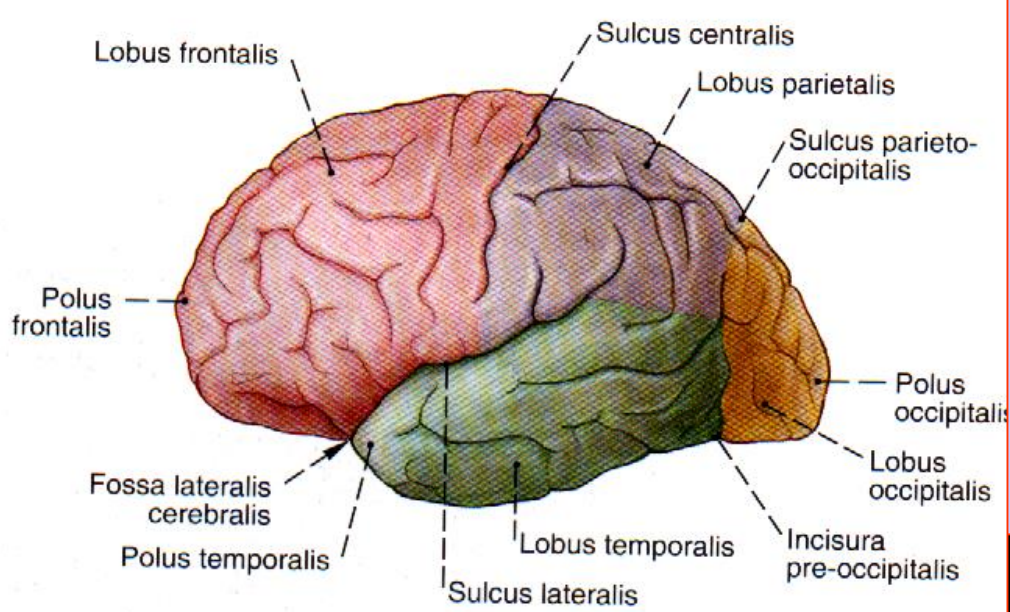


# **TELENCEPHALIC CORTEX - NOMENCLATURE**

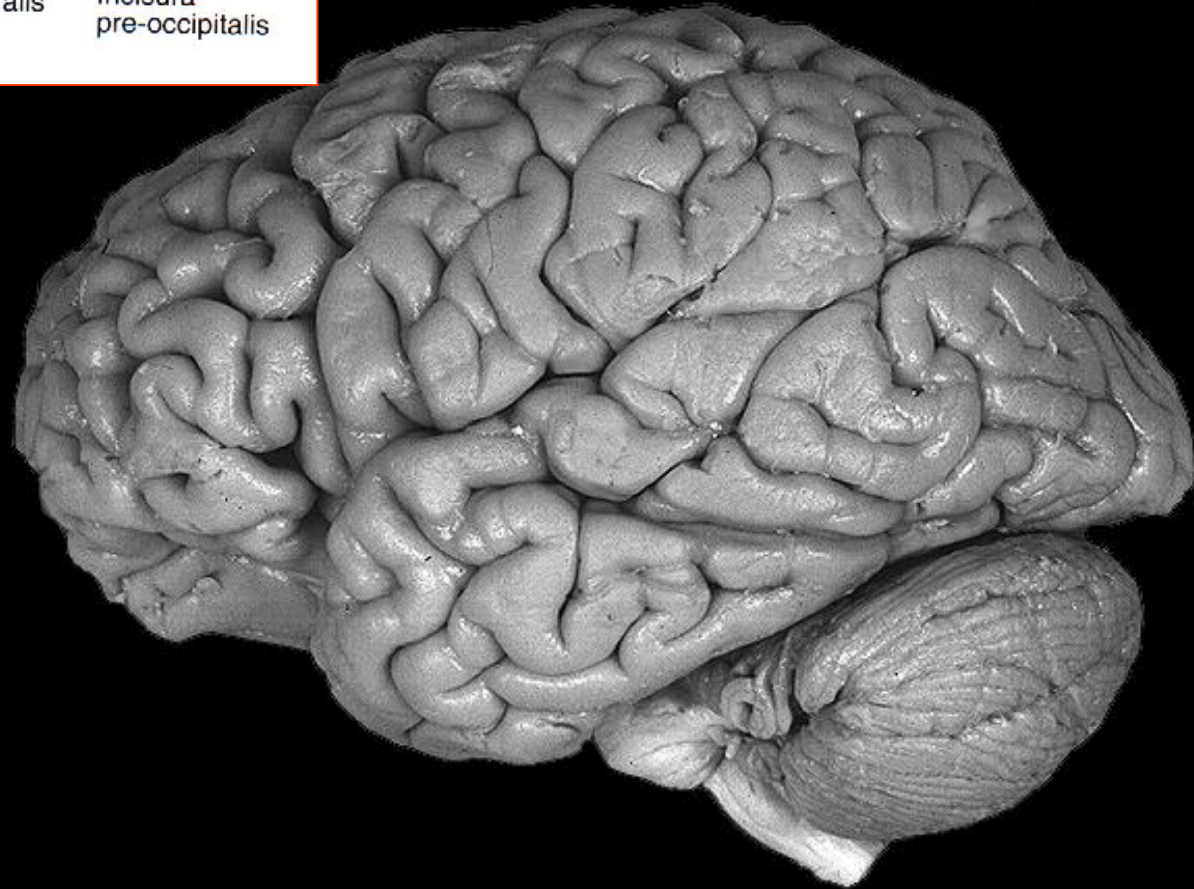
**paleocortex, archicortex (allocortex) – neurons in 3-5 layers**

**neocortex (isocortex) – neurons in 6 layers**

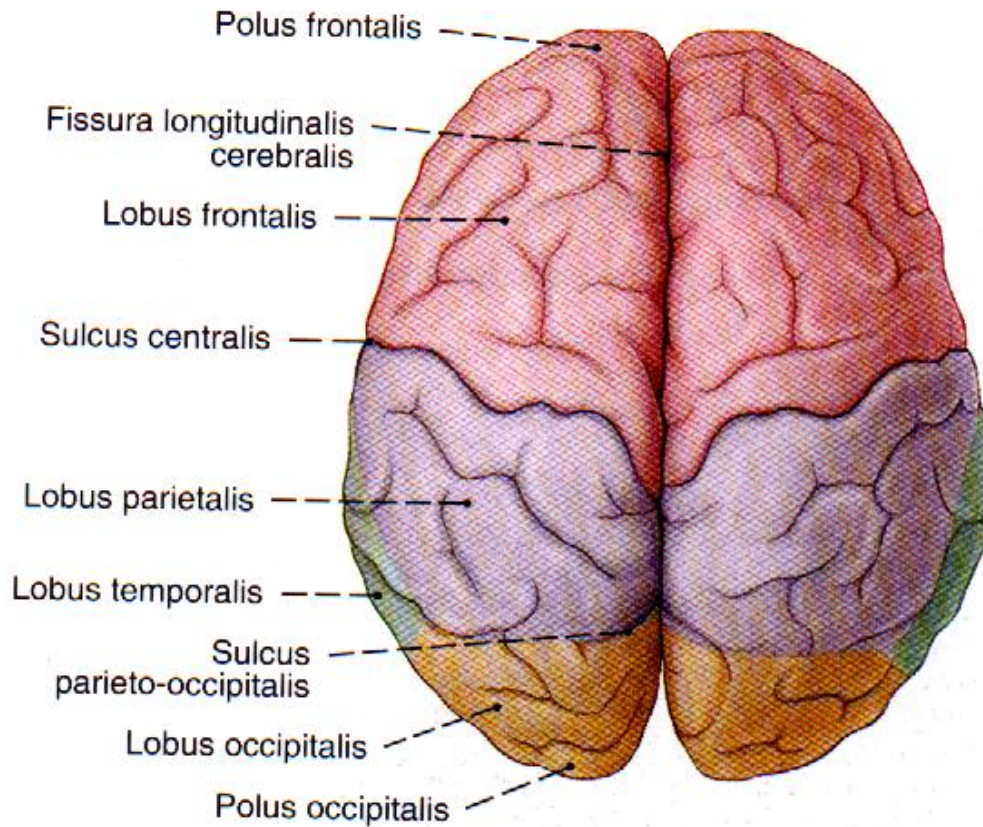
**peripaleocortex et periarchicortex = mesocortex**



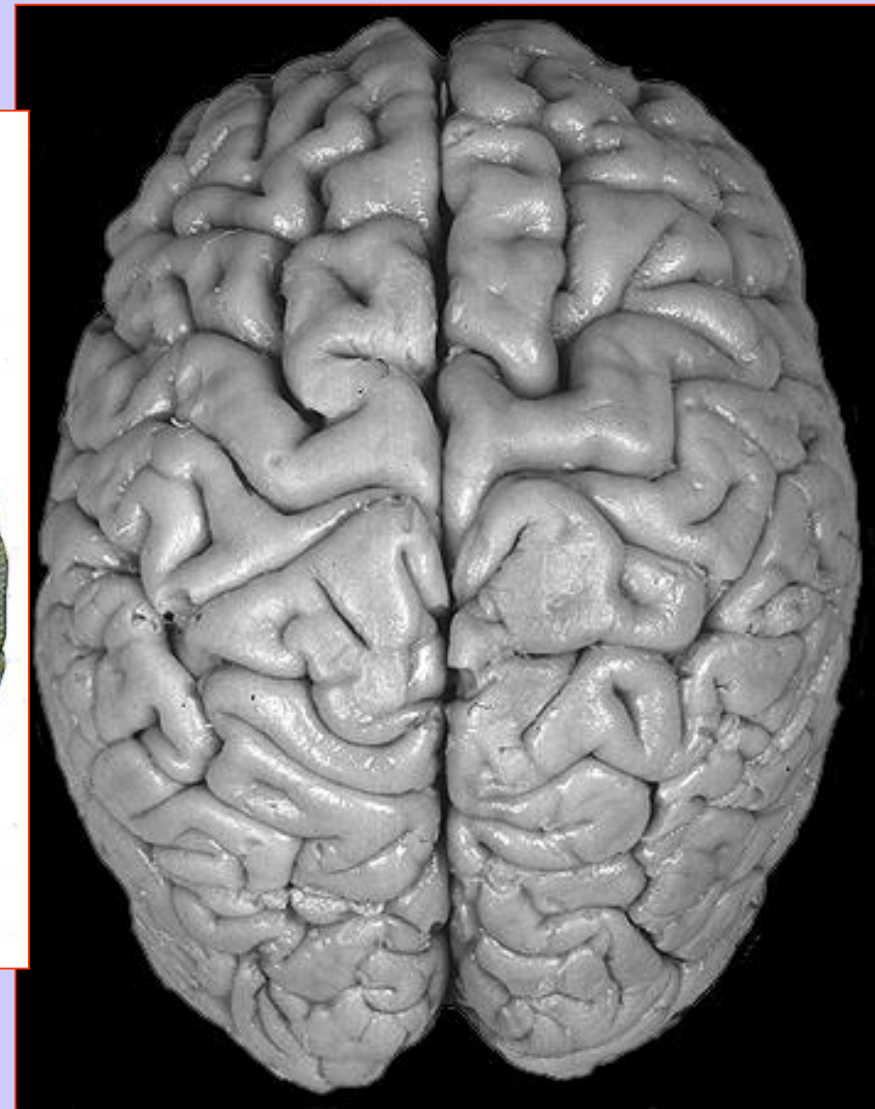
*Sobotta J, Figge FHJ. Atlas of human anatomy  
Urban & Schwarzenberg, 1977*



*John A. Kiernan 2008.  
Barr's The Human Nervous System*

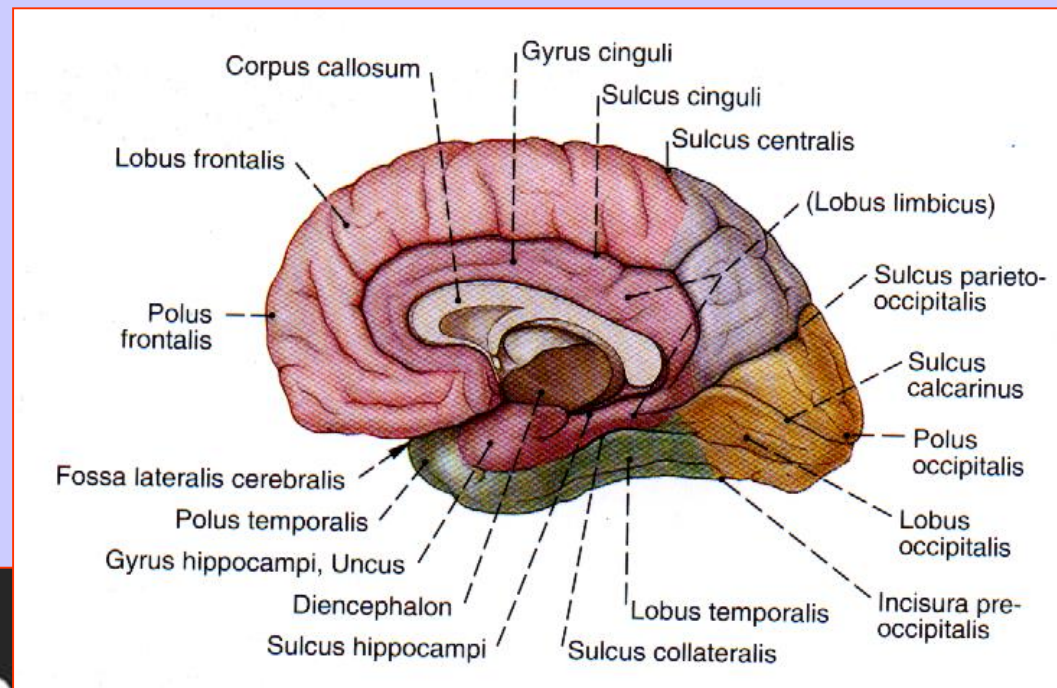


*Sobotta J, Figge FHJ. Atlas of human anatomy  
Urban & Schwarzenberg, 1977*



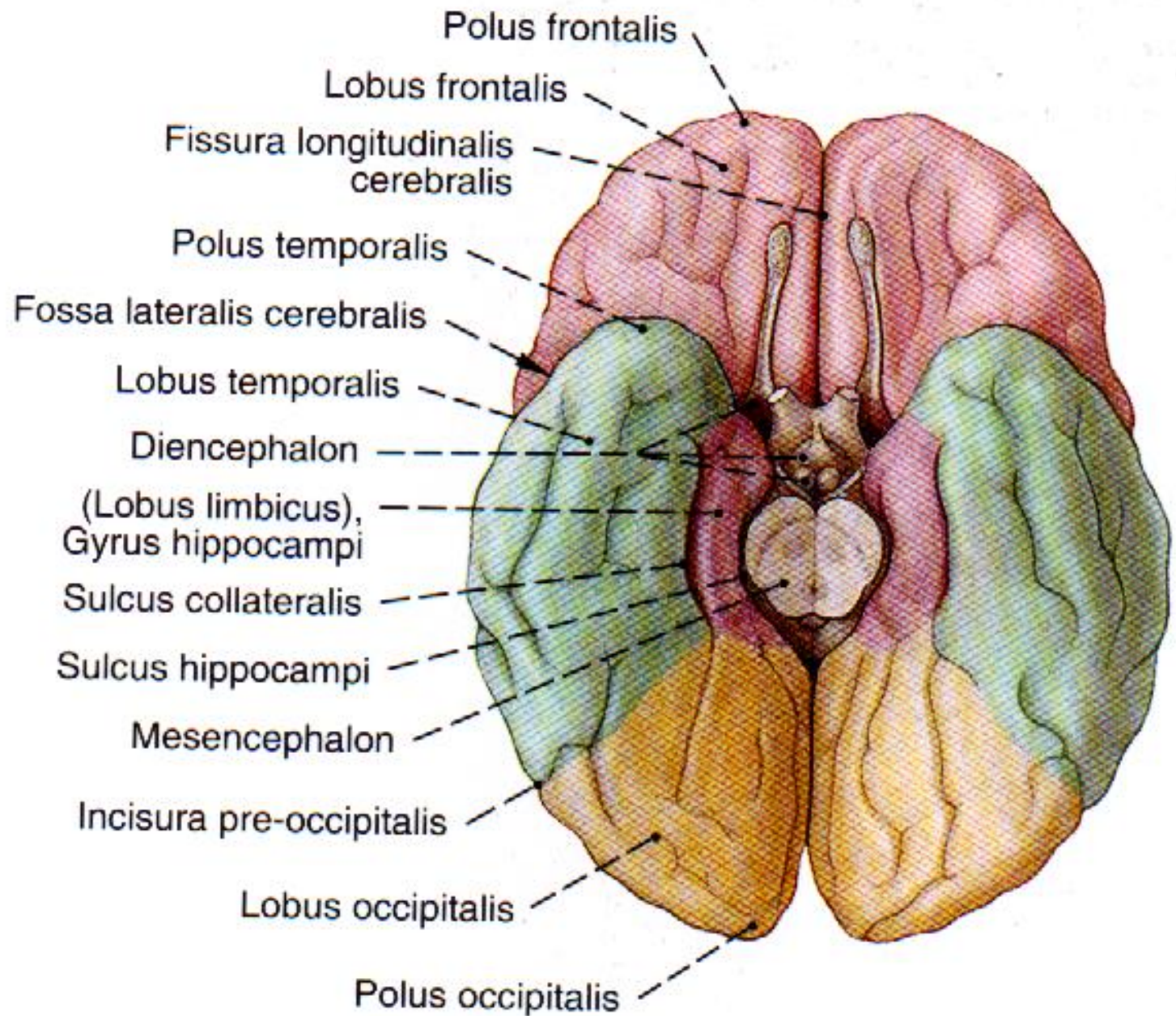
*John A. Kiernan 2008.  
Barr's The Human Nervous System*



