

# Module 7: Functional Anatomy of the Brain

**Arnold Bakker**

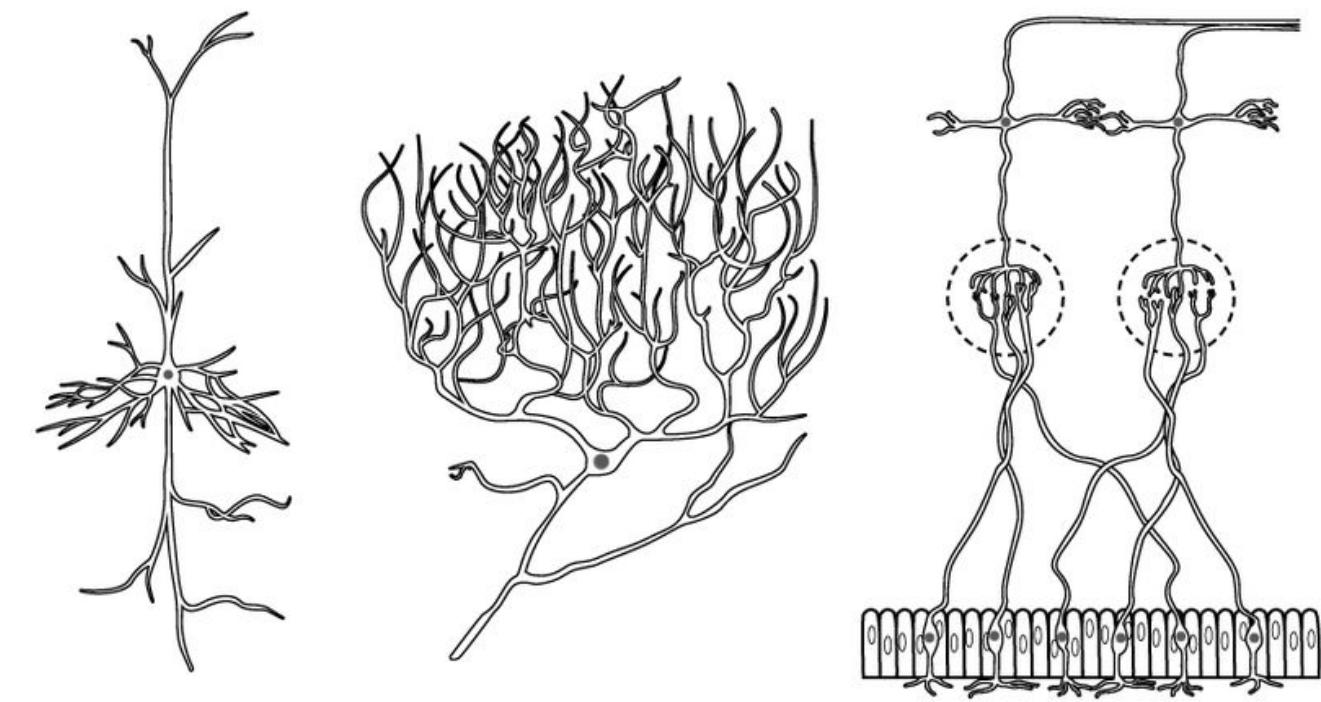
Department of Psychiatry and Behavioral Sciences  
Division of Psychiatric Neuroimaging  
Johns Hopkins University School of Medicine

# Functional Anatomy

Neurons form the fundamental information processing unit of the brain

Neurons vary in:

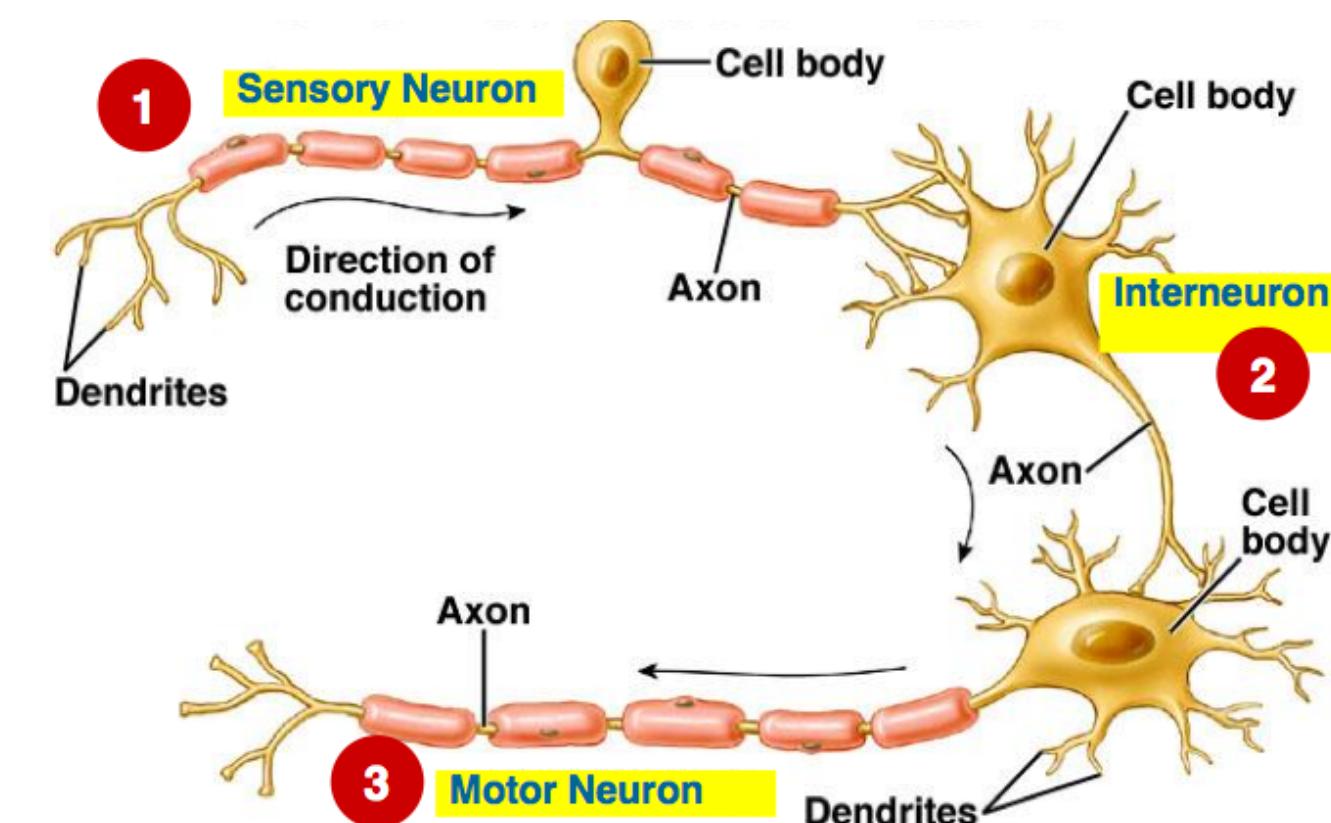
- Type (sensory, interneuron, motor)
- Length and complexity



