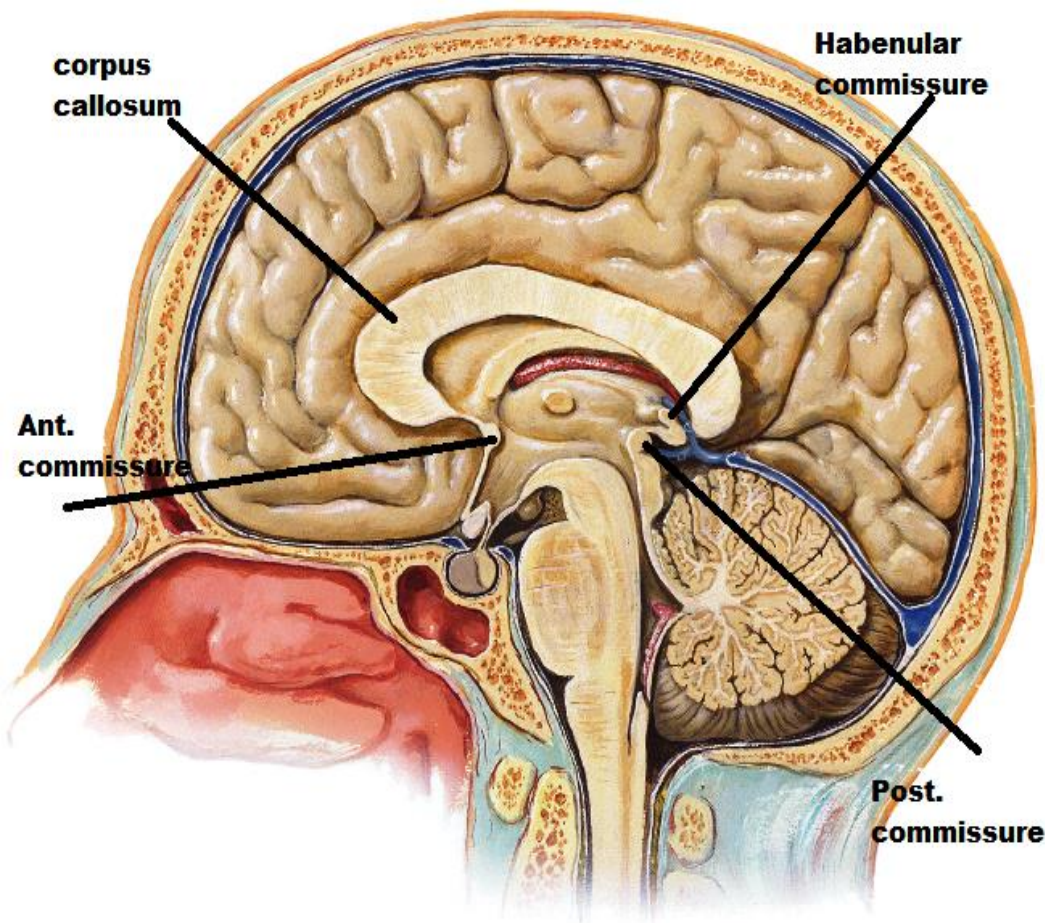
- cingulate gyrus
- isthmus
- parahippocampal gyrus
- And ends at uncus



# COMMISSURAL FIBERS

## Types

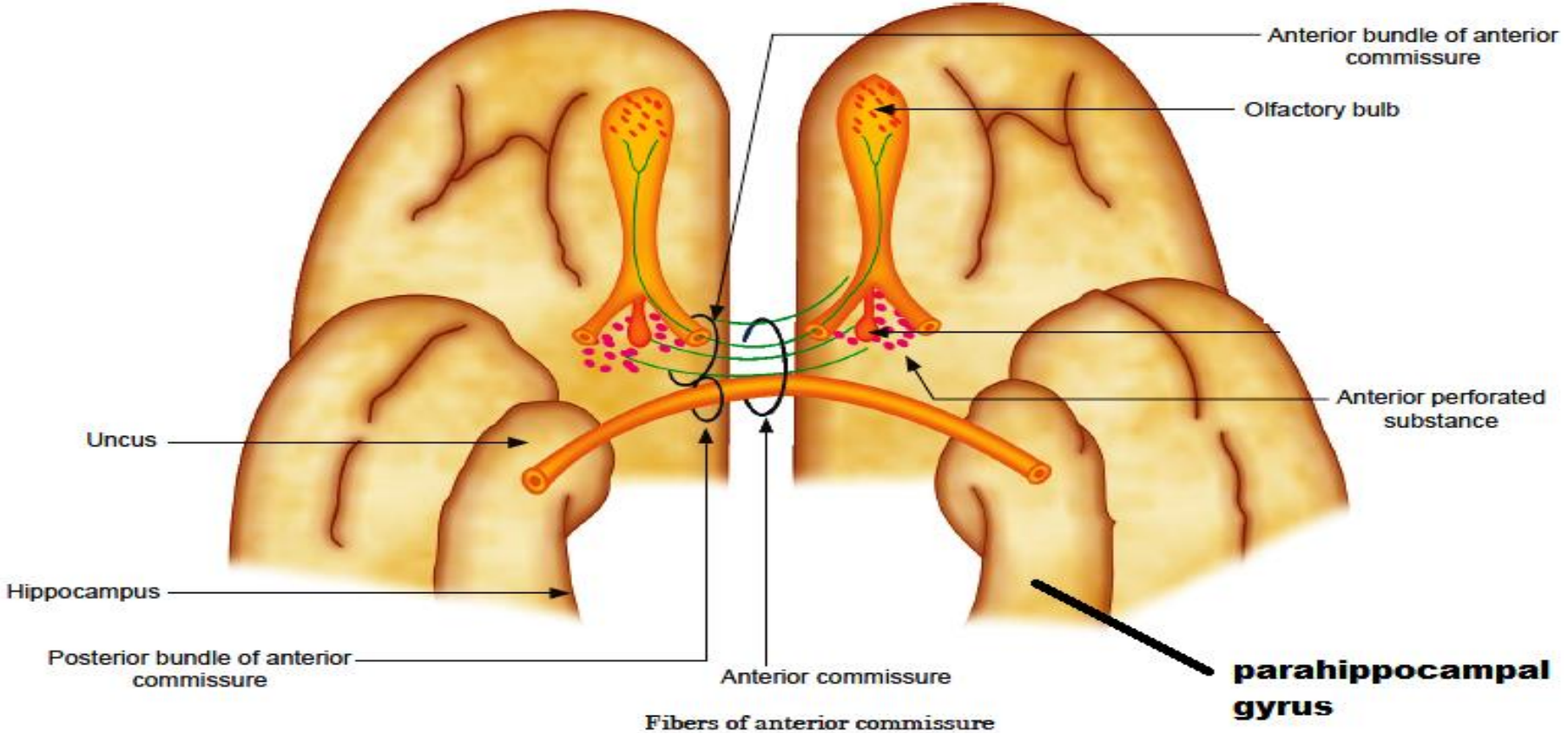
1. Corpus callosum
2. Anterior commissure
3. Habenular commissure
4. Posterior commissure
5. Hippocampal commissure.