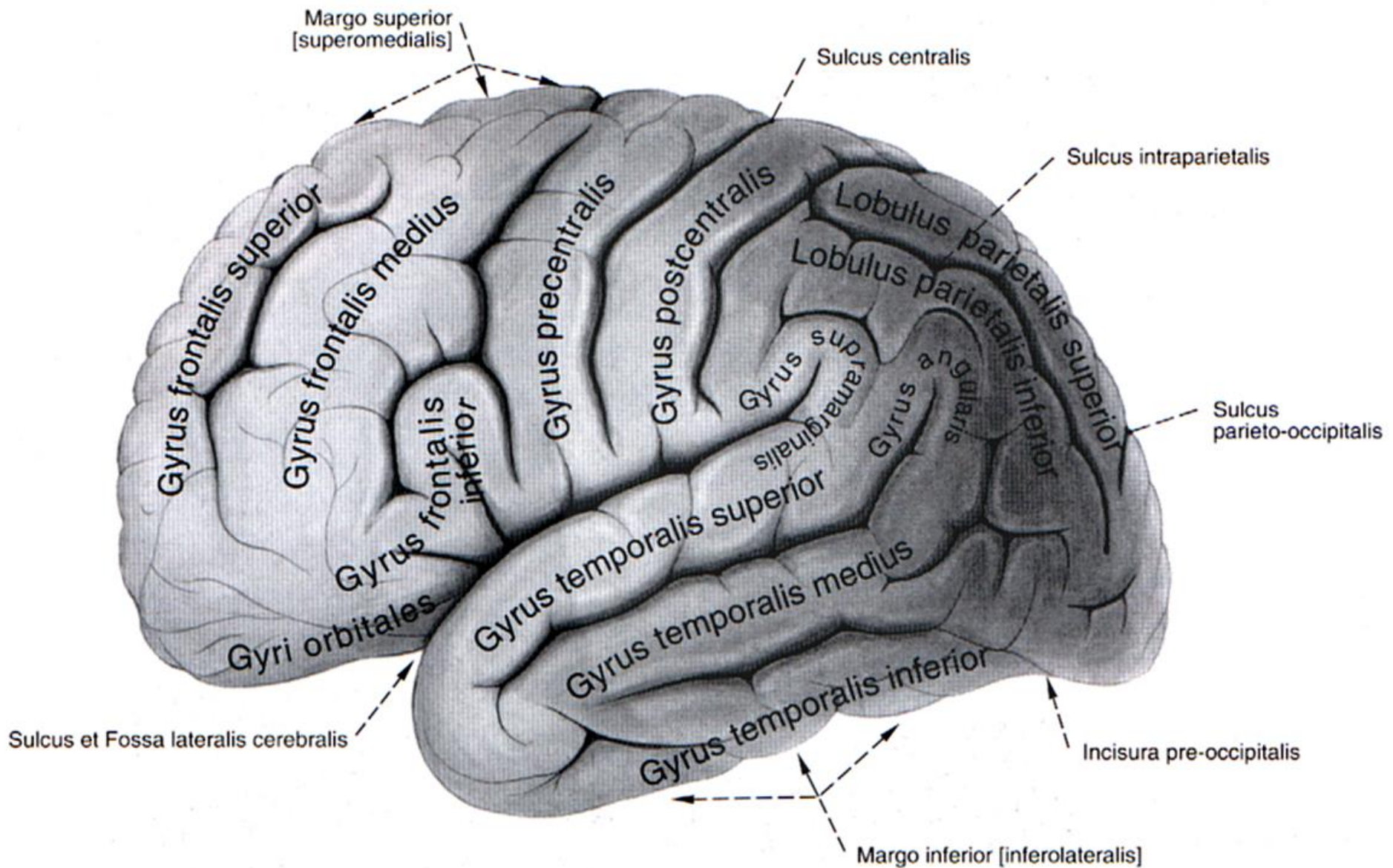


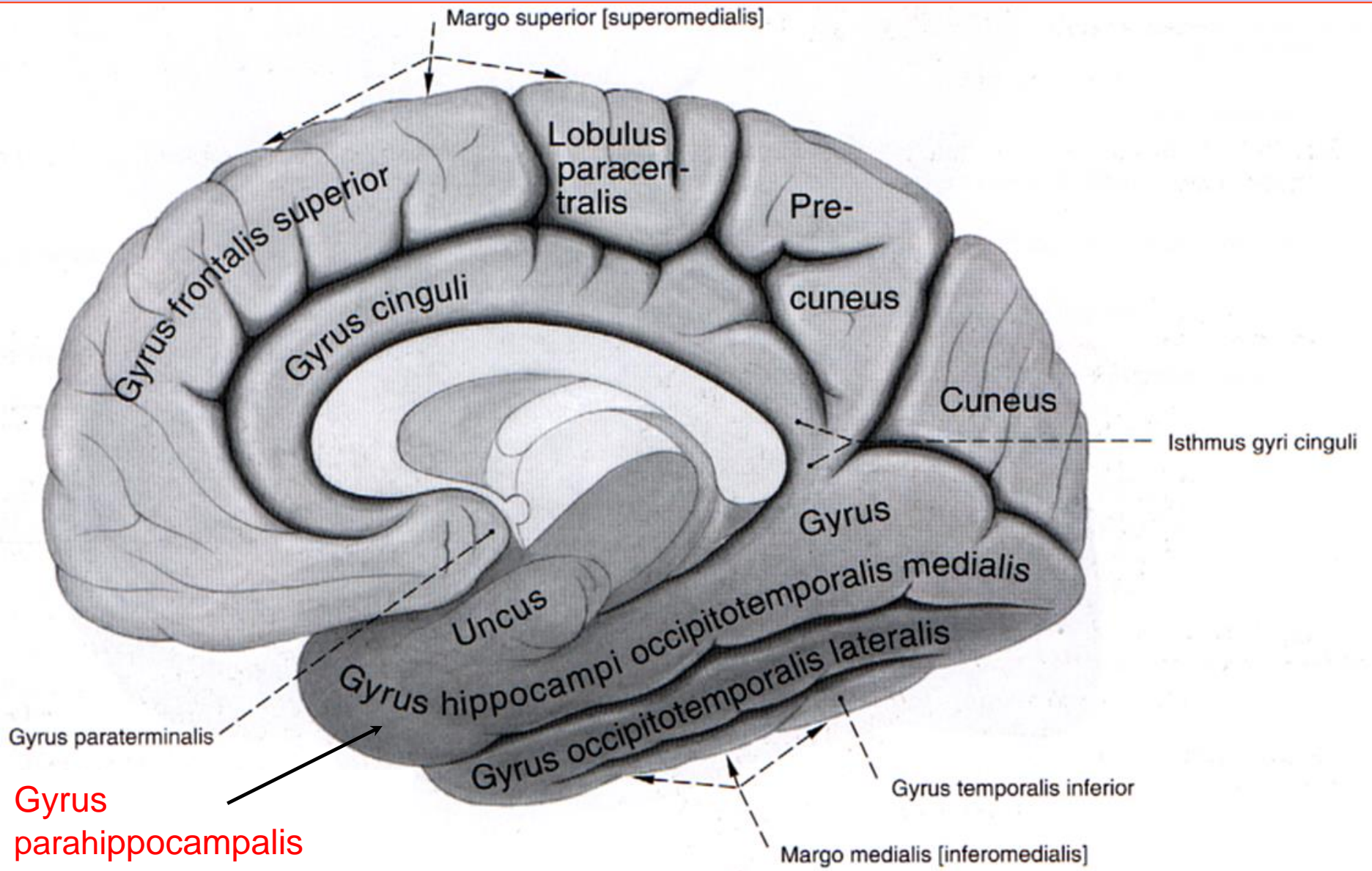
*Sobotta J, Figge FHJ. Atlas of human anatomy Urban & Schwarzenberg, 1977*

*John A. Kiernan 2008.  
Barr's The Human Nervous System*

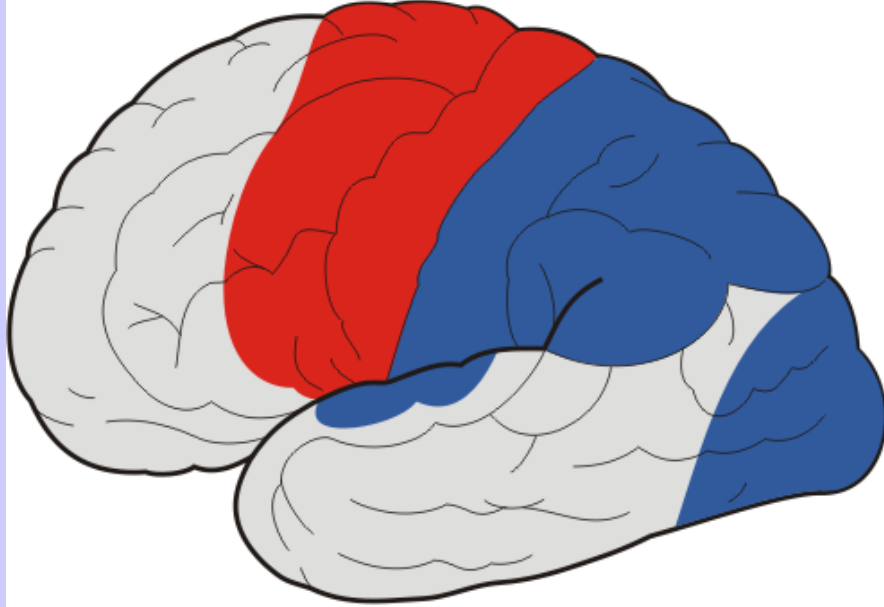









## LOCATION OF MAIN FUNCTIONAL REGIONS OF TELEENCEPHALIC CORTEX

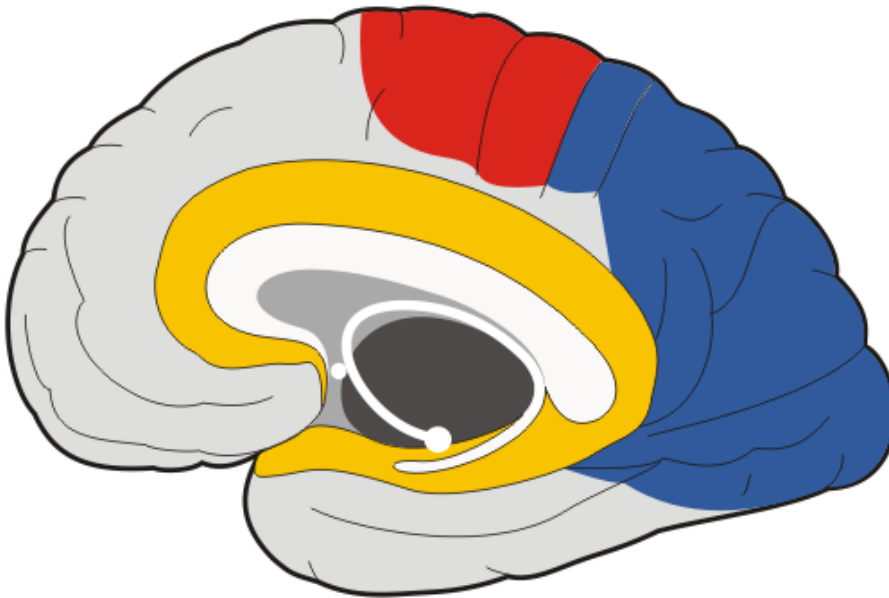


 somatosensory and sensory

 motor

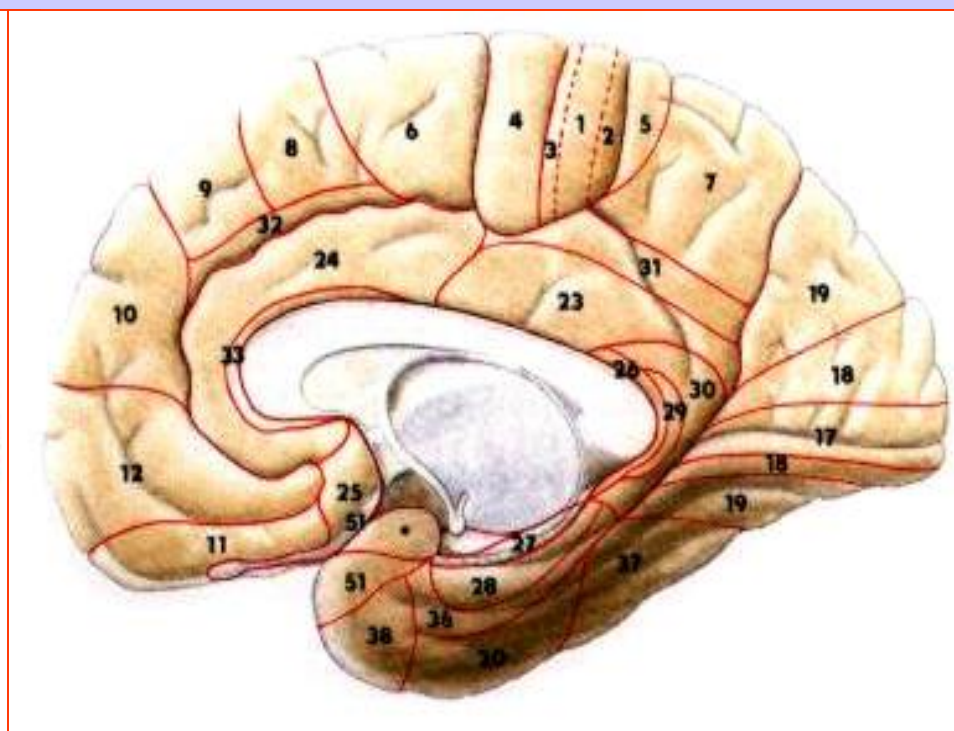
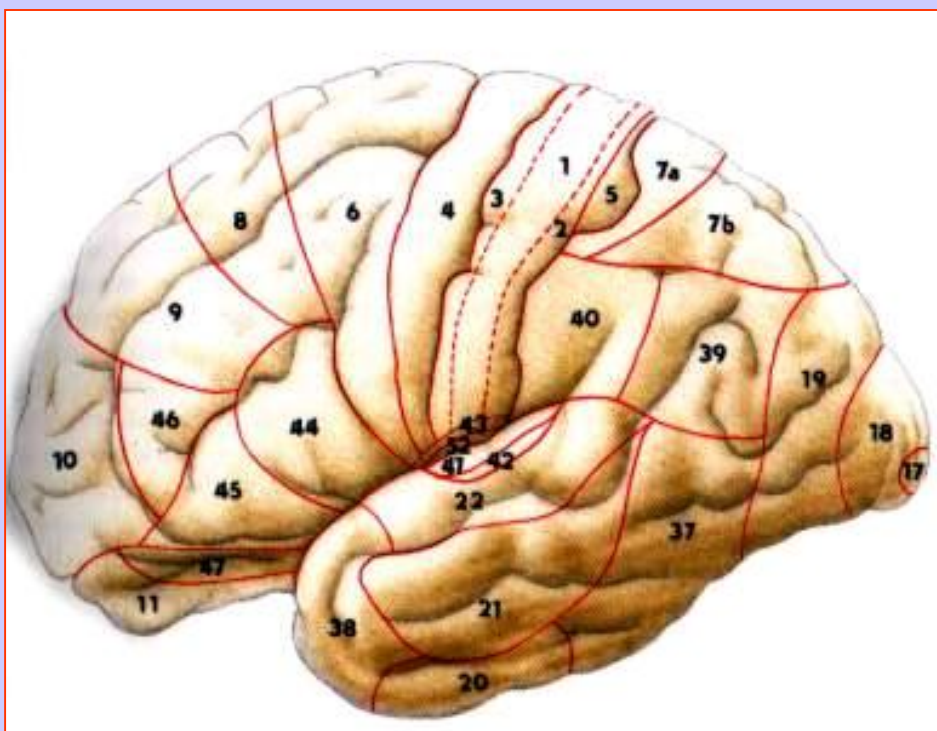
 cortex of limbic forebrain

 association cortex





Brodmann's area	cortical location	functional involvement
a 3, 2, 1	postcentral gyrus	analysis of the somatosensory information
a 4, 6	precentral gyrus	primary motor cortex
a 41, 42	gyri temporales transversi	analysis of the hearing
a 17	cortex parallel with the calcarine sulcus	primary visual cortex
a 18, 19	cortex parallel with a 17	secondary visual cortex
a43	caudal part of the postcentral gyrus	analysis of the taste



