



# Breve Introducción a la **NEUROANATOMÍA**

**Dr. Perfecto Oscar González Vargas**

Neurólogo

INNN-HMP MP- MDS- SOMENE



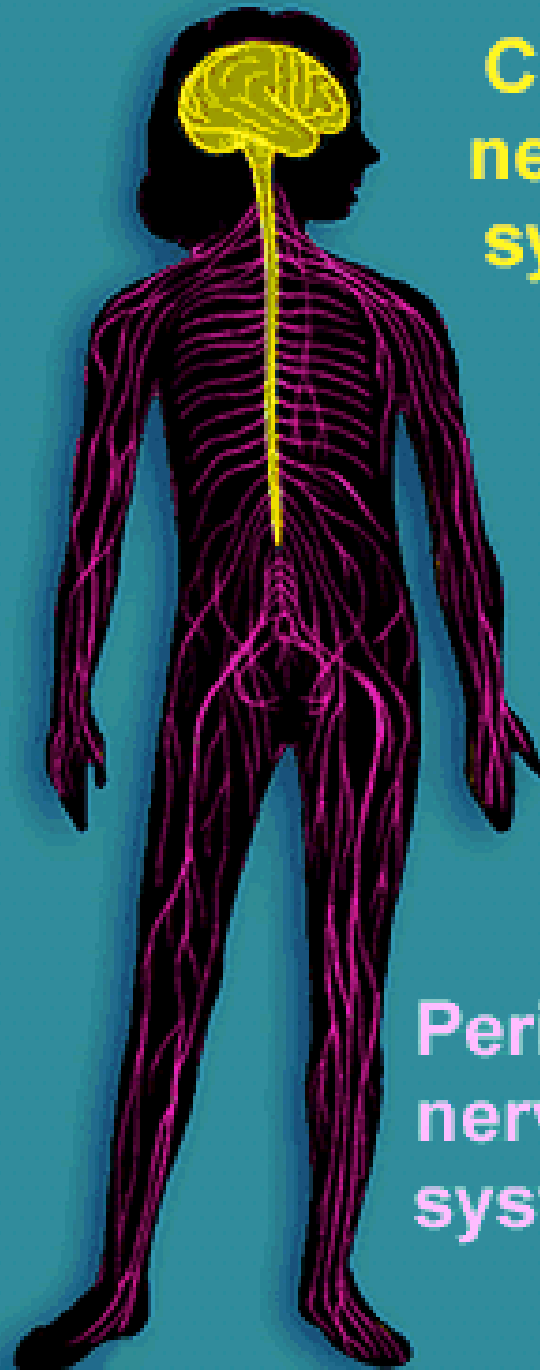
CAMELICE



# División Básica

1. **Sistema Nervioso Central.** Encéfalo y médula espinal.
2. **Sistema Nervioso Periférico.** Nervios Craneales, nervios espinales, ganglios y receptores.
3. **Sistema Nervioso Autónomo.** Función visceral.

**Central  
nervous  
system**



**Peripheral  
nervous  
system**

# Encéfalo

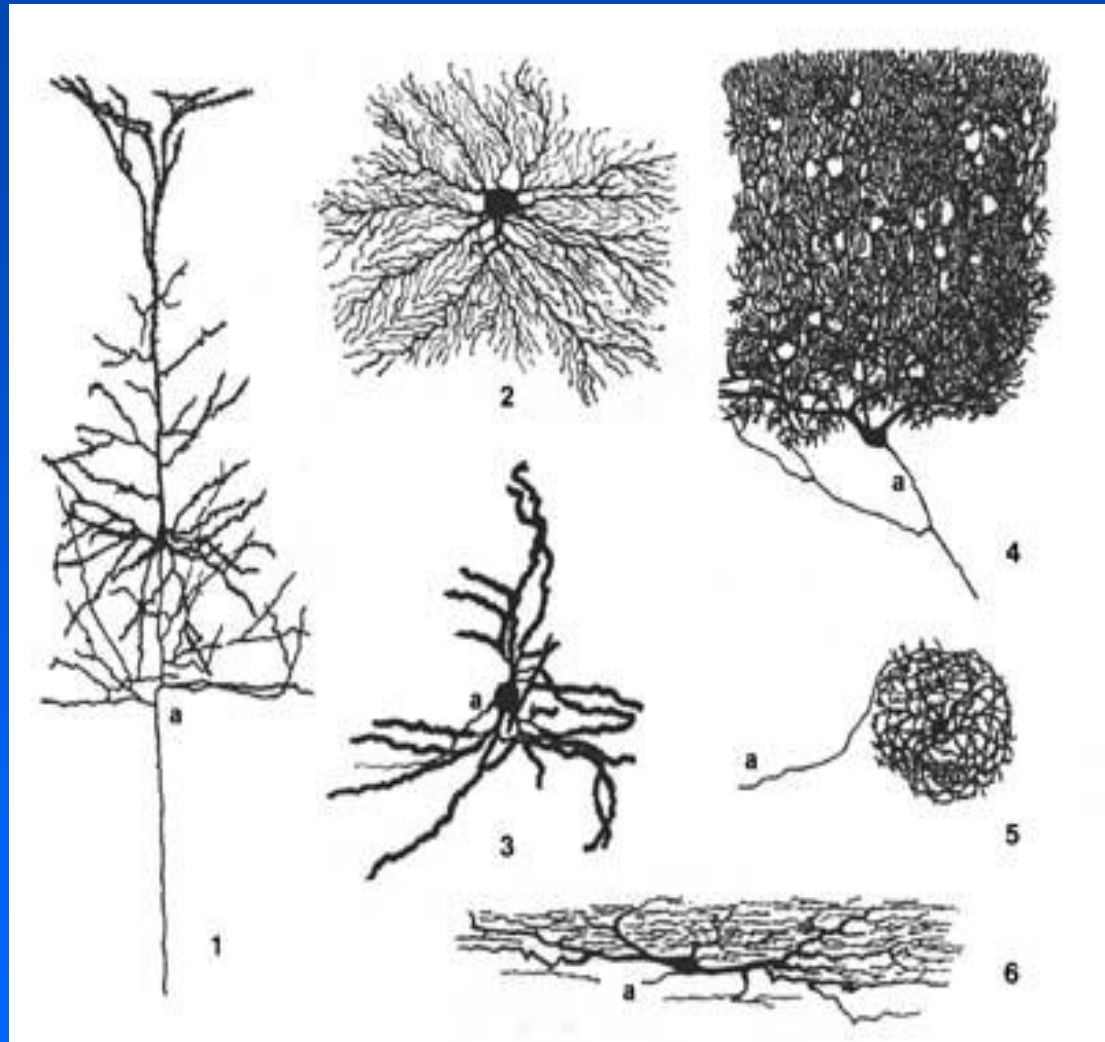
- Contiene cerca de 100,000 millones de neuronas multipolares
- Peso de 1,450 gr
- Flujo sanguíneo 70 ml-100 gr de tejido
- OMBLIGO DEL UNIVERSO