# COMMISSURAL FIBERS

## 1-anterior commissure:

- it is a small rounded bundle embedded in the upper end of lamina terminalis, just in front columns of fornix
- connects olfactory structures of both sides :olfactory bulb, ant. perforated substance, uncus & ant. part of parahippocampal gyrus





# COMMISSURAL FIBERS

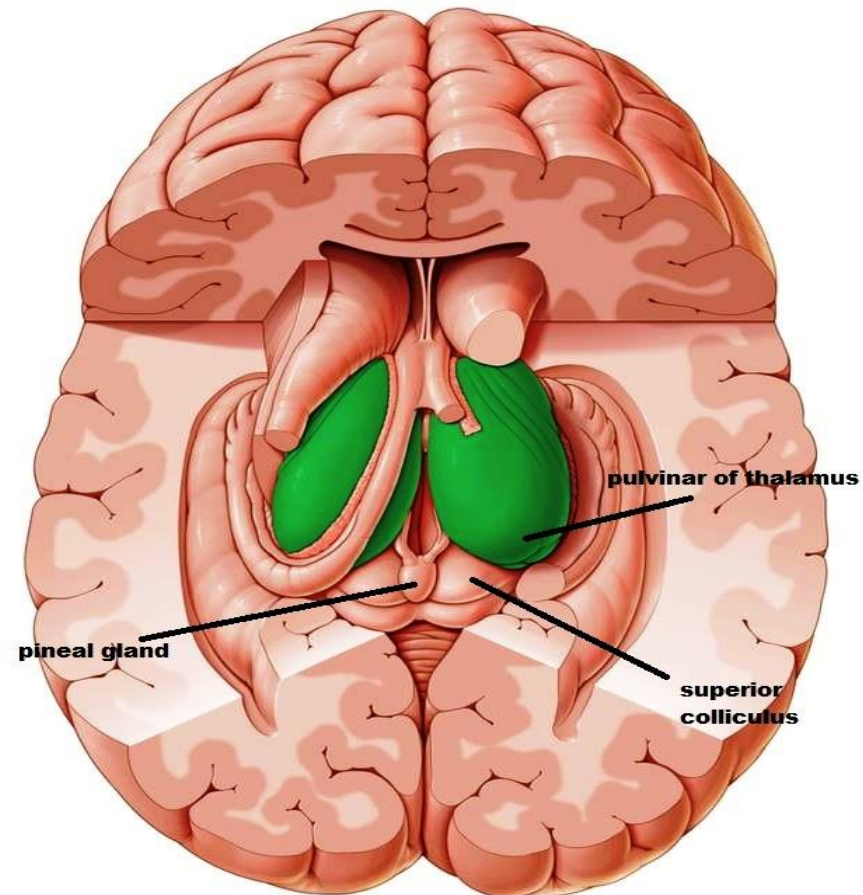
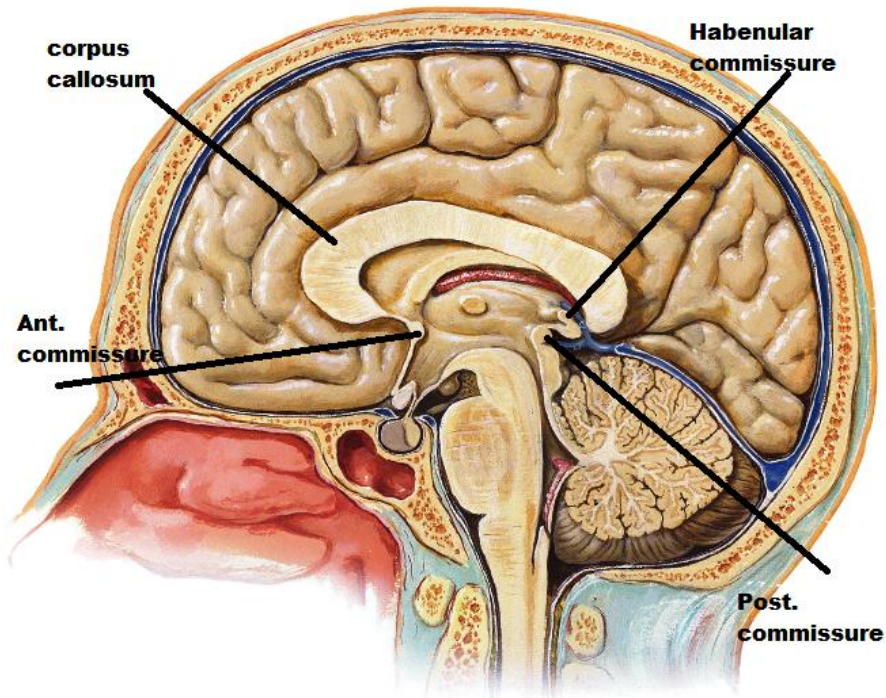
## 2-post. commissure (midbrain commissure)

- in inferior part of pineal stalk, above the upper end of cerebral aqueduct
- it connects the following structures on both sides:

Midbrain nuclei

Pulvinar of thalamus

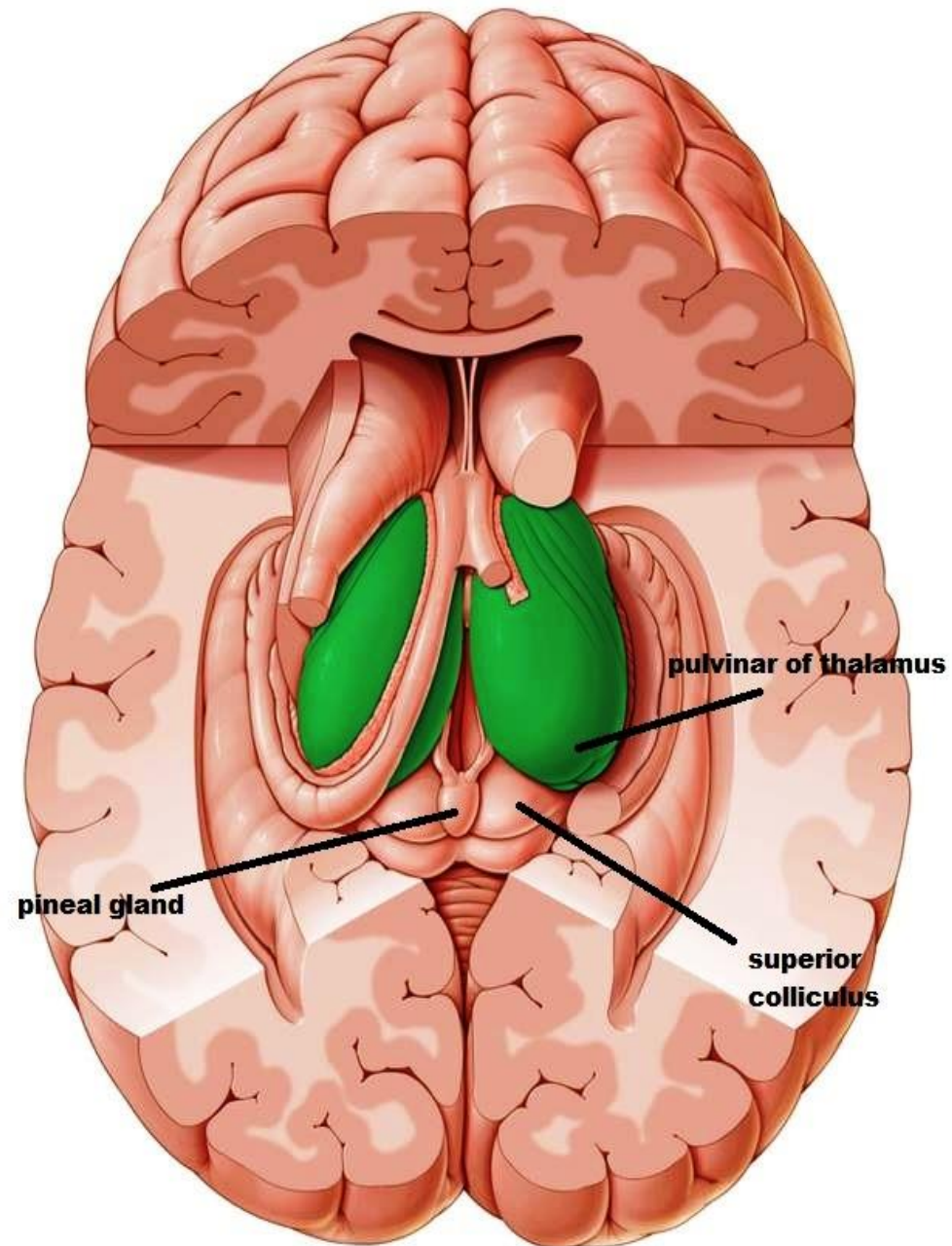
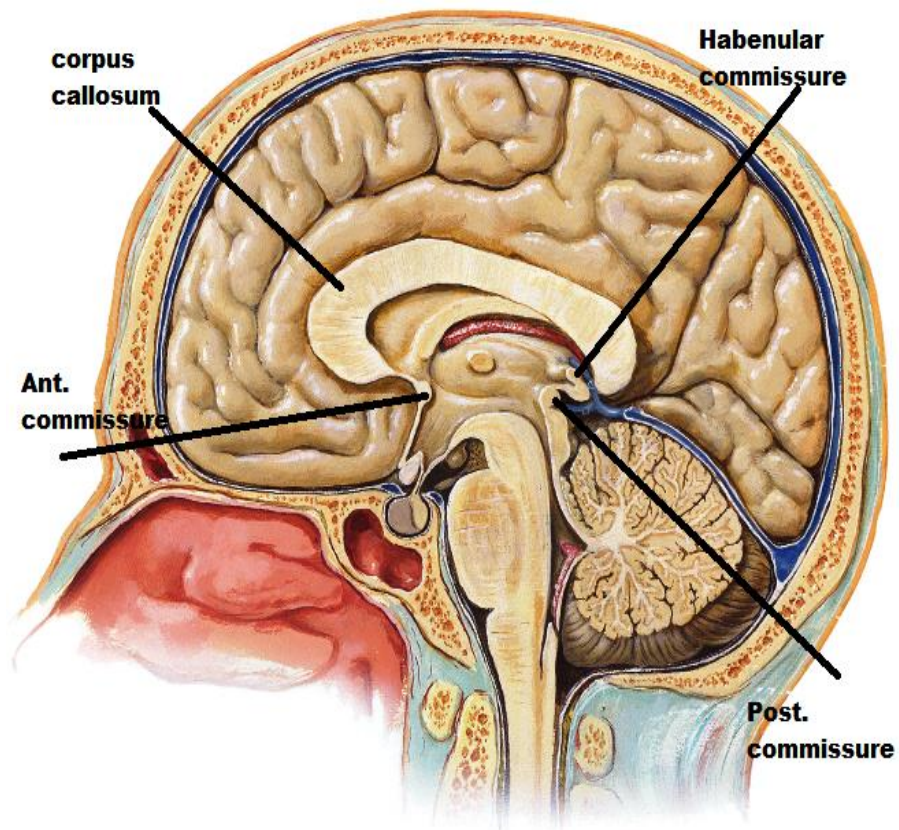
superior colliculus



# COMMISSURAL FIBERS

## 3-habenular commissure:

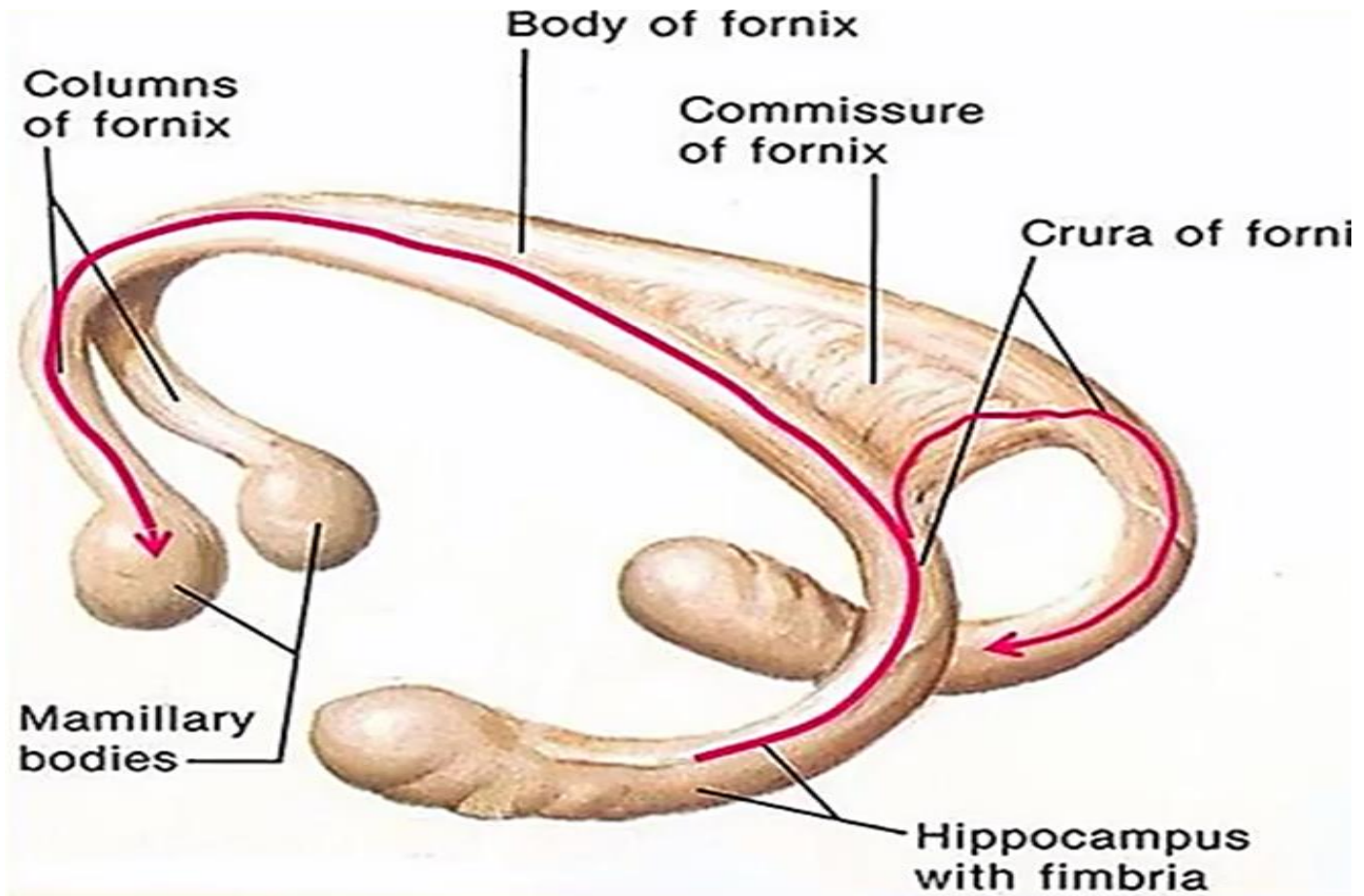
- in superior lamina of pineal stalk
- it connects habenular nuclei of both sides of epithalamus