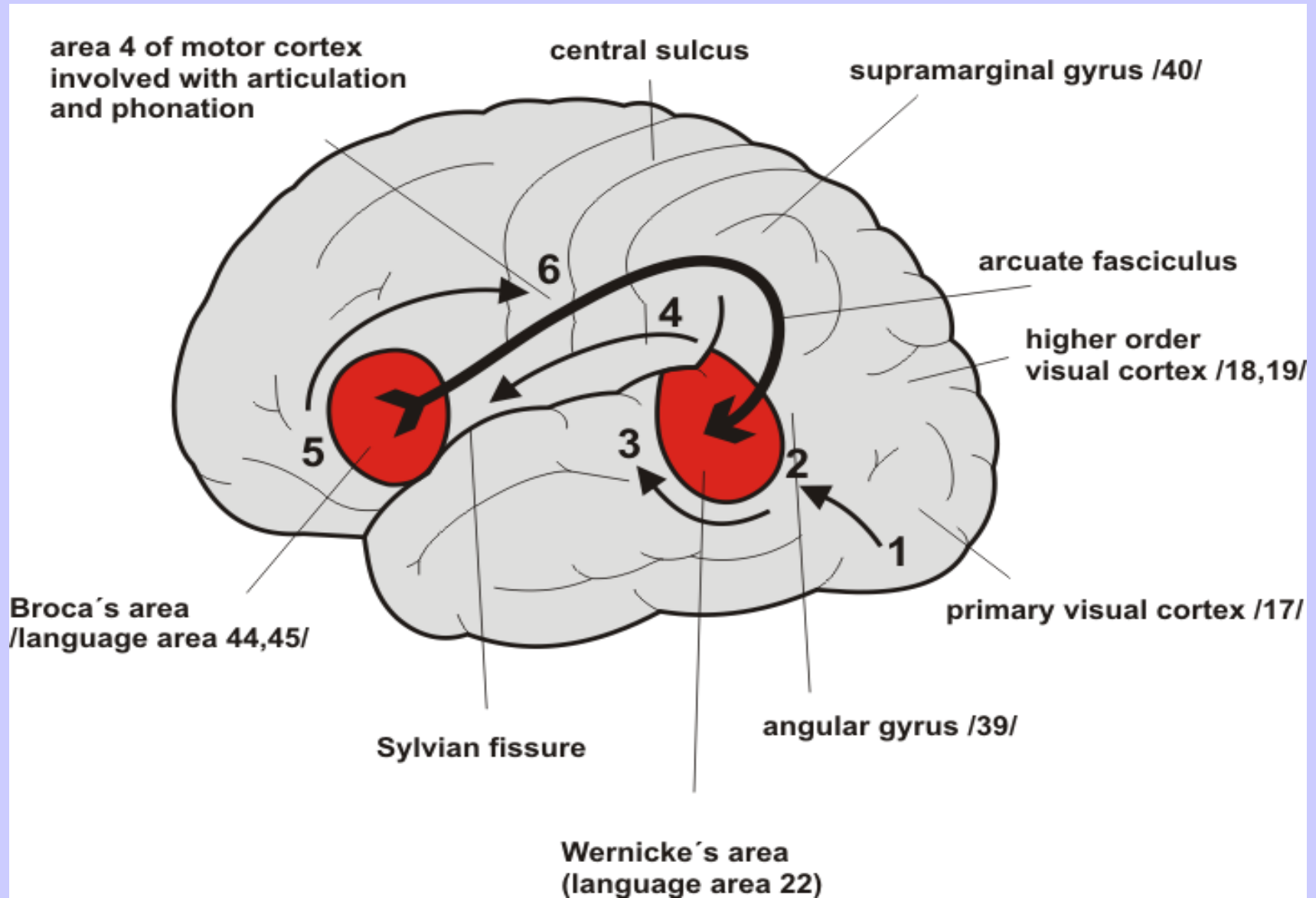
# CORTICAL AREAS FOR SPEECH - I

Broca's (motor) cortical area - g. front. inf. a44, 45

for right-hander in L-hemisphere, for left-hander in R-hemisphere

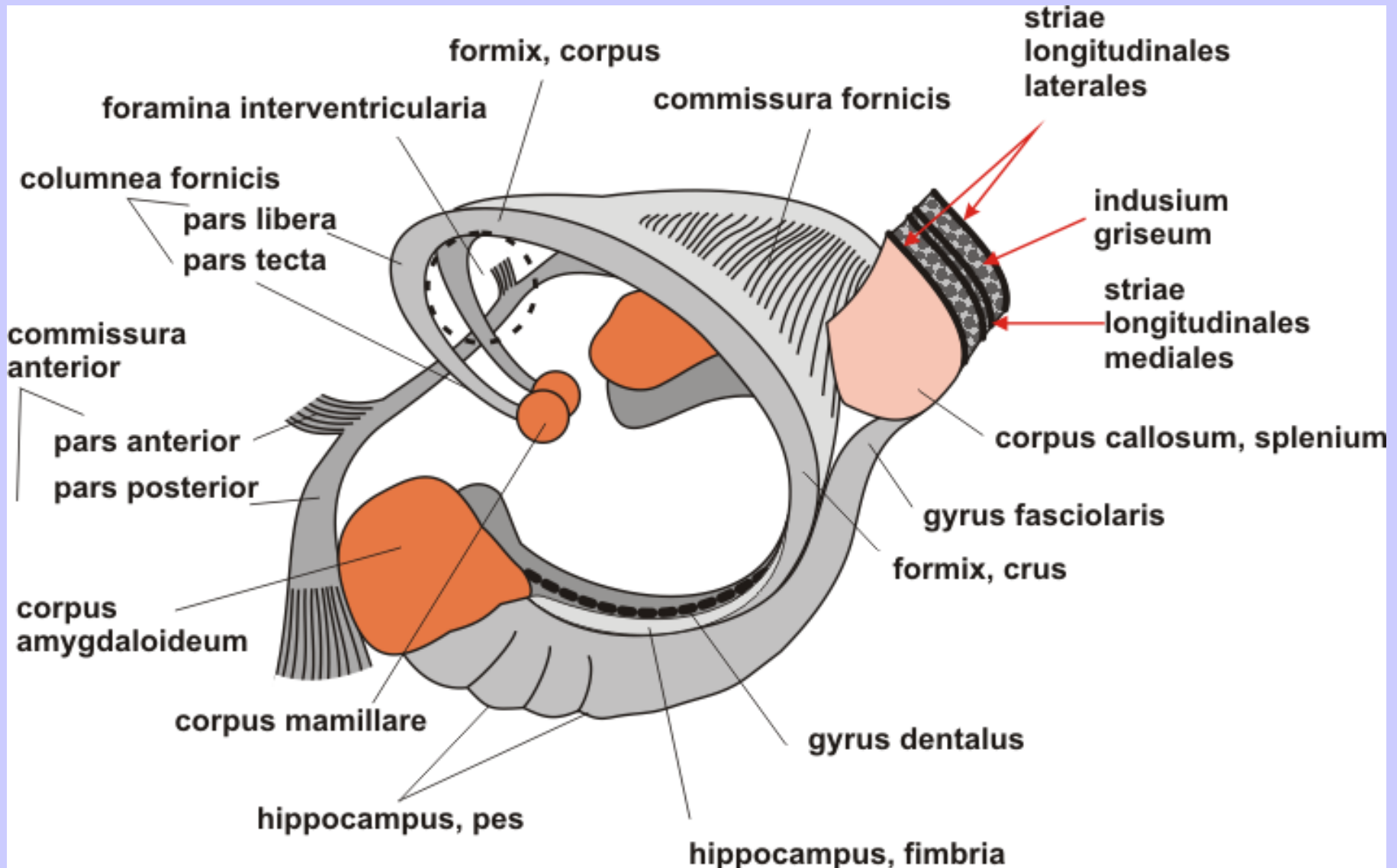
Wernicke's (sensory) cortical area - a 22,39,40 in dominant hemisphere