# Células del SNC

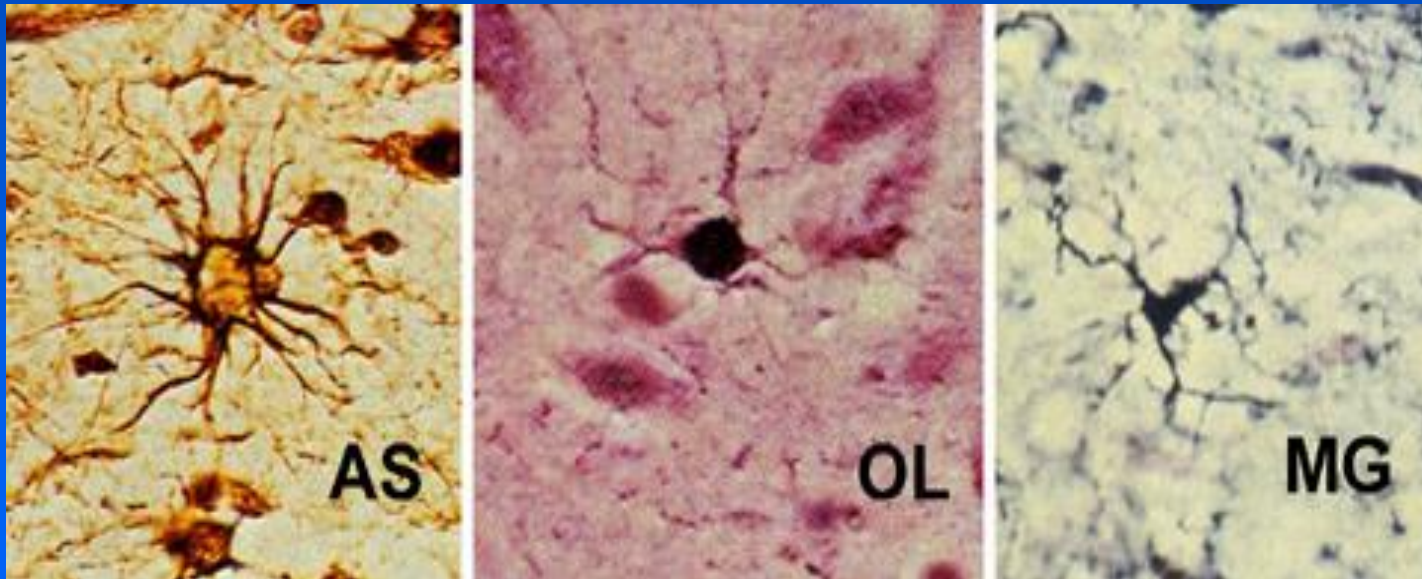
Neuronas

Glía: Astrocitos, Oligodendrocitos, Microglia y  
Células Ependimarias

Diversity of  
Neuronal  
Morphology



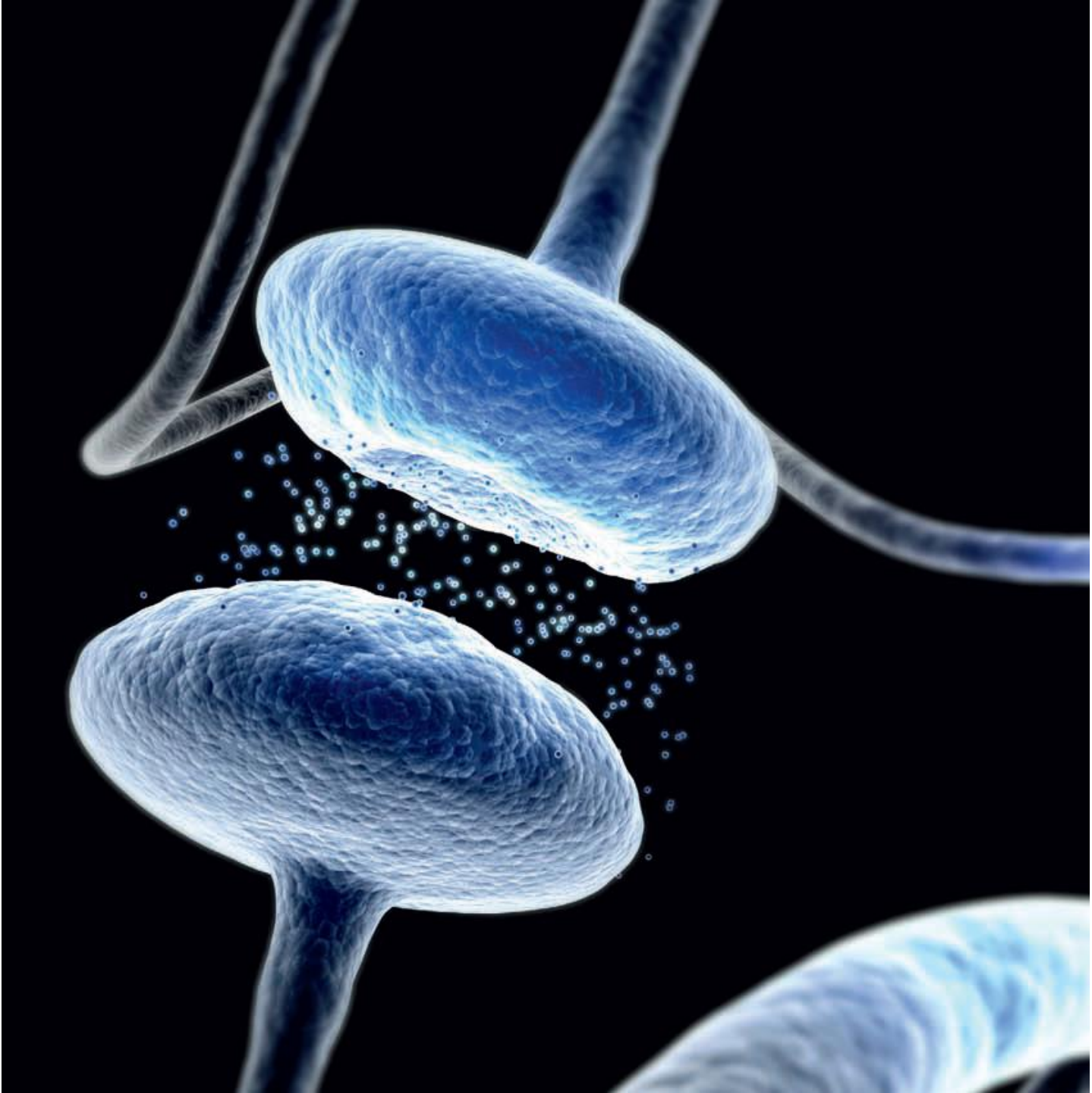
# Neuroglia

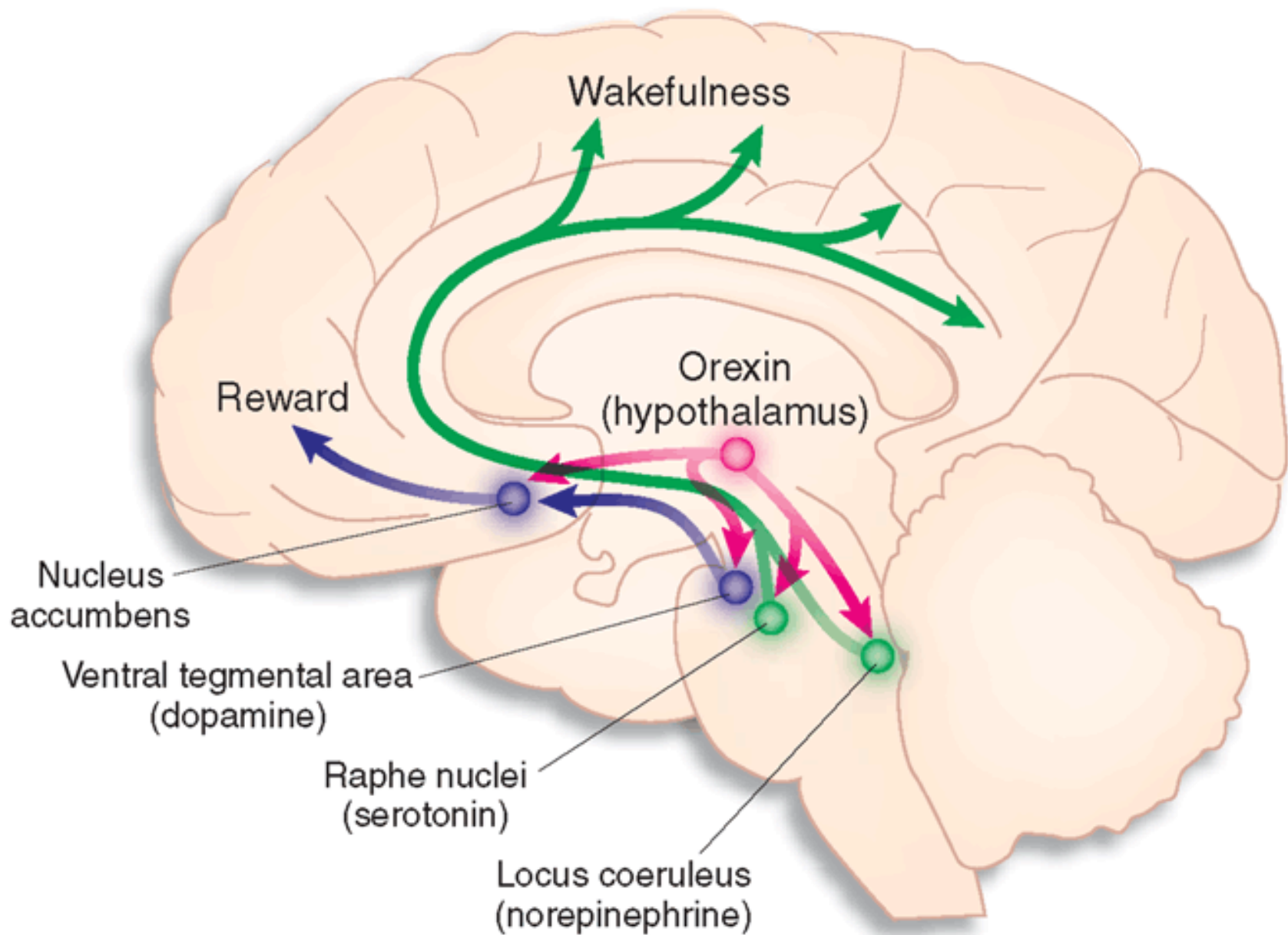


Astrocyte

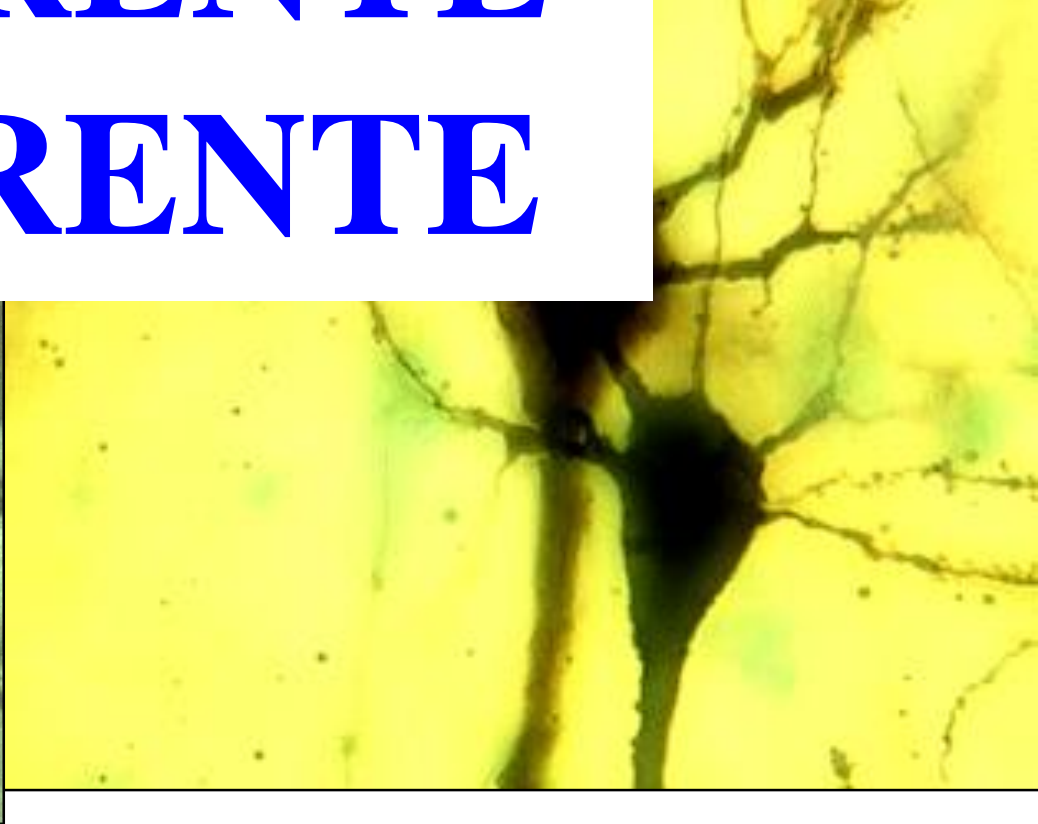
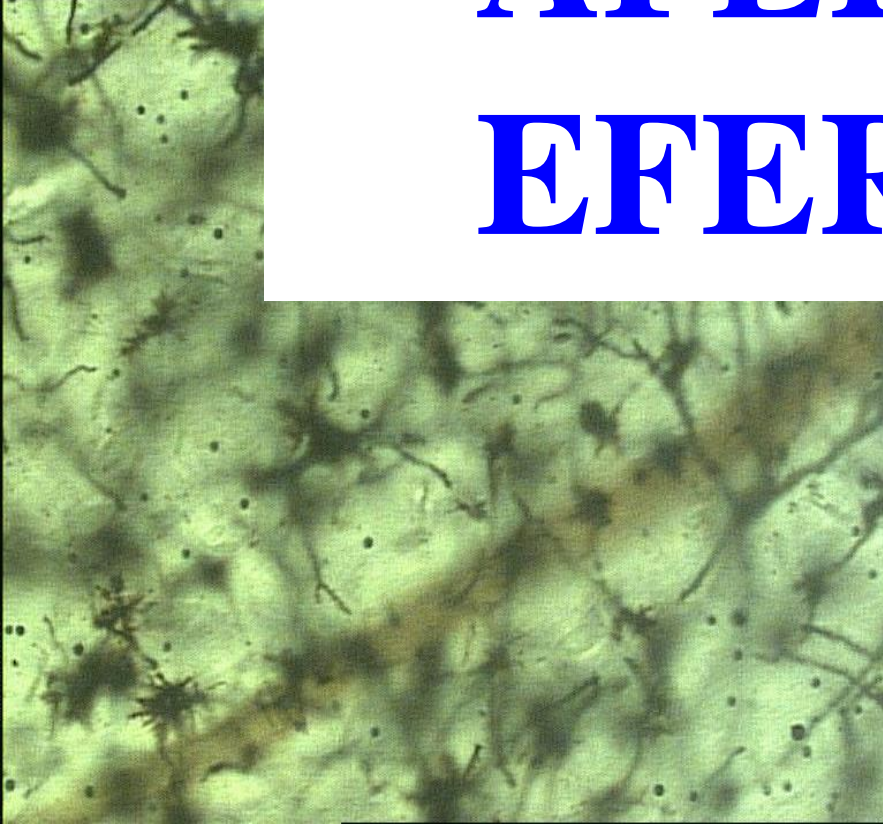
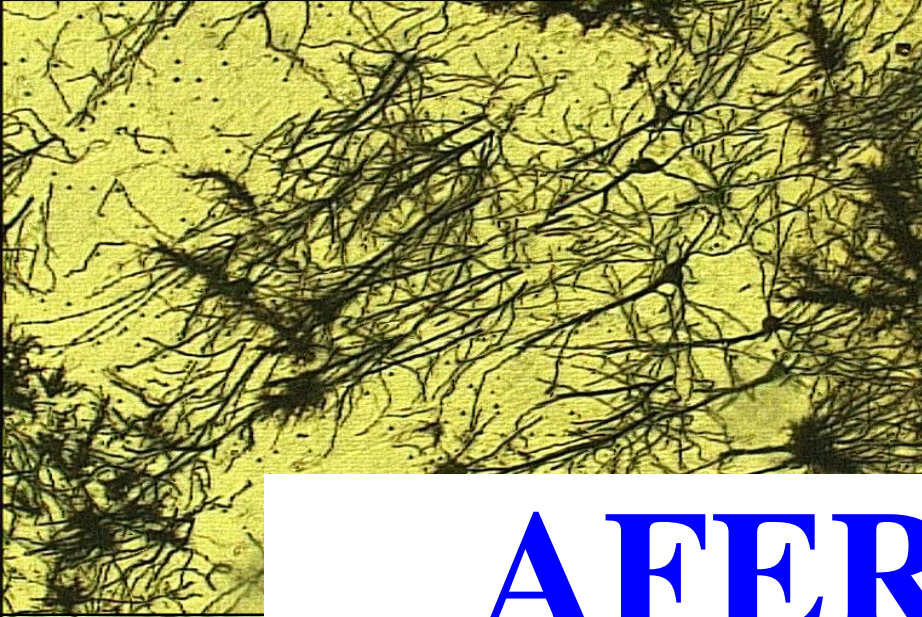
Oligodendrocyte

Microglia





# AFFERENTE EFFERENTE



# Encéfalo

Peso de 1,400 gr.

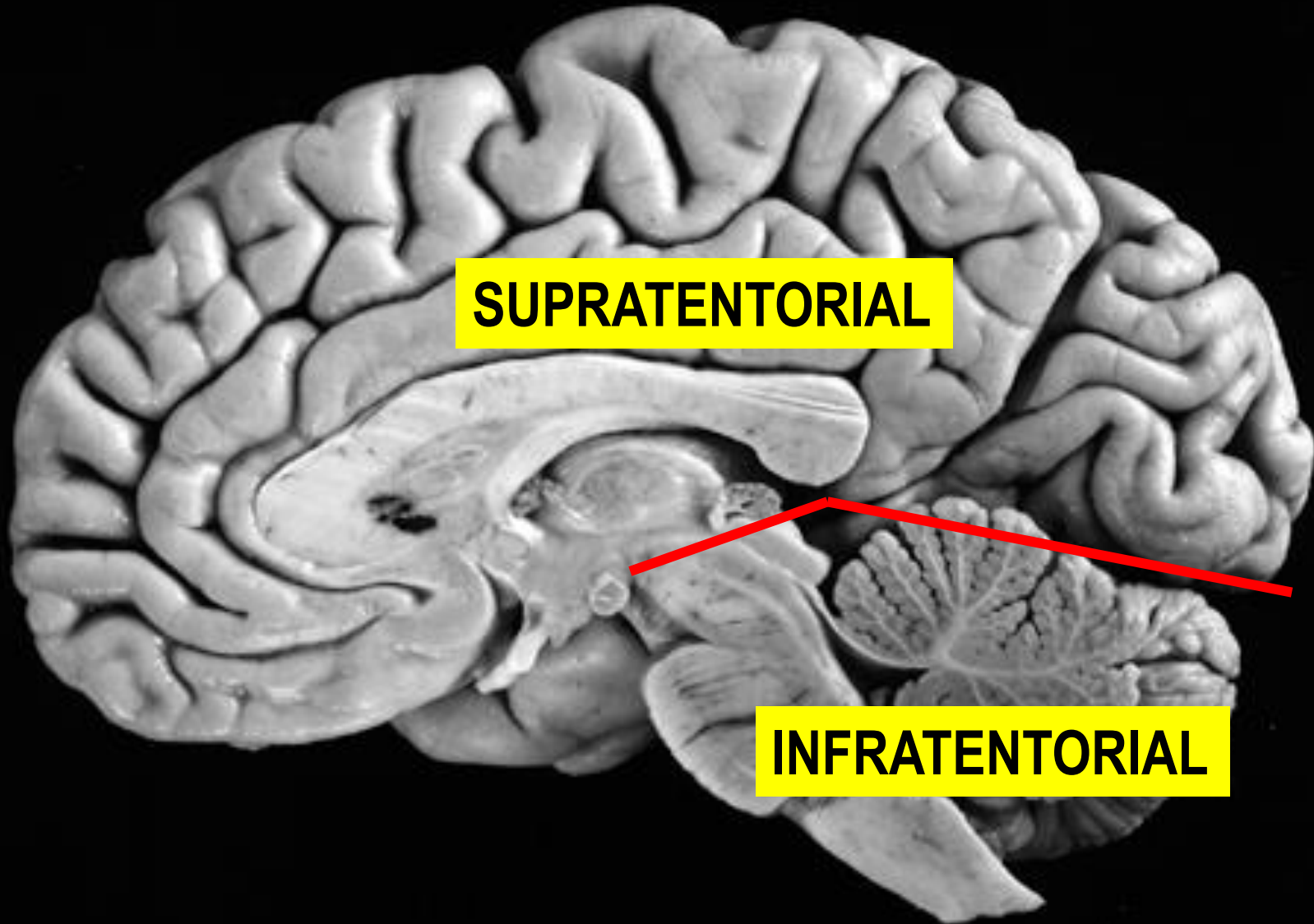
- Hemisferios Cerebrales. Cerebro
- Tallo Cerebral.
  - Mesencéfalo,
  - Puente y
  - Bulbo
- Cerebelo