(a) Pyramidal cell of the cerebral cortex

(b) Purkinje cell of the cerebellar cortex

(c) Olfactory cells in the olfactory epithelium and olfactory bulbs

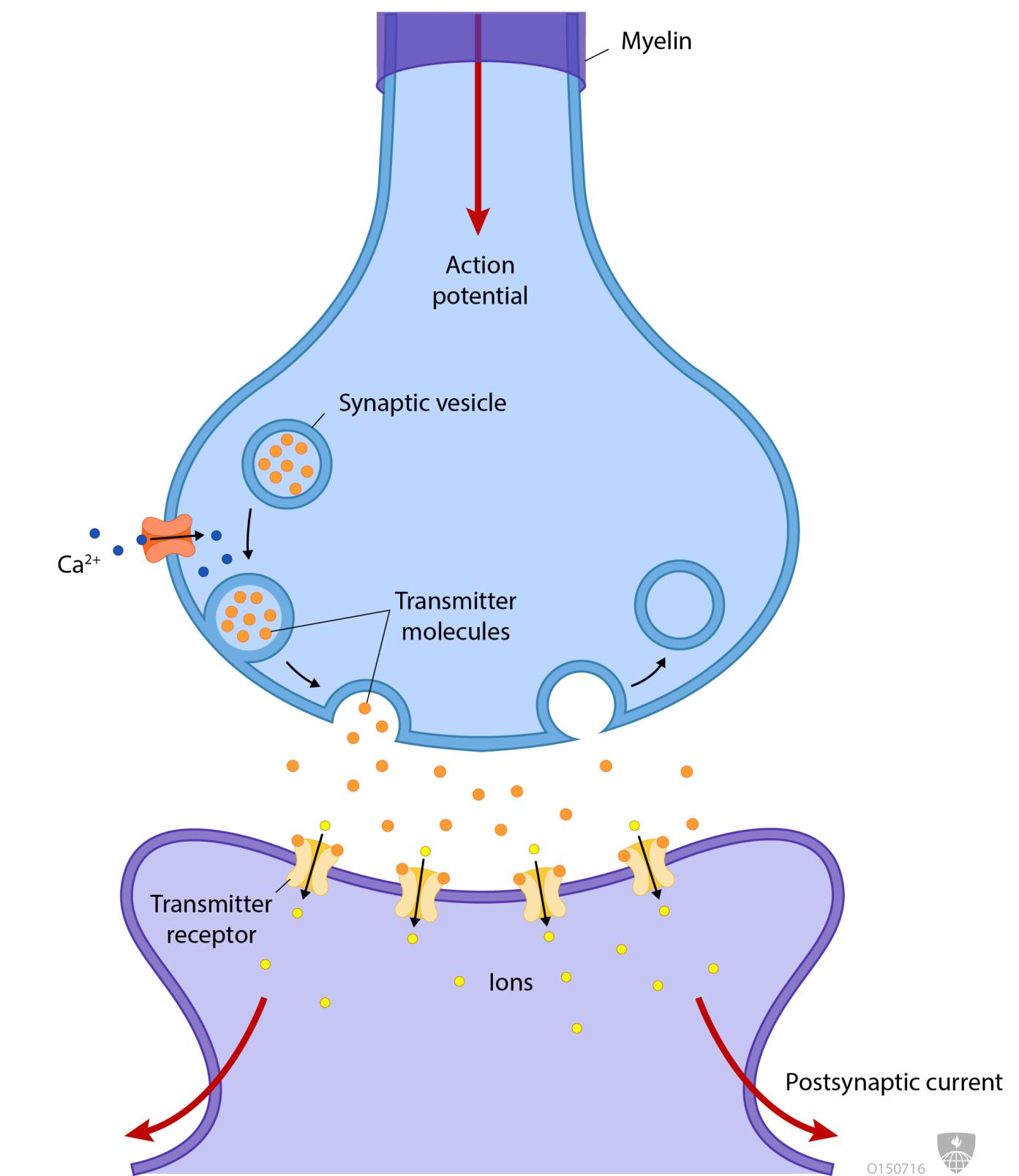


# Functional Anatomy

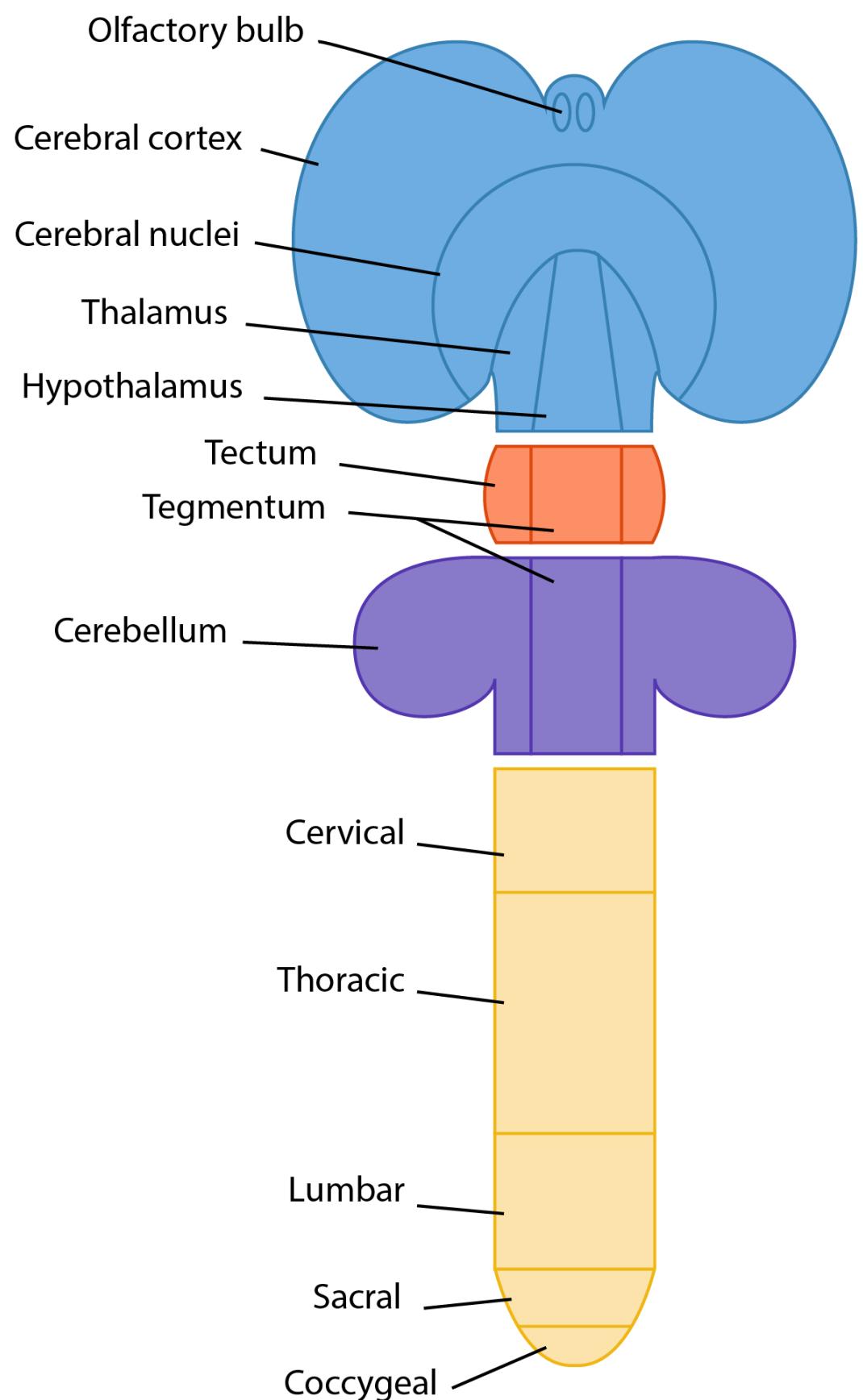
Neurons form the fundamental information processing unit of the brain

Neurons vary in:

- Type (sensory, interneuron, motor)
- Length and complexity
- Receptors and Neurotransmitters
- Excitatory or inhibitory



# Functional Anatomy



**Endbrain**

**Midbrain**

**Hindbrain**

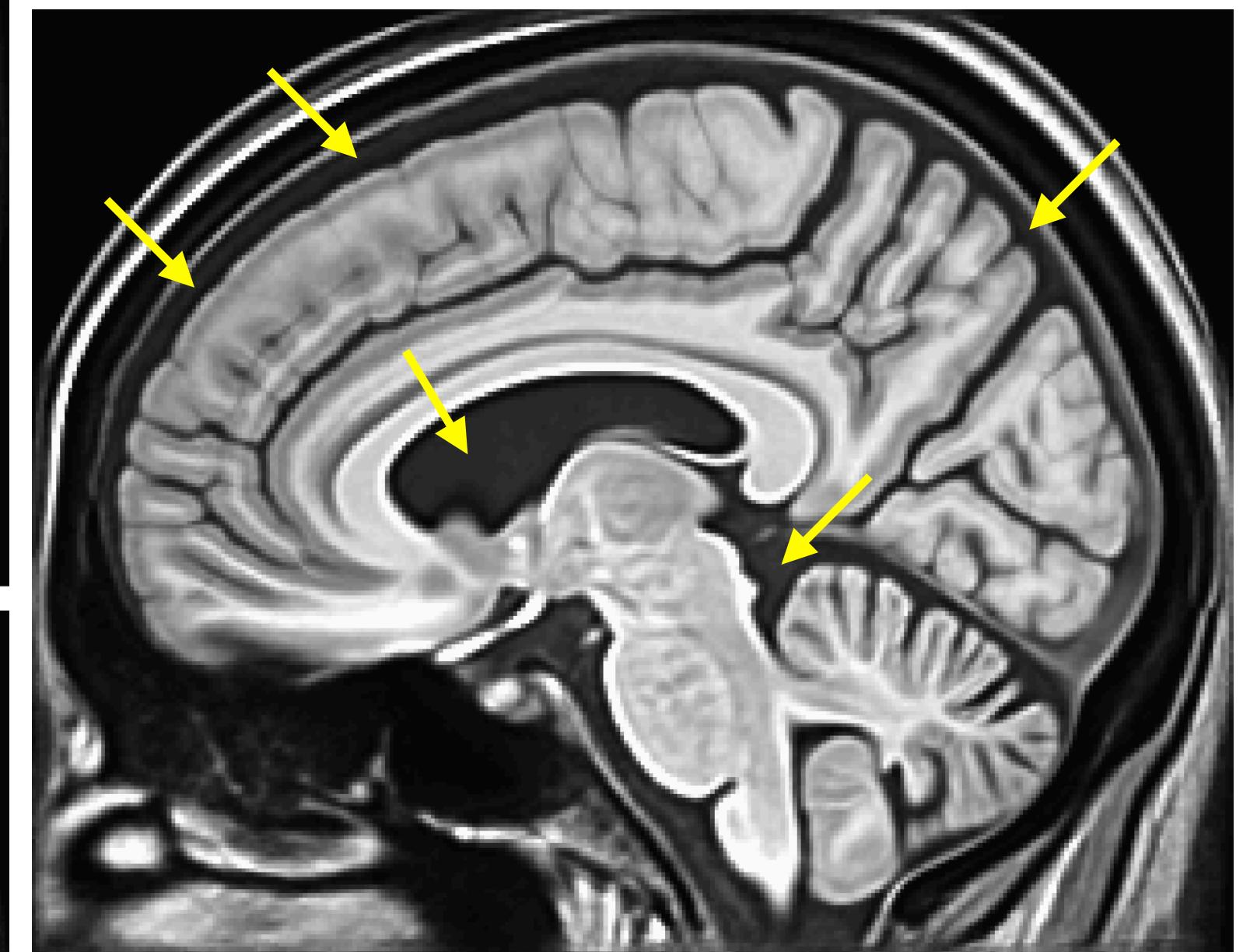
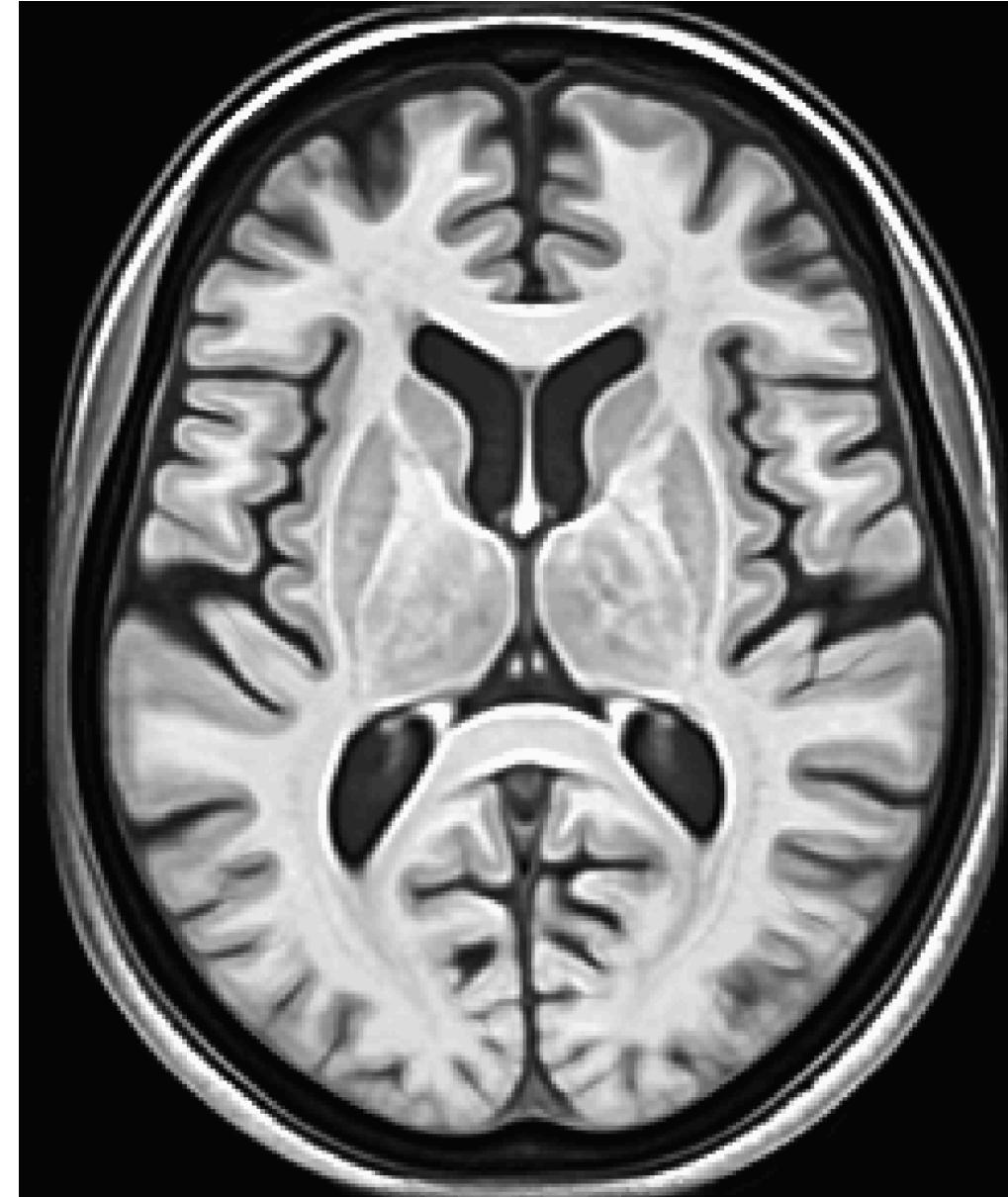
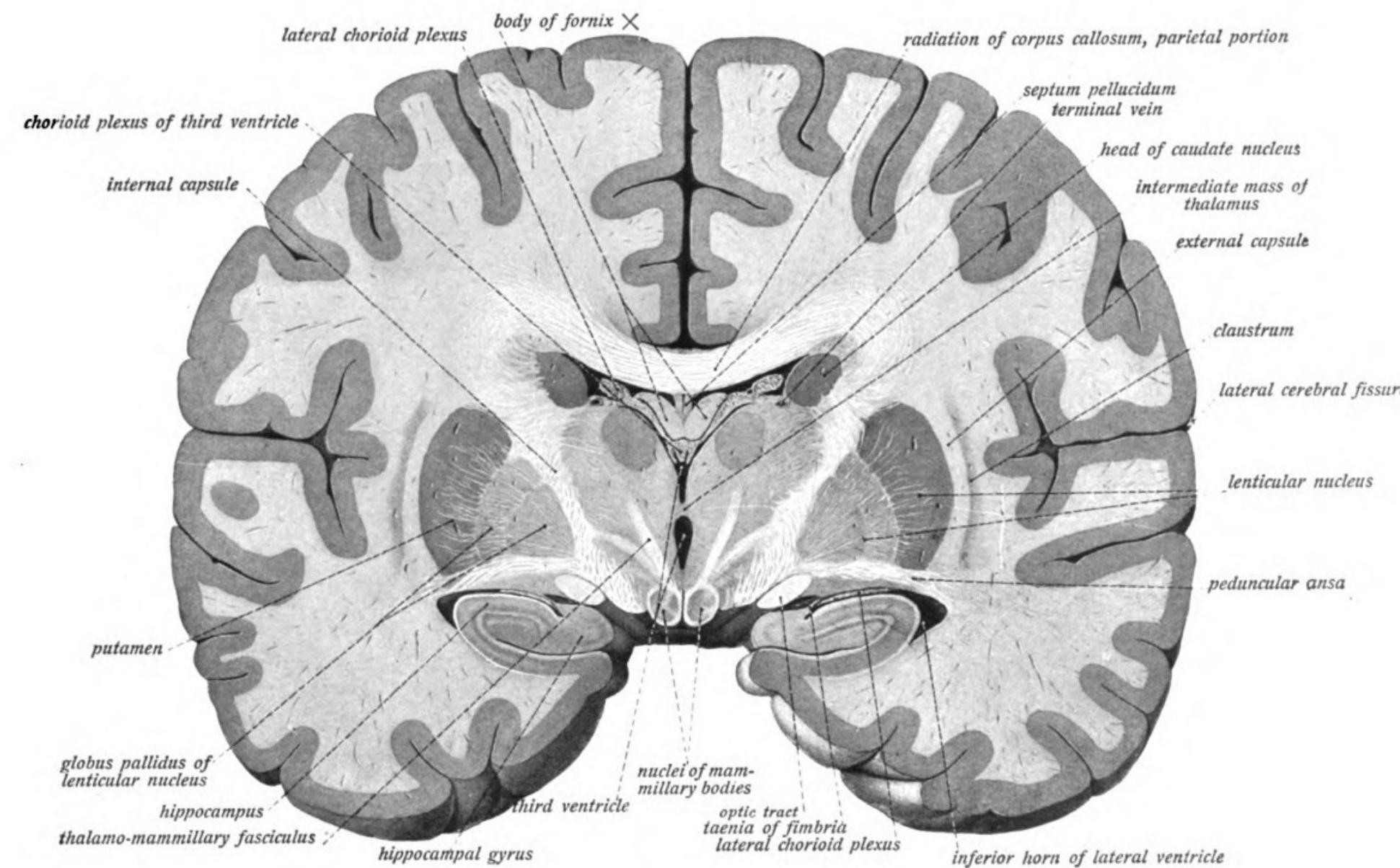
**Spinal cord**