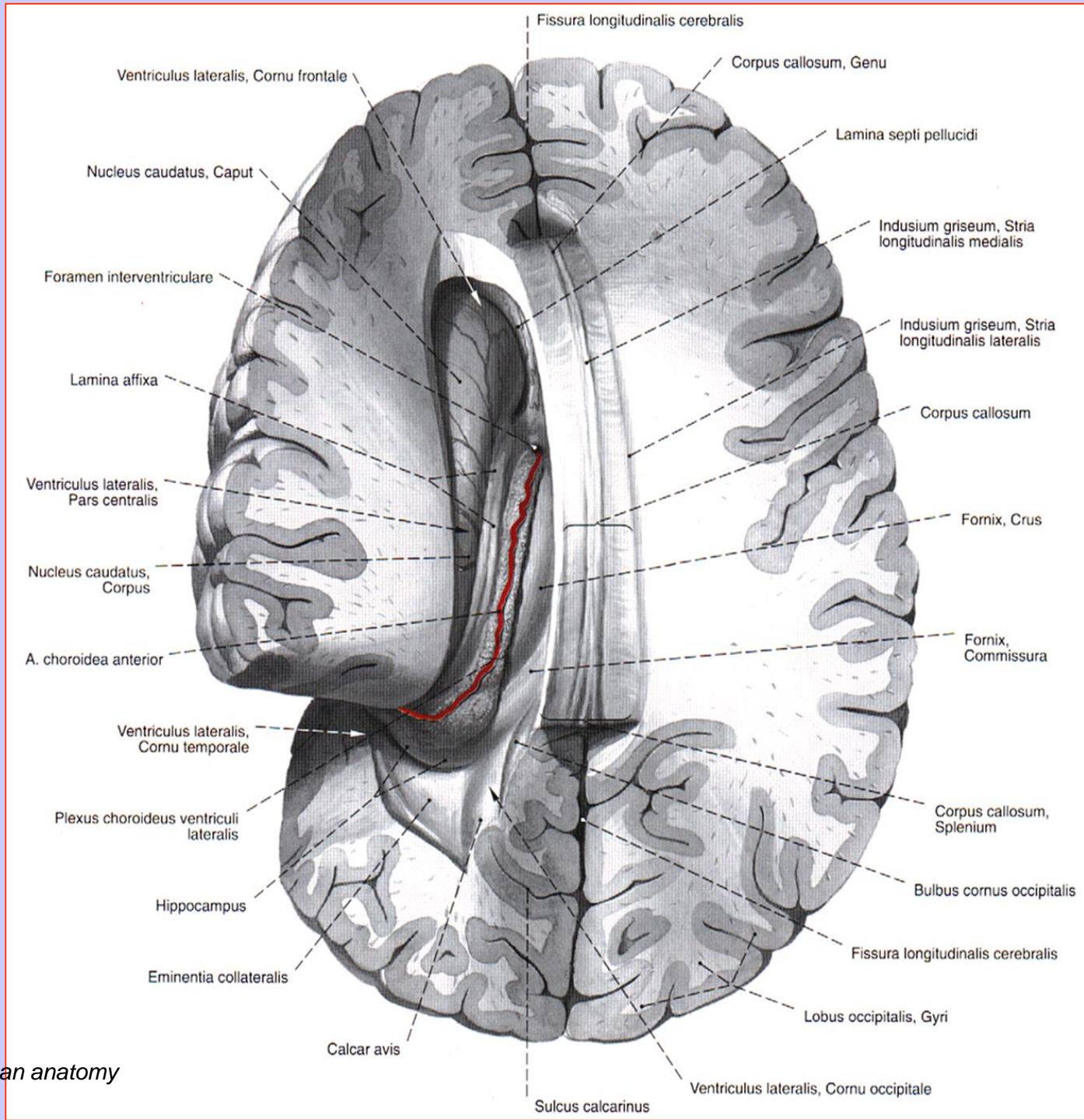
# CORTICAL AREAS FOR SPEECH - II



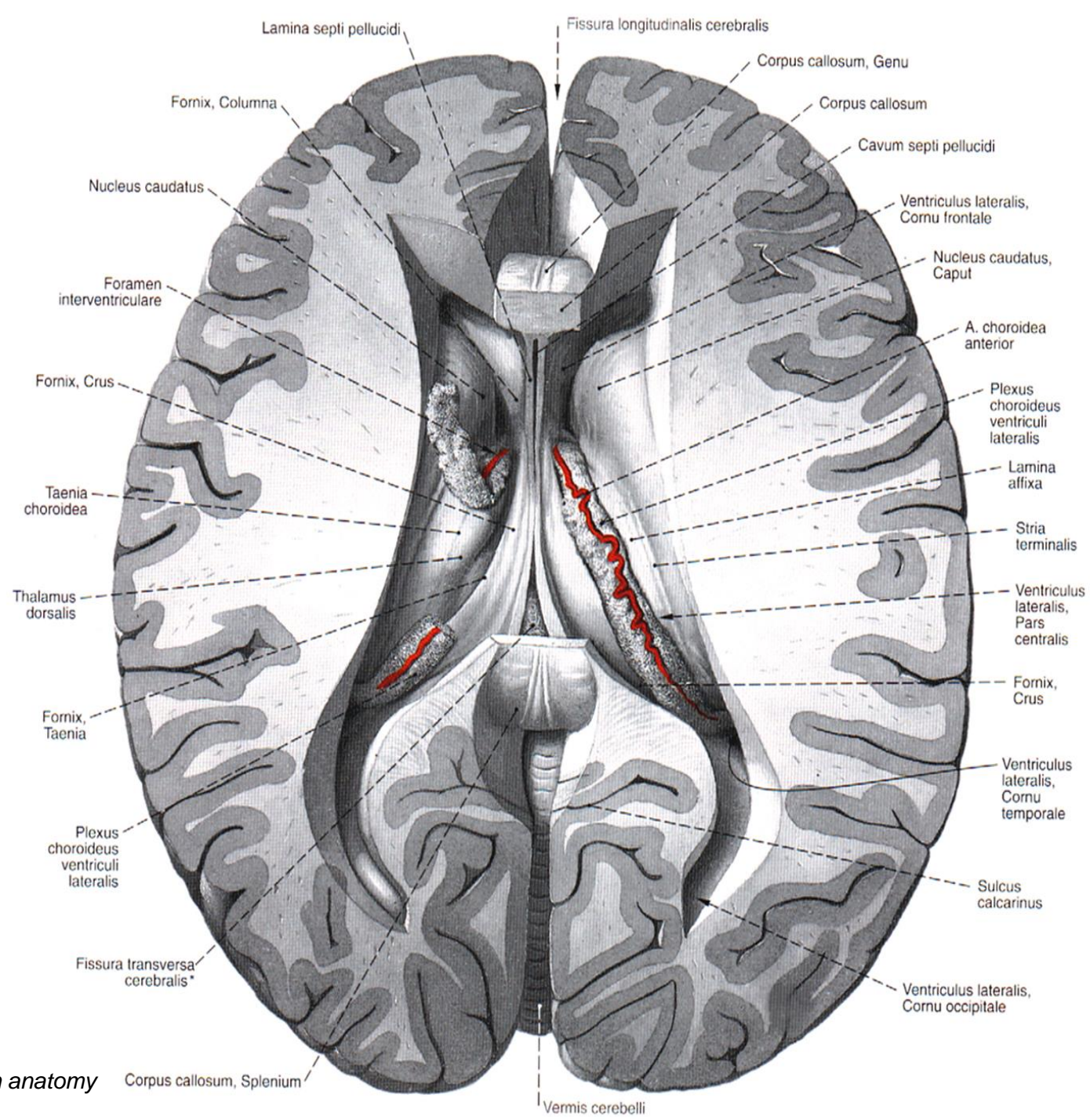


# A SCHEMATIC DRAWING OF 3D ARRANGEMENT OF SOME TELENCEFALIC STRUCTURES

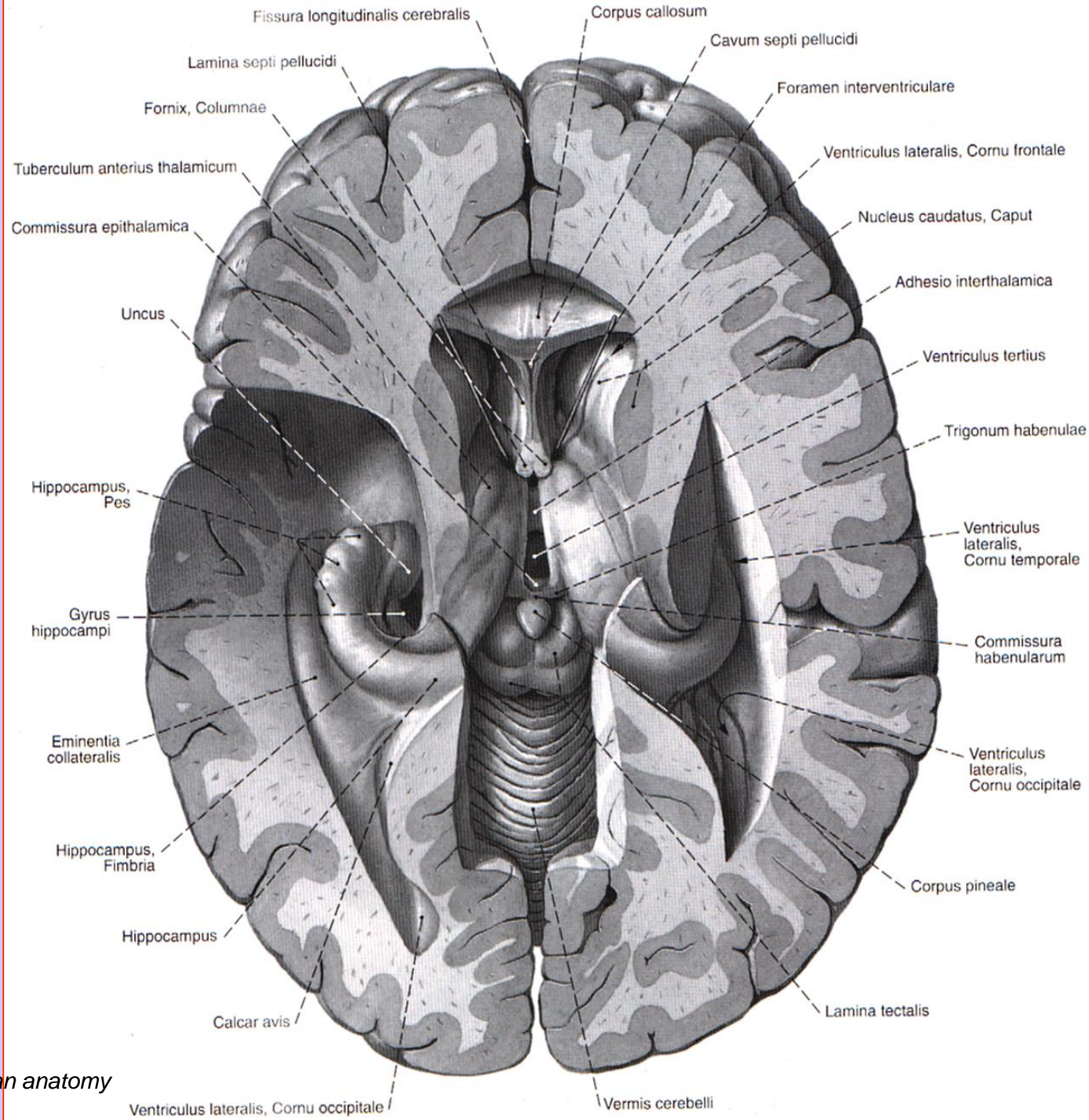




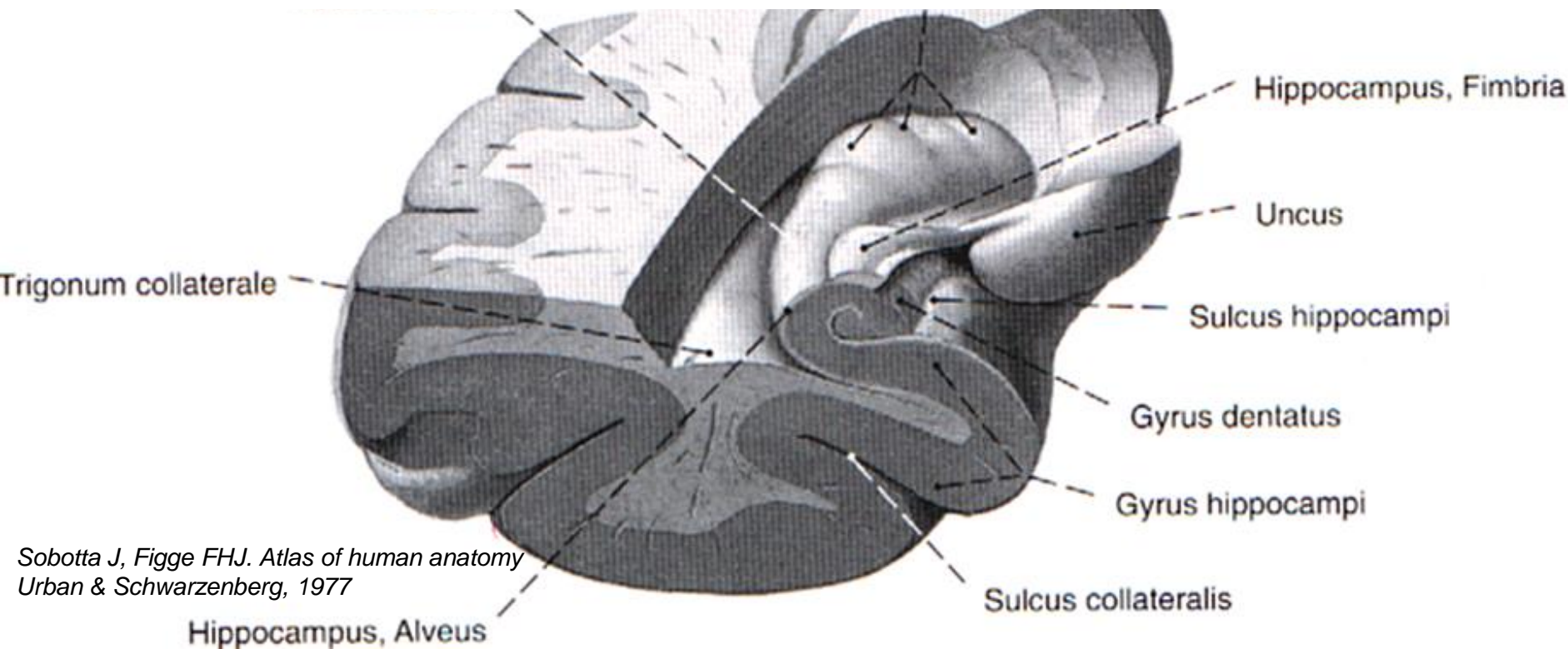
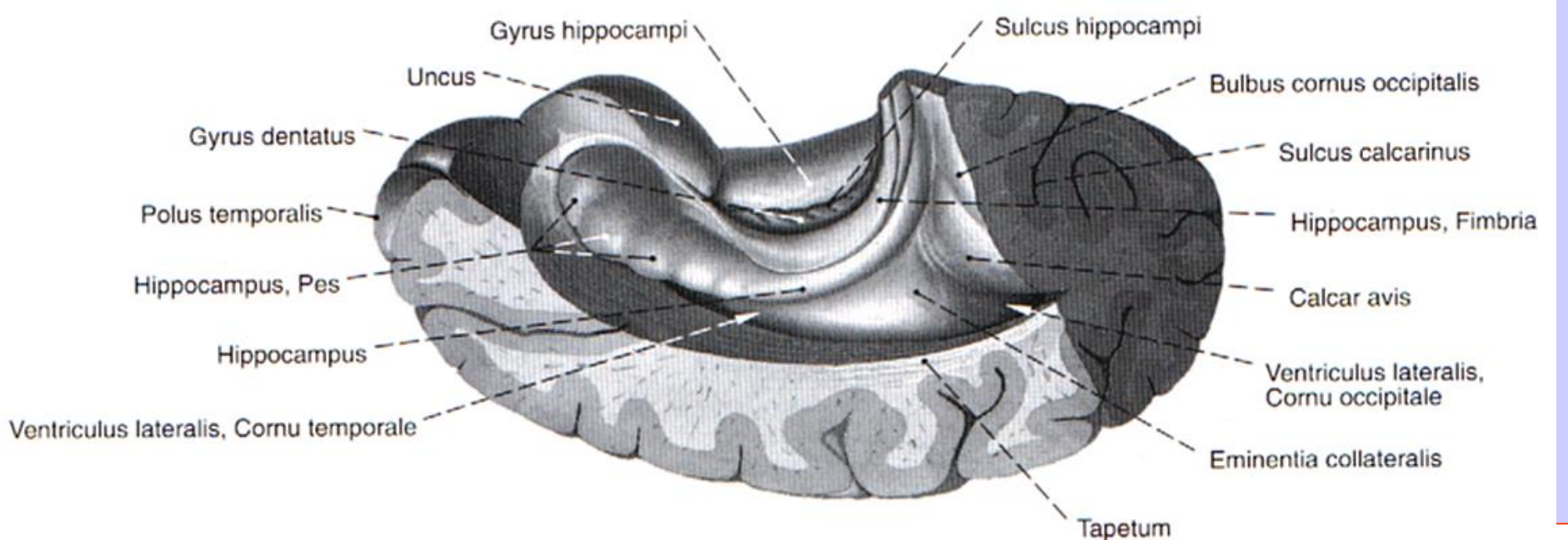