01:28



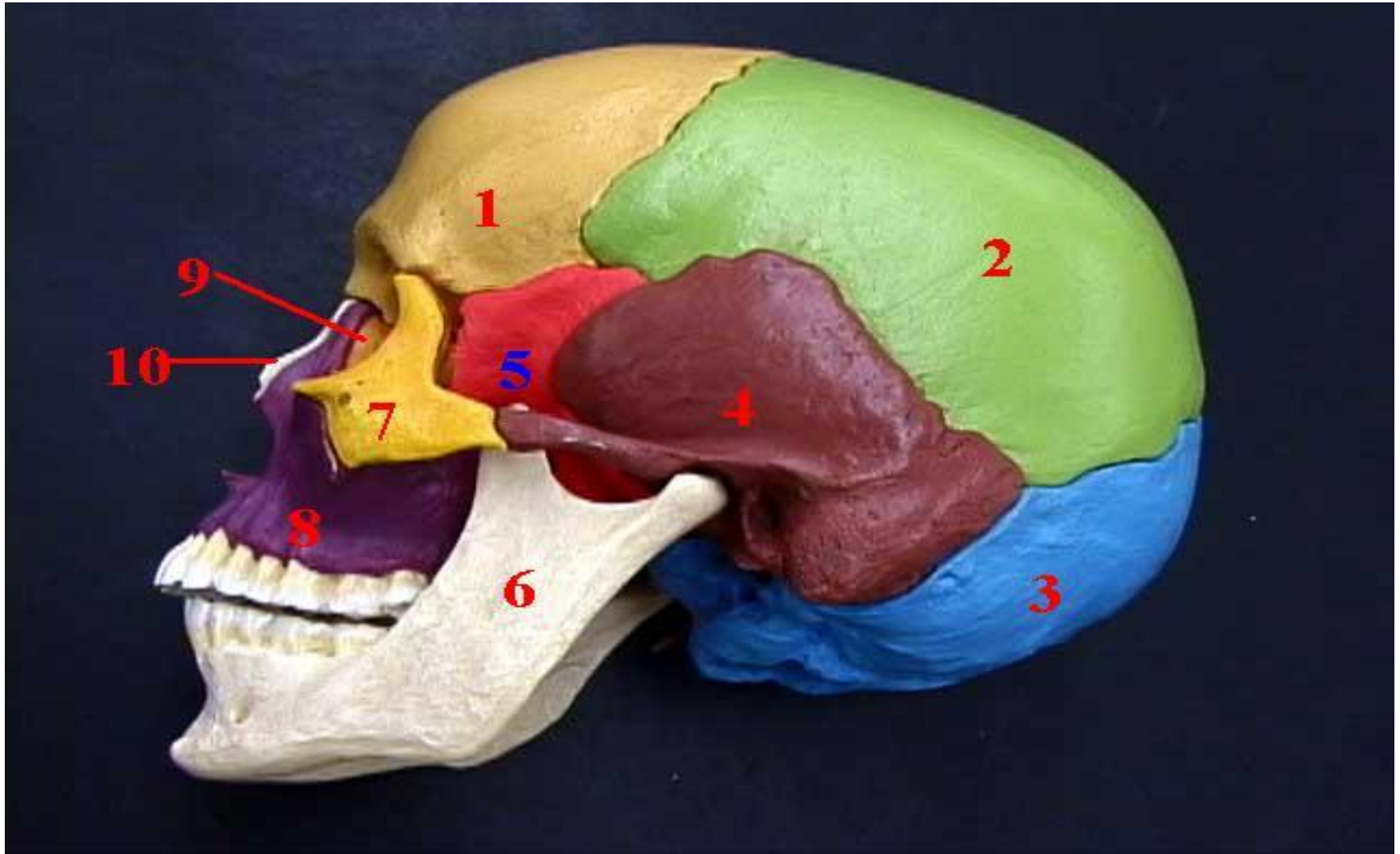


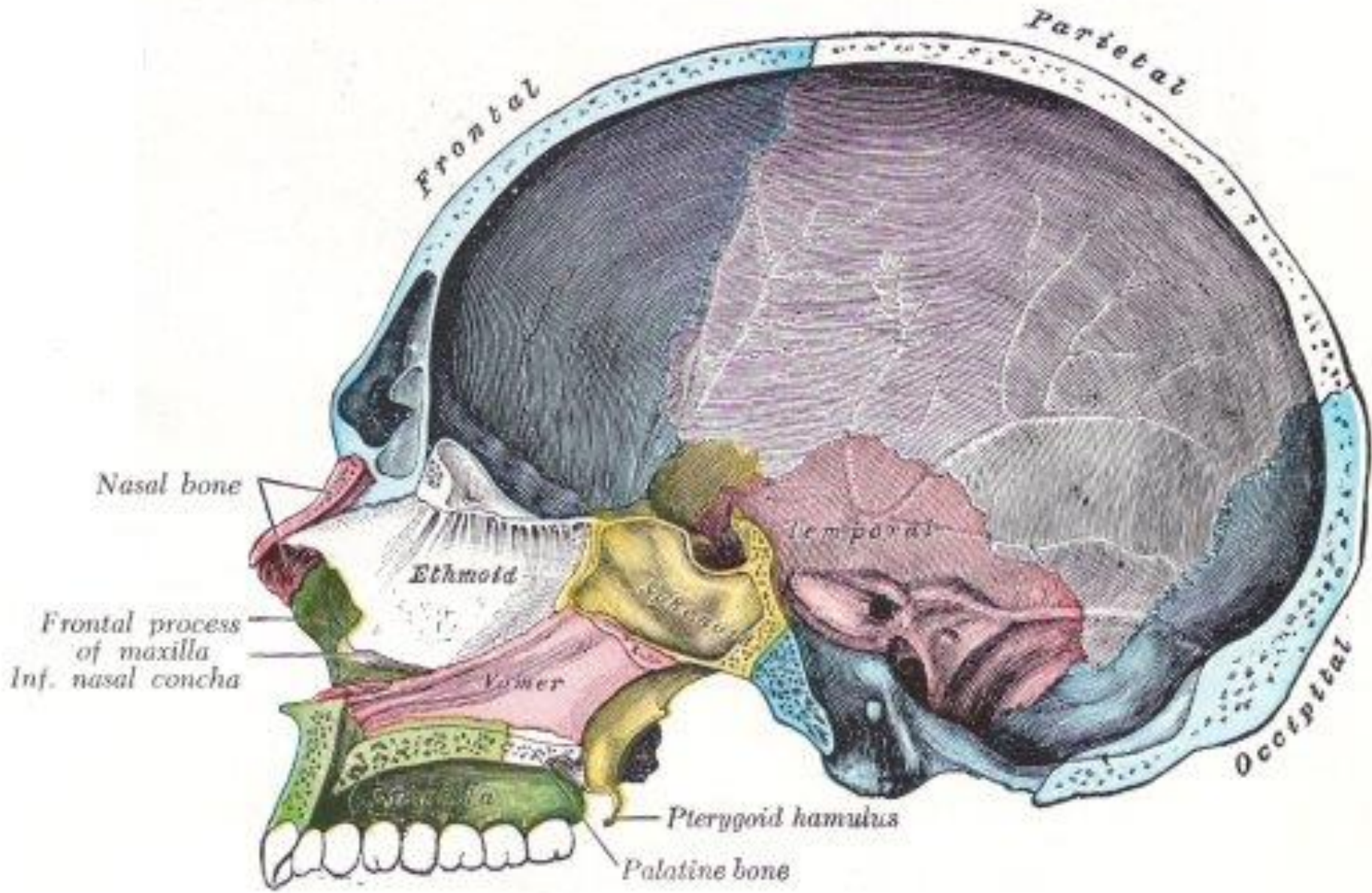


**SUPRATENTORIAL**

**INFRATENTORIAL**

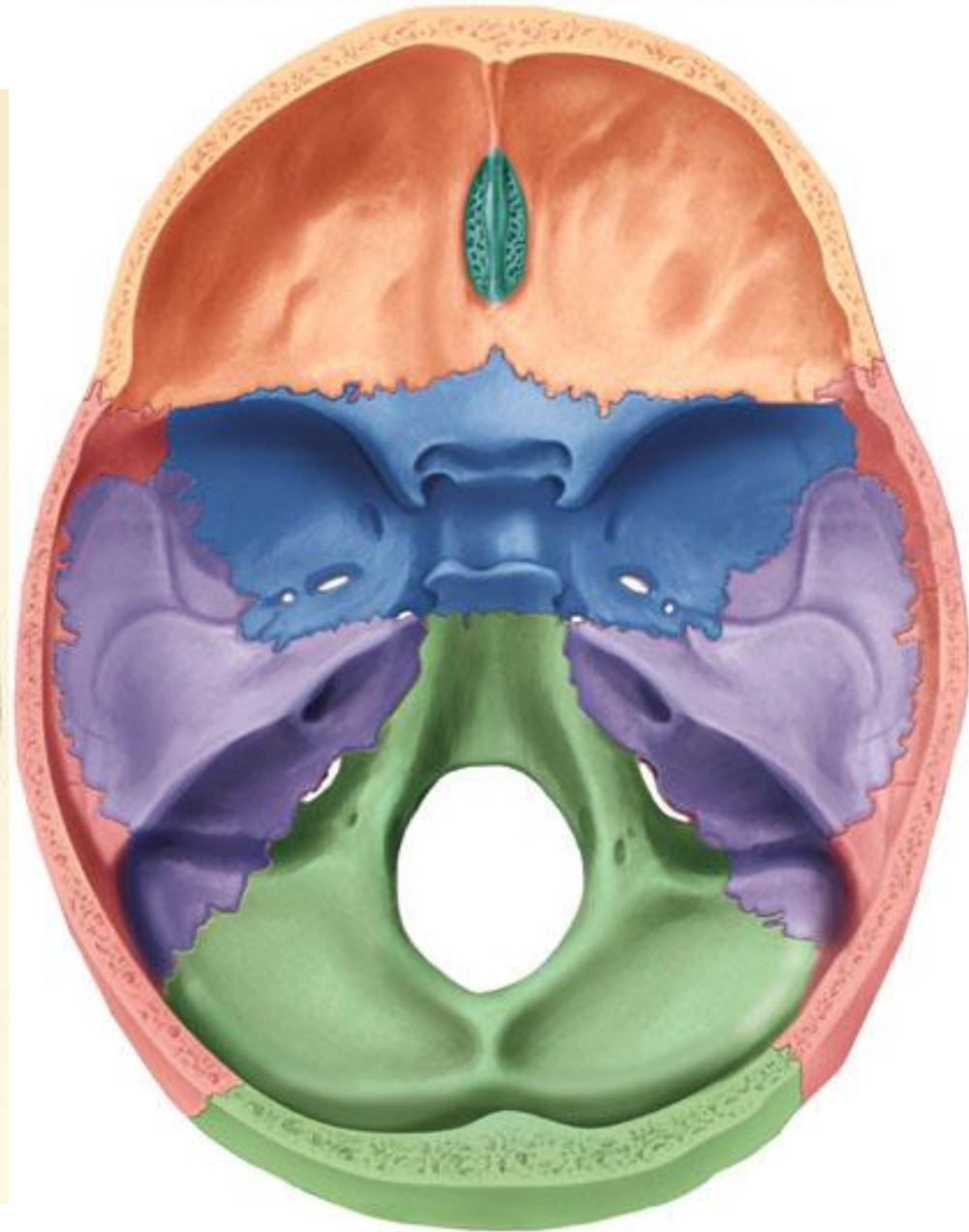
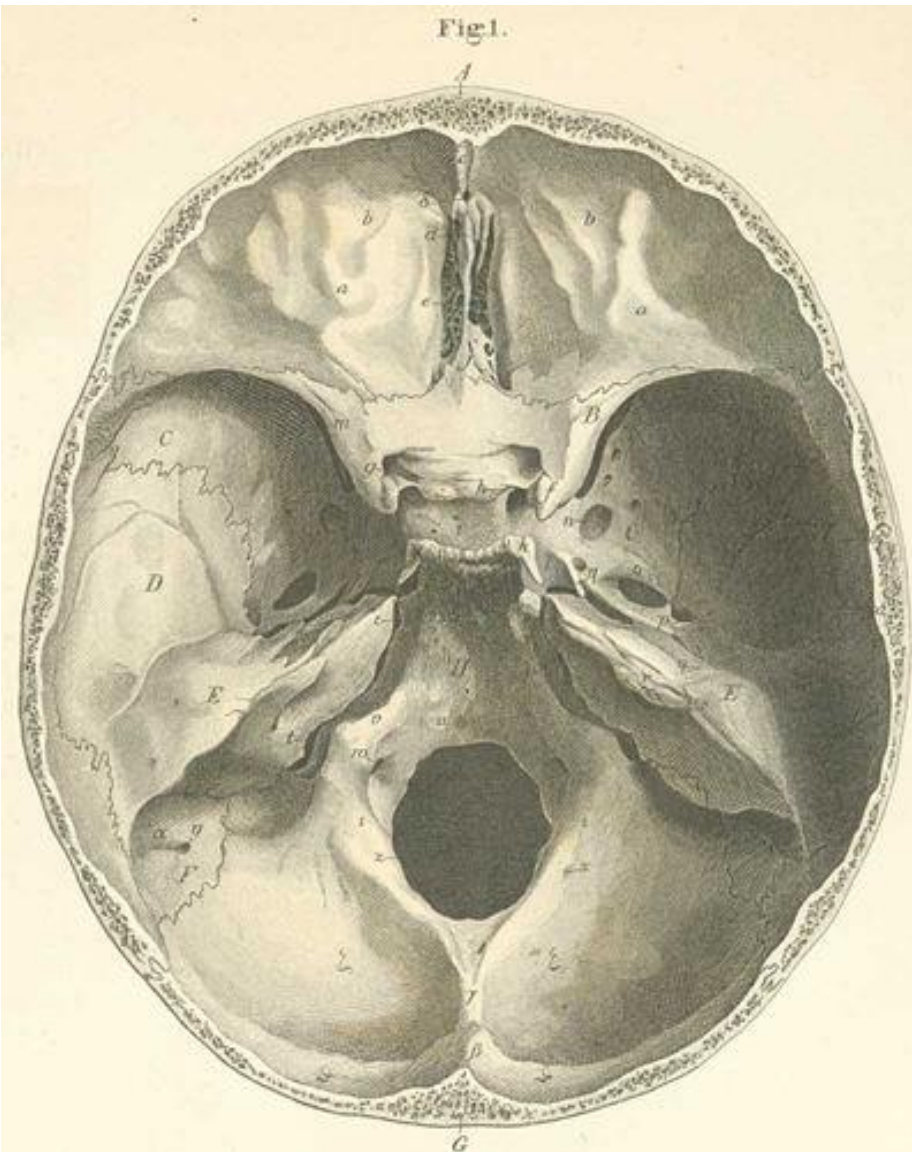
# Calota y Base Craneal



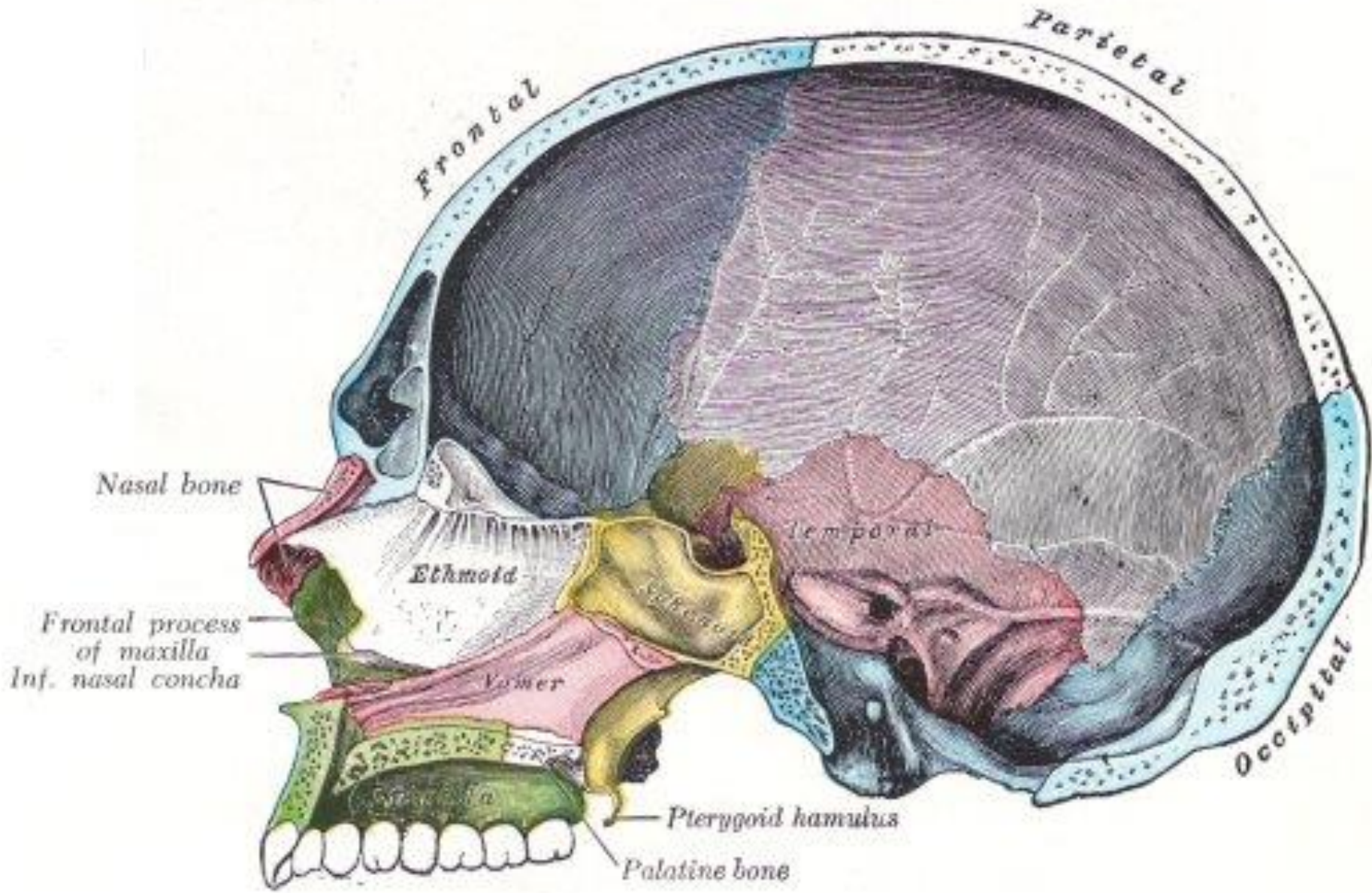


# BASE CRANEAL

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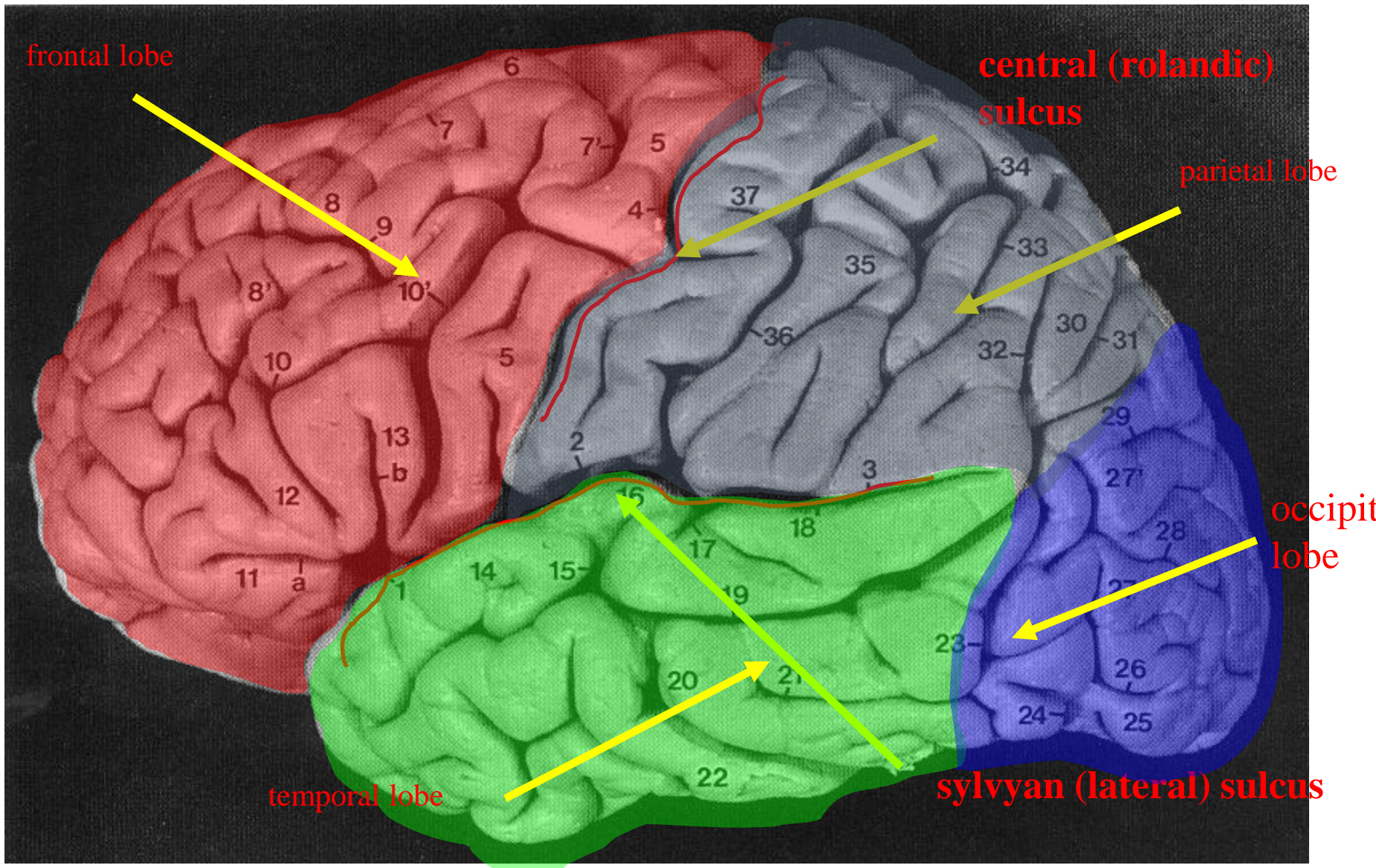