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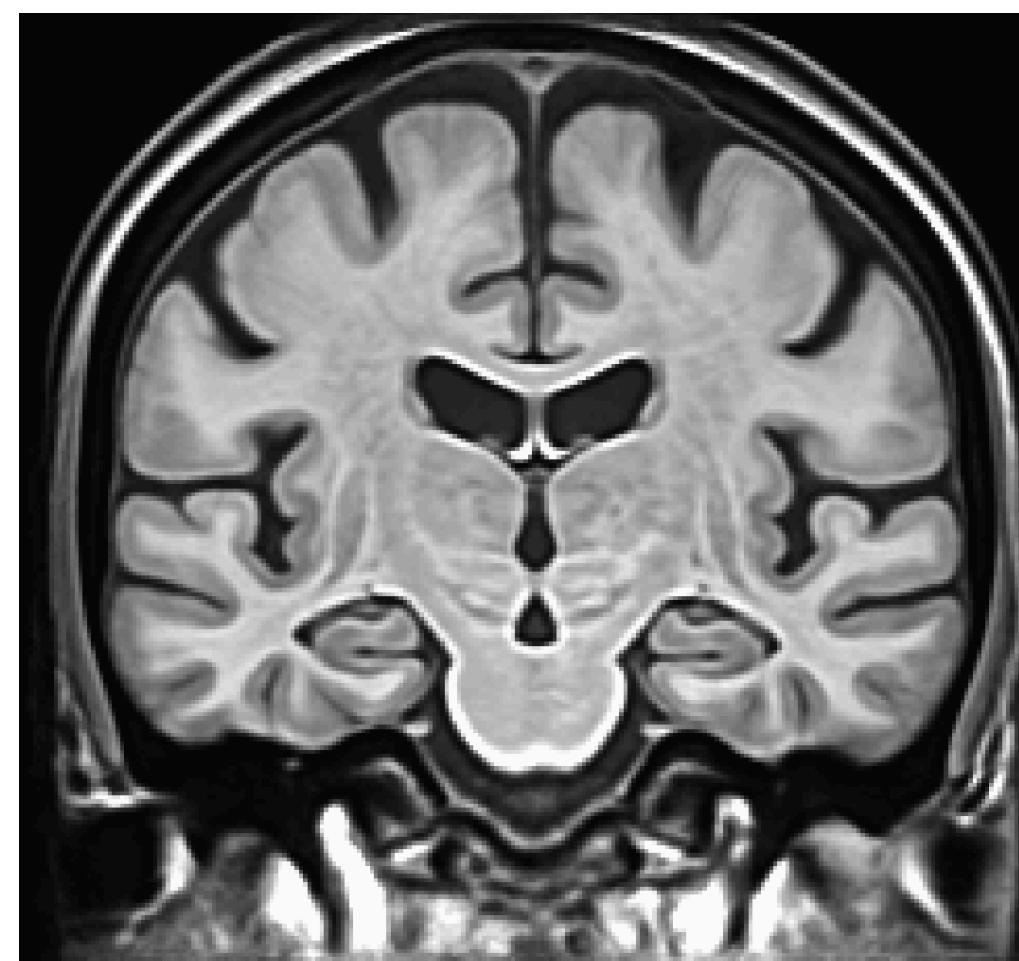
Artist: Greg Dunn

# Cerebrospinal Fluid

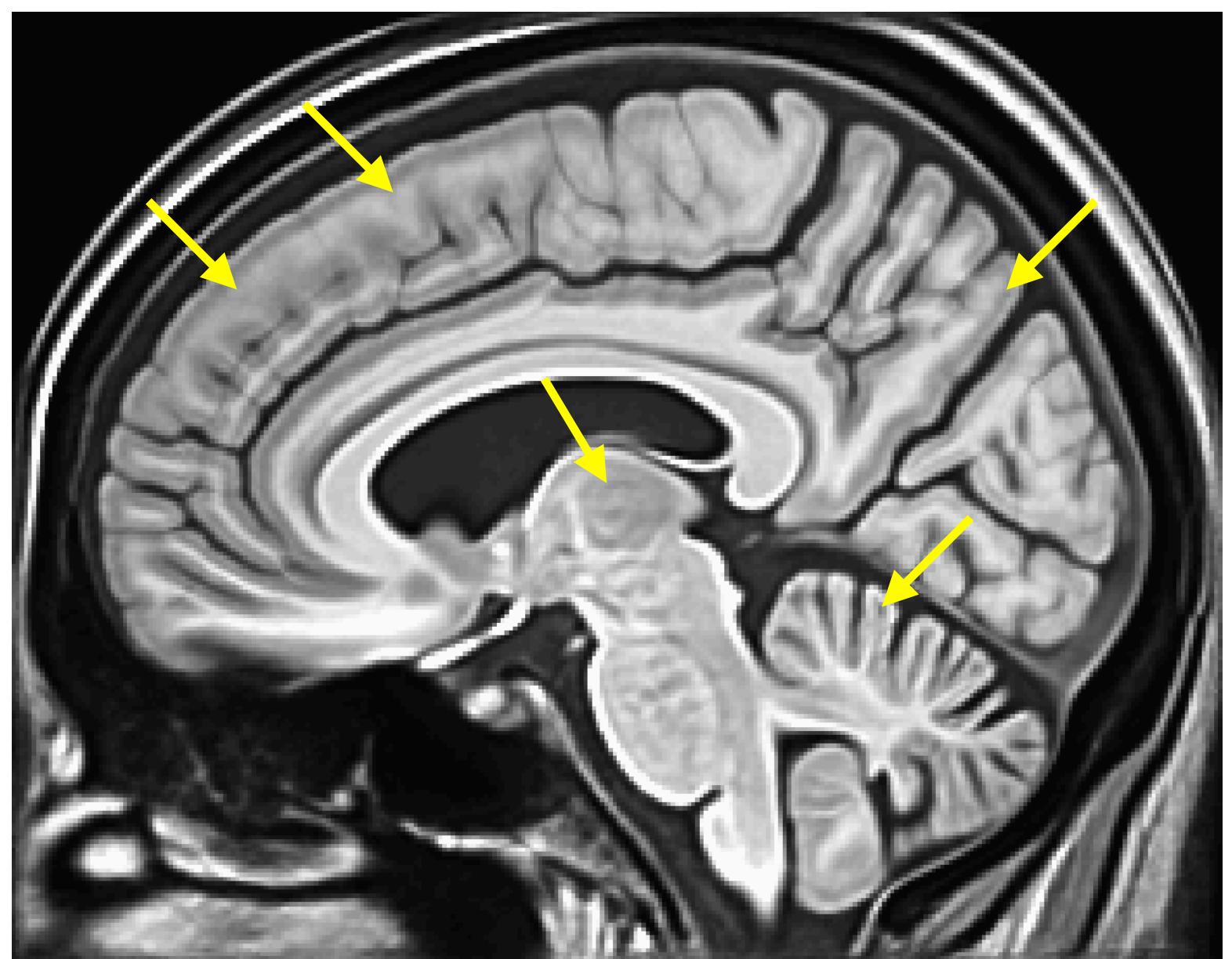
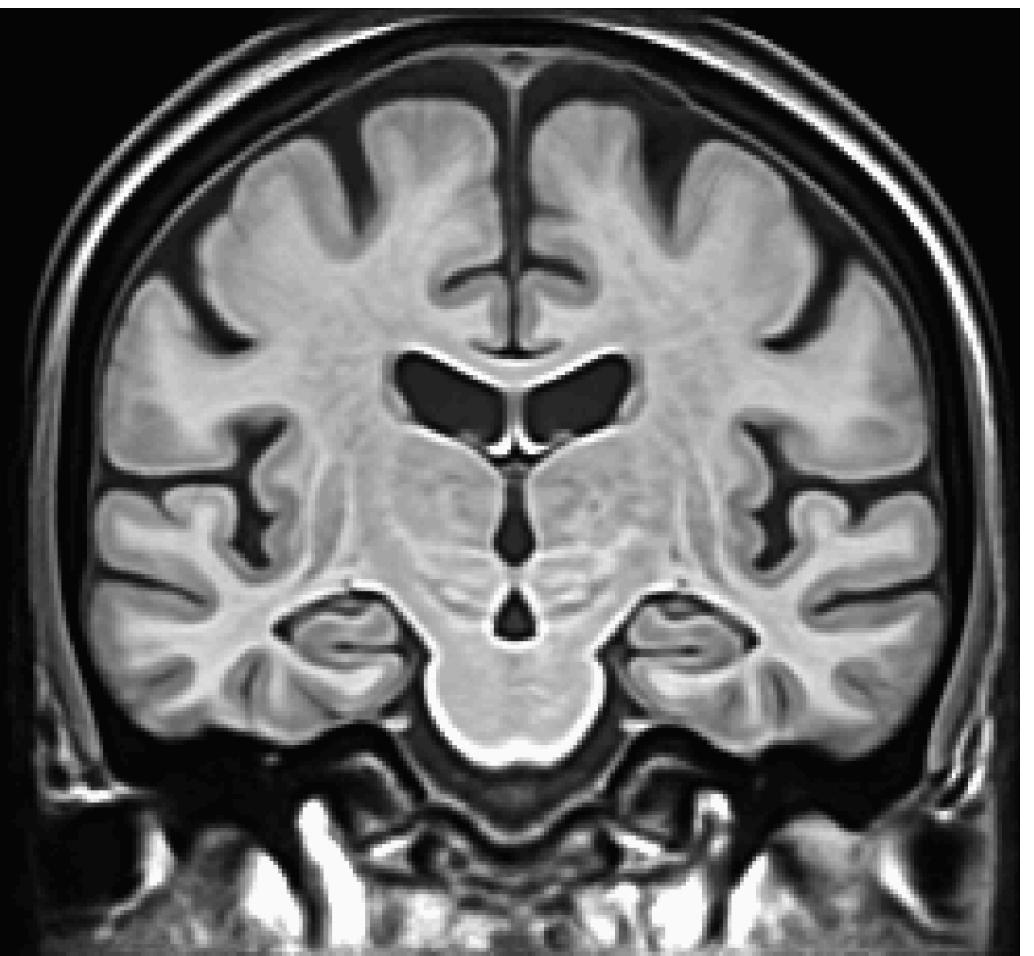
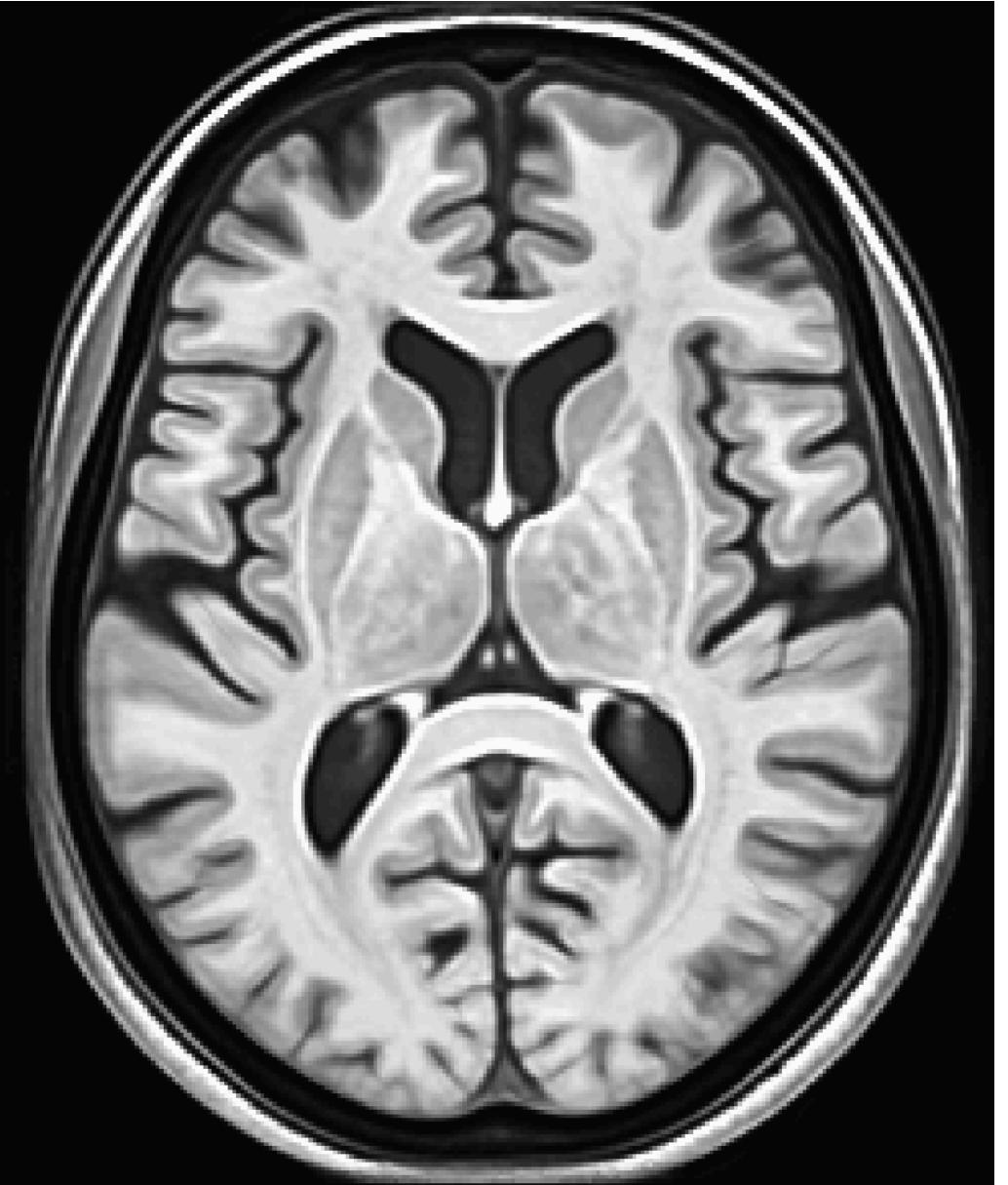
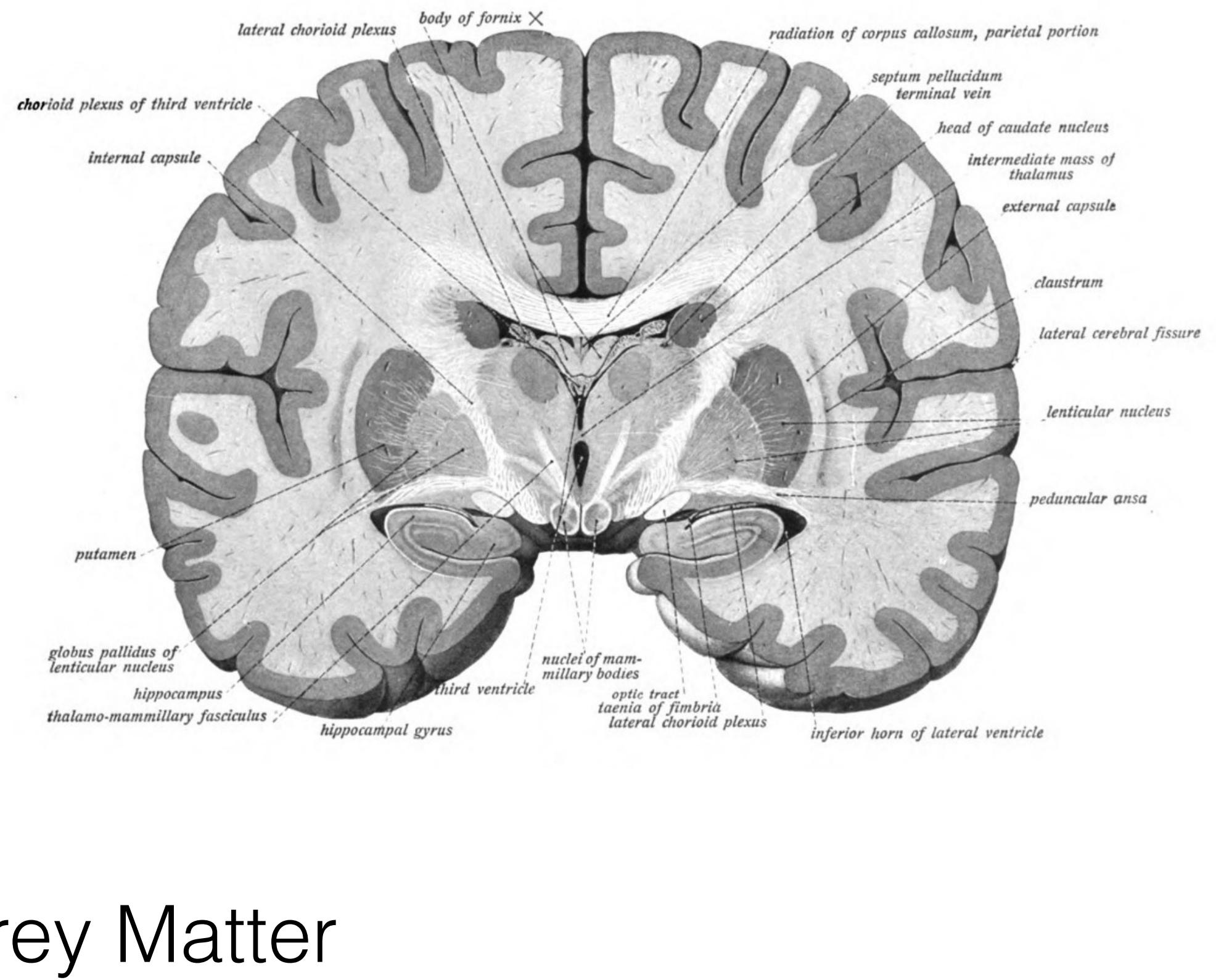