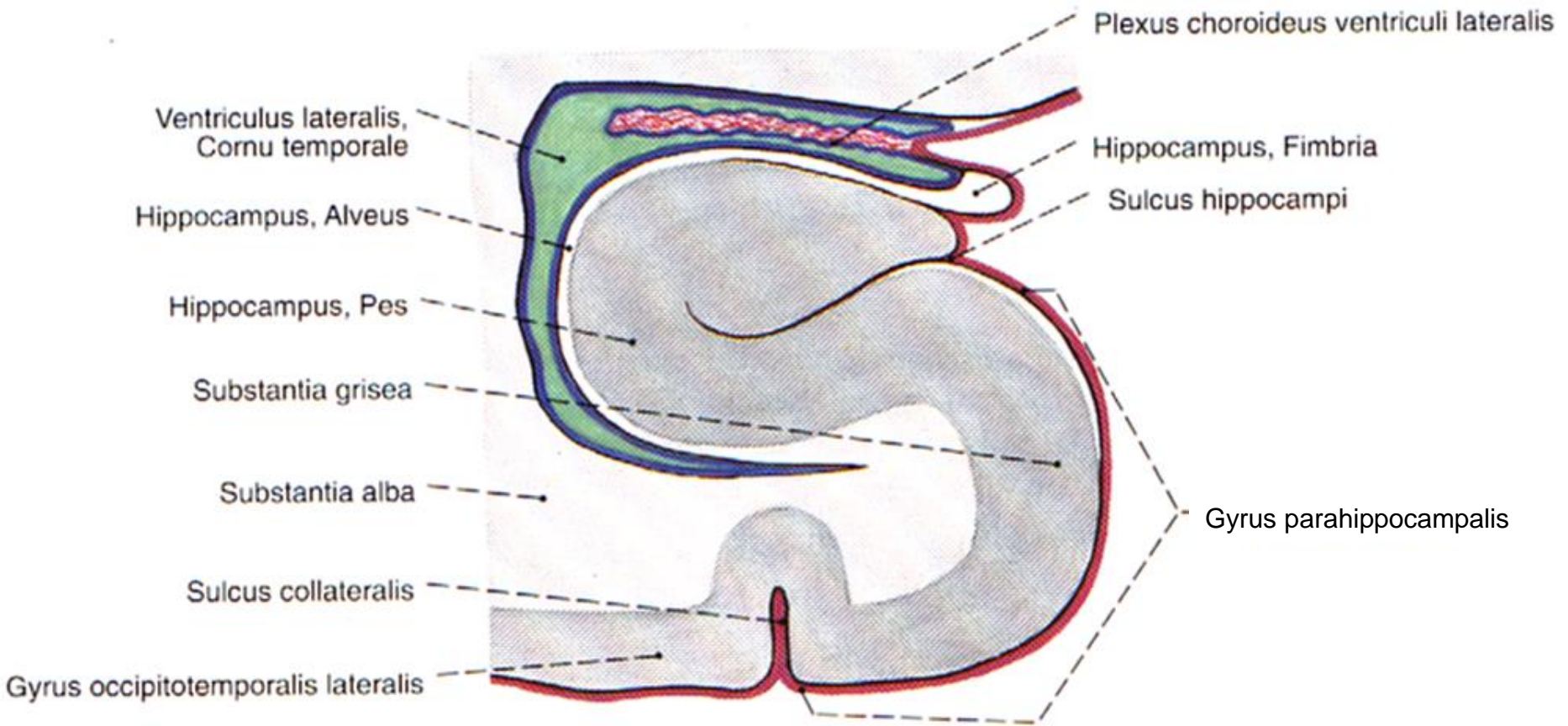


Sobotta J, Figge FHJ. Atlas of human anatomy  
 Urban & Schwarzenberg, 1977

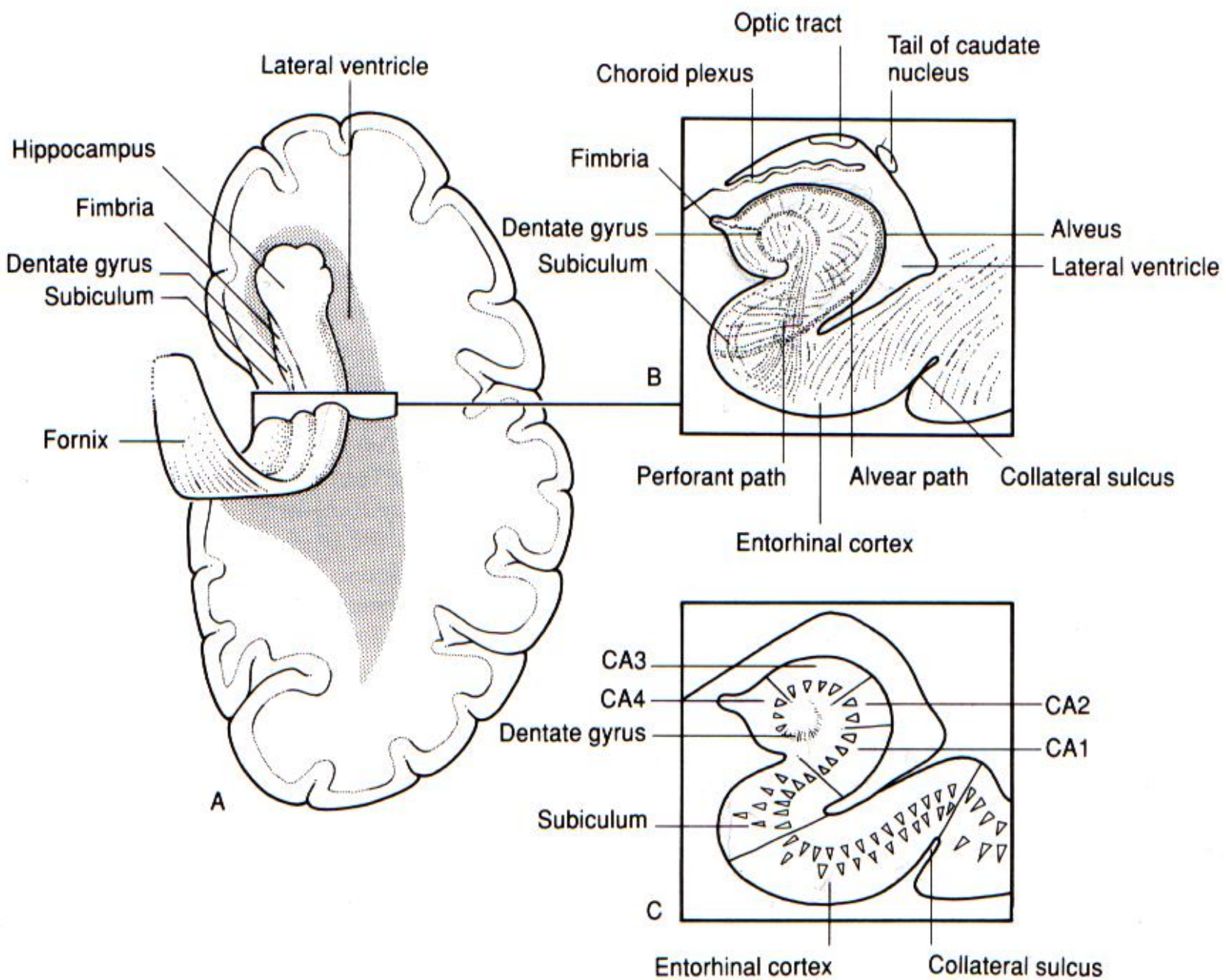


Sobotta J, Figge FHJ. Atlas of human anatomy  
Urban & Schwarzenberg, 1977





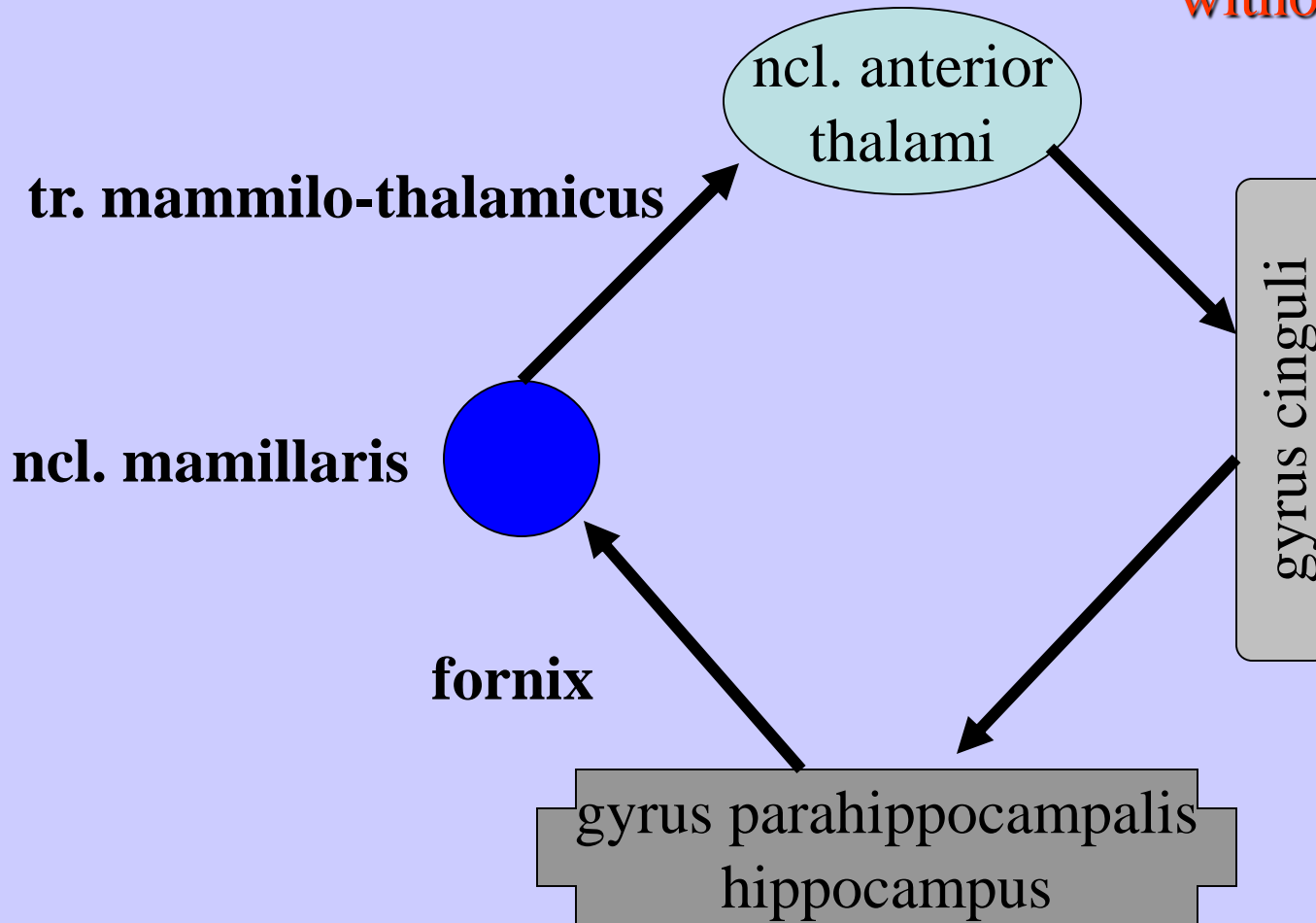




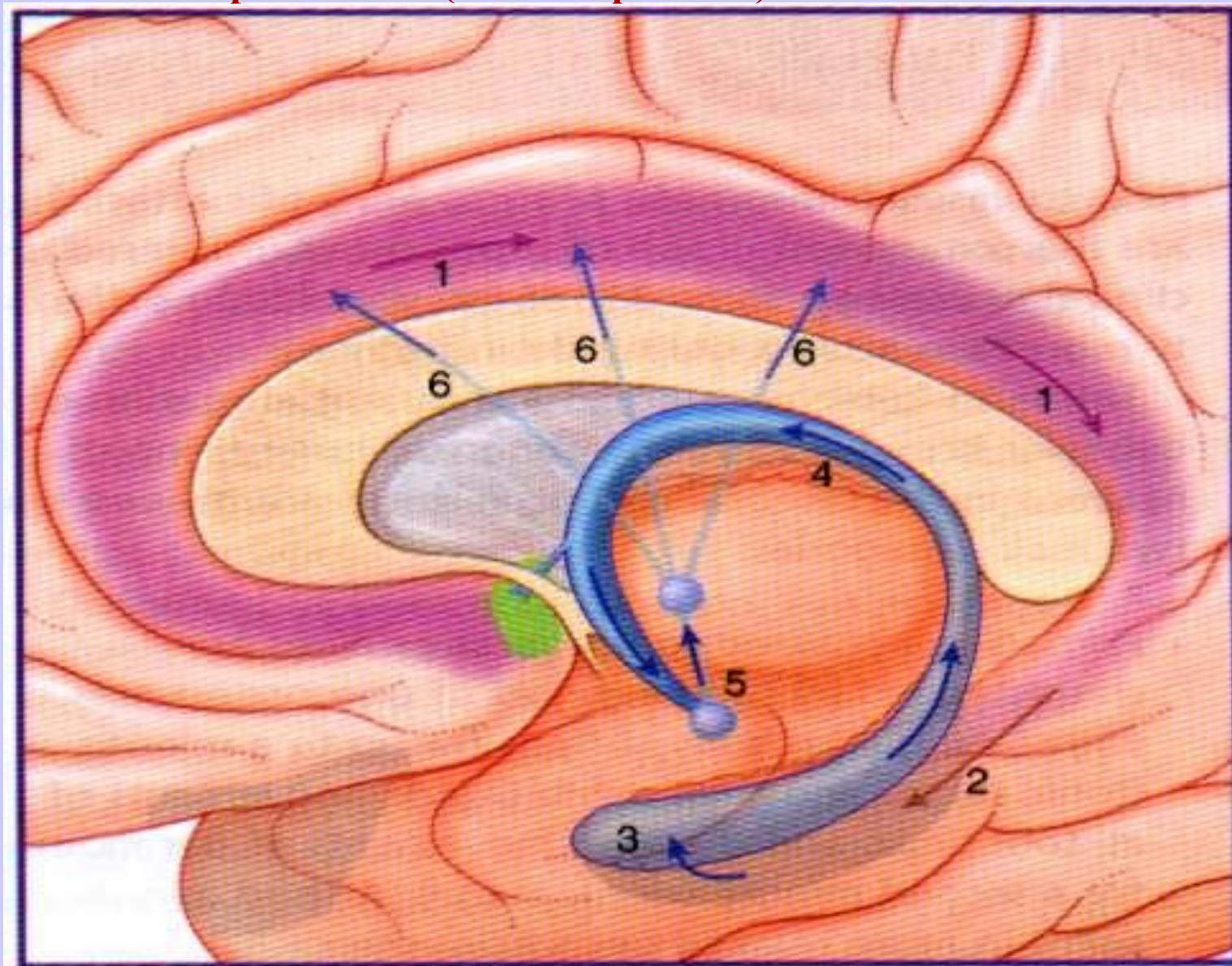
# Limbic system – classic conception

## Papez's circuit (James Papez 1939)

without specific function



**Limbic system – classic conception  
Papez's circuit (James Papez 1939)**





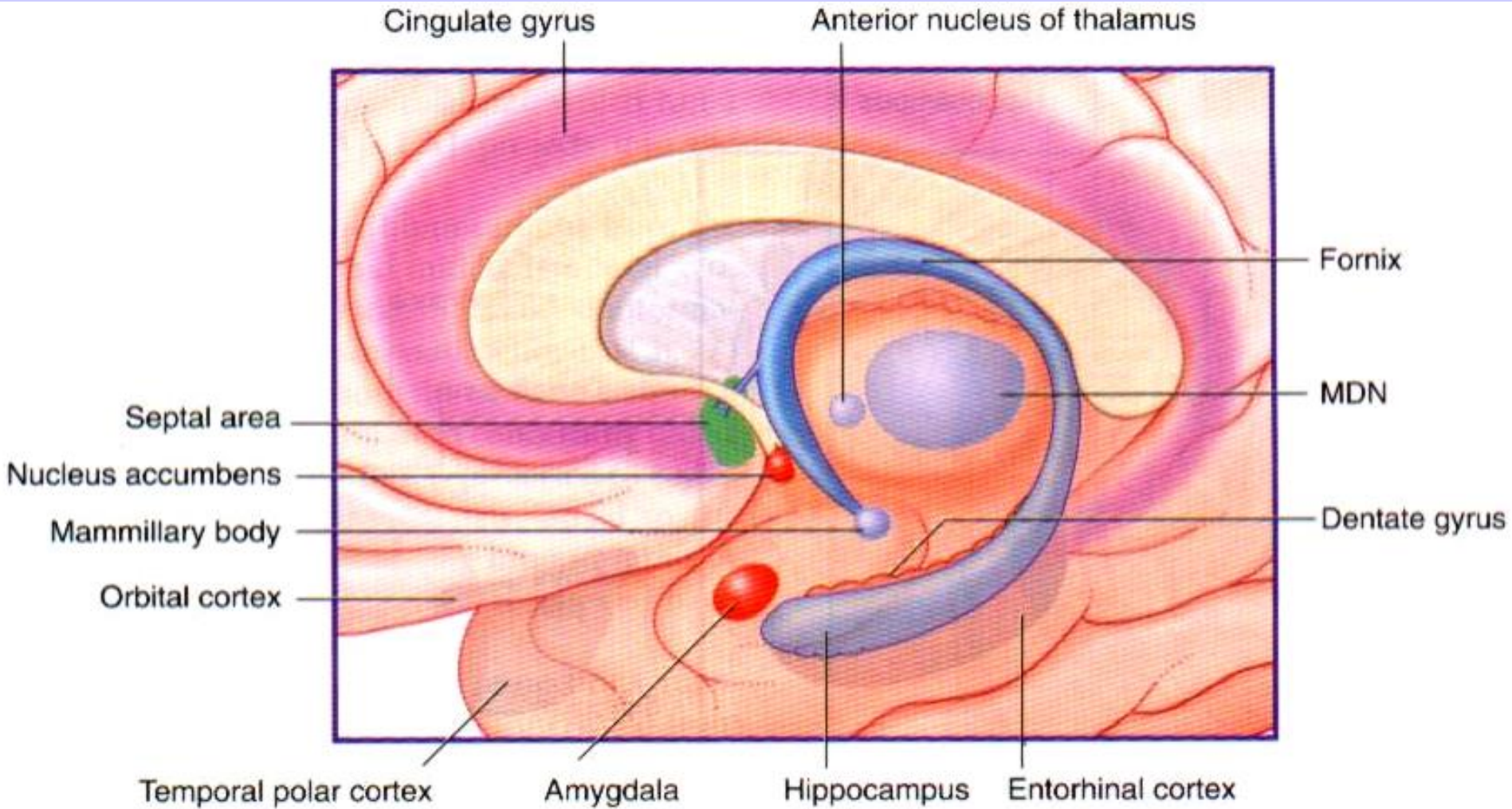
# RECENT CONCEPTION OF LIMBIC FOREBRAIN

- **basomedial telencephalon, structures of diencephalon and mesencephalon for emotion and motivation of our behavior**

## Regular structures

- **g. cinguli, g. parahippocampalis, hippocampus,**
- **neocortical regions of forebrain - basal frontotemporal regions, orbital cortex, ventral striatum (pallidum)**
- ***area septalis*, amygdalar ncl., hypothalamus (ncl. mammillaris)**
- **ncl. anterior et *medialis dorsalis* thalami**
- ***insular cortex* and ncl. Meynerti**