**(b) Superior view of cranial floor**



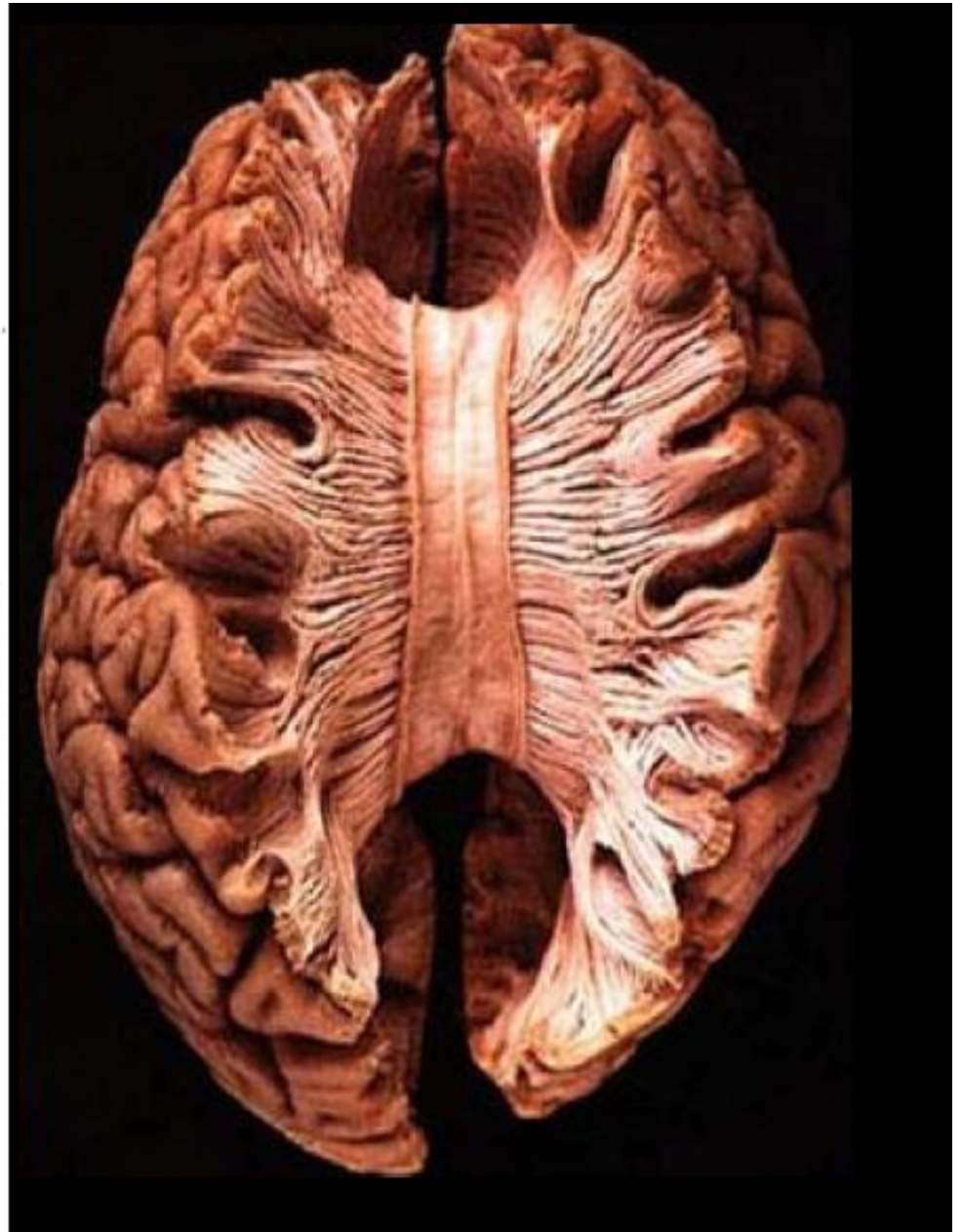
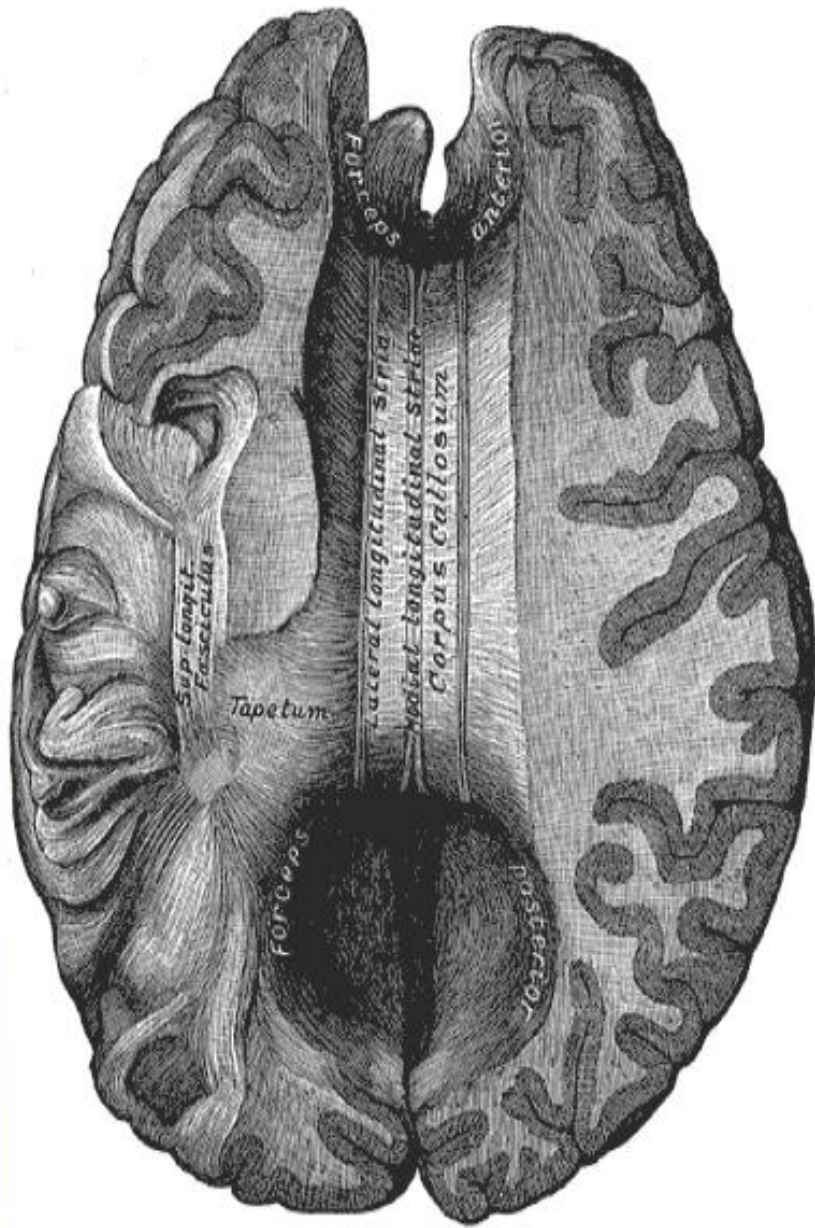
# Encéfalo. Superficie Externa

- Surcos (Fisuras) y Circunvoluciones
- Surco Central (Rolando) y Lateral (Silvio)
- Ínsula

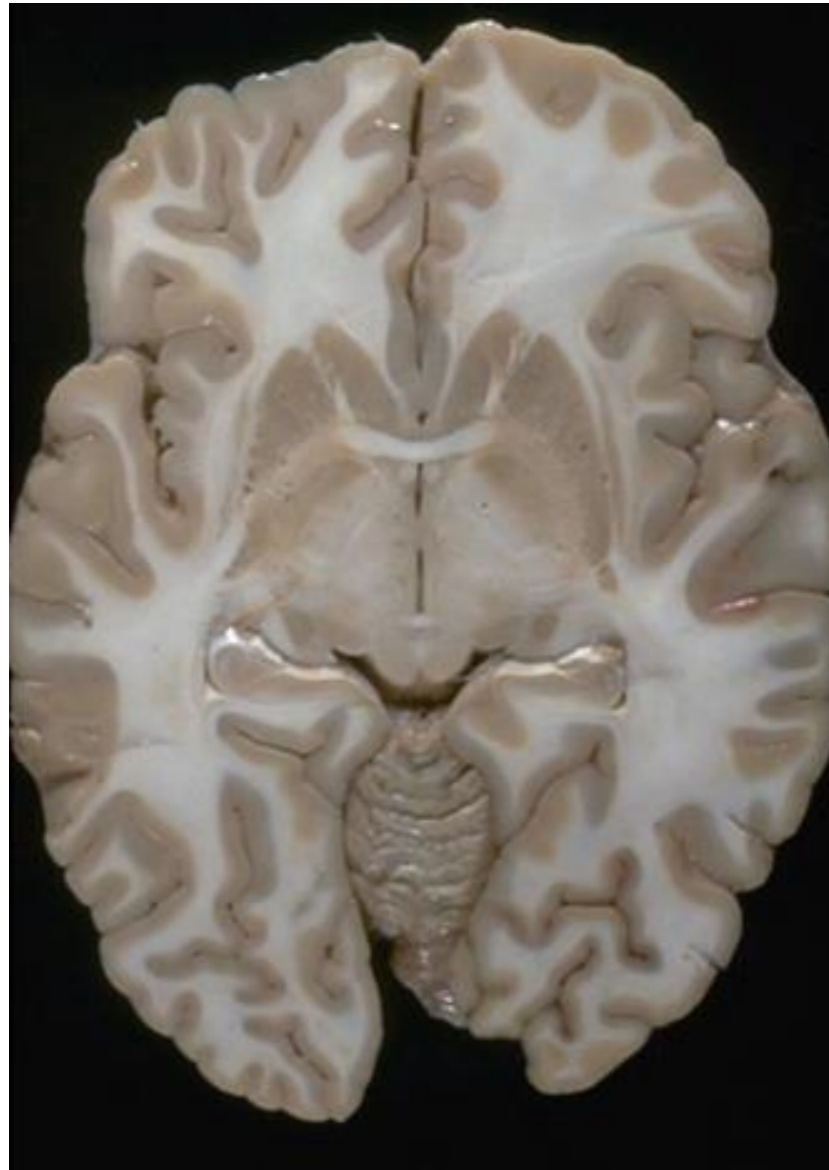




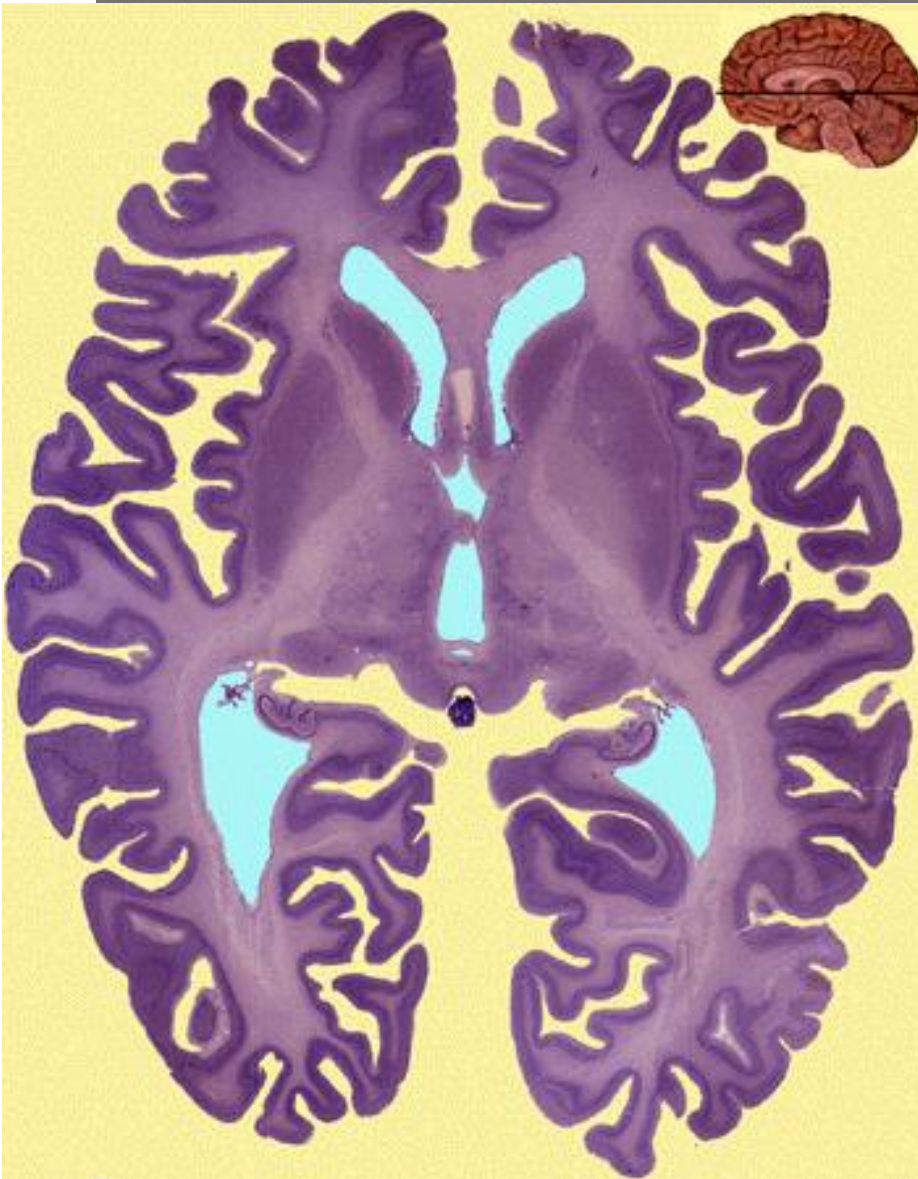
# Estructuras de Asociación Inter-Hemisféricas o Comisurales

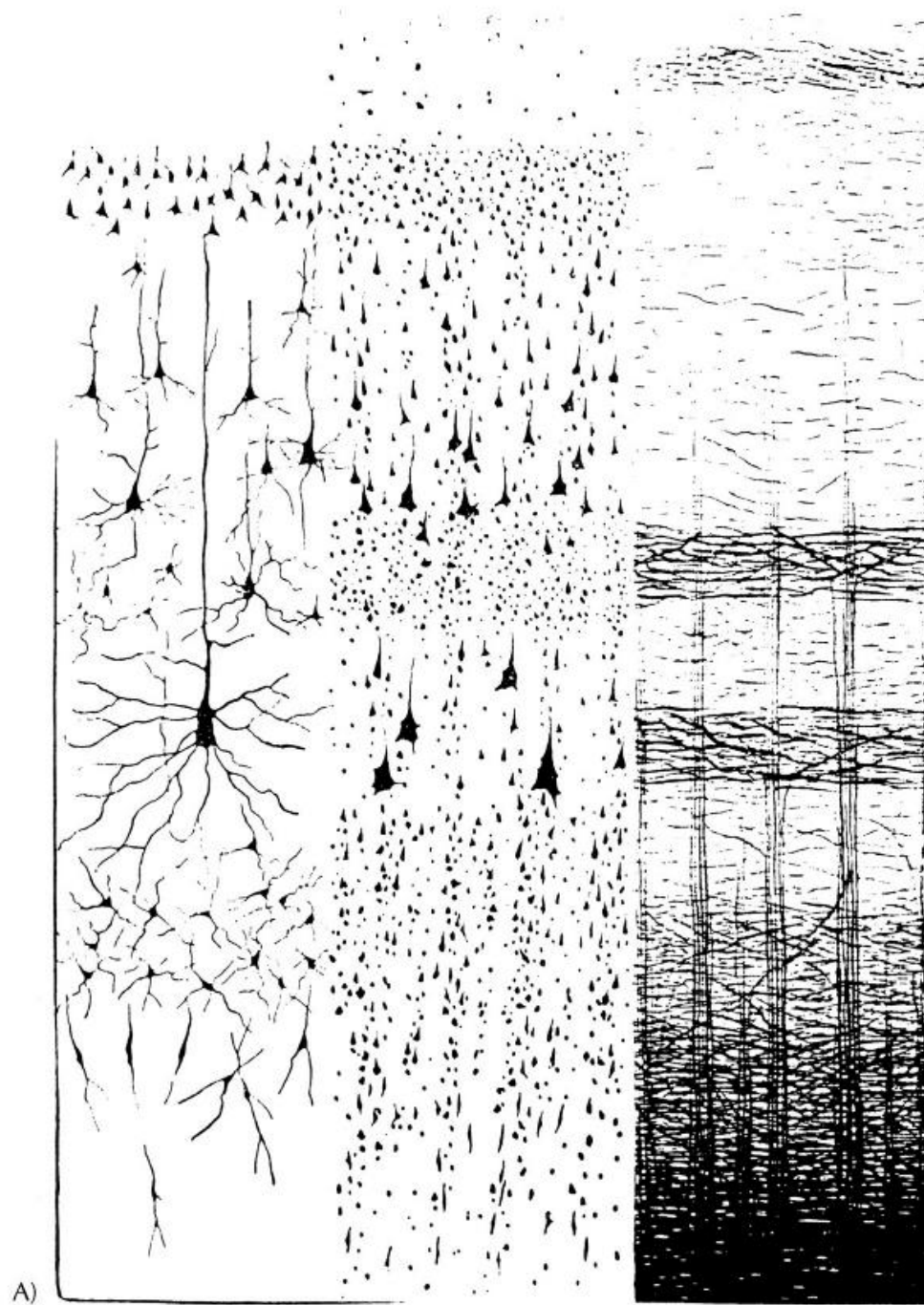


# Sustancia Blanca y Sustancia Gris



# Nissl vs Myelin Stain





A)