## Cerebrospinal Fluid (CSF)

- Protects the brain and spinal cord from trauma
- Supplies key nutrients



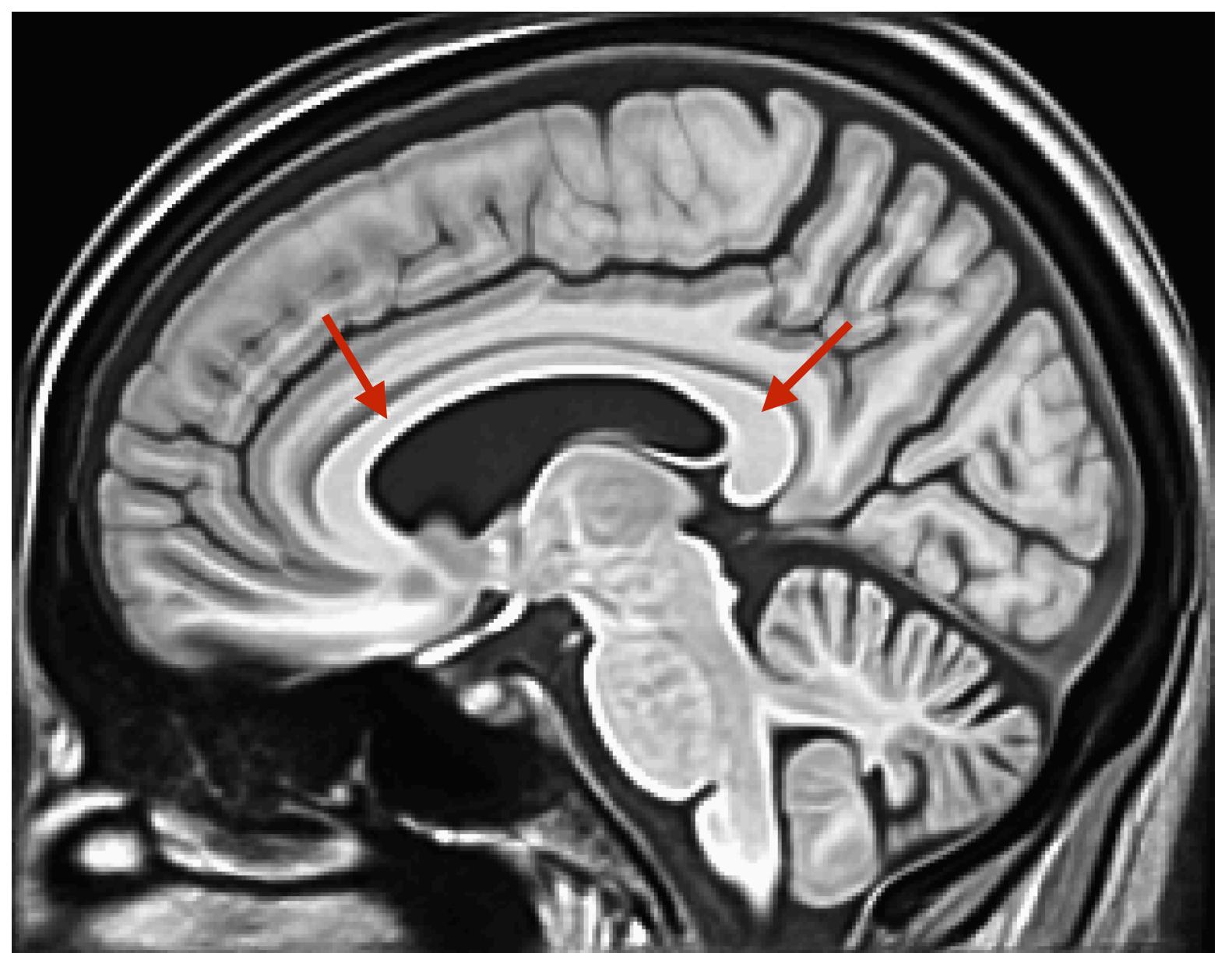
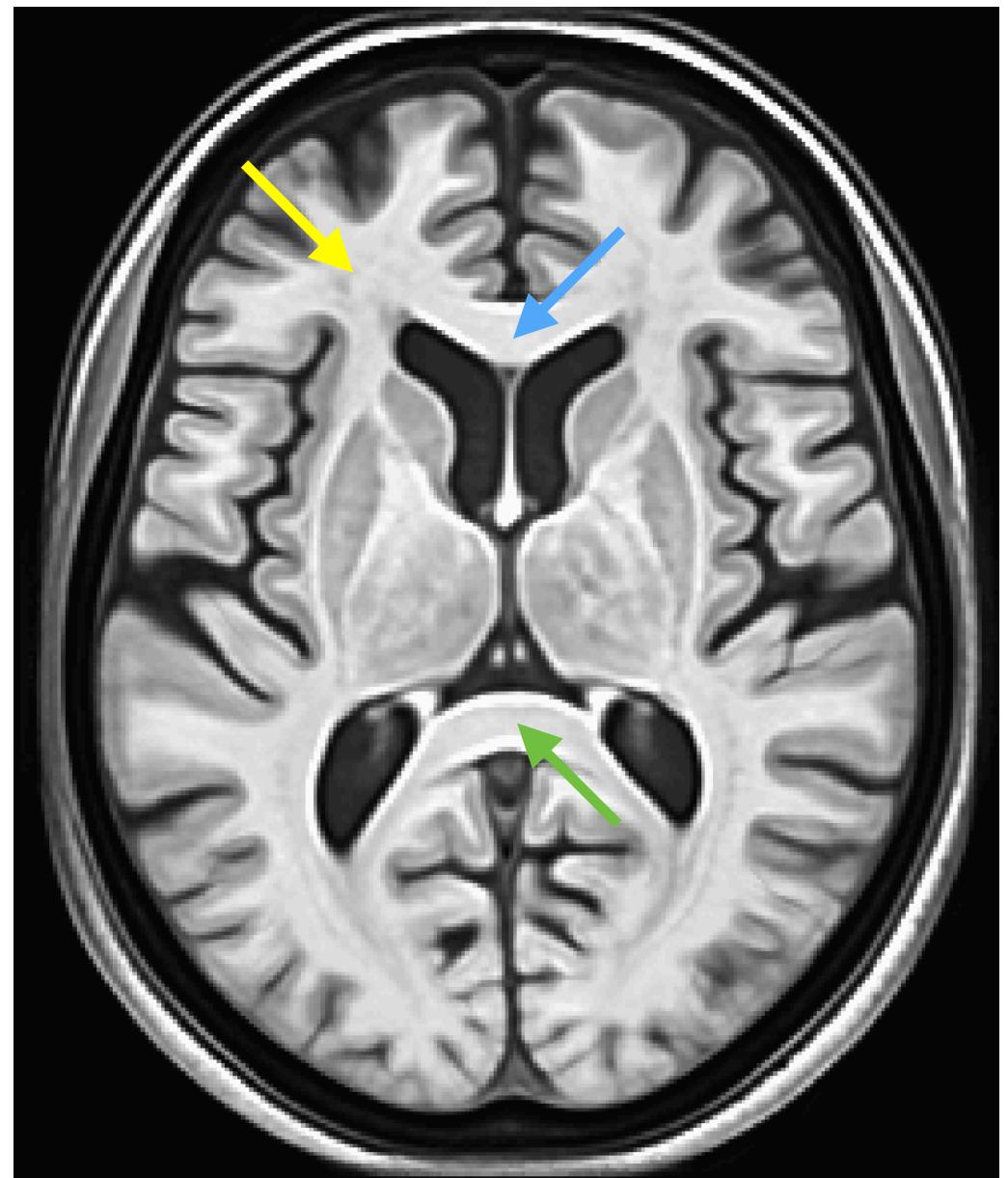
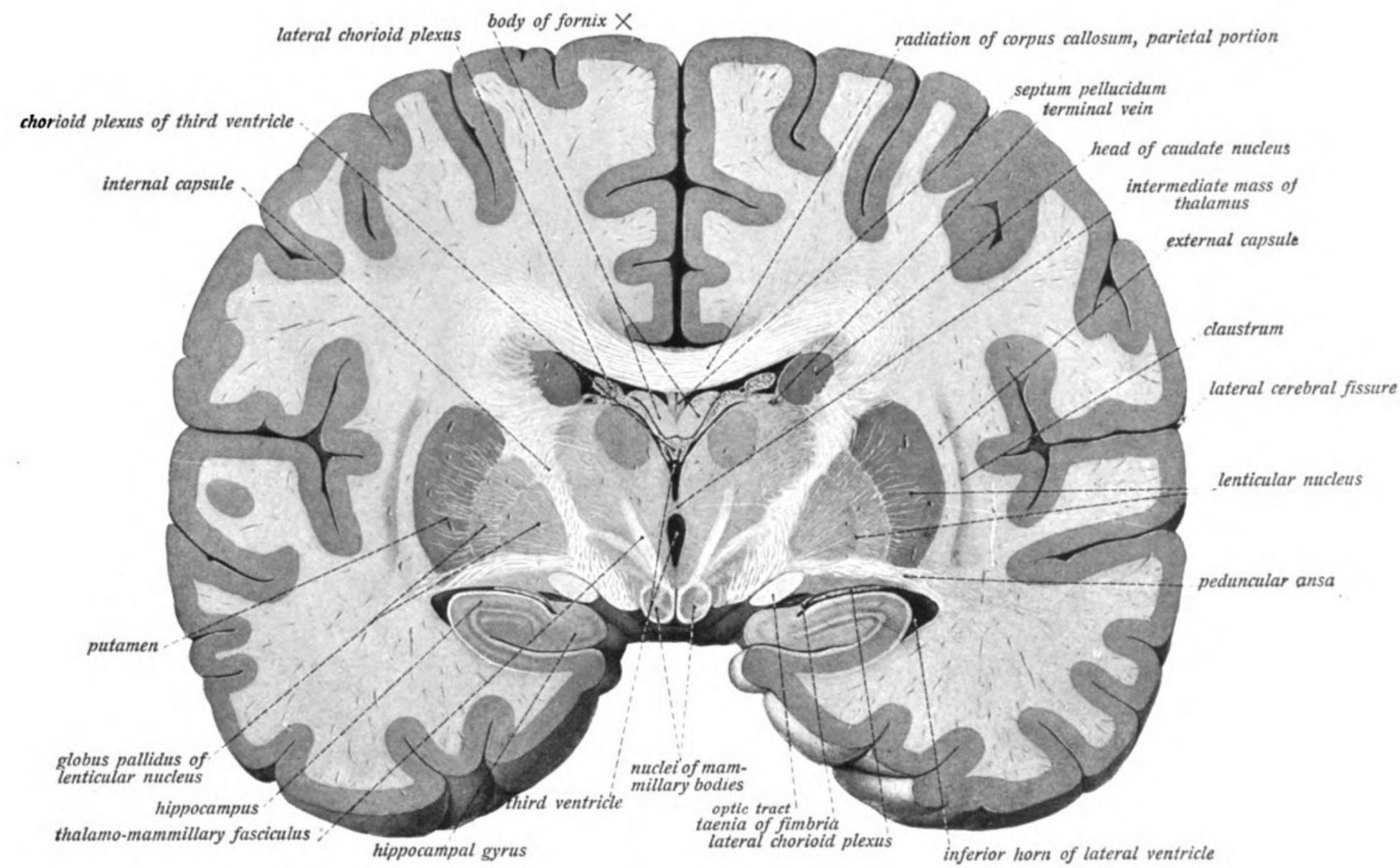
# Grey Matter