# STRUCTURES OF LIMBIC FOREBRAIN



notion of tooth pain

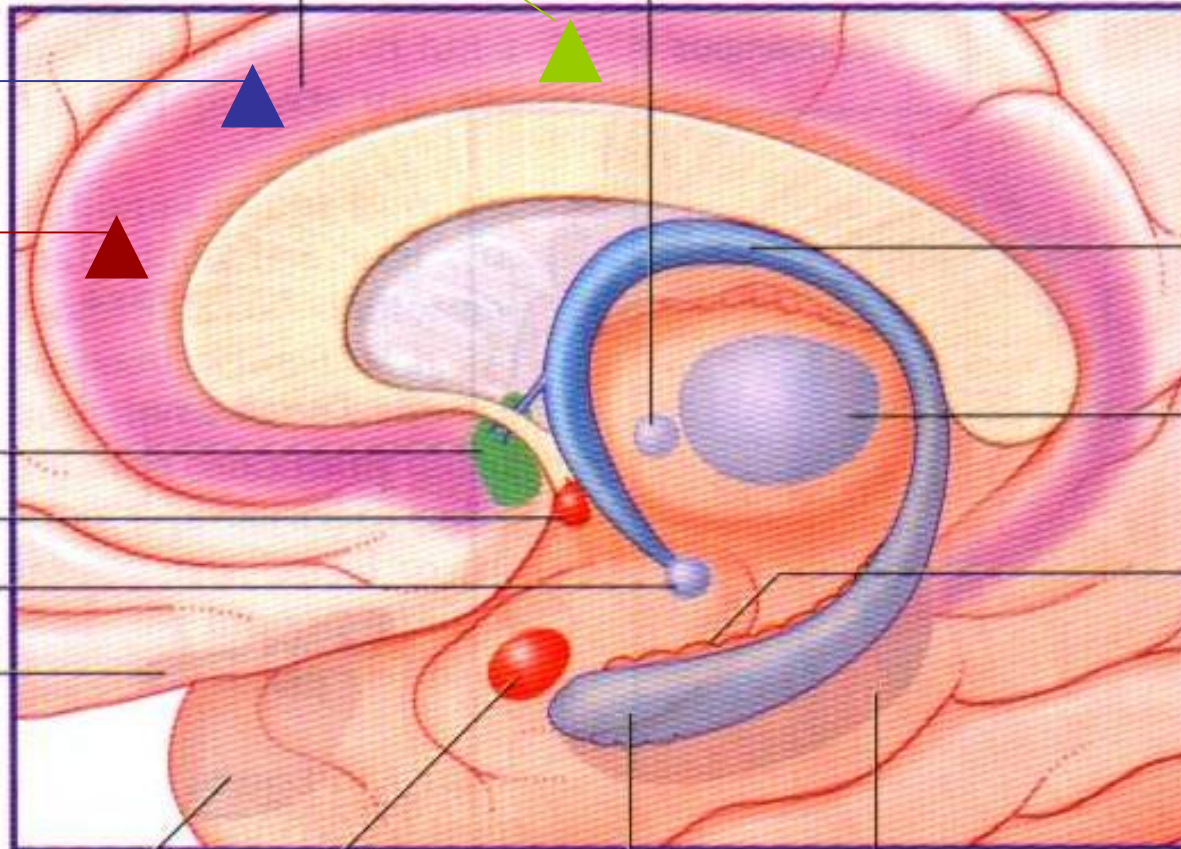
# Cingular cortex

notion of fear

memory of listening to music

Cingulate gyrus

Anterior nucleus of thalamus



Fornix

MDN

Dentate gyrus

Septal area

Nucleus accumbens

Mammillary body

Orbital cortex

Temporal polar cortex

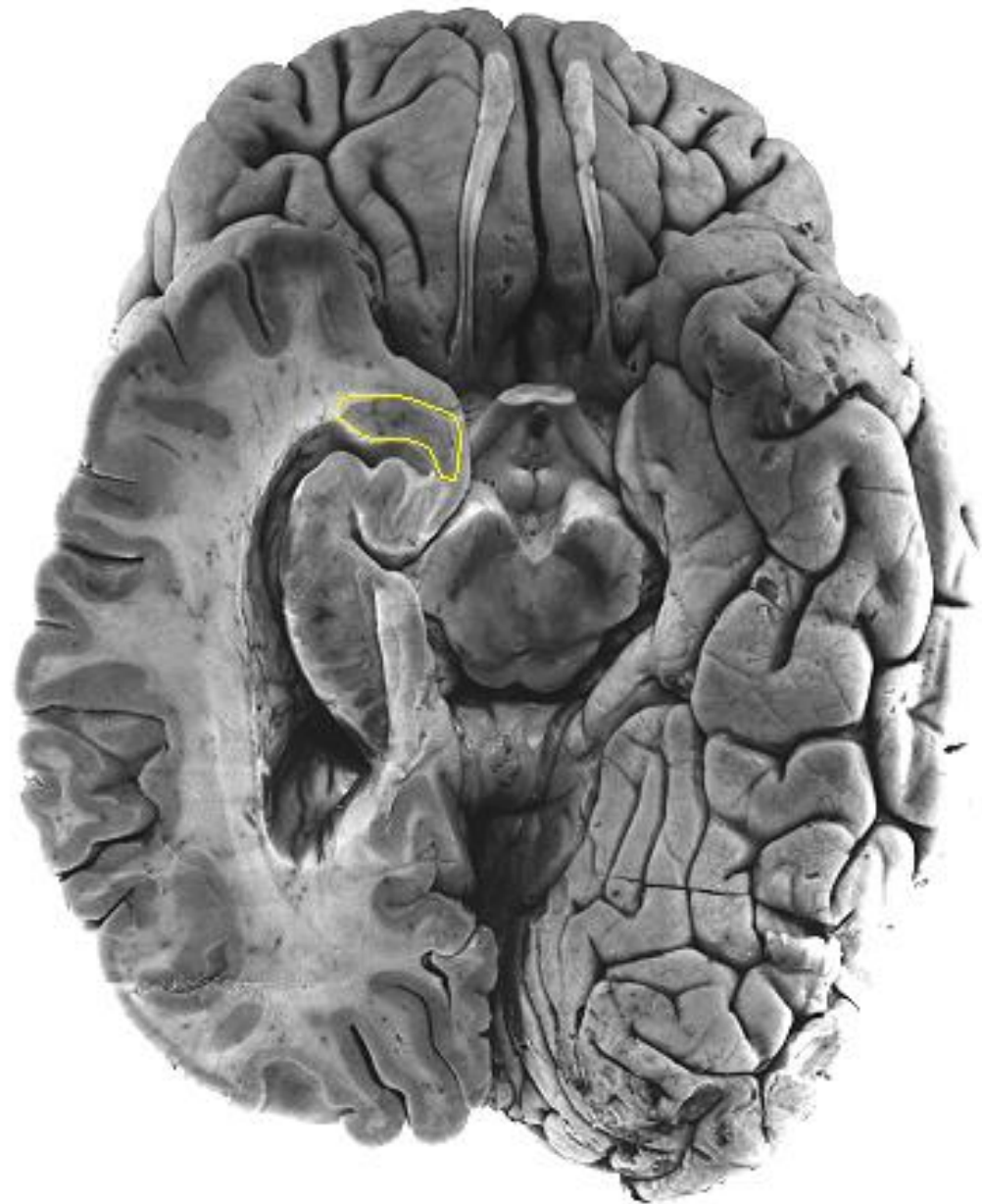
Amygdala

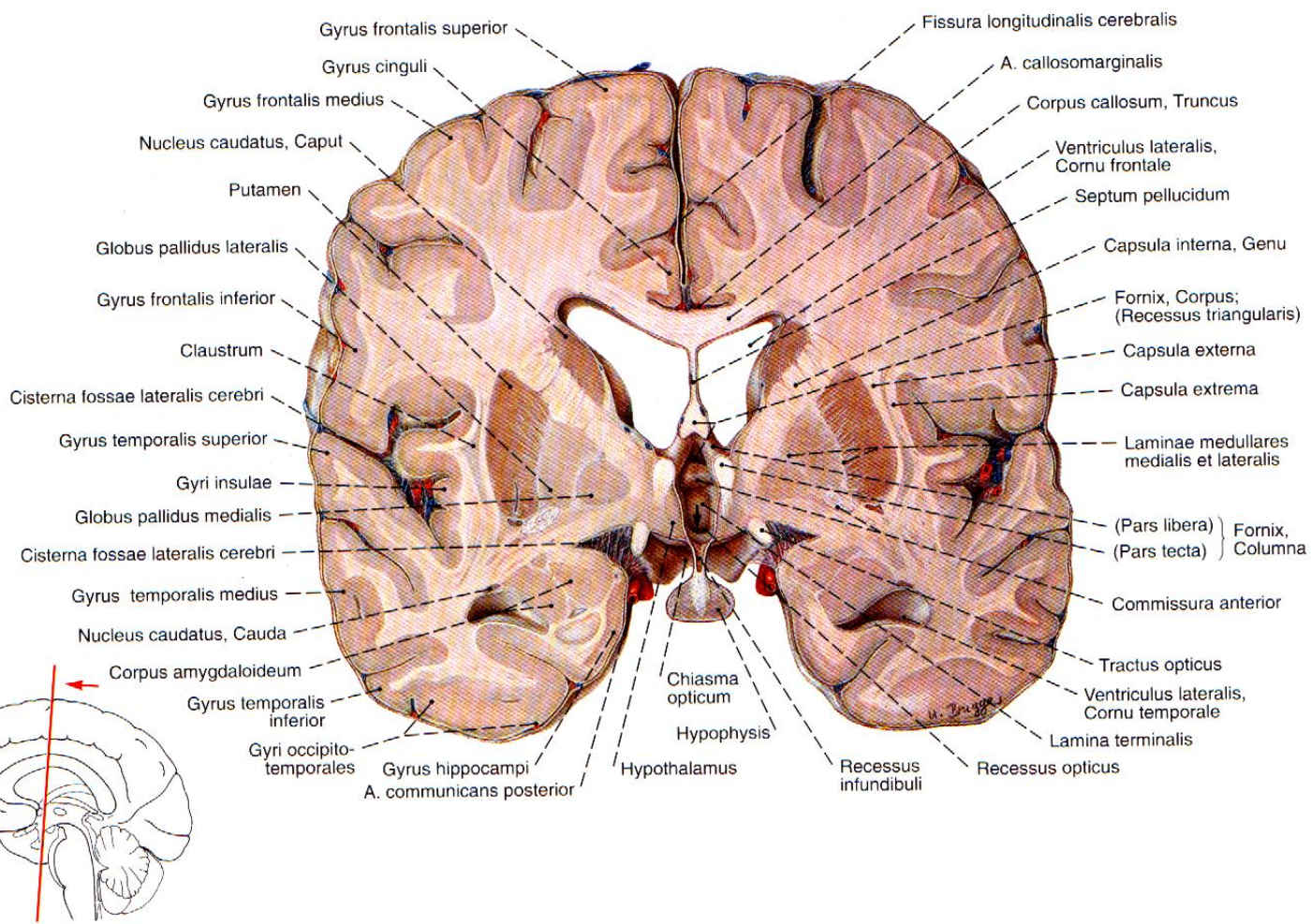
Hippocampus

Entorhinal cortex



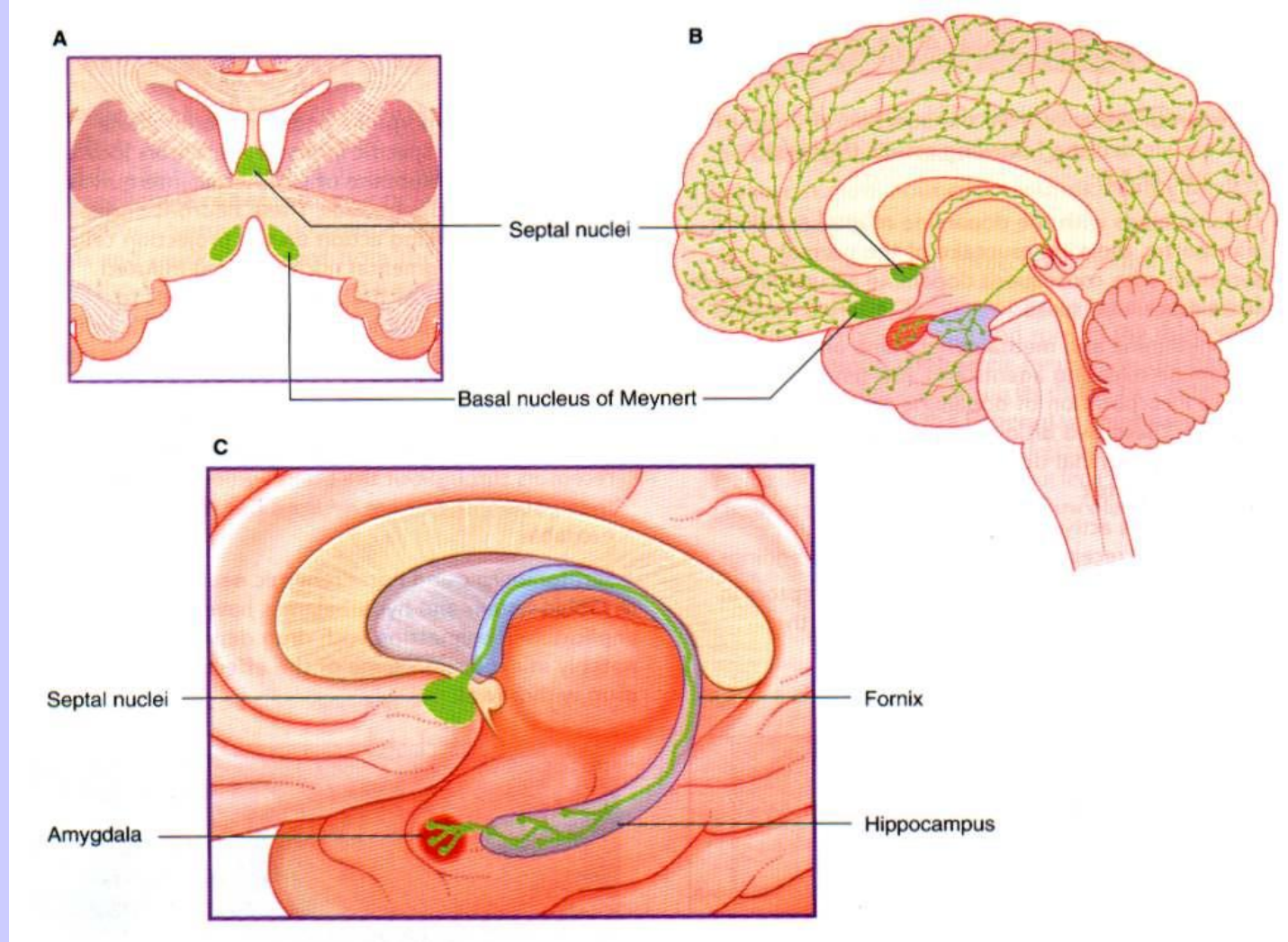
# AMYGDALAR NUCLEI





## Amygdalar nuclei: the principal nuclei with the perception of fear



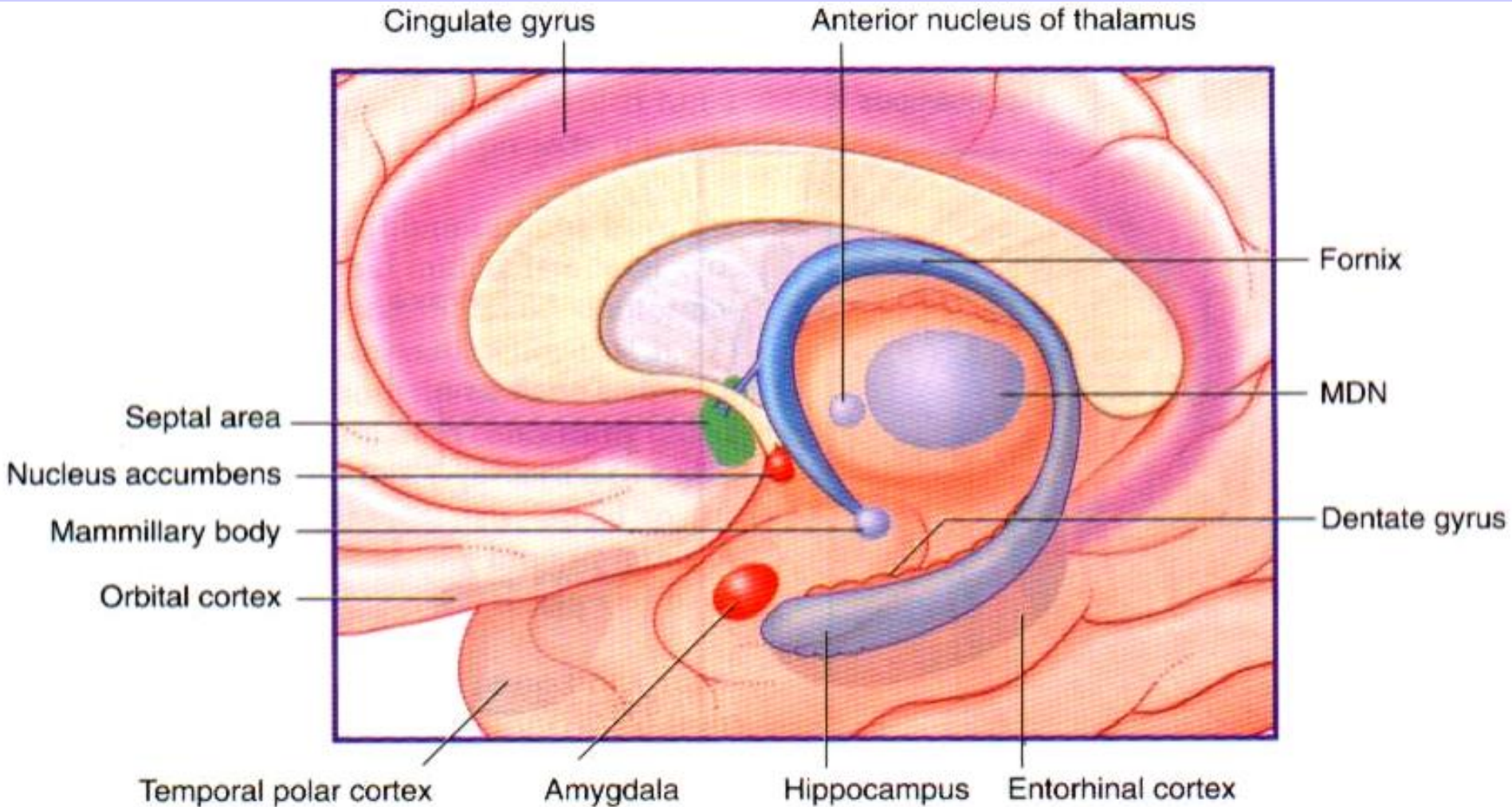


Projection of cholinergic neurons to neocortex

Alzheimer's disease – about half reduction of cholinergic neurons in the nuclei



# STRUCTURES OF LIMBIC FOREBRAIN



# LIMBIC FOREBRAIN AND AMYGDALAR NUCLEI



implicated in the generation of the most **rudimentary** and the most **profound** of human emotions

including **fear**, **sexual desire**, **rage**, **religious ecstasy**, or at a more basic level, determining if **something might be good to eat**

seeking of **loving attachments** and the formation of **long term emotional memories**

neurons become activated in response to the human face

# BASAL GANGLIA AND RELATED STRUCTURES

ncl. caudatus, putamen, globus pallidus, claustrum and amygdalar ncll.

**functional:** + thalamus, substantia nigra and ncl. subthalamicus

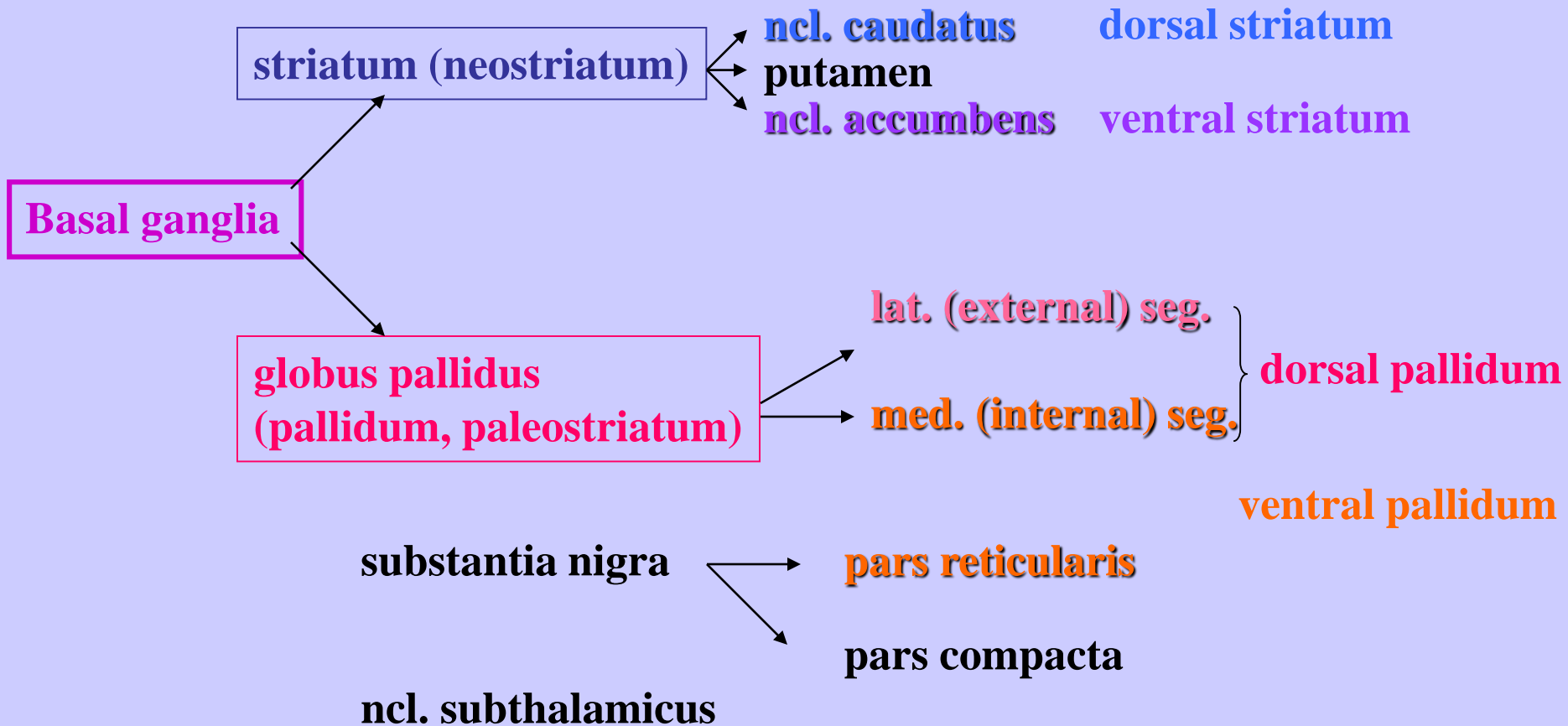
ncl. caudatus + putamen = **neostriatum (striatum)**