## Vergleichende Lokalisation der Großhirnrinde

in ihren Prinzipien dargestellt auf  
des Zellenbaues

Von

**Dr. K. Brodmann**

Assistenten am neurobiologischen Laboratorium der Universität

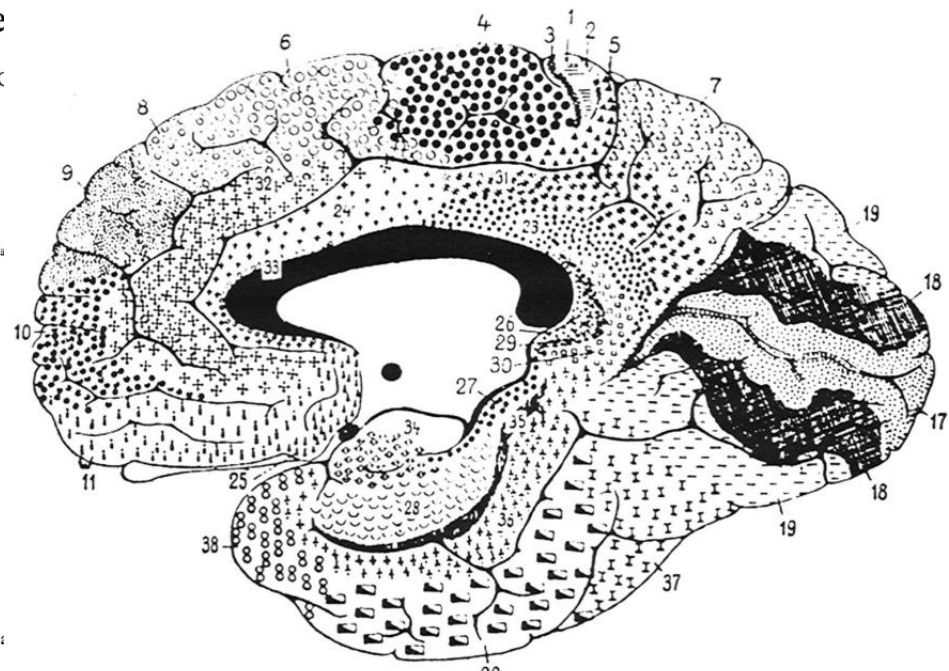
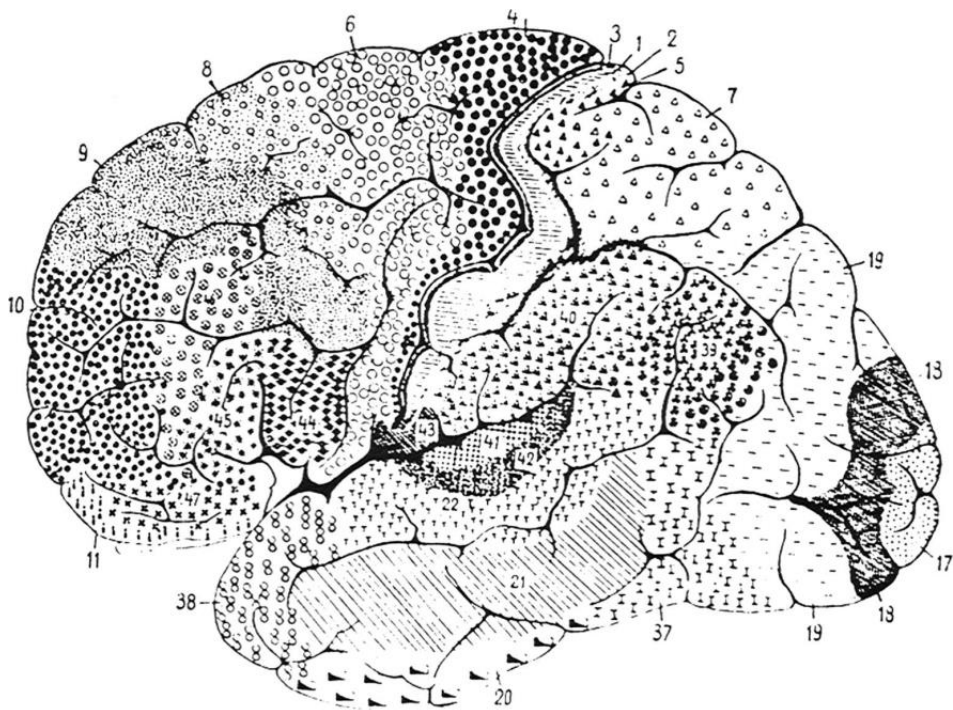
Mit 150 Abbildungen im Text.



Leipzig

Verlag von Johann Ambrosius Barth

1909



*K. Brodmann*

1868—1918

# Áreas de Brodmann Básicas

4 ... Movimiento (motora)

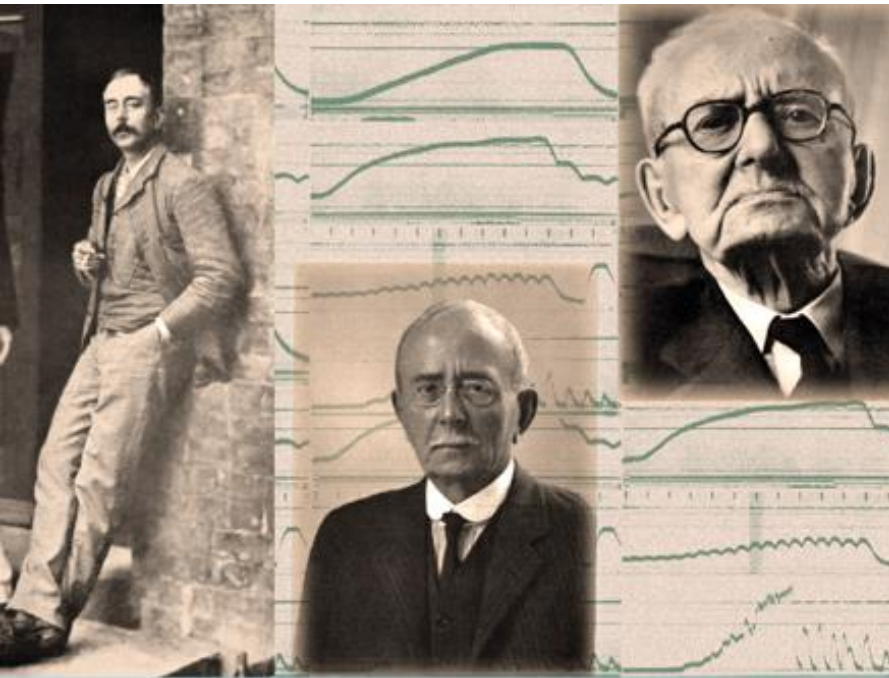
3,1,2 ... Sensibilidad

17,18,19 ... Visión

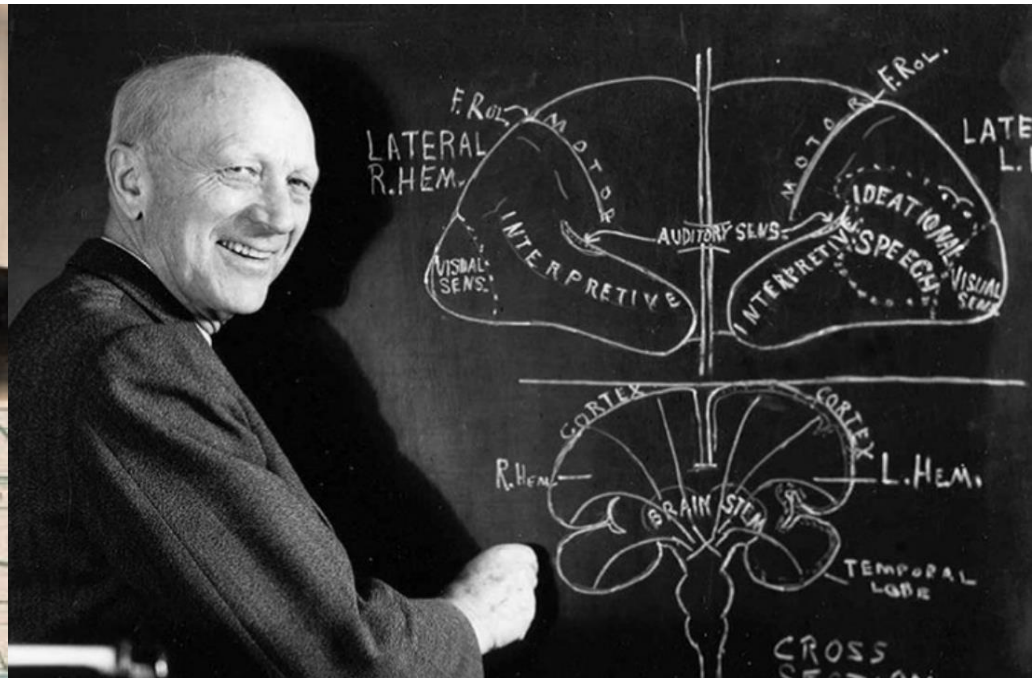
44 ... Lenguaje Motor

# Representación Cortical de Nuestro Cuerpo

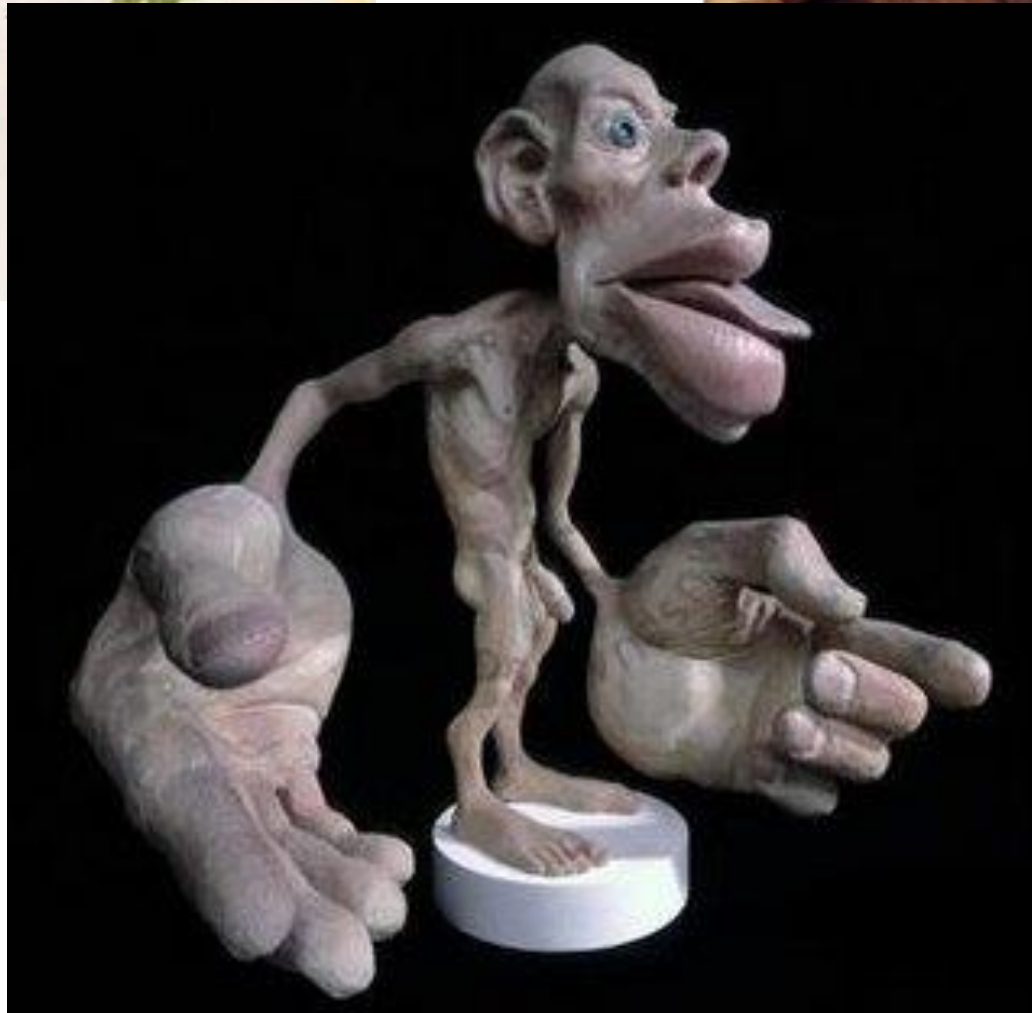
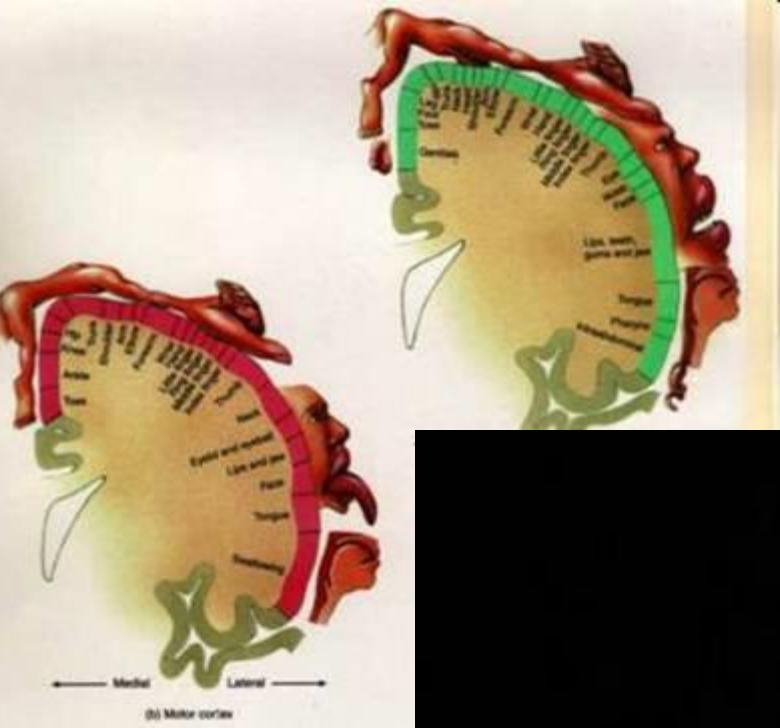
“If you set out to do your best and work hard, the paths will open up for you. I know. It’s worked for me.”



Sir Charles Sherrington



Wilder Penfield



# Vesículas Cerebrales

## 1. Vesículas Primarias.

Rombencéfalo, Mesencéfalo y Prosencéfalo

## 2. Vesículas Secundarias.

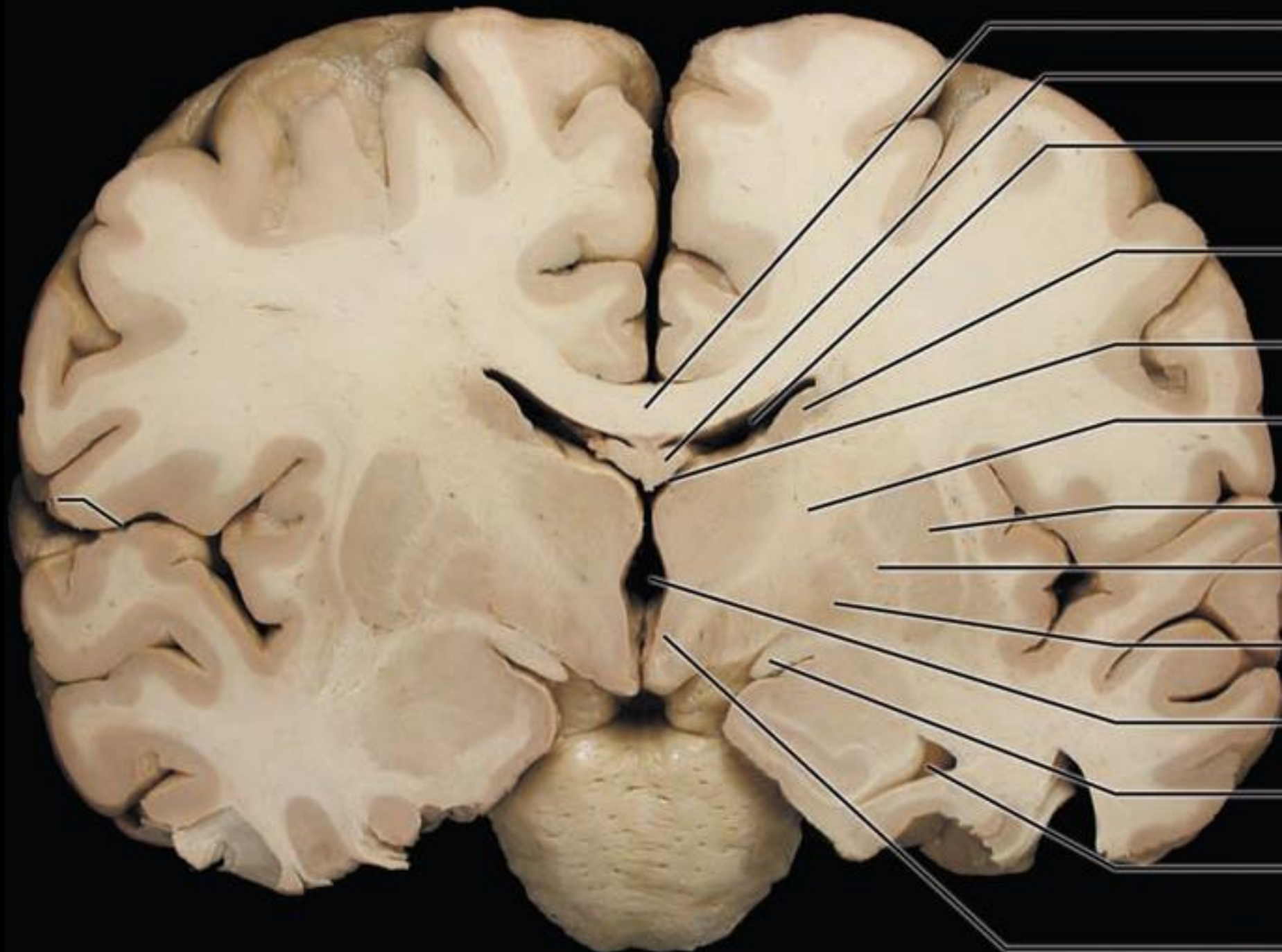
Mielencéfalo y Metencéfalo

Mesencéfalo

Diencéfalo y Telencéfalo

# Derivados de las Vesículas Cerebrales

1. Mielencéfalo. **Bulbo**
2. Metencéfalo. **Puente y Cerebelo**
3. Mesencéfalo.
4. Diencéfalo. **Tálamo e Hipotálamo**
5. Telencéfalo. **Hemisferios Cerebrales**