# COMMISSURAL FIBERS

## 4-hippocampal (fornix) commissure:

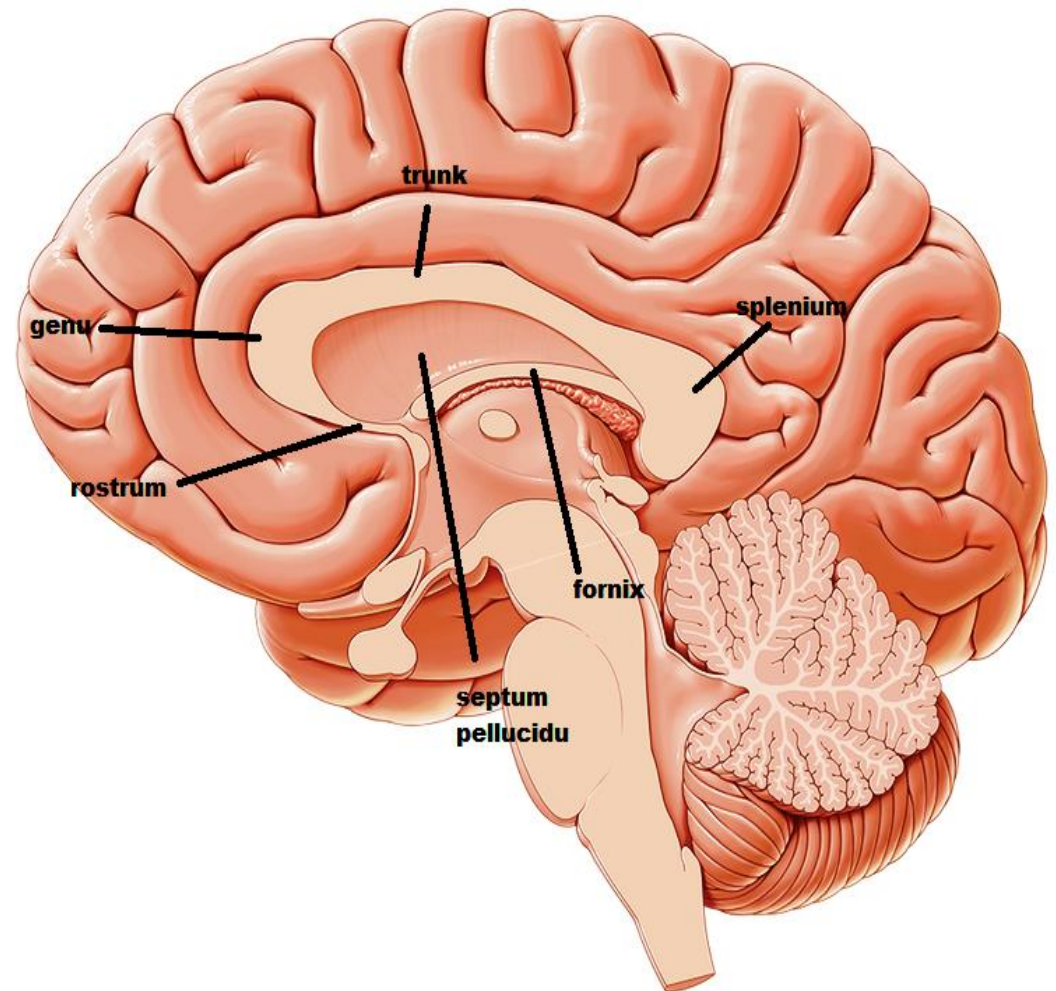
- Transverse fibers that connect the 2 crura of the fornix with each other, just before formation of the body.
- it connects the hippocampal formations of both sides



# COMMISSURAL FIBERS

## 5-corpor callosum

def.: largest and the main commissure in the brain. Its fibers connect **nearly** all the symmetrical cortical areas of the 2 hemispheres



# COMMISSURAL FIBERS C.C.

parts:

1-rostrum:

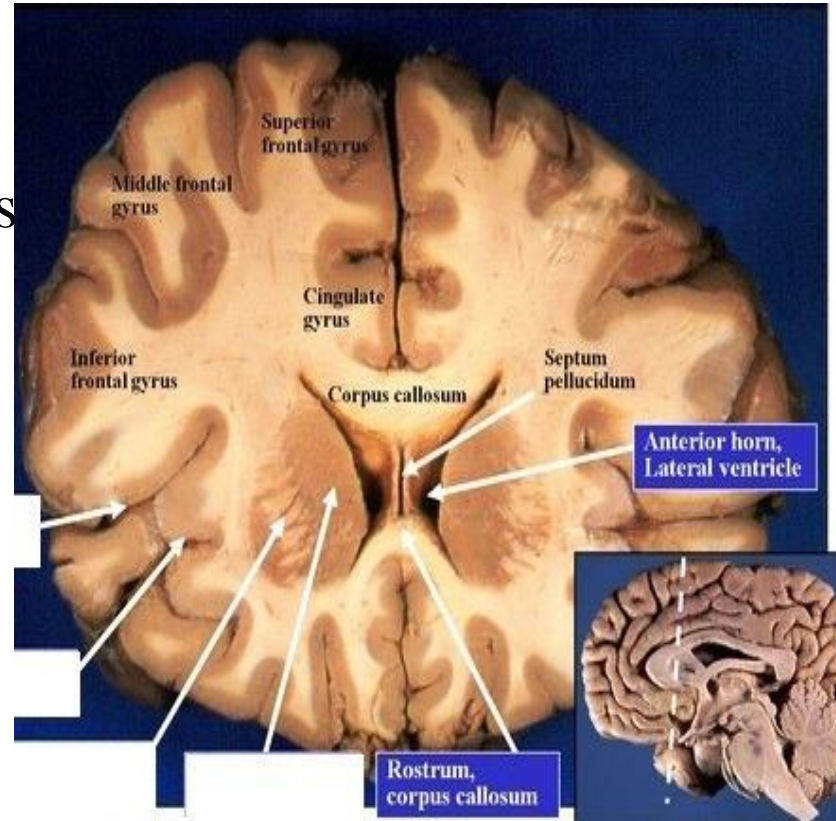
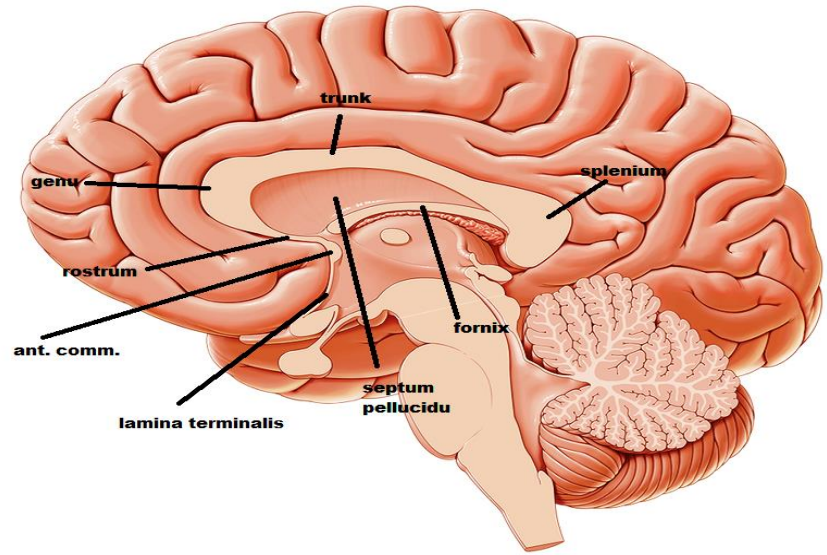
**in sagittal section**

It is thinnest part of corpus callosum .

From the genu it directs backwards and downwards to end at the level of ant. Commissure to be continued with lamina terminalis

**in coronal section:** inverted V shape,

its fibers connect the orbital surfaces of frontal lobes on both sides



# COMMISSURAL FIBERS C.C.

parts:

2-genu

**in sagittal section**

-curved ant. end of corpus callosum

-it is 4 cm behind the frontal pole

**in horizontal section :**

on both sides, the fibers pass

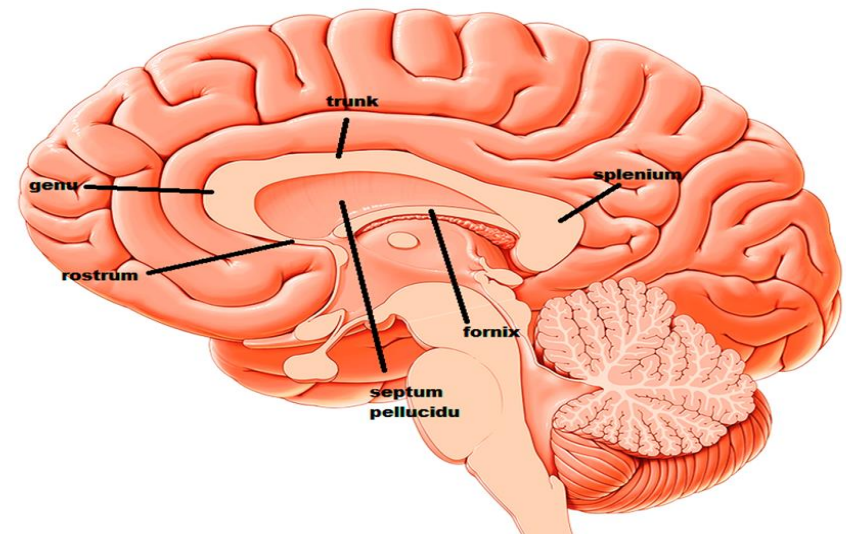
horizontally forward

forming forceps minor which connect

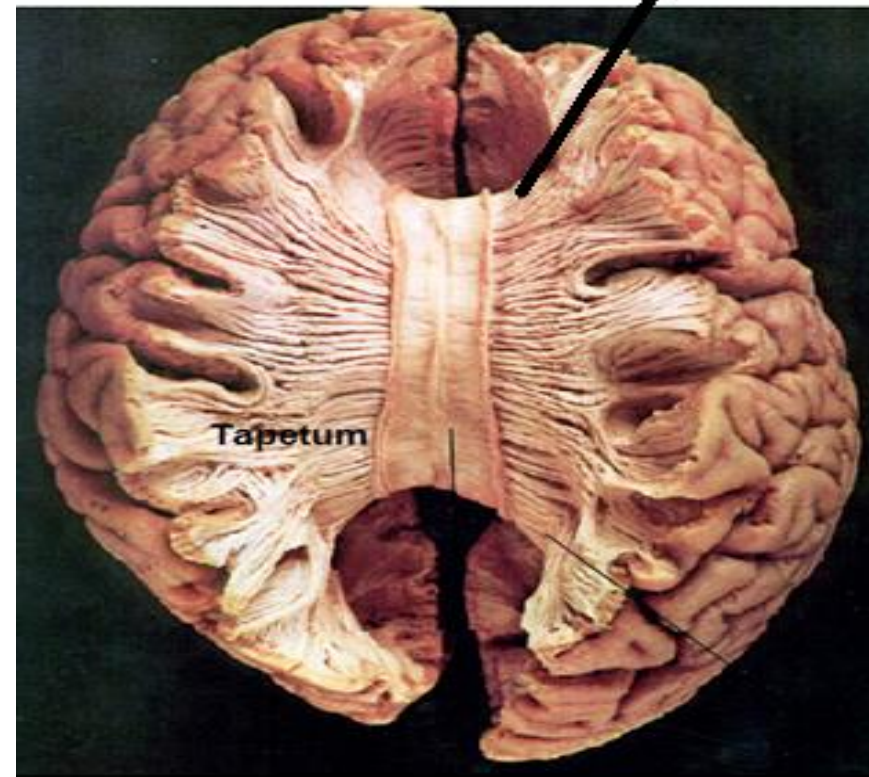
identical areas of both

frontal lobes

except orbital surfaces



**forceps minor**



# COMMISSURAL FIBERS C.C.

## parts:

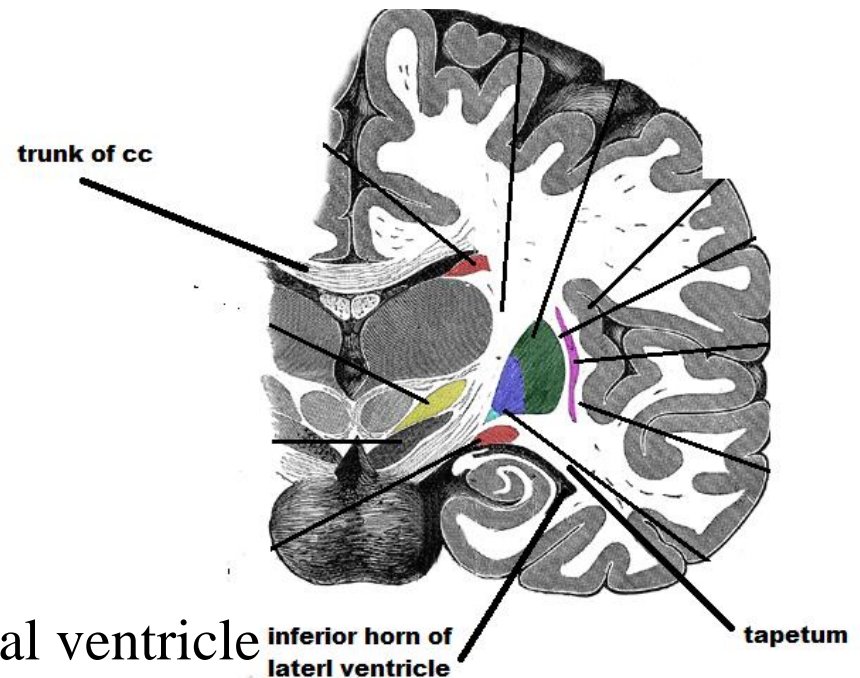
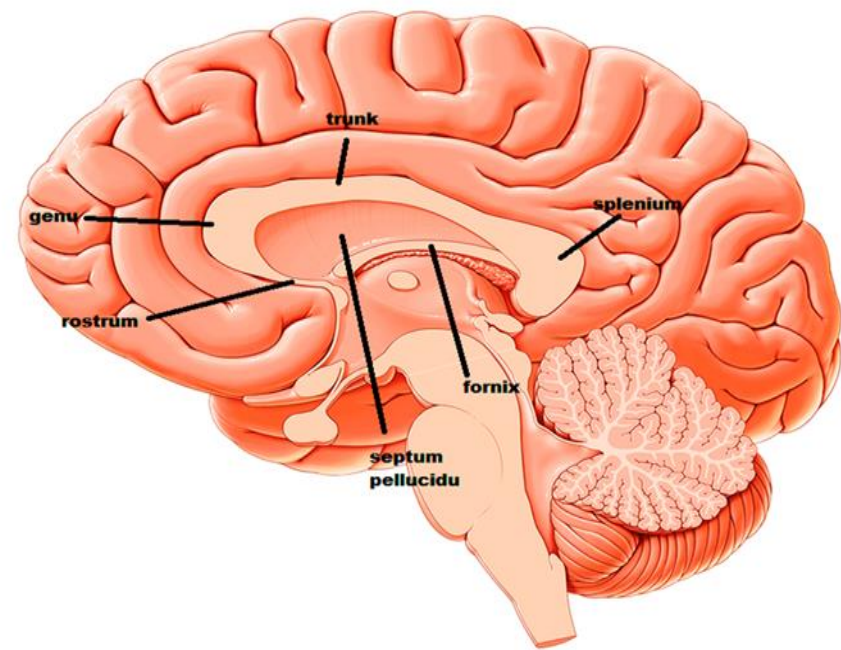
3-trunk( body)

## in sagittal section

- the main part of corpus callosum.
- Extends between genu and splenium
- its upper surface is convex

## in coronal section

the fibers on both sides diverge upward& laterally to connect the parietal lobes on both sides, downward and laterally to connect the temporal lobes on both sides. most of its fibers intersect with fibers of corona radiate, but some fibers not intersect with corona & form the tapetum of lateral wall of inferior horn of lateral ventricle



# COMMISSURAL FIBERS C.C.

parts:

4-splenium

**in sagittal section:**

the rounded post. end of corpus callosum

It is 6 cm in front of occipital pole.

**in horizontal section :**

on both sides, the fibers pass

horizontally backwards

forming forceps major which connect

identical areas of both

occipital lobes

Fibers of forceps major,

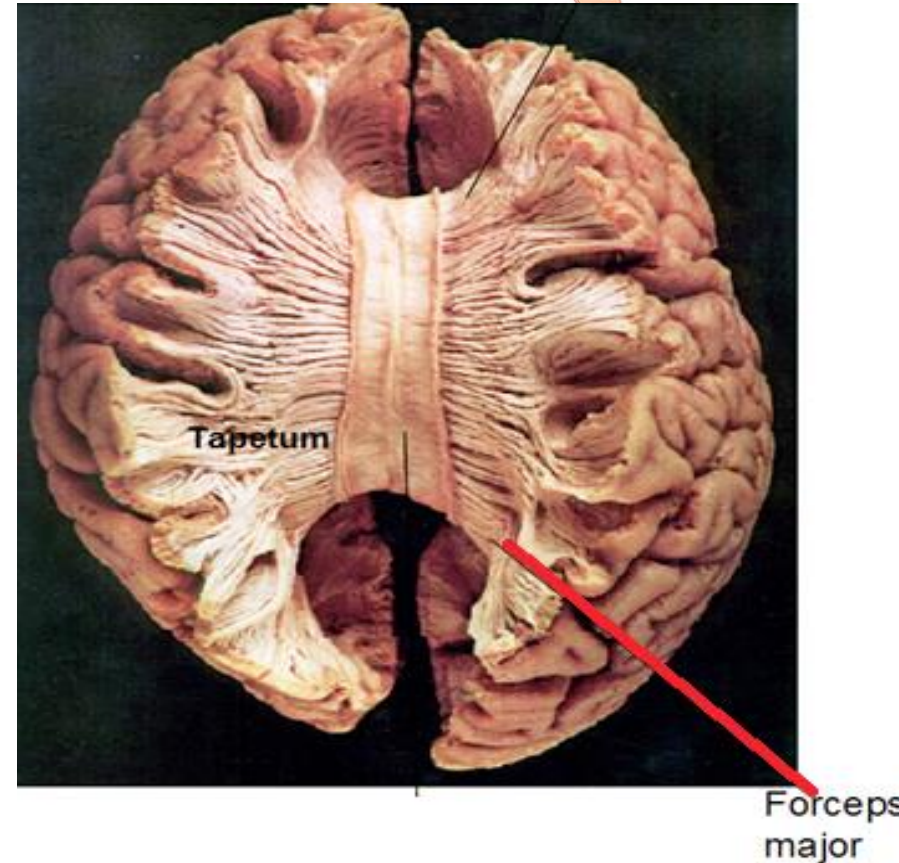
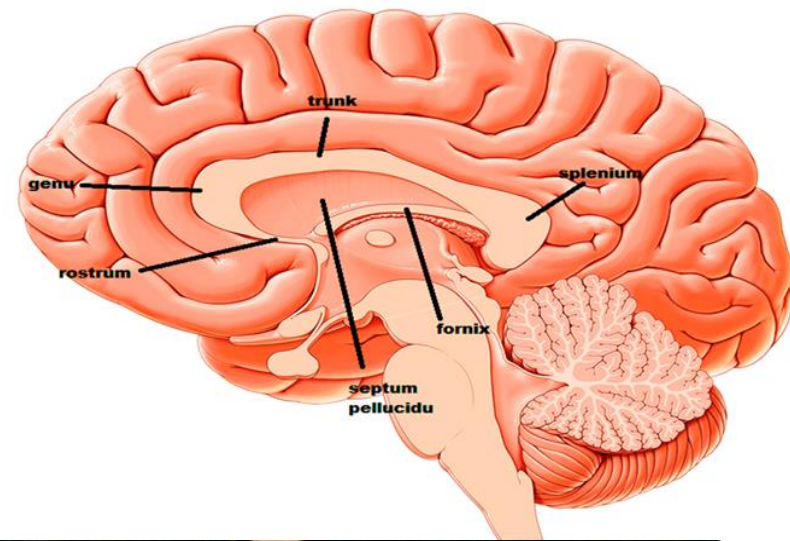
while passing backwards

and medially along the upper part

of medial wall of posterior horn

of lateral ventricle, form a bulge on the

wall called bulb of posterior horn.