globus pallidus (ext. + int. segment) = **paleostriatum (pallidum)**

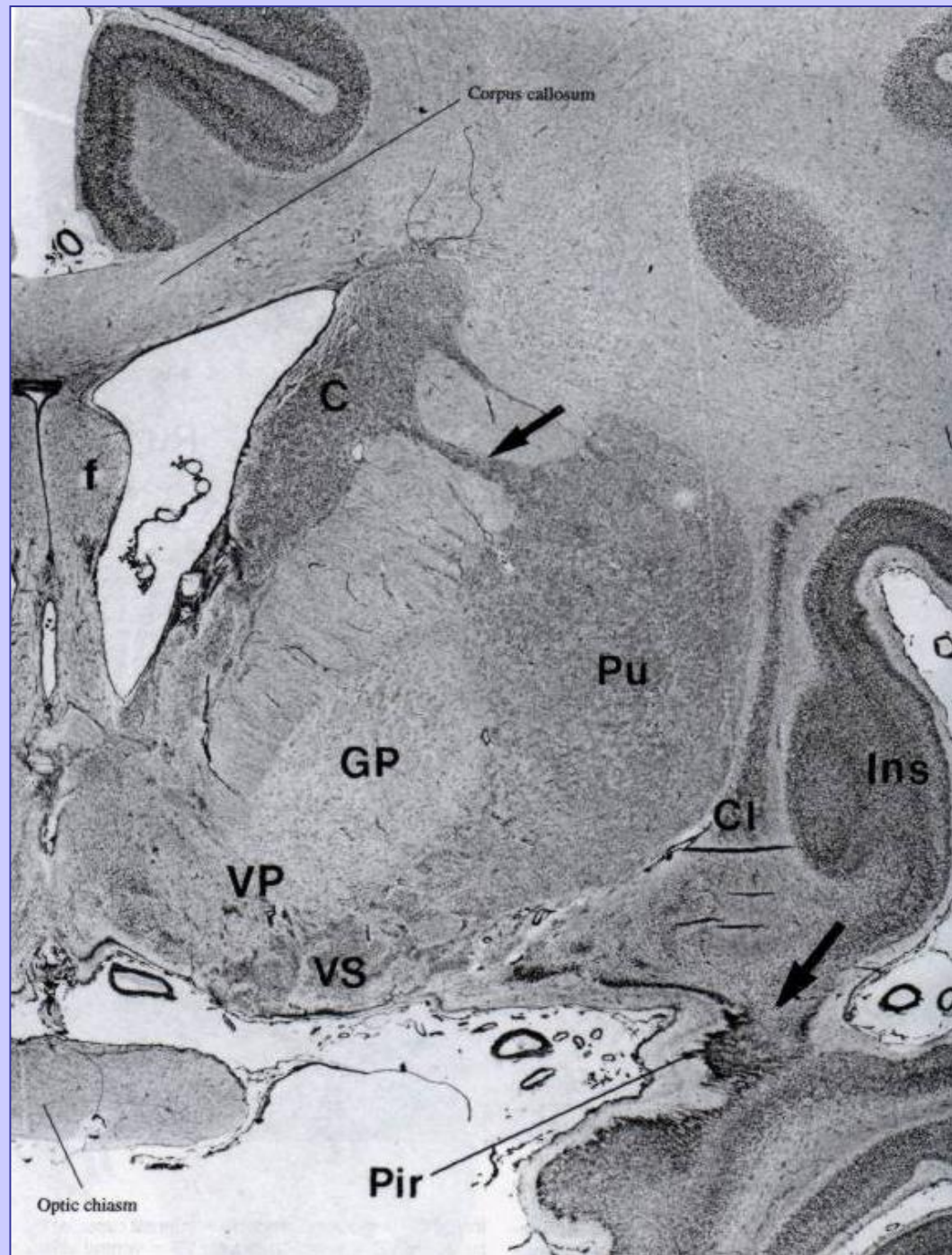
globus pallidus + putamen = **ncl. lentiformis**

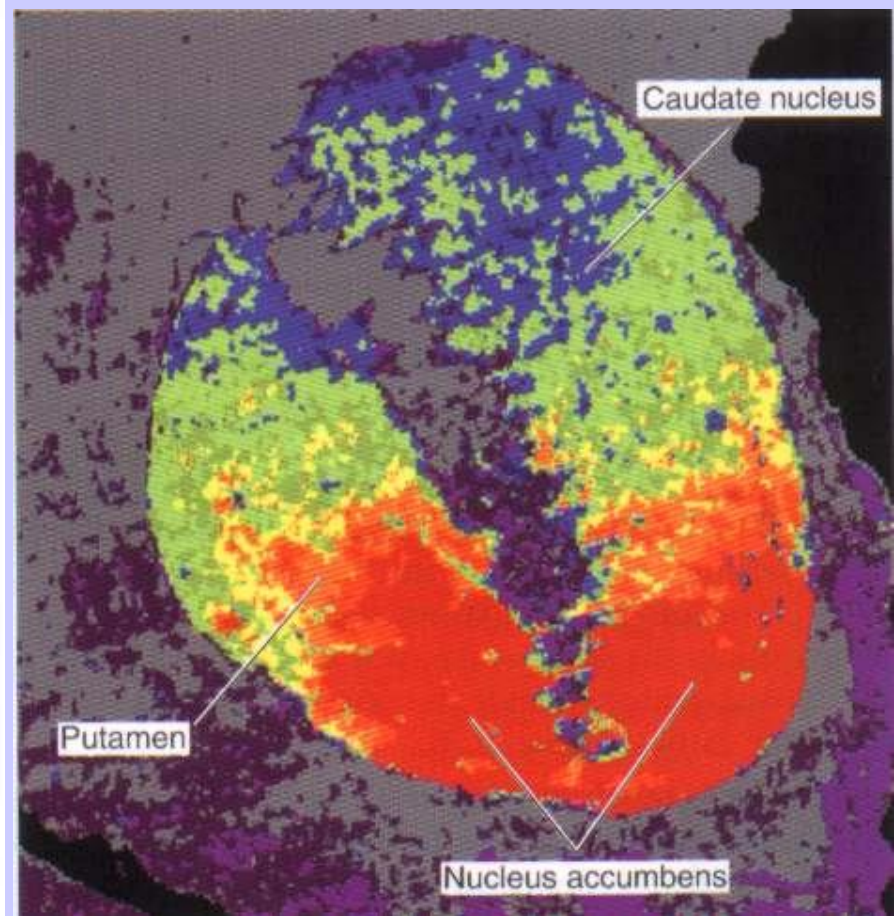
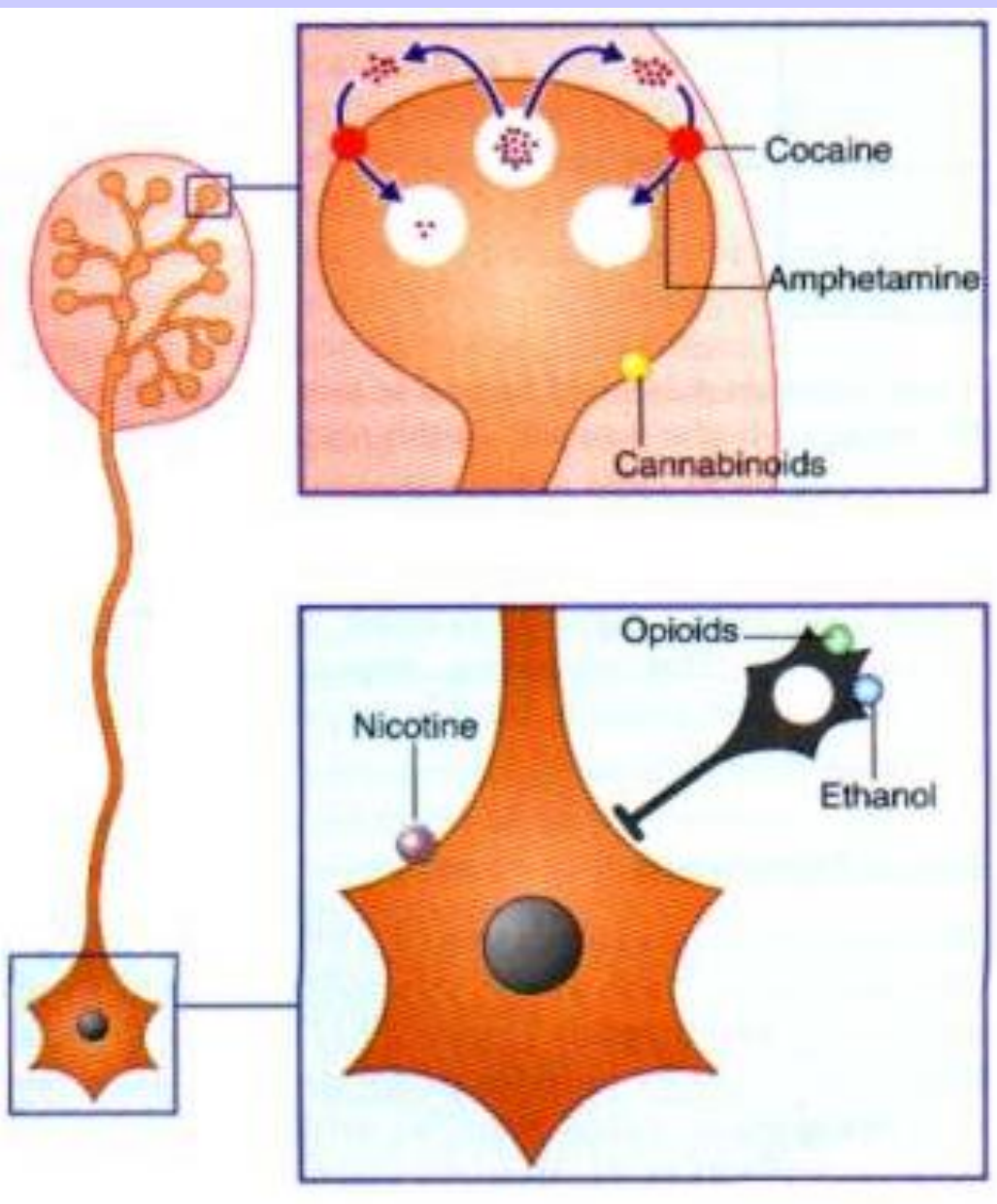