## Grey Matter

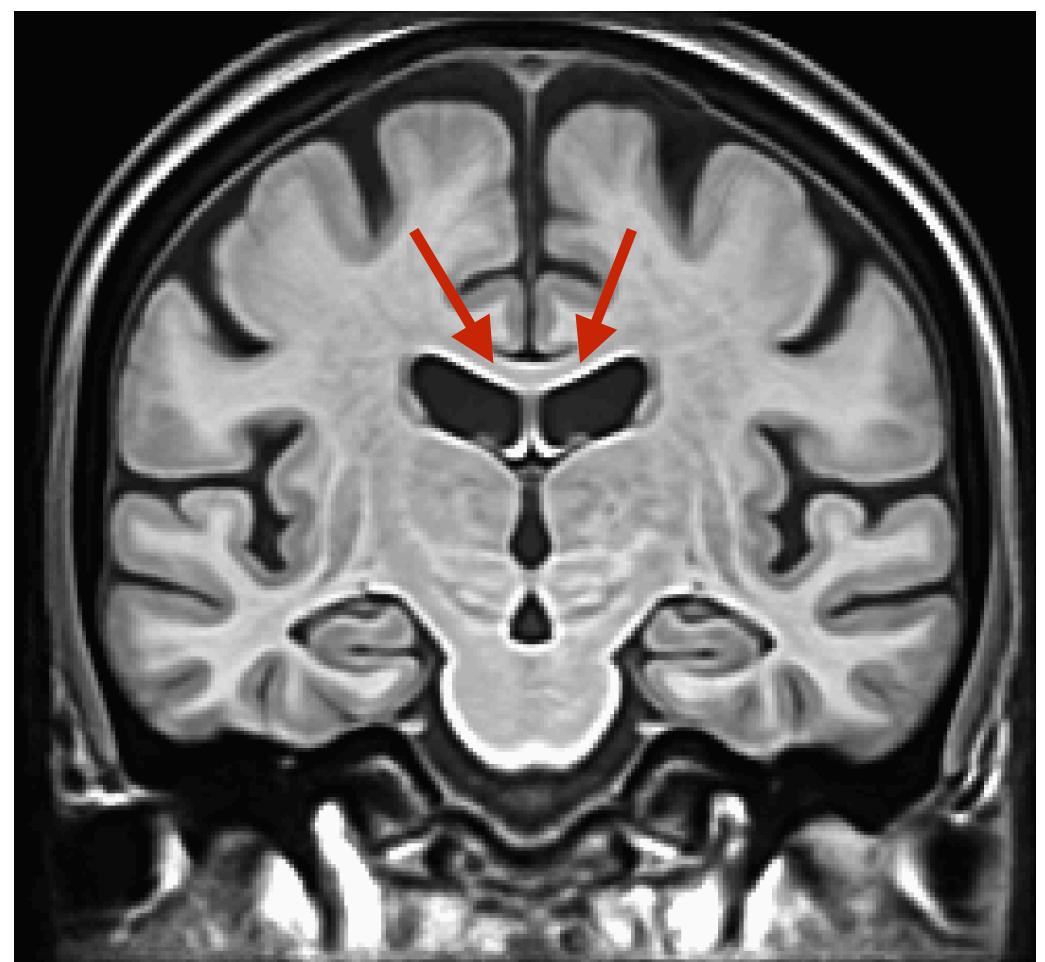
- Contains neuronal cell bodies
- Information processing

# White Matter



White Matter

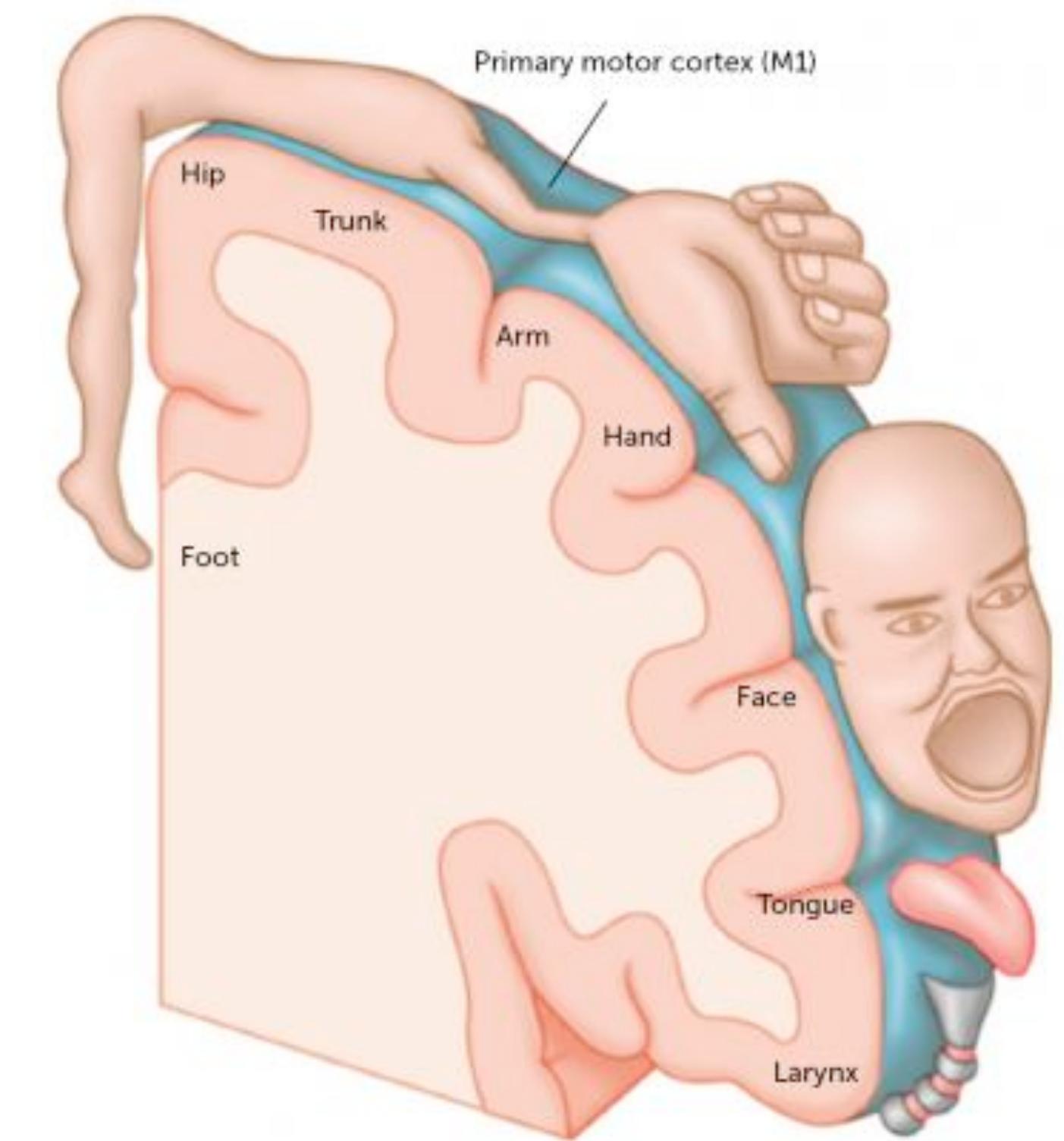
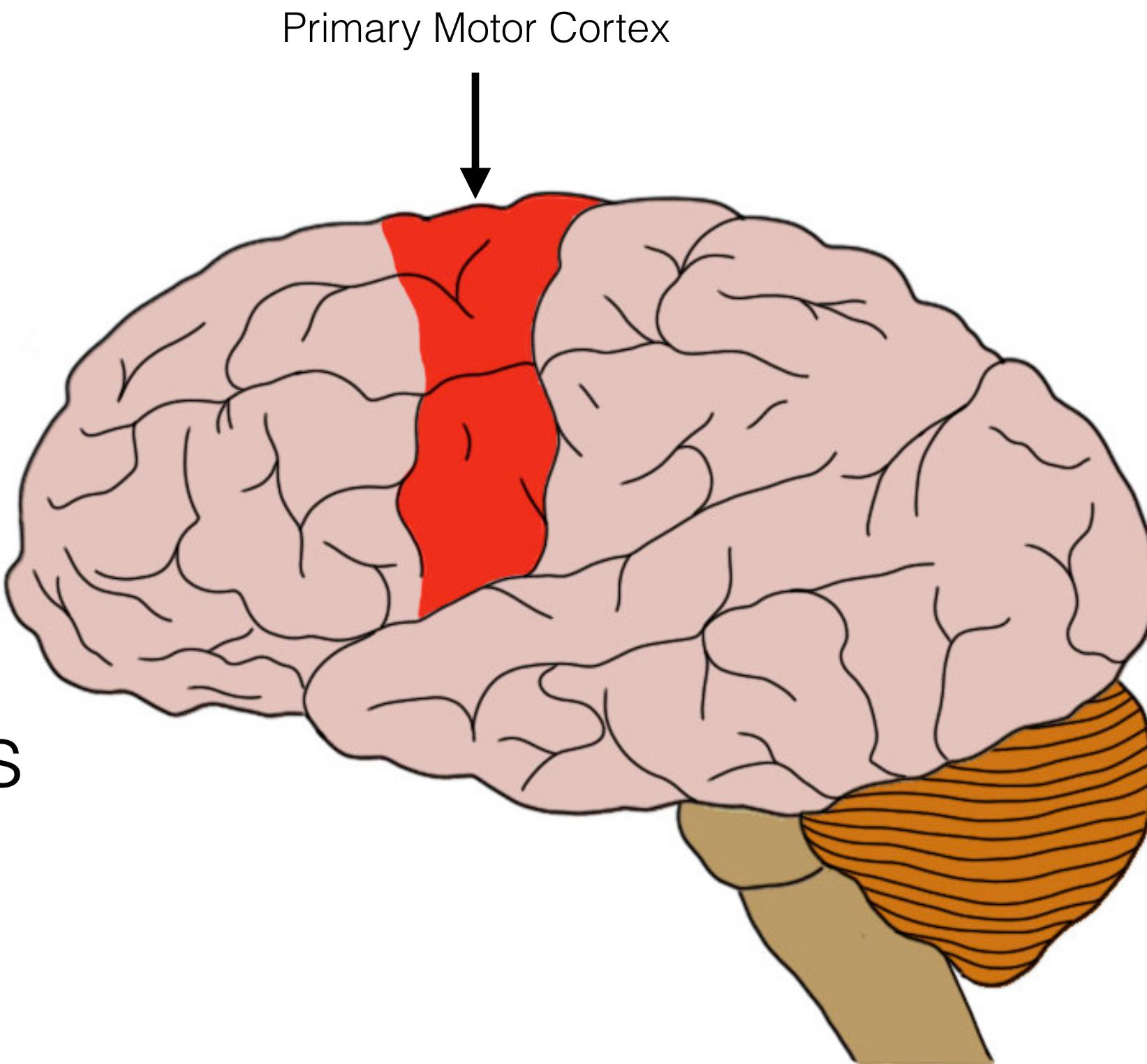
- Axon projections
- Information transmission