# Estructuras Sub-Corticales

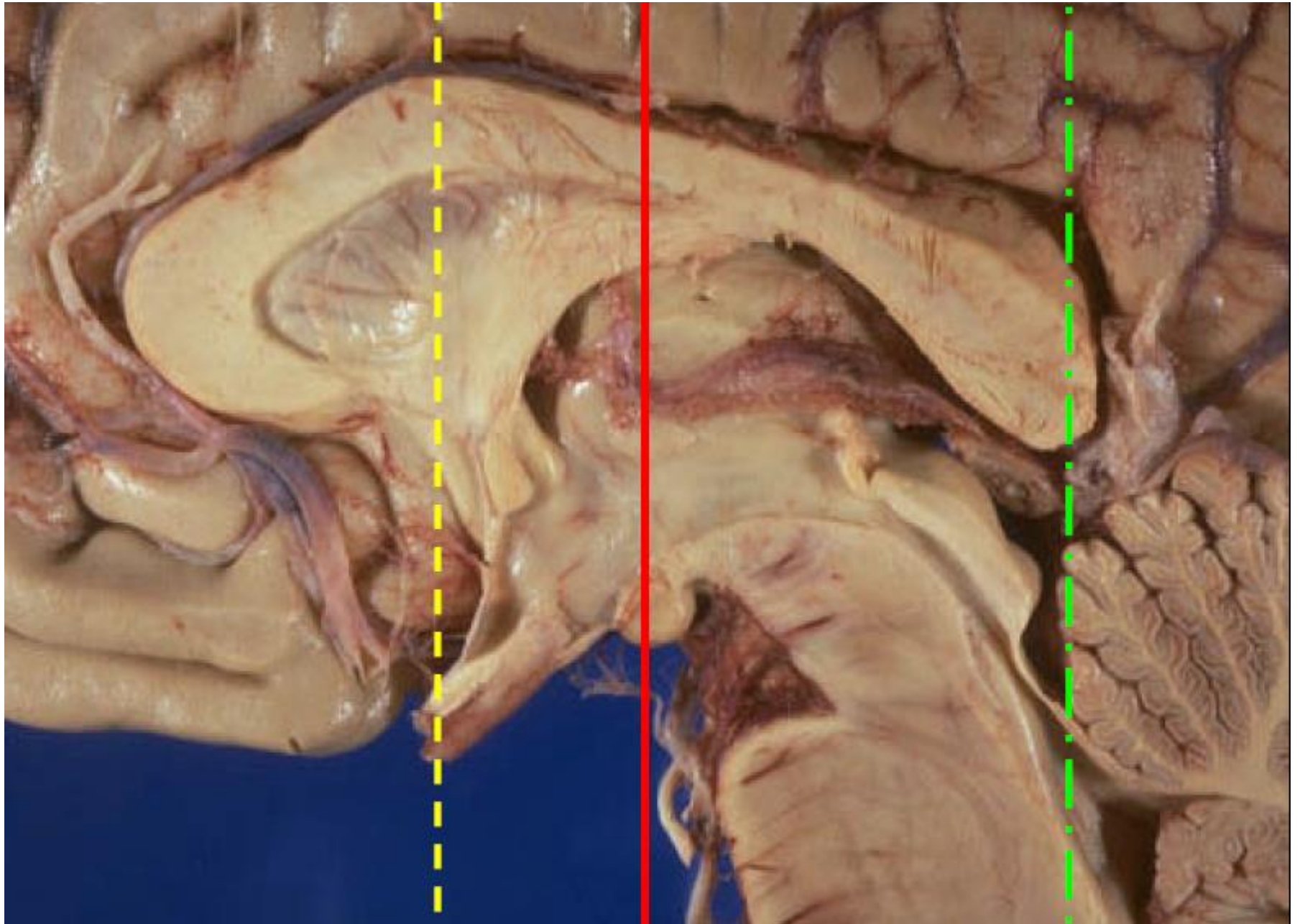
1. Diencéfalo. **Tálamo e Hipotálamo**
2. Telencéfalo. **Hemisferios Cerebrales**  
**Sustancia Blanca Profunda. Ganglios Basales**
3. Sistema Límbico
4. Ventrículos Laterales



# Tálamo

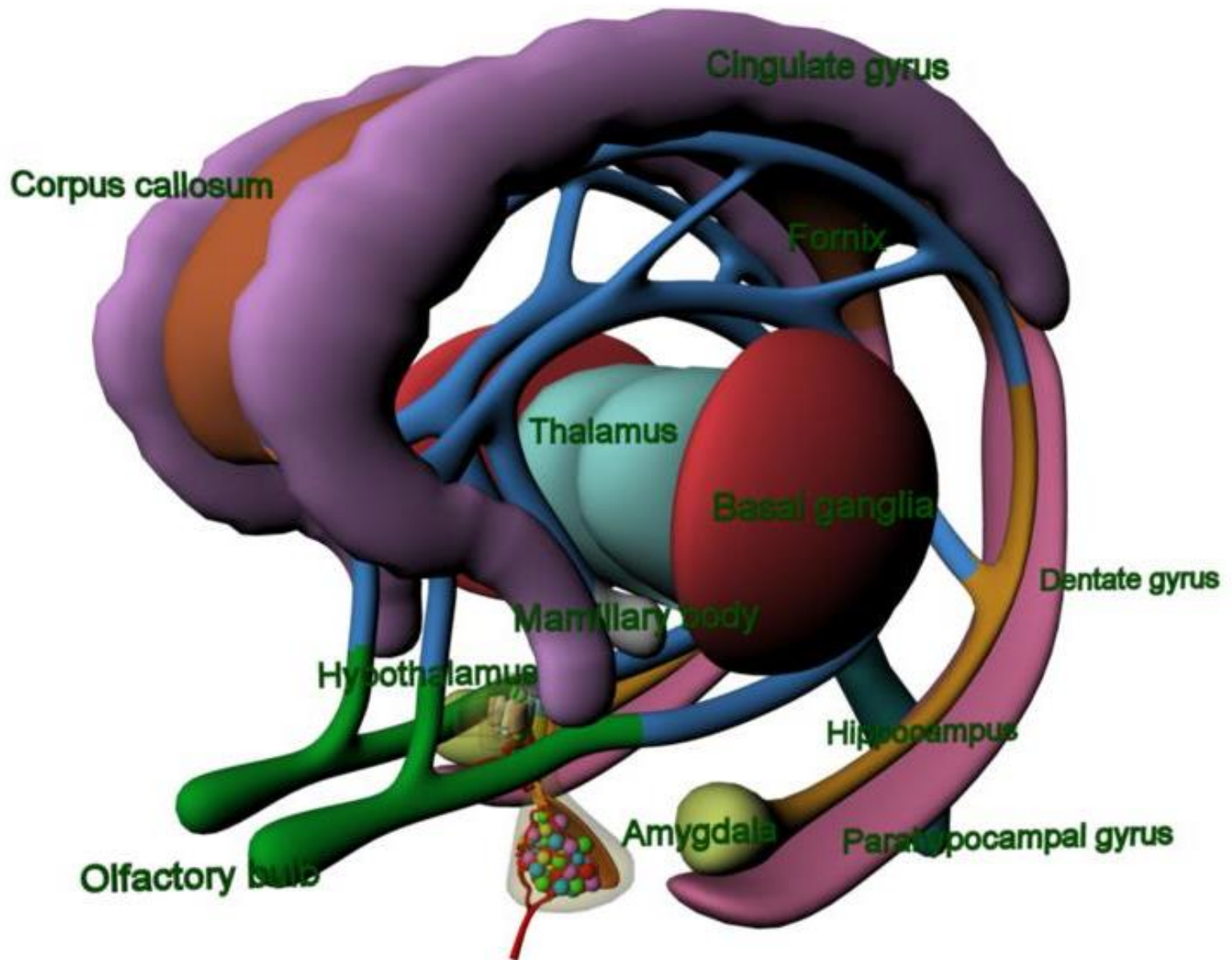
“Mini cerebro”.

Principal estructura de relevo de la información que llega a la corteza cerebral.