# COMMISSURAL FIBERS C.C.

## parts

### 4-splenium

#### **in coronal section**

some fibers of splenium

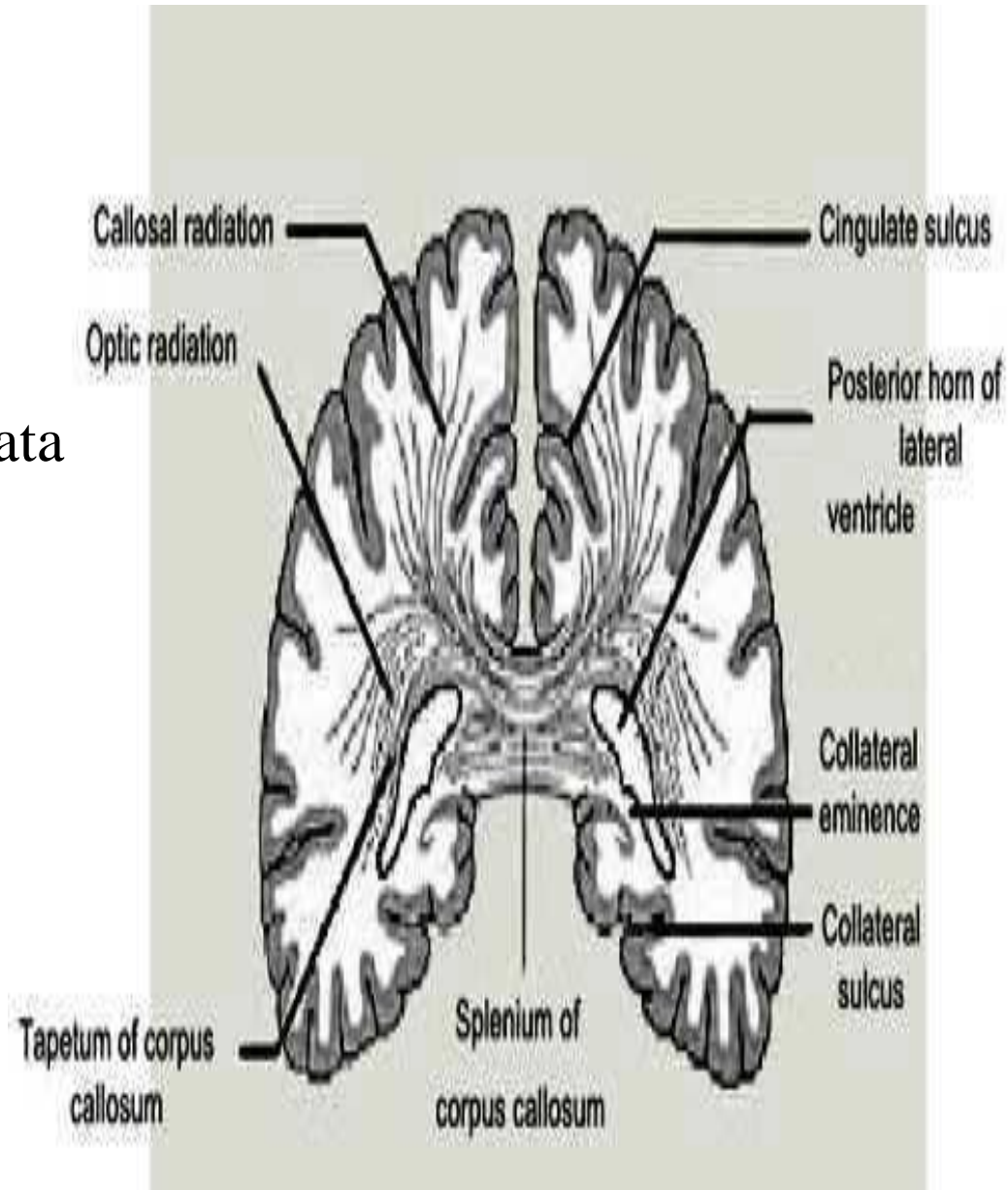
pass laterally then downward

& not intersect with corona radiata

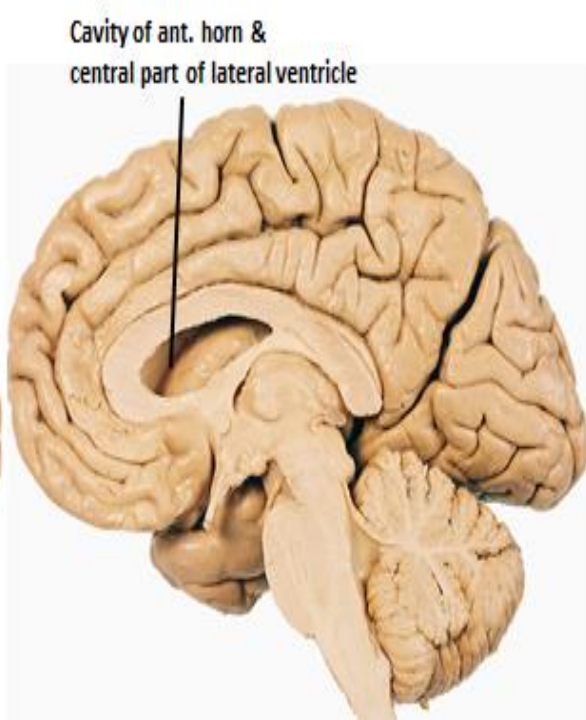
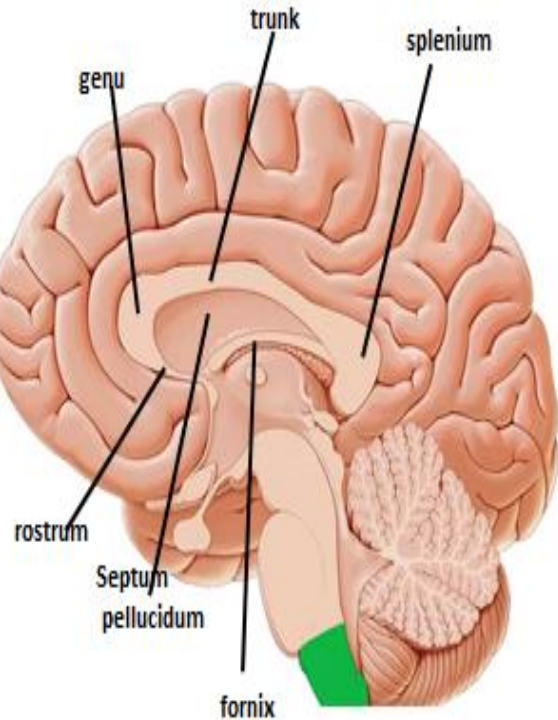
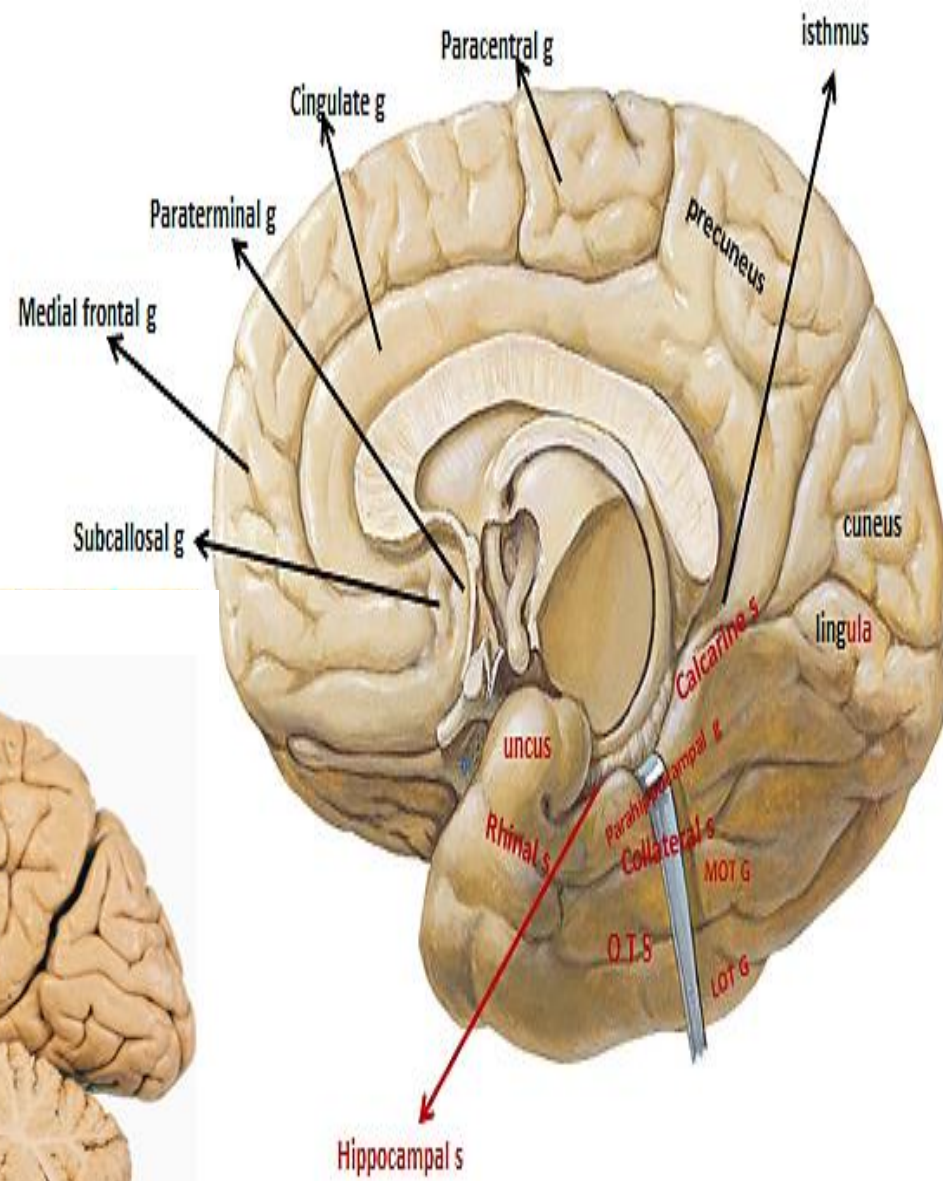
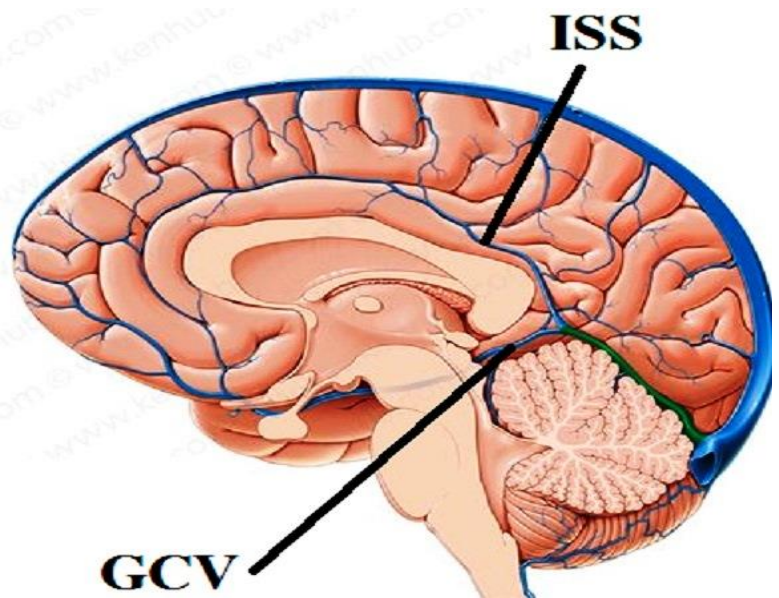
forming tapetum of roof

& lateral wall of post horn

of lateral v.



# COMMISSURAL FIBERS C.C.



# COMMISSURAL FIBERS C.C.

## Relation

### 1-Rostrum

**Inferiorly:** callosal sulcus contains anterior cerebral artery  
paraterminal & subcallosal gyri.

### **Superiorly:**

septum pellucidum.

anterior horn of lateral ventricle.

### 2-genu

**anteriorly:** callosal sulcus contains anterior cerebral artery  
cingulate gyrus.

### **posteriorly:**

septum pellucidum.

anterior horn of lateral ventricle.

# COMMISSURAL FIBERS C.C.

## Relation

### 3-trunk

**superiorly:** callosal sulcus contains anterior cerebral artery  
cingulate gyrus  
falx cerebri contains inferior sagittal sinus.

### **inferiorly:**

septum pellucidum, fornix  
central part of lateral ventricle.

### 4-splenium

**superiorly:** : callosal sulcus  
cingulate gyrus  
falx cerebri contains inferior sagittal sinus.

### **Posteriorly** isthmus

great cerebral vein of Galen which joins with inferior sagittal sinus  
to form straight sinus

### **inferiorly:** pineal body

tectum of midbrain.  
pulvinar of thalamus

THANQ