# Primary Motor Cortex

## Primary Motor Cortex

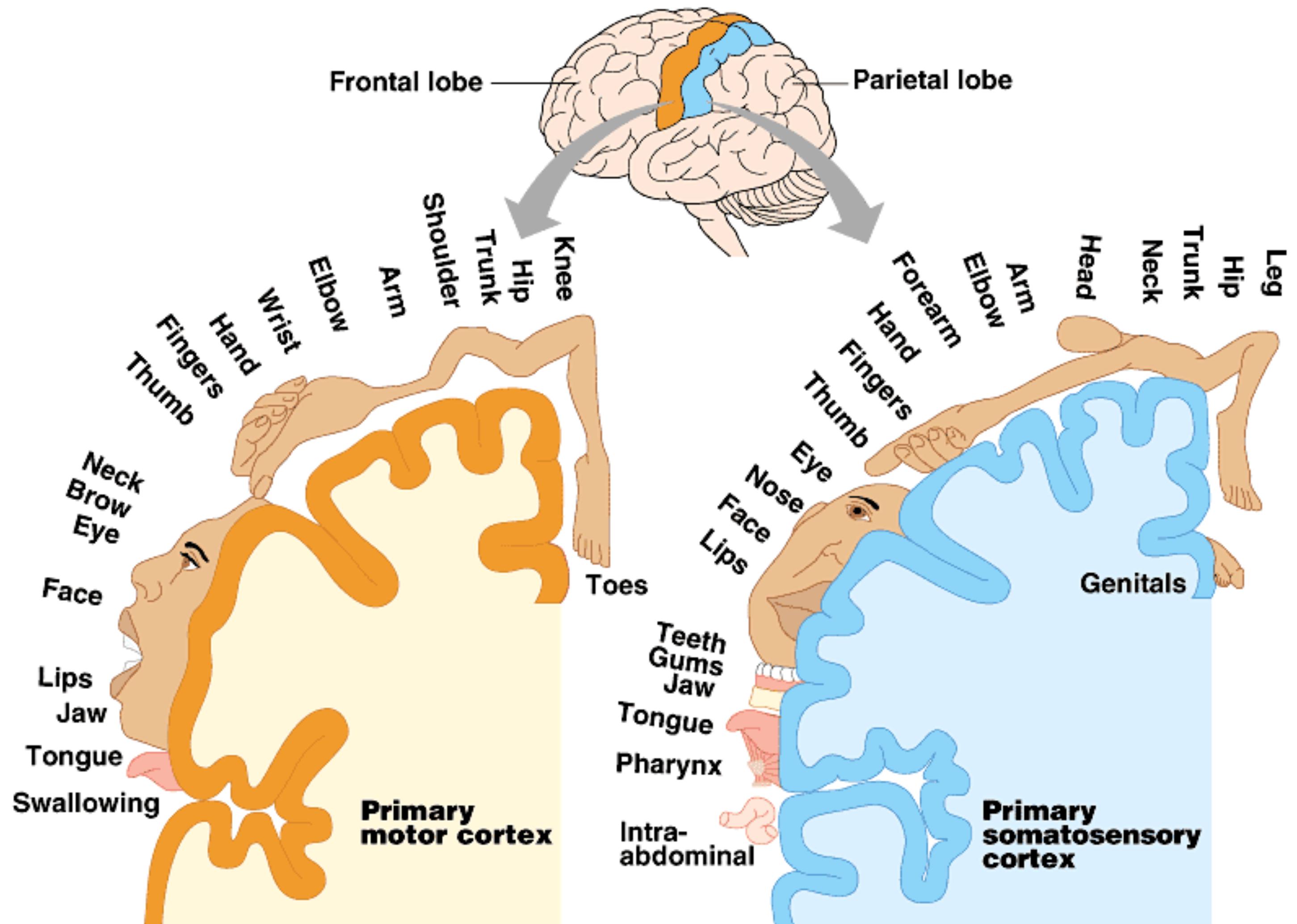
- Dorsal portion of the frontal lobe
- Plan and execute movements
- Cortical neurons send long axons down the spinal cord
- Orderly arranged from head to toe