# Sistema Límbico

1. Fórnix
2. Tracto Mamillo-Talámico
3. Tálamo anterior
4. Cíngulo
5. Giro uncinado
6. Amígdala
7. Formación Hipocampal



# Estructuras Infratentoriales

Tallo cerebral: Mesencéfalo, puente y bulbo

Cerebelo

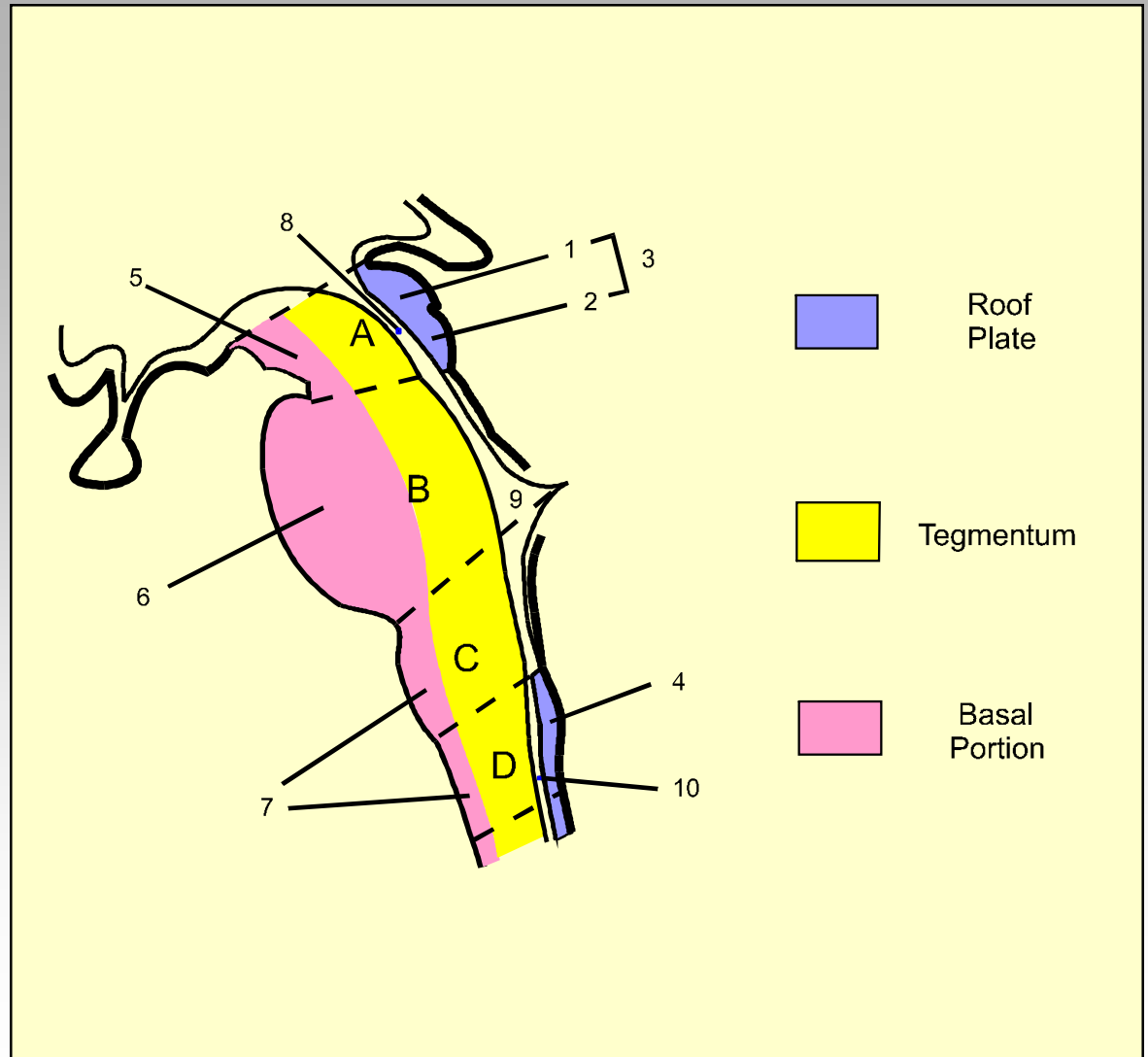


# Basic Structure of *Brain Stem*

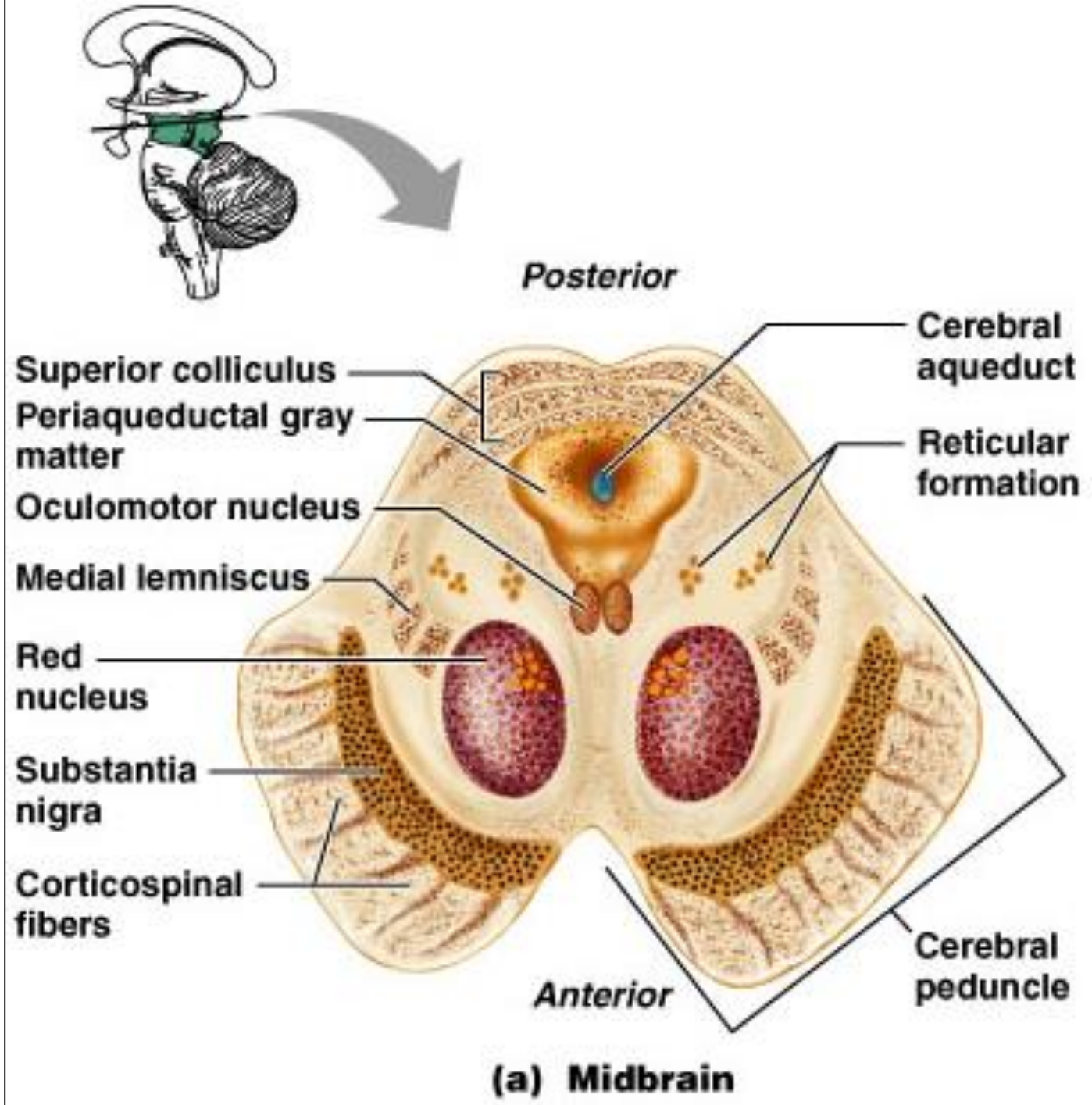
1. *Techo*

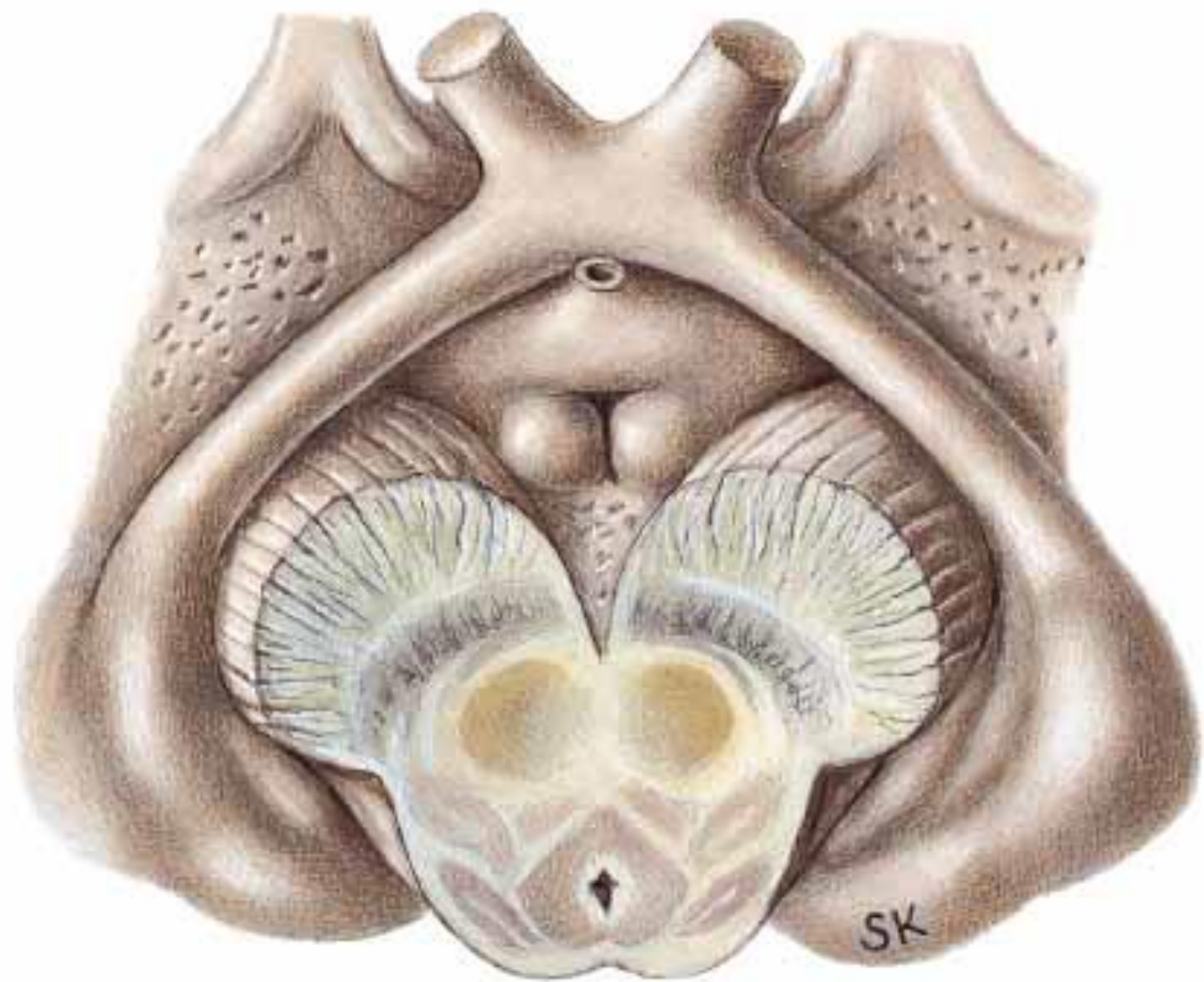
2. *Tegmentum*

3. *Porción Basilar*



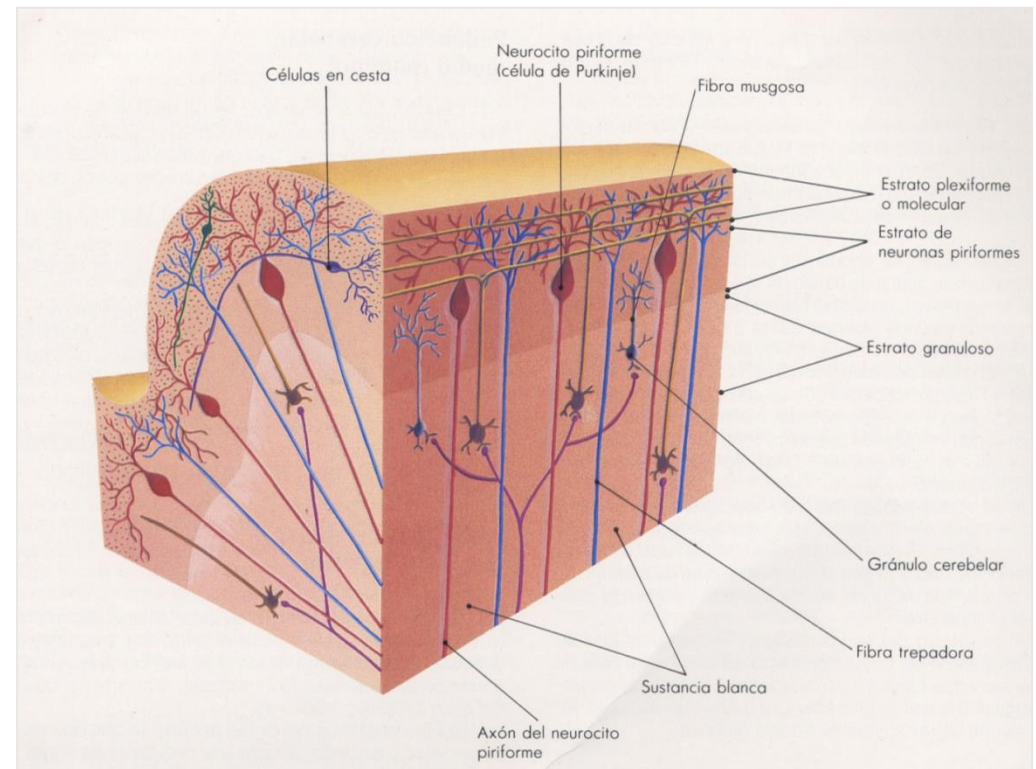
# Midbrain Nuclei





# CEREBELO

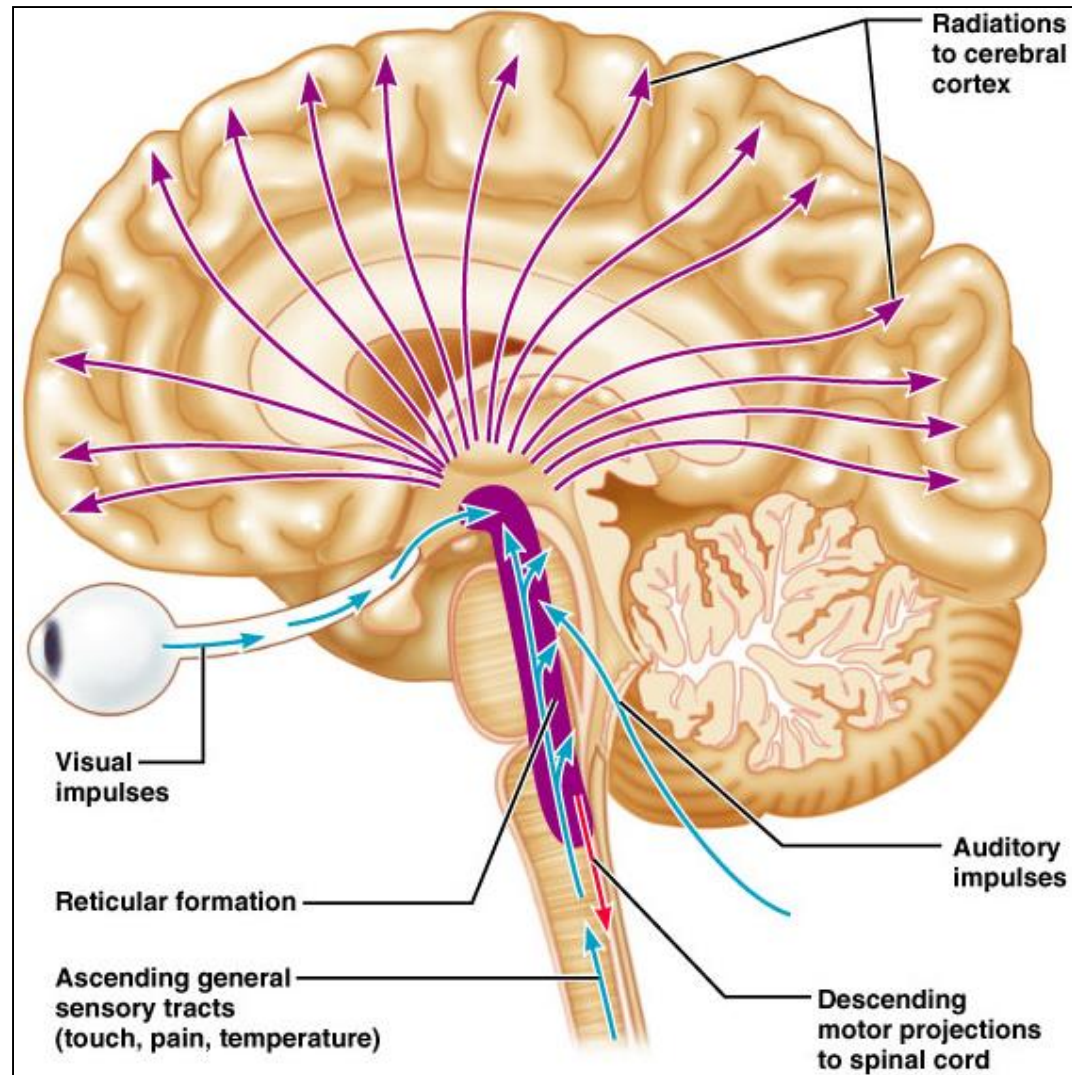
- CORTEX
- NUCLEOS: DENTEADO  
FASTIGIO  
GLOBOSO  
EMBOLIFORME
- IV VENTRICULO
- CÉLULAS:  
Purkinje



# Reticular Formation

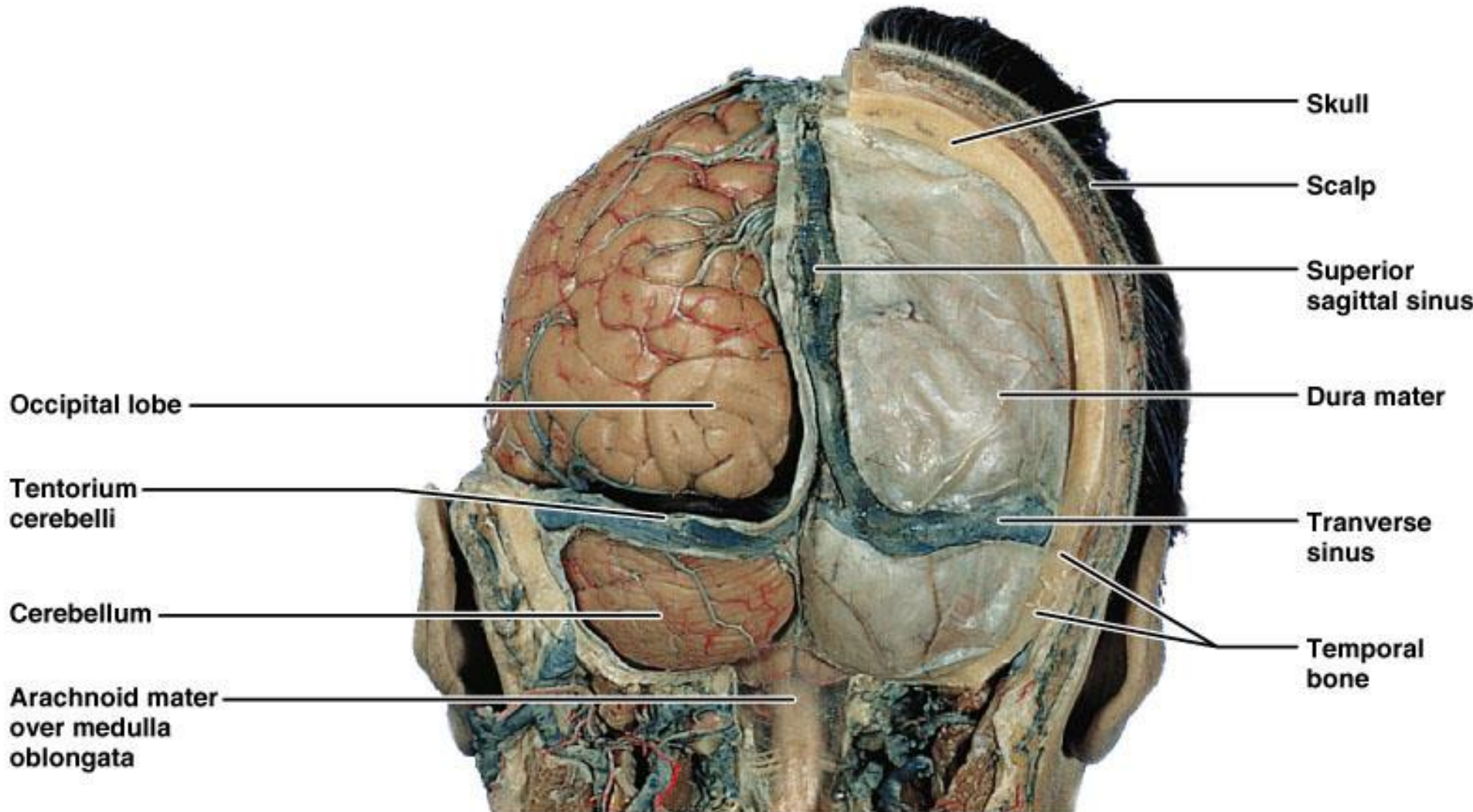
Three broad columns extending through the core of the brain stem

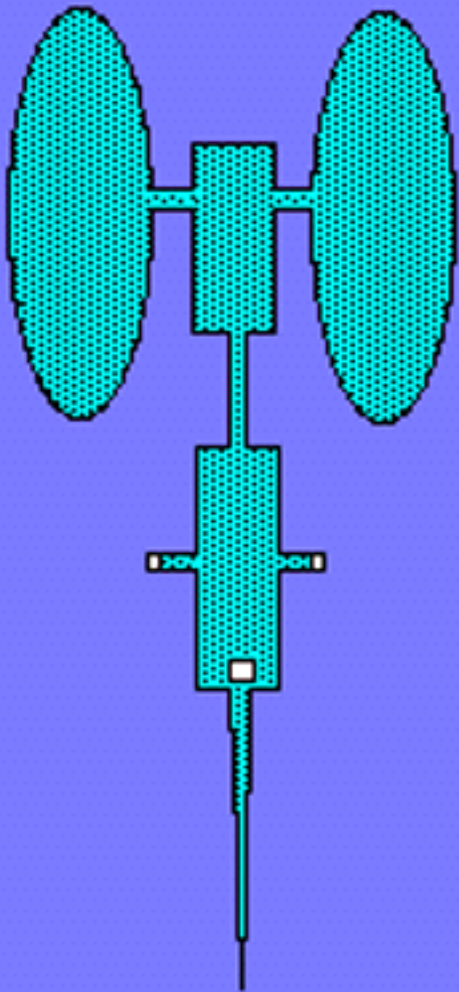
Has axon connections with hypothalamus, thalamus, cerebellum, and spinal cord



# Protection of the Brain

The brain is protected by bone, meninges, and cerebrospinal fluid (CSF)