# BASAL GANGLIA AND RELATED STRUCTURES



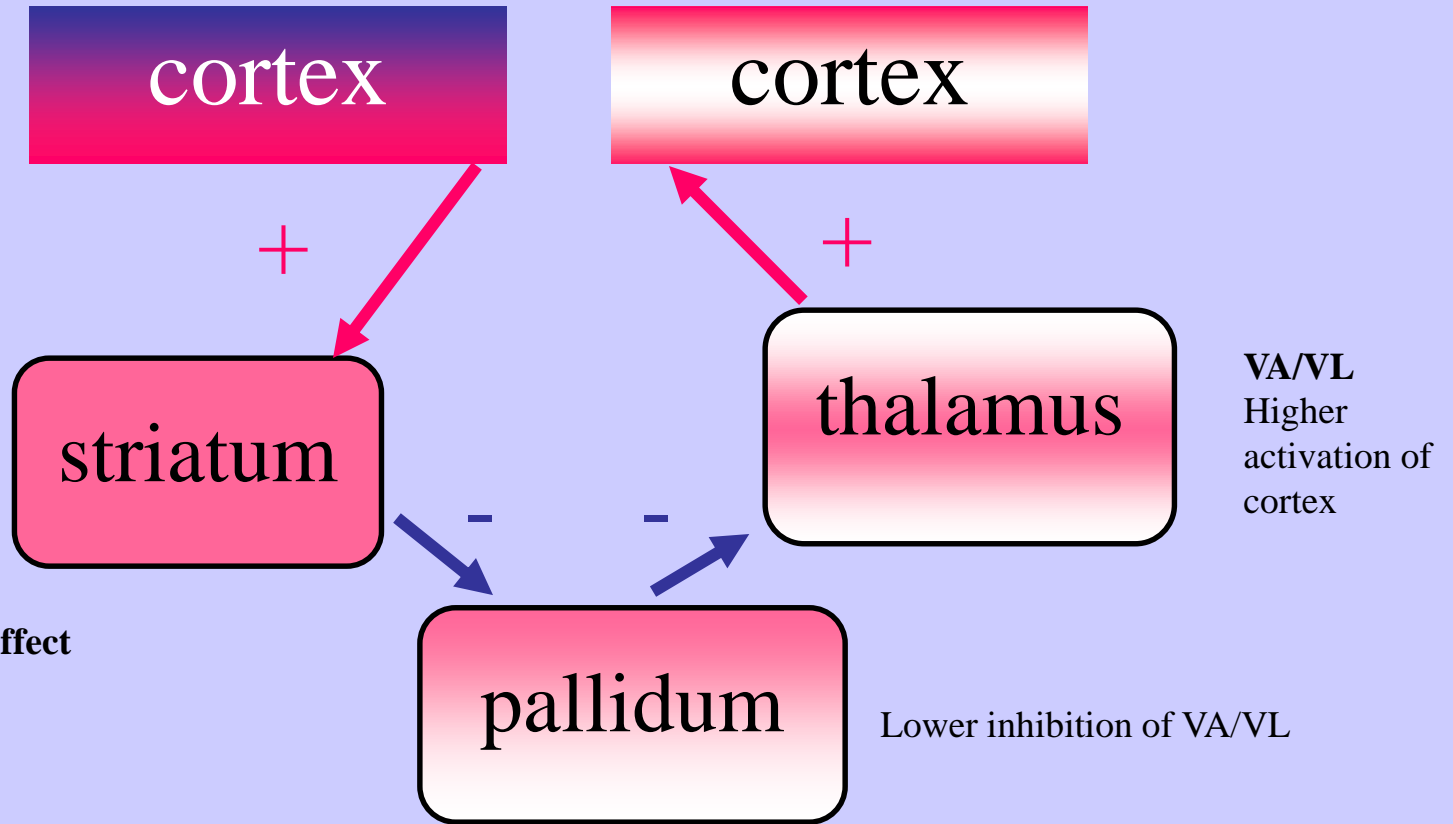
# VENTRAL PALIDUM AND VENTRAL STRIATUM







# GENERAL CONNECTIONS OF BG



# WHITE MATTER OF TELENCEPHALON

## *Pathways - associated, projection and commissural*

**ASSOCIATED PATHWAYS** - interconnections of various cortical regions

**fasciculus longitudinalis superior**

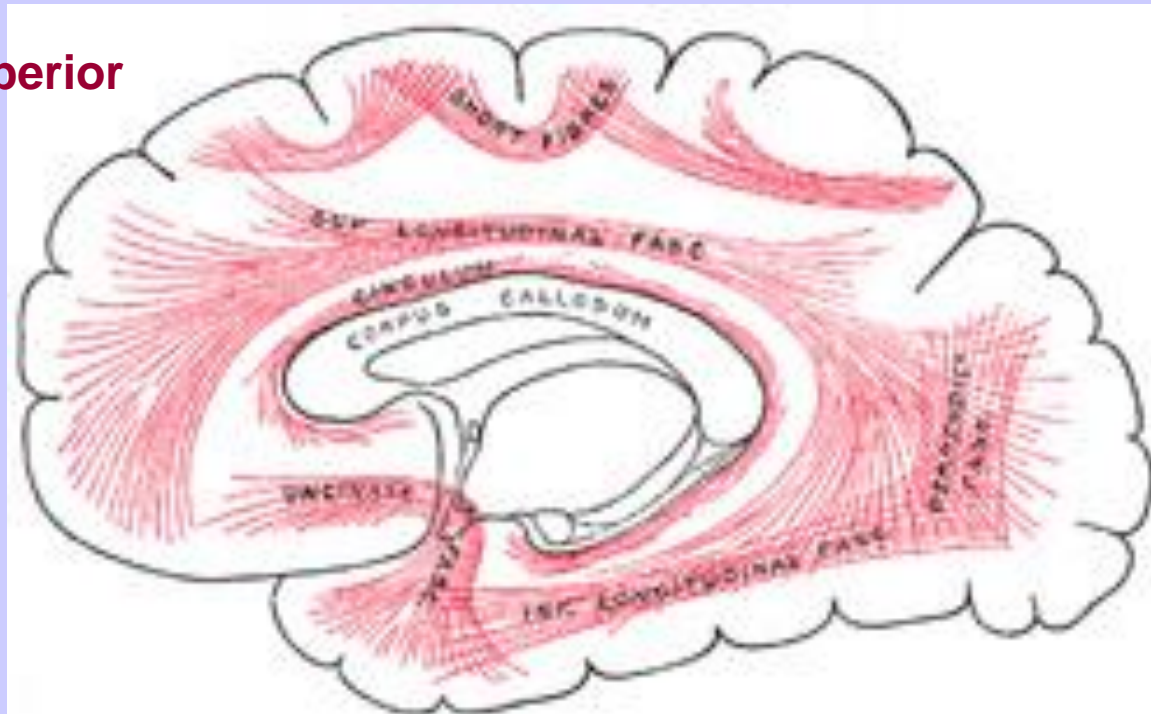
**fasciculus longitudinalis inferior**

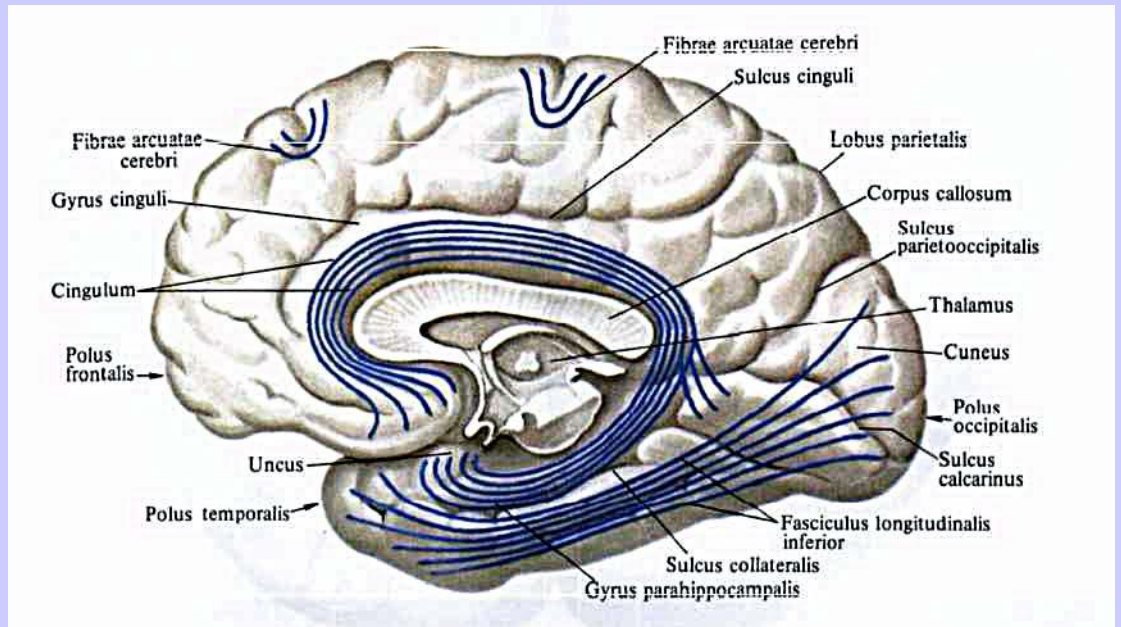
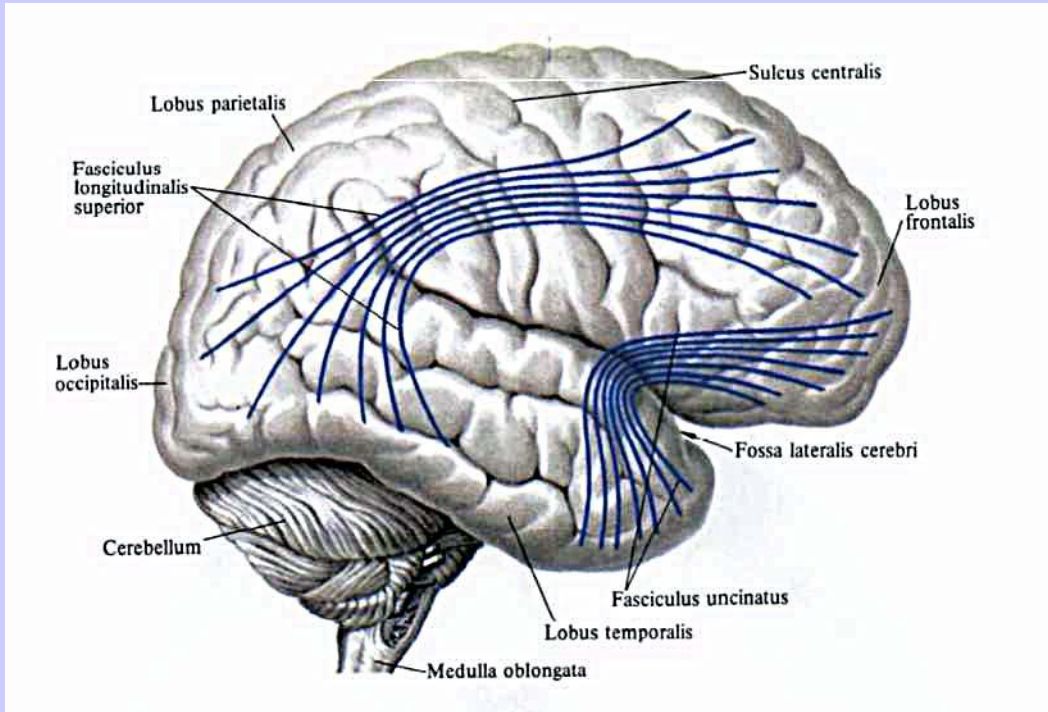
**fasciculus occipitofrontalis superior**

**fasciculus uncinatus**

**fasciculi occipitales verticales**

**cingulum**







# Projection pathways

**Short projection pathways**

**Long projection pathways - *capsula interna***

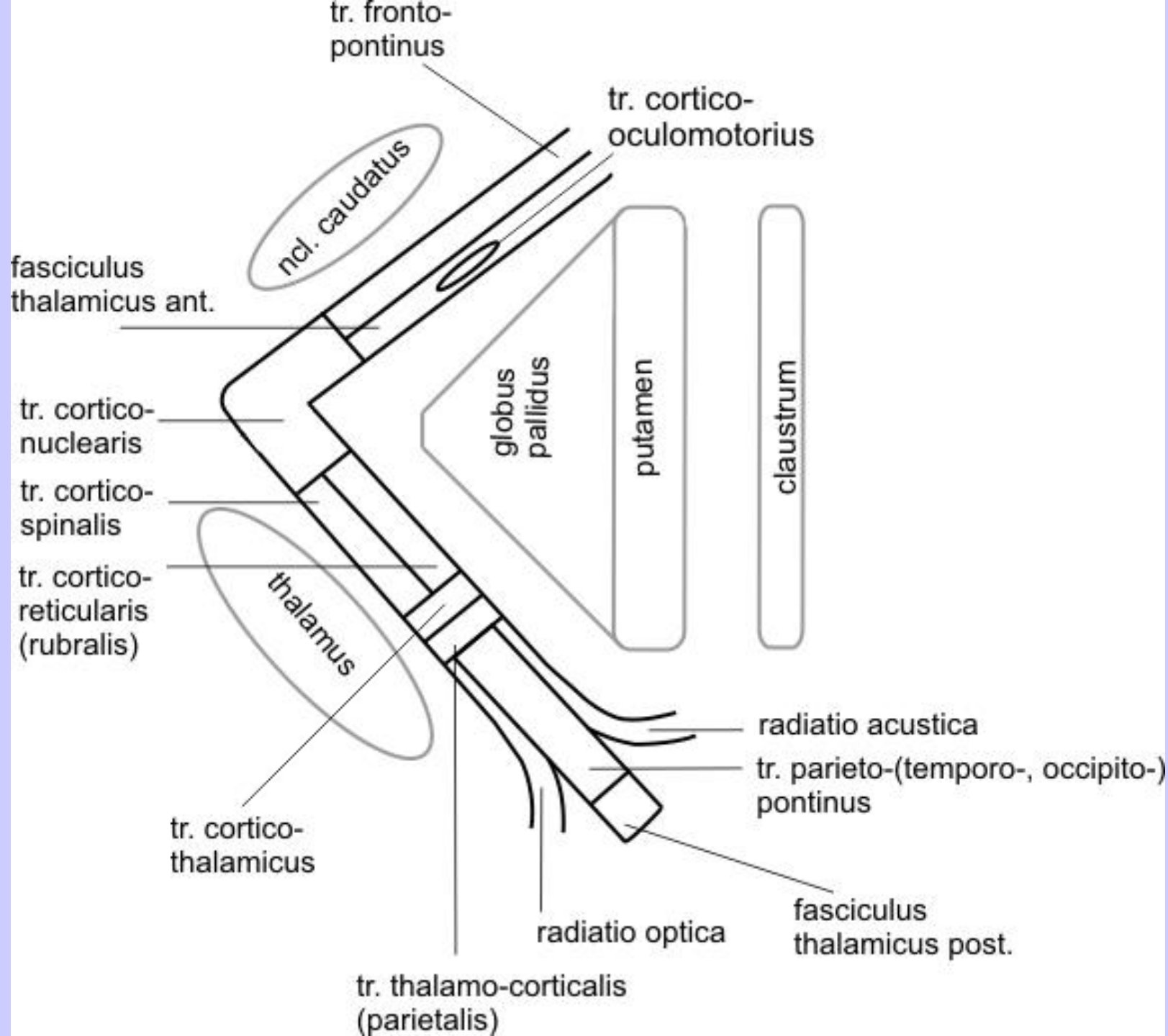
crus anterius, genu et crus posterius capsulae internae

## ***CAPSULA INTERNA***

**crus anterior** – anterior tr. thalamo-corticalis and tr. fronto-pontinus

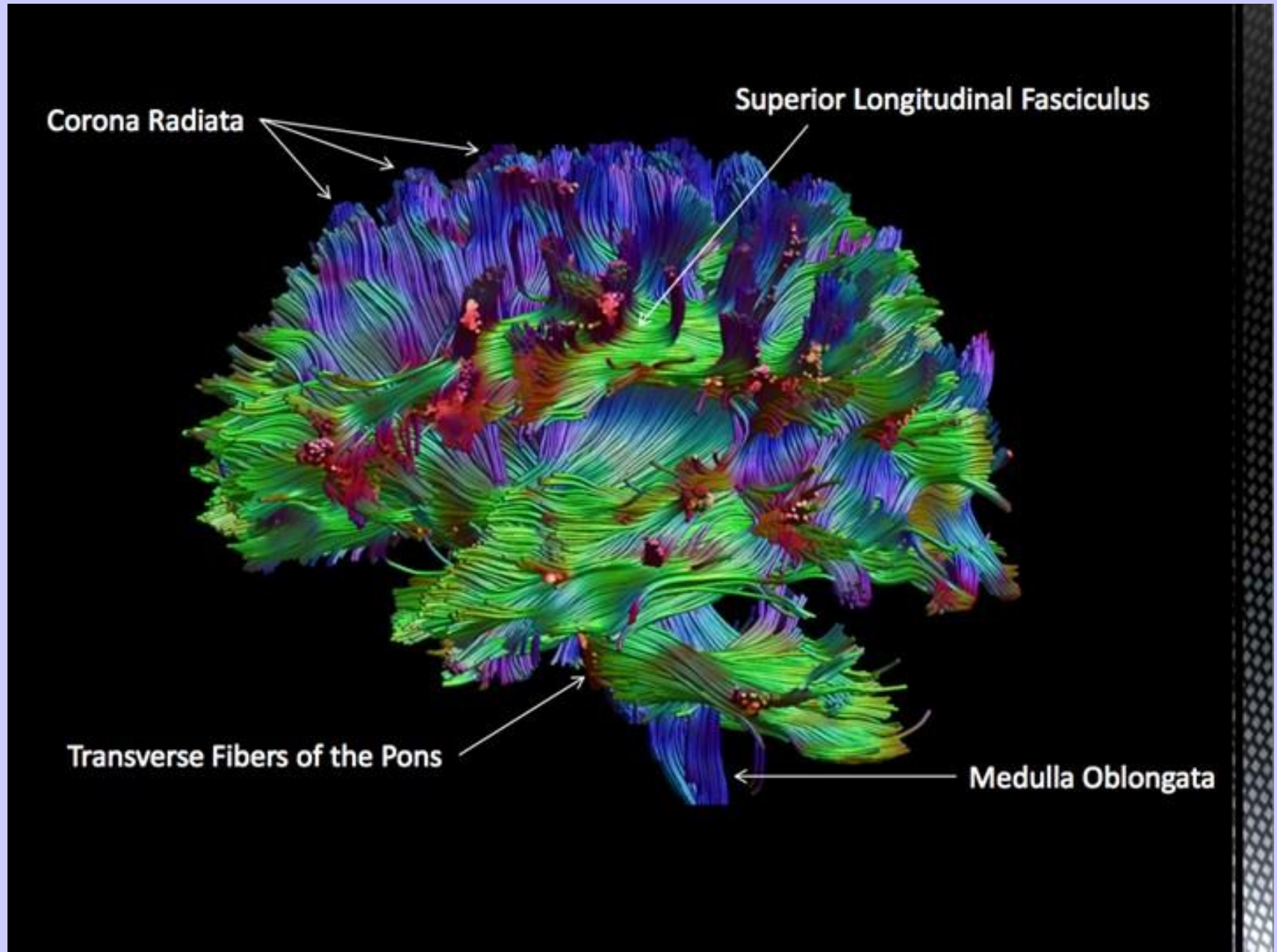
**genu** - tr. cortico-nuclearis, from area 4 to contralateral motoneurons of cranial nerves

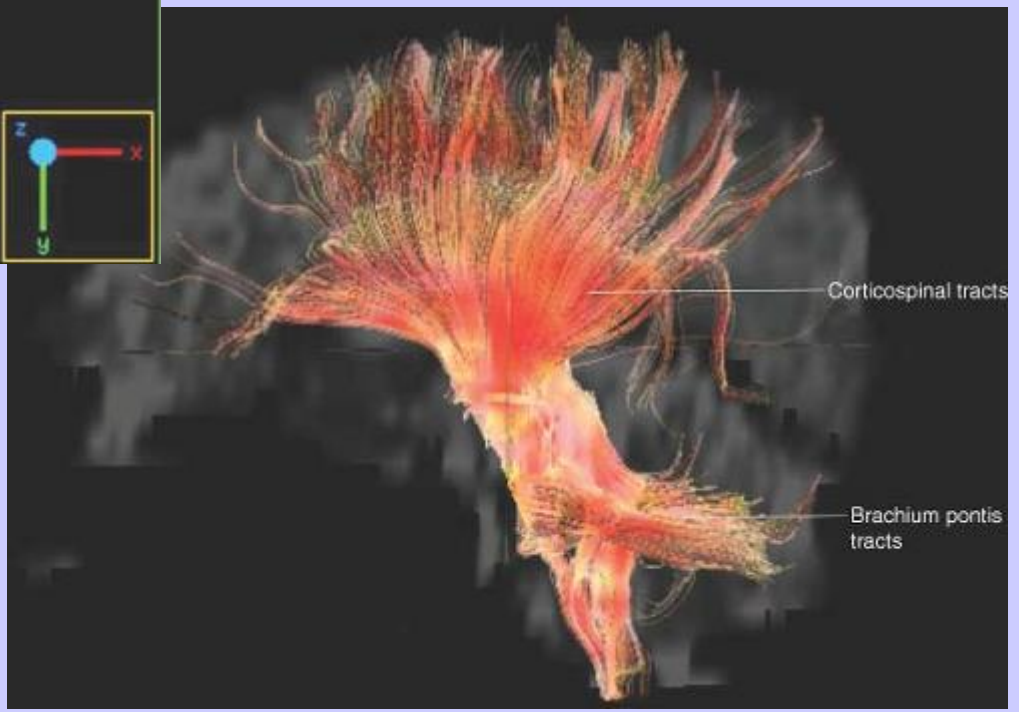
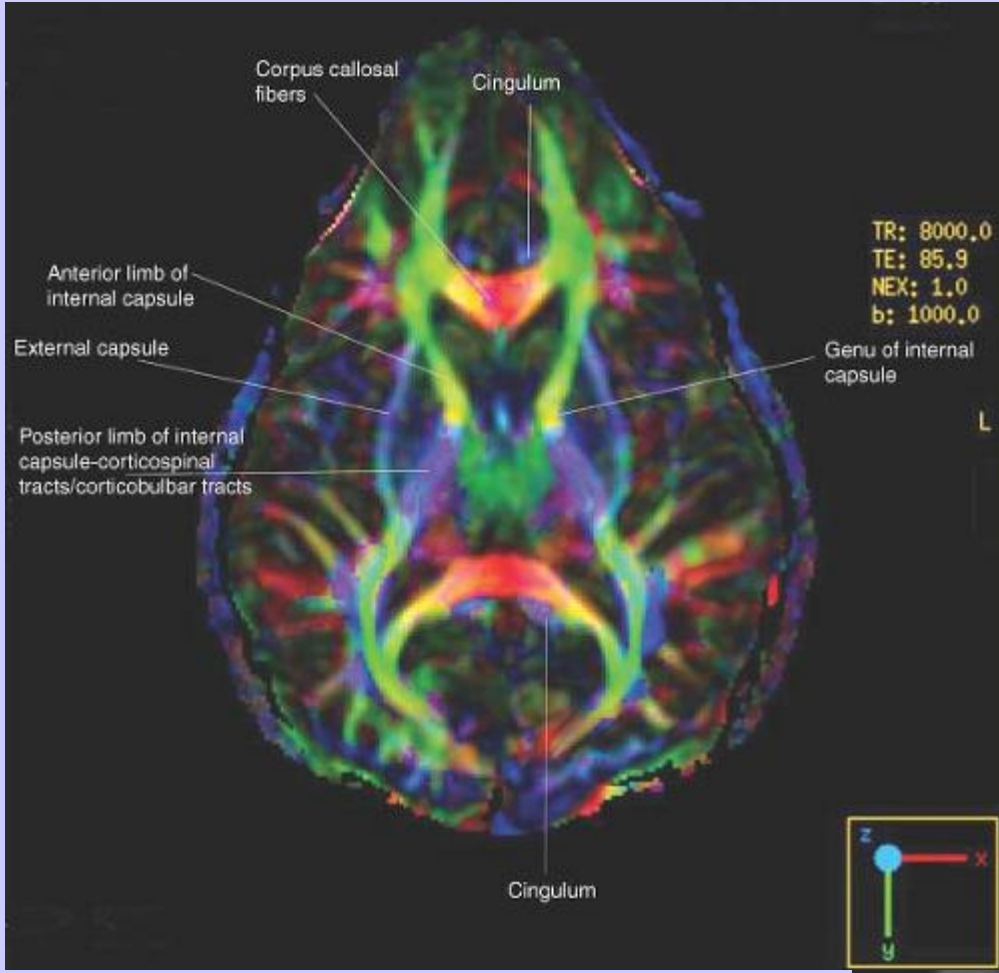
**crus posterior** - tr. cortico-spinalis (somatotopic arrangement), tr. cortico-reticularis and tr. cortico-rubralis, posterior tr. thalamo-corticalis (somatosensory information to parietal cortex), tr. parieto- , temporo-, occipito-pontinus, radiatio optica, radiatio acustica





# Tractography - Diffusion Tensor Imaging (DTI)





# Traktografie - Diffusion Tensor Imaging (DTI)