# Primary Somatosensory Cortex

## Primary Somatosensory Cortex

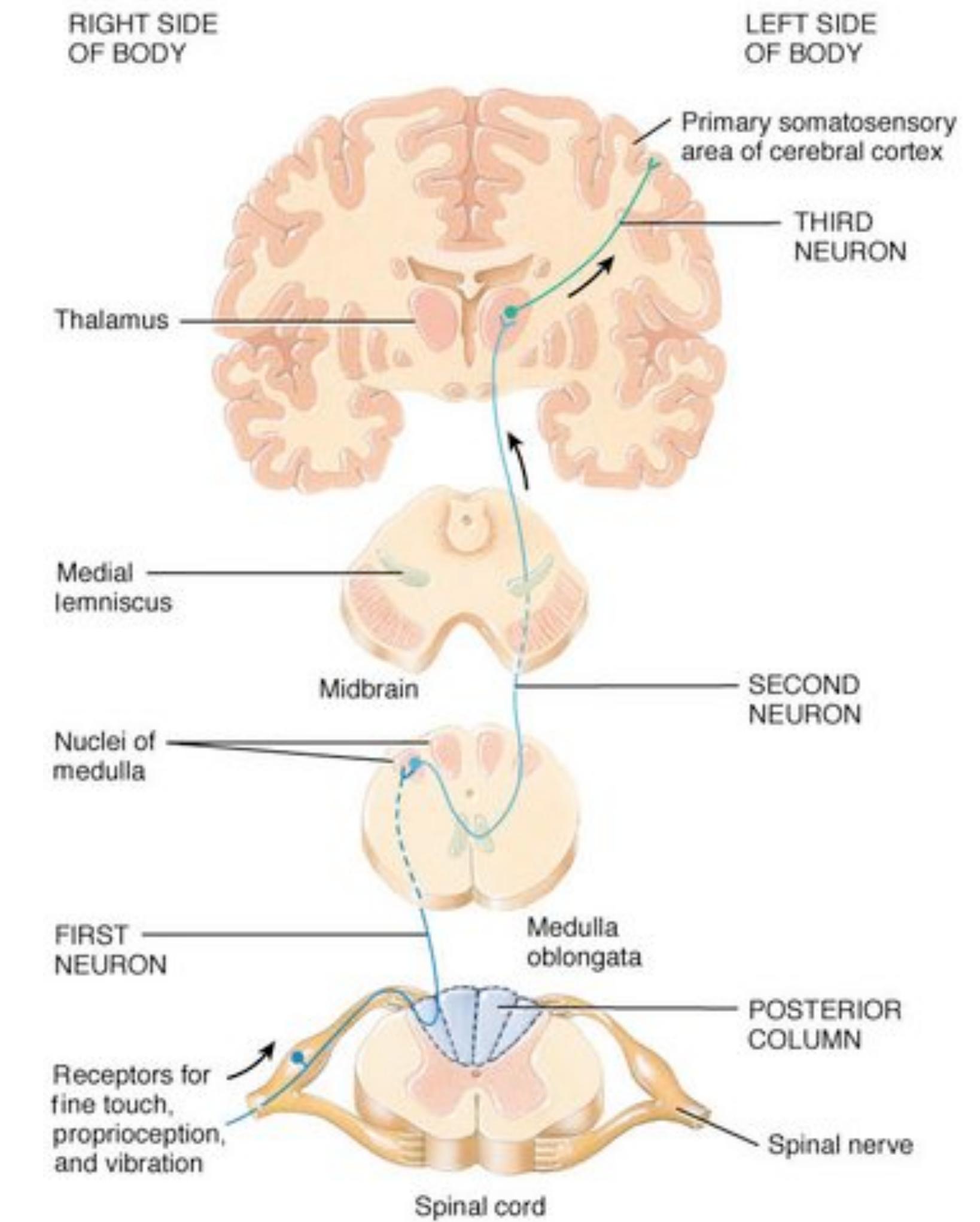
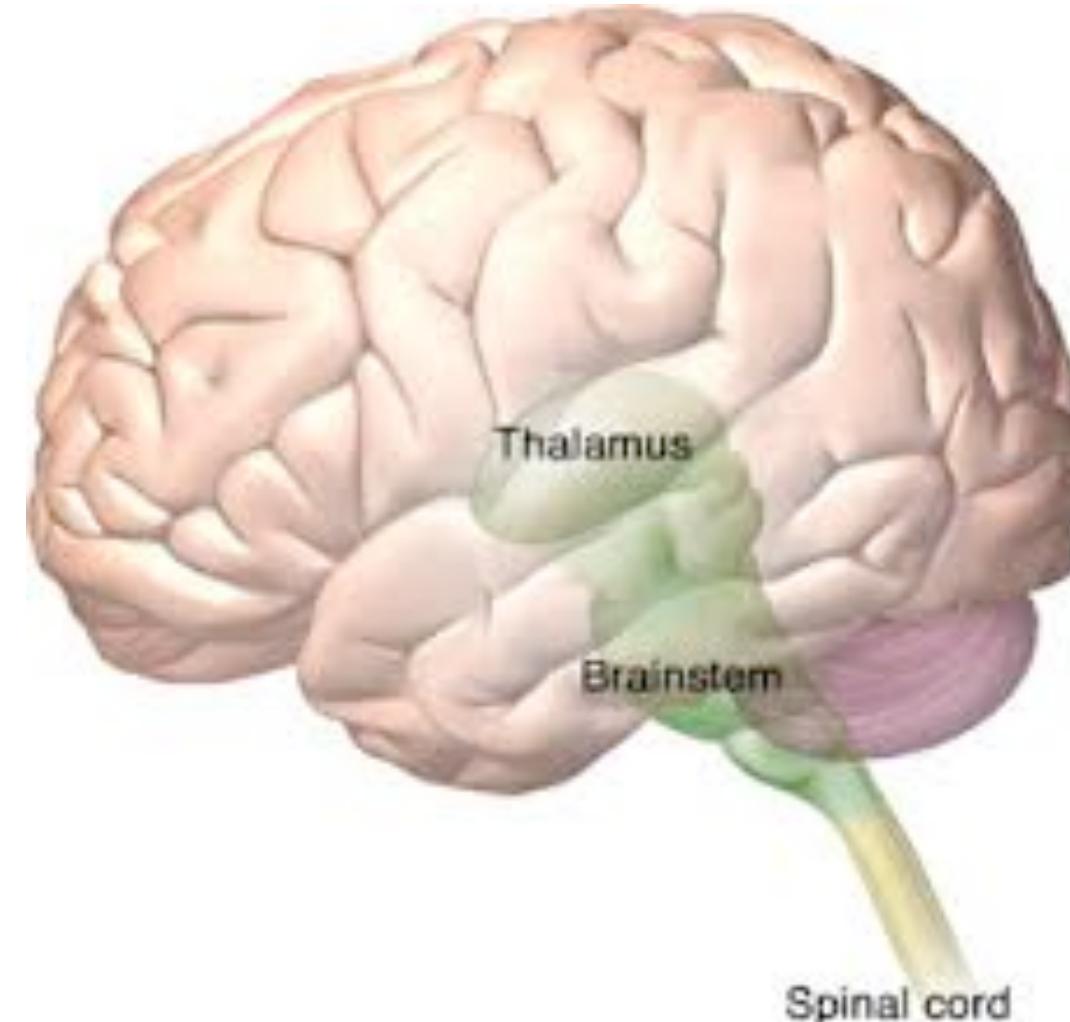
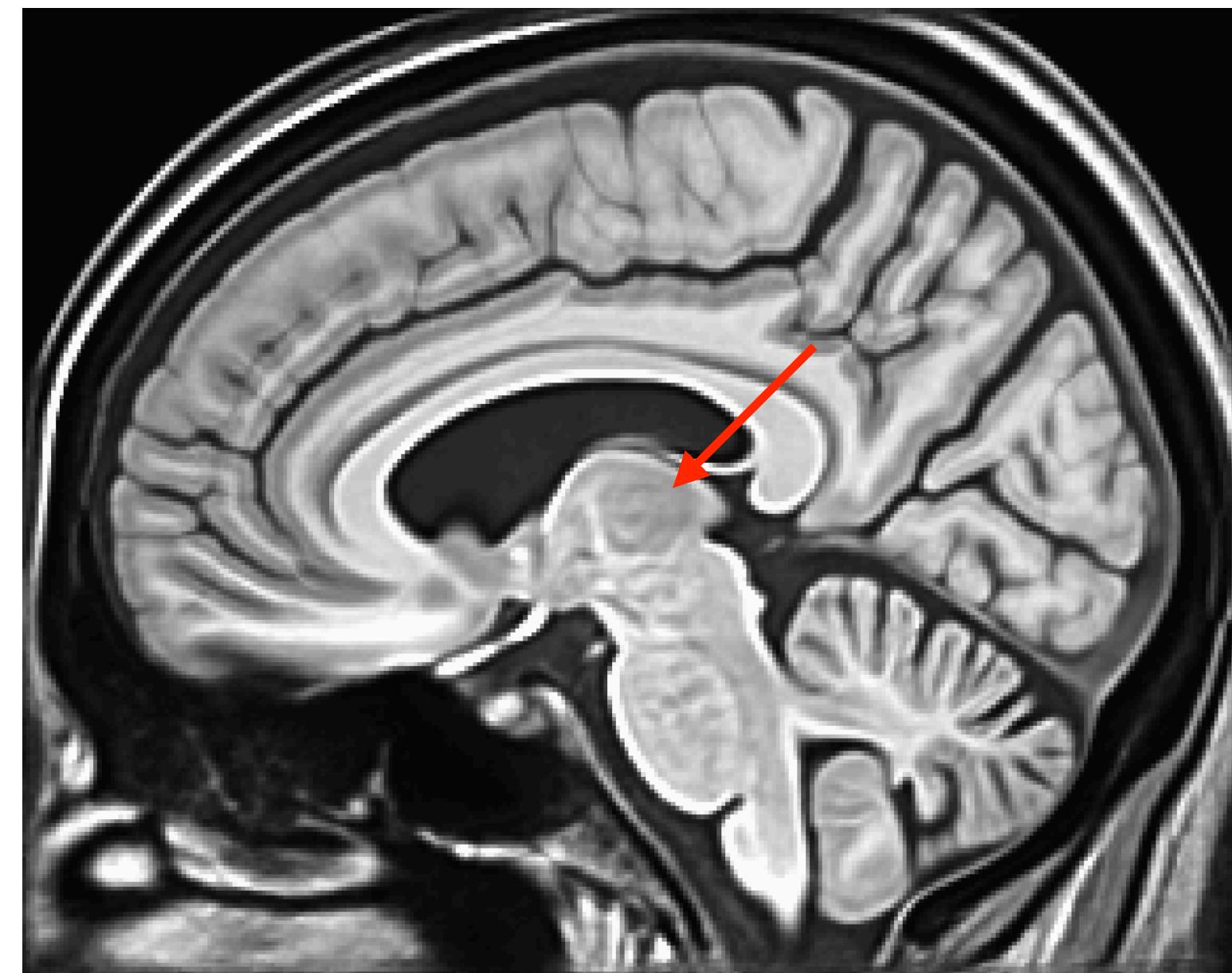
- Receives sensory input
- Tactile representation also orderly arranged
- Cortex is not proportional to size but to density of tactile receptors



# Thalamus

## Thalamus

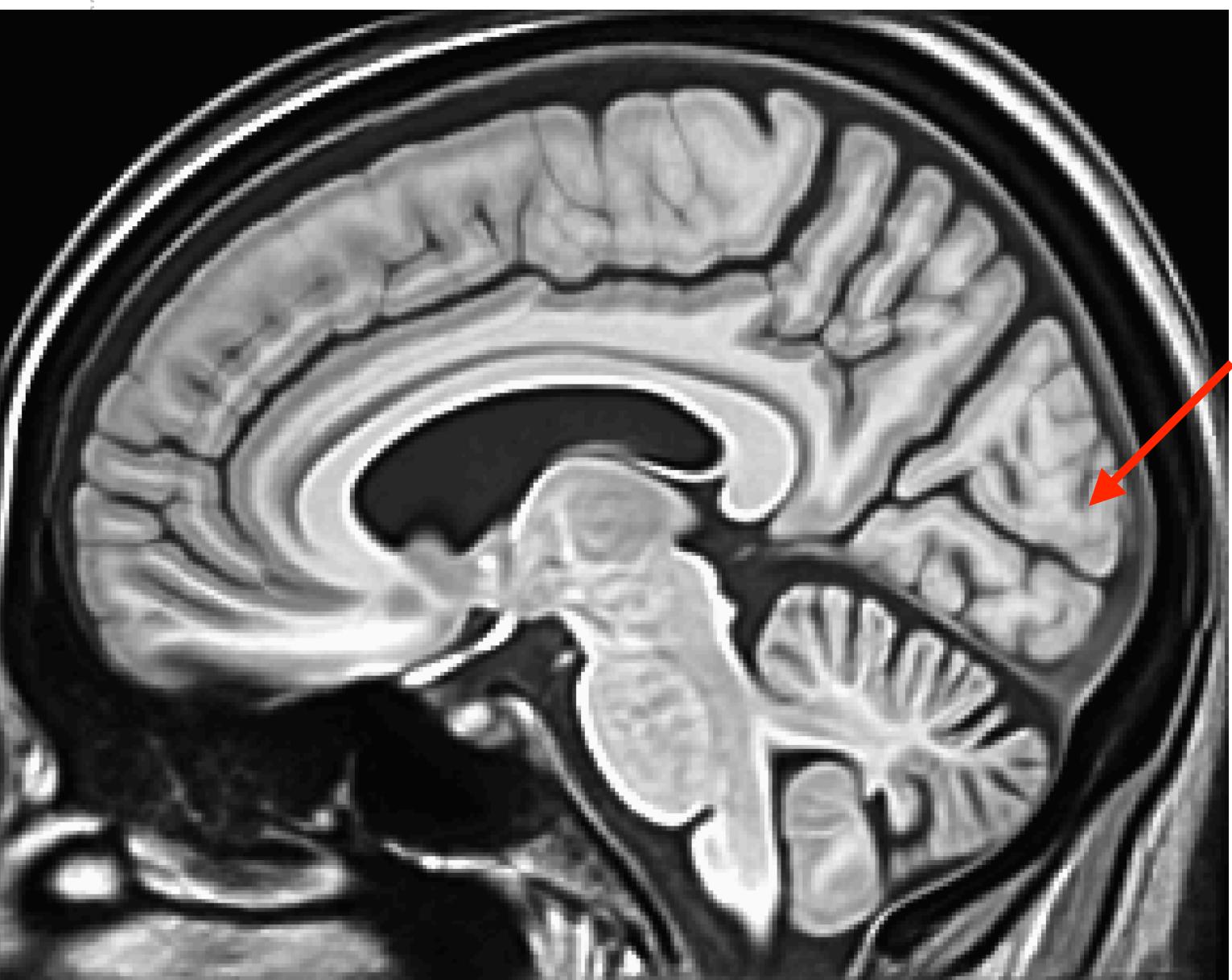
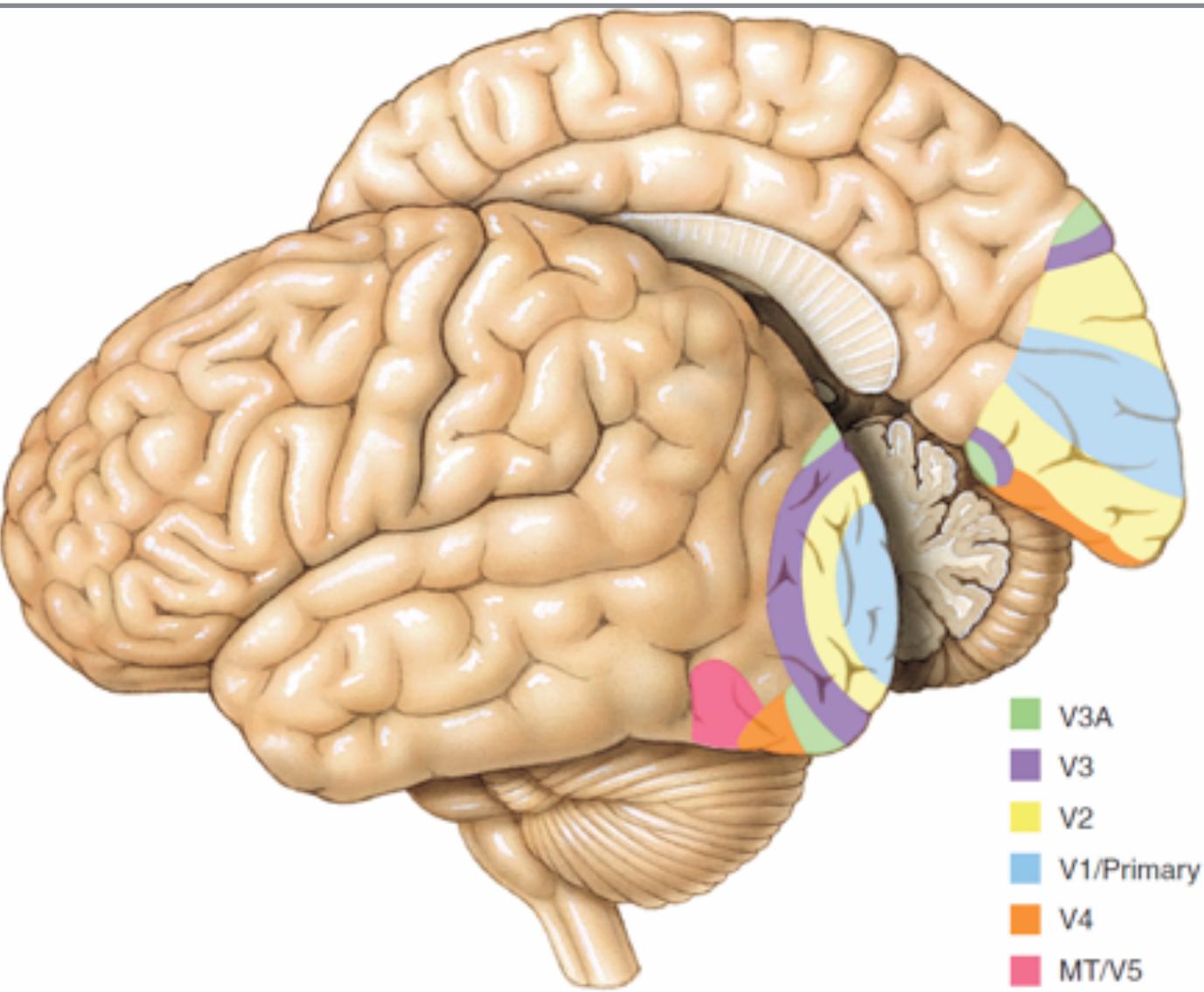
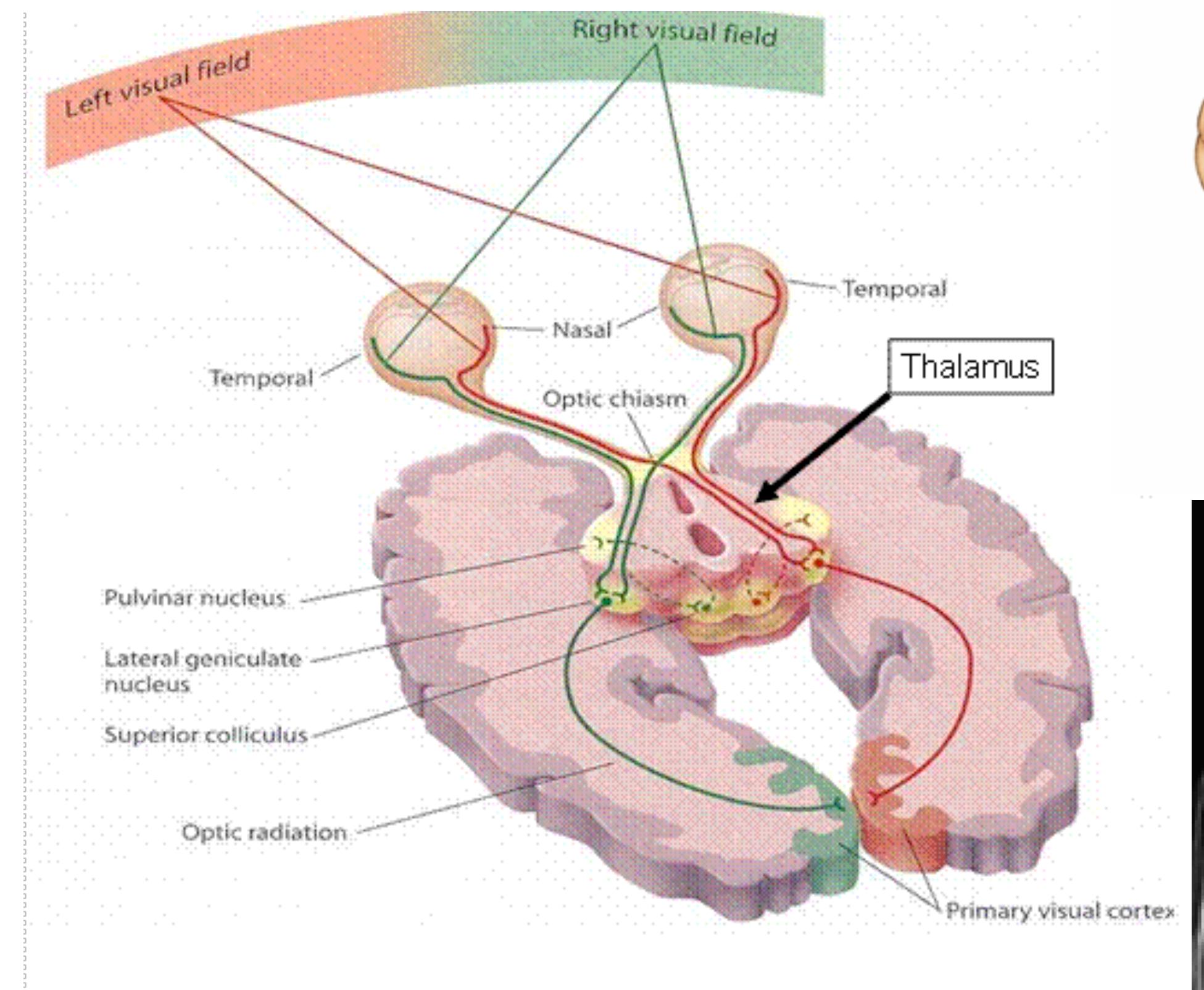
- Consist of a number of individual nuclei
- Relay station of the brain
- Sensory and motor signal relay
- Regulation of sleep and consciousness