# Vascular Anatomy of Brain

## **Anterior Circulation**

Paired Internal Carotid Arteries



Middle cerebral A      Anterior Cerebral A

## **Posterior Circulation**

Paired Vertebral Arteries



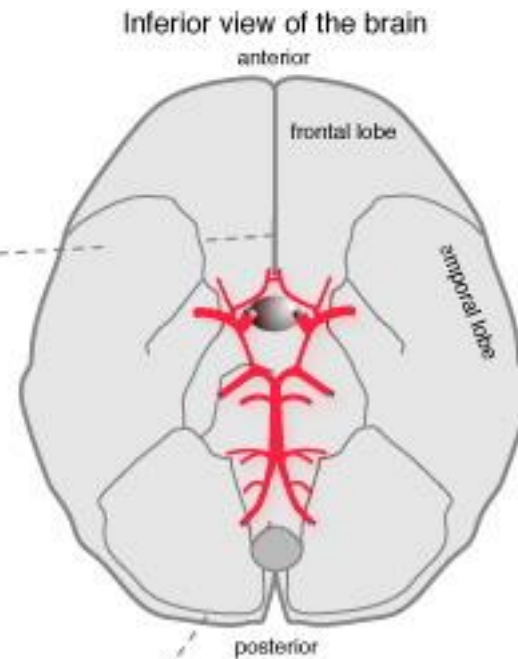
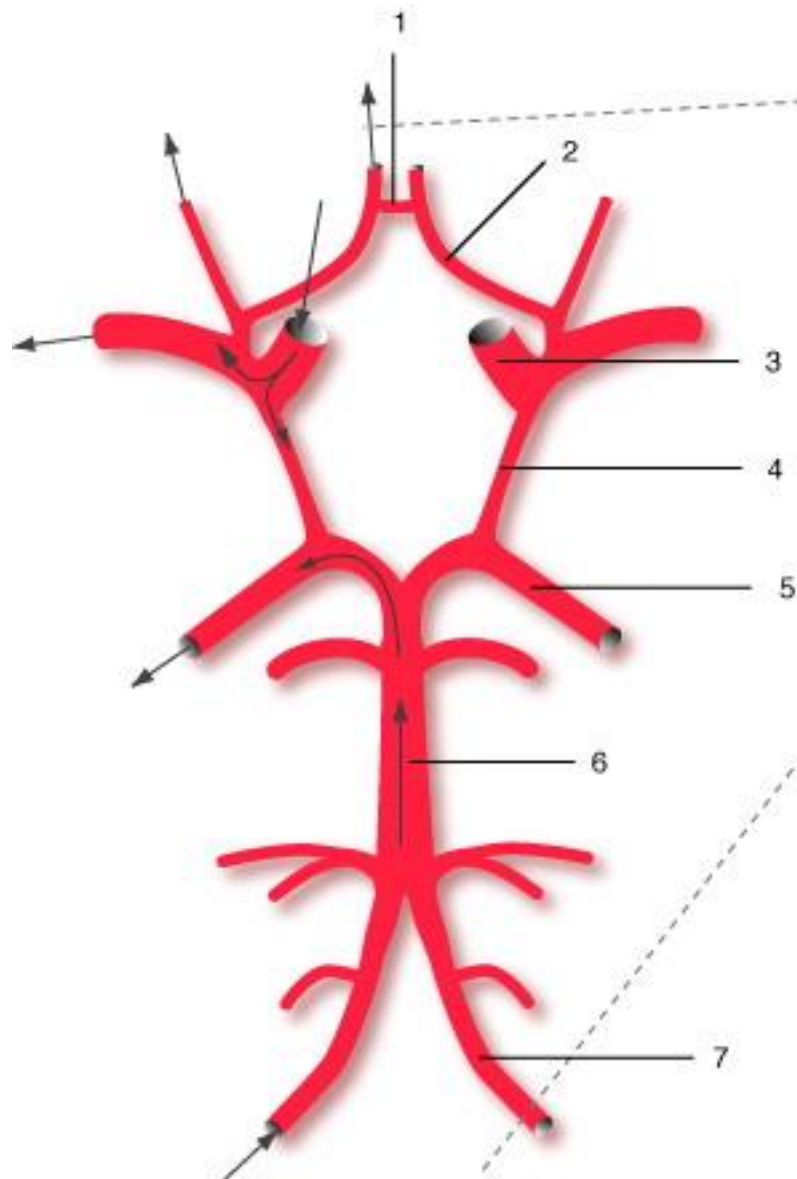
Basilar A



Posterior Cerebral A

Concept of 'end' arteries and 'communicating' arteries

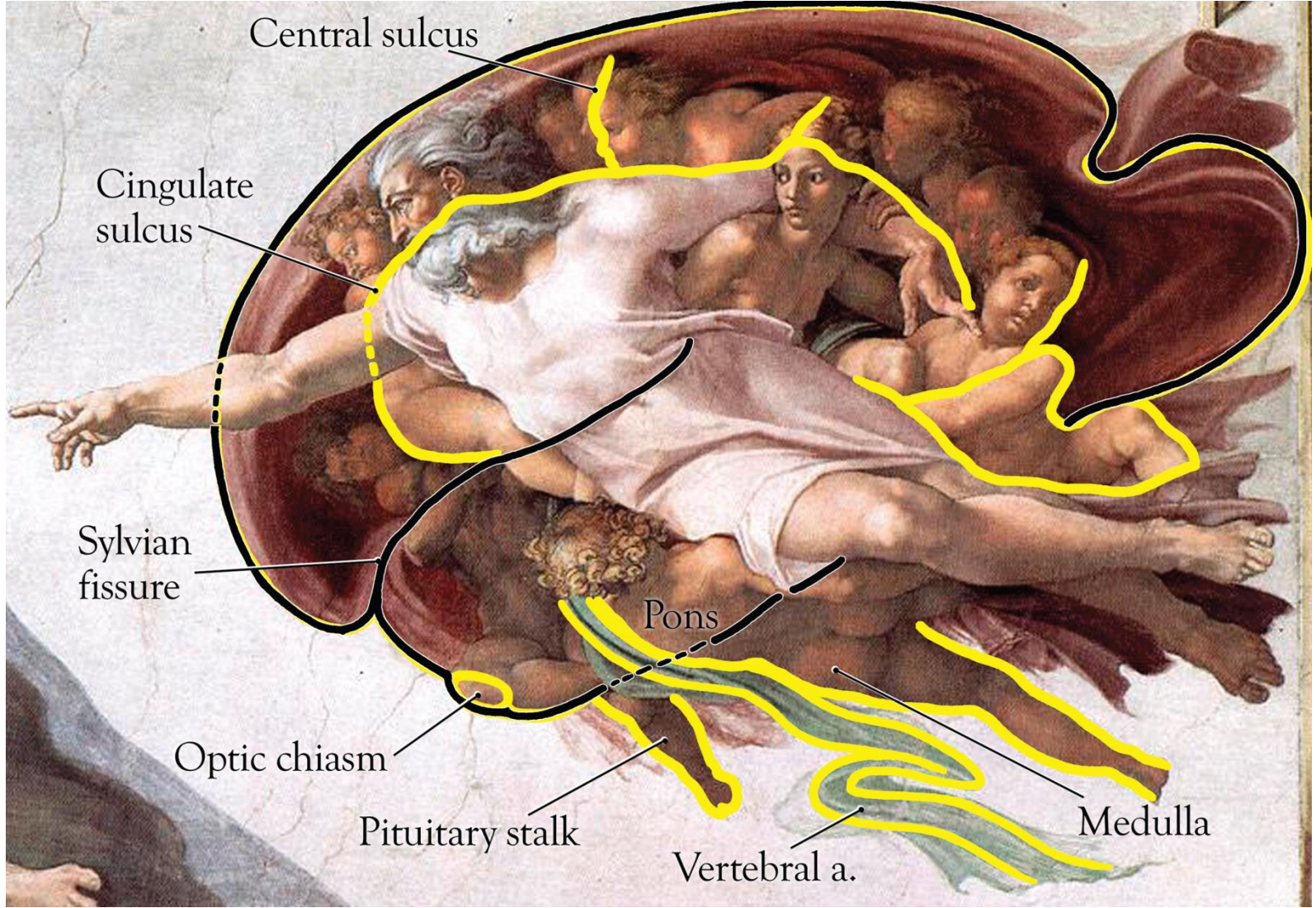
# The Arterial Circle of Willis

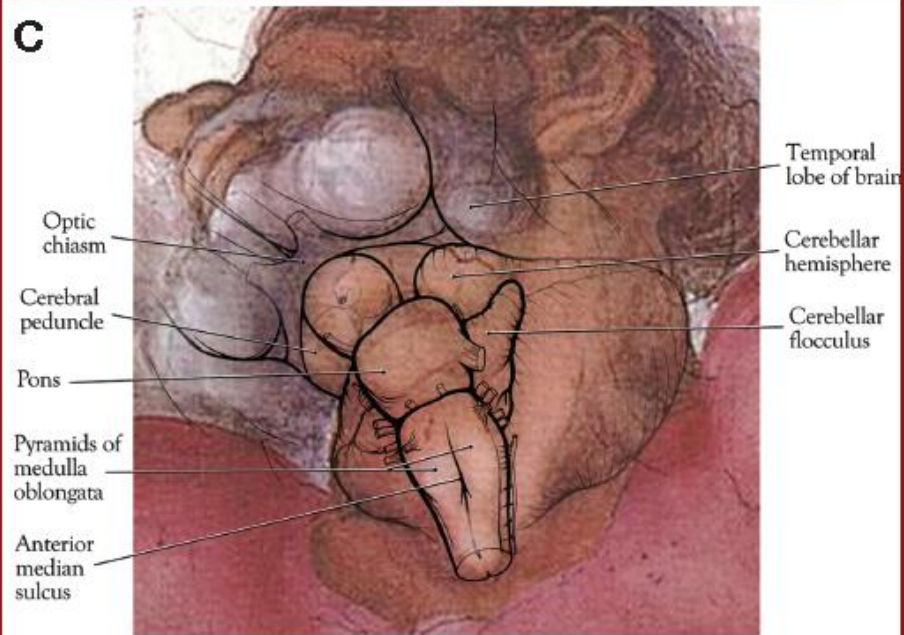
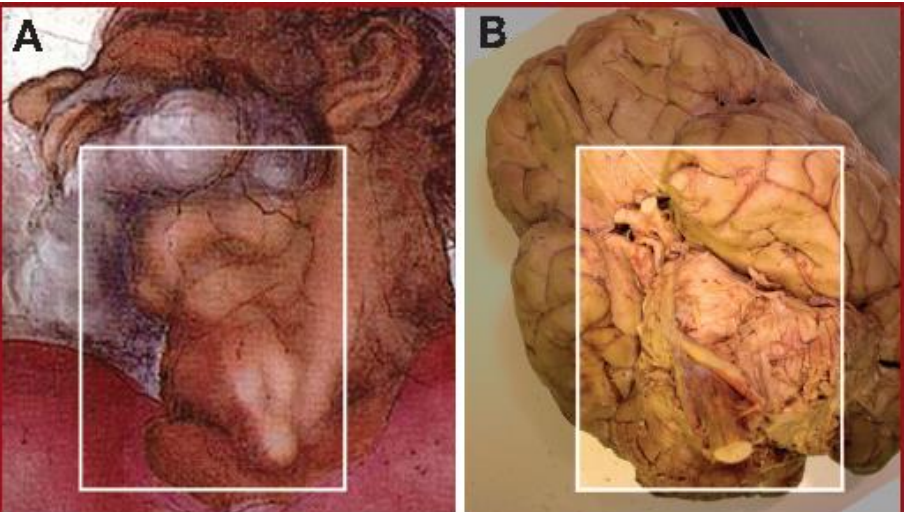


## Arteries of the Circle of Willis\*

1. Anterior communicating\*
2. Anterior cerebral\*
3. Carotid
4. Posterior communicating\*
5. Posterior cerebral\*
6. Basilar
7. Vertebral

Anil Rao, Ph.D., 2001

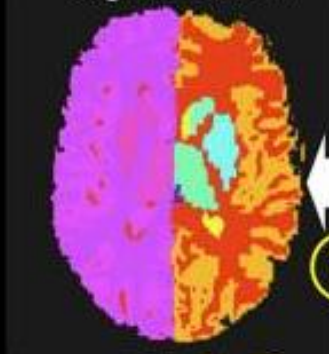




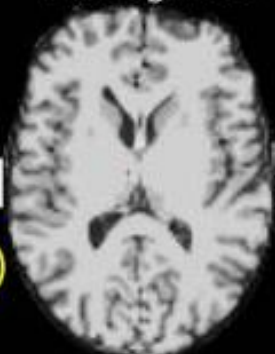
**FIGURE 5.** Analysis of 2 disparate light sources in the Separation of Light

# MRI Acquisition

Segmentation



T1w high res.



Diffusion Spectrum Imaging



2

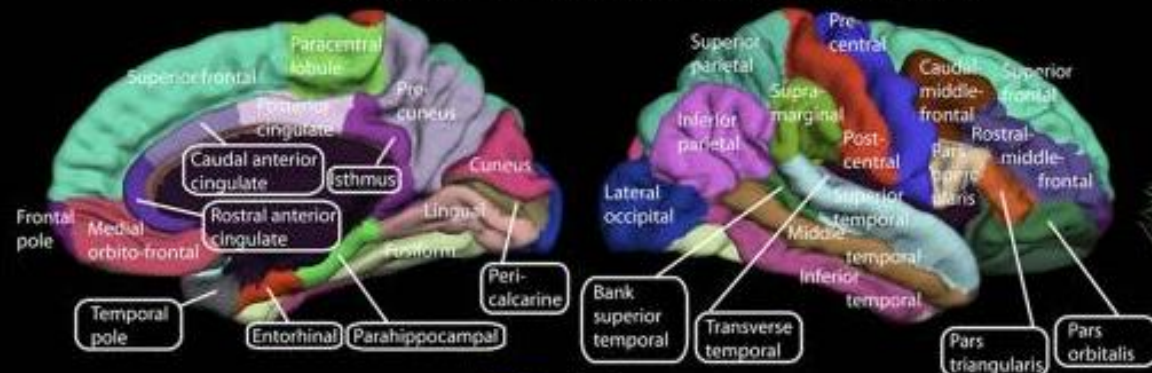
1

3a

4

Partition into 66 anatomical subregions

Tractography

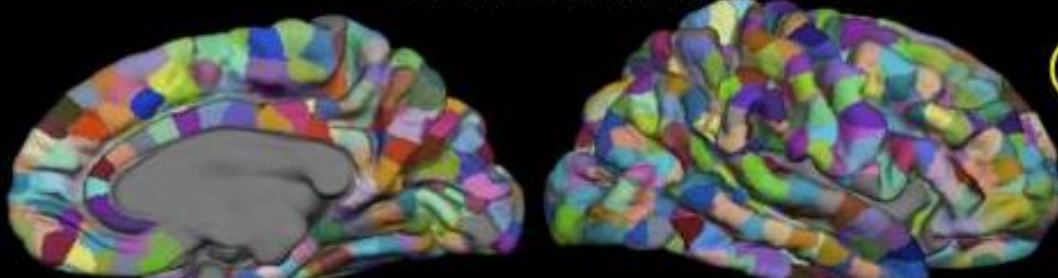


3b

5

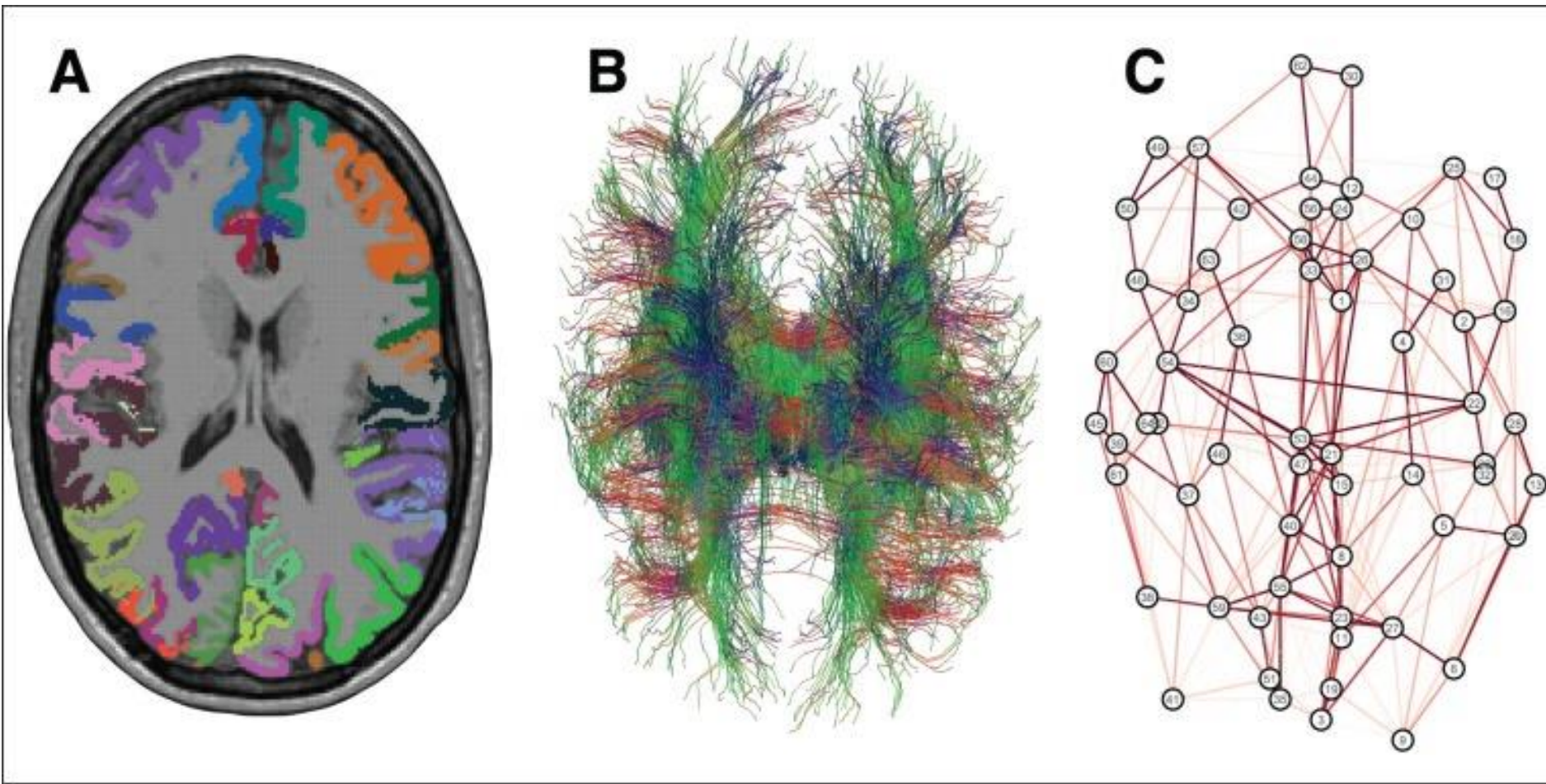
Partition into 1000 ROIs

Whole brain structural connection network



5





“Todos somos muy ignorantes.  
Lo que ocurre es que no todos  
ignoramos las mismas cosas”