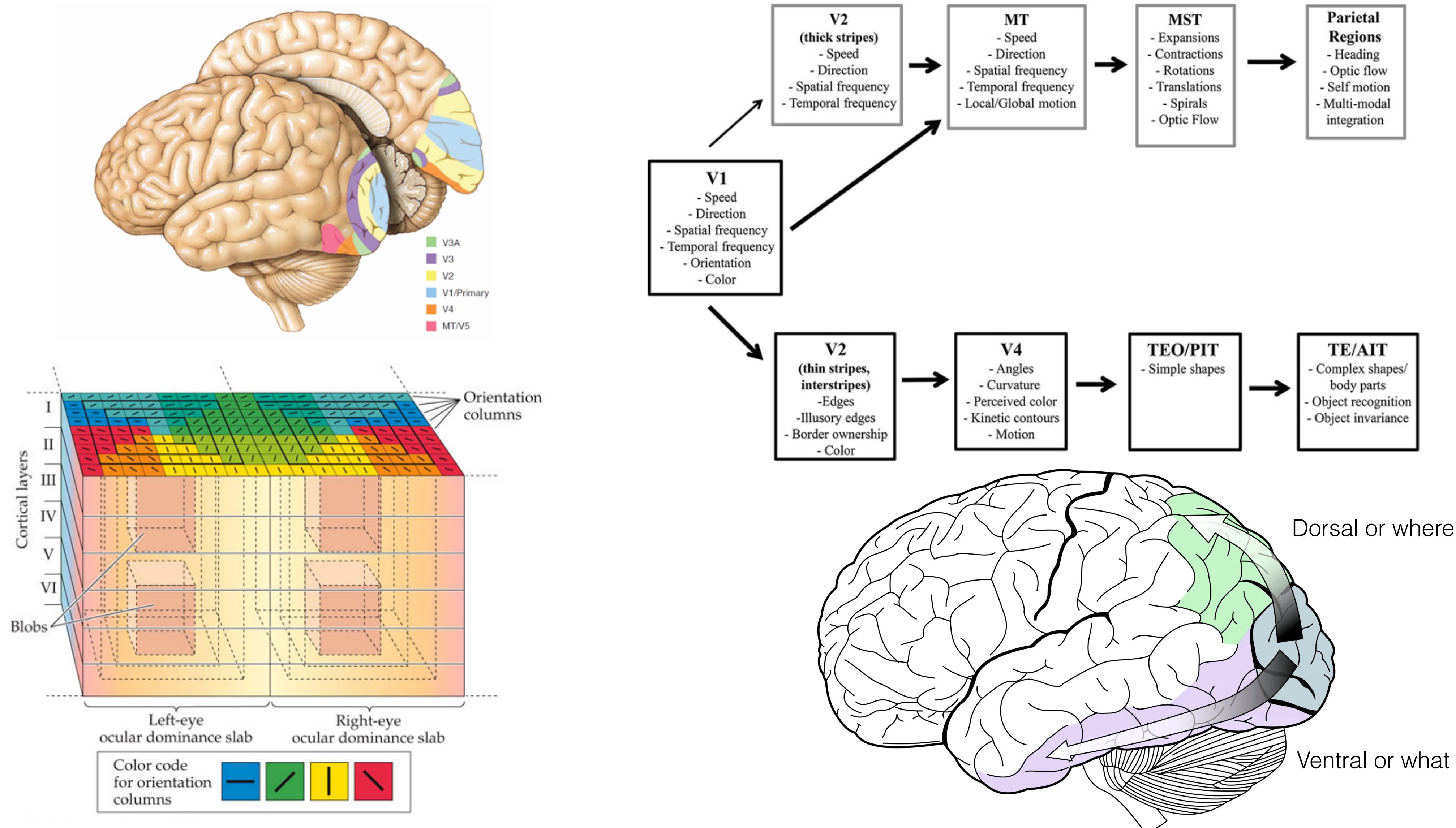
# Visual Cortex

## Visual Cortex

- Highly organized columns
- Process orientation, motion, color
- Organized by visual field



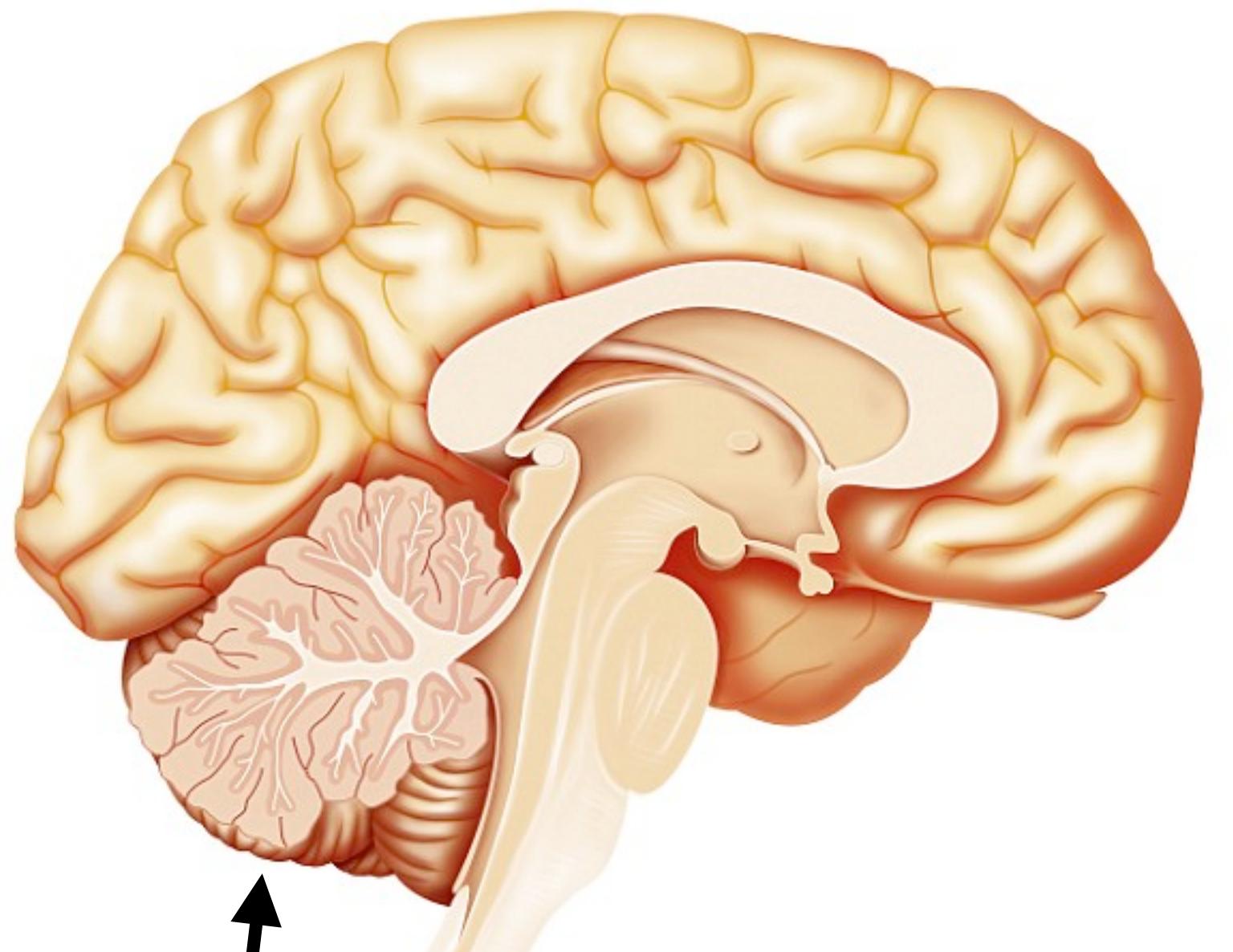
# Visual Cortex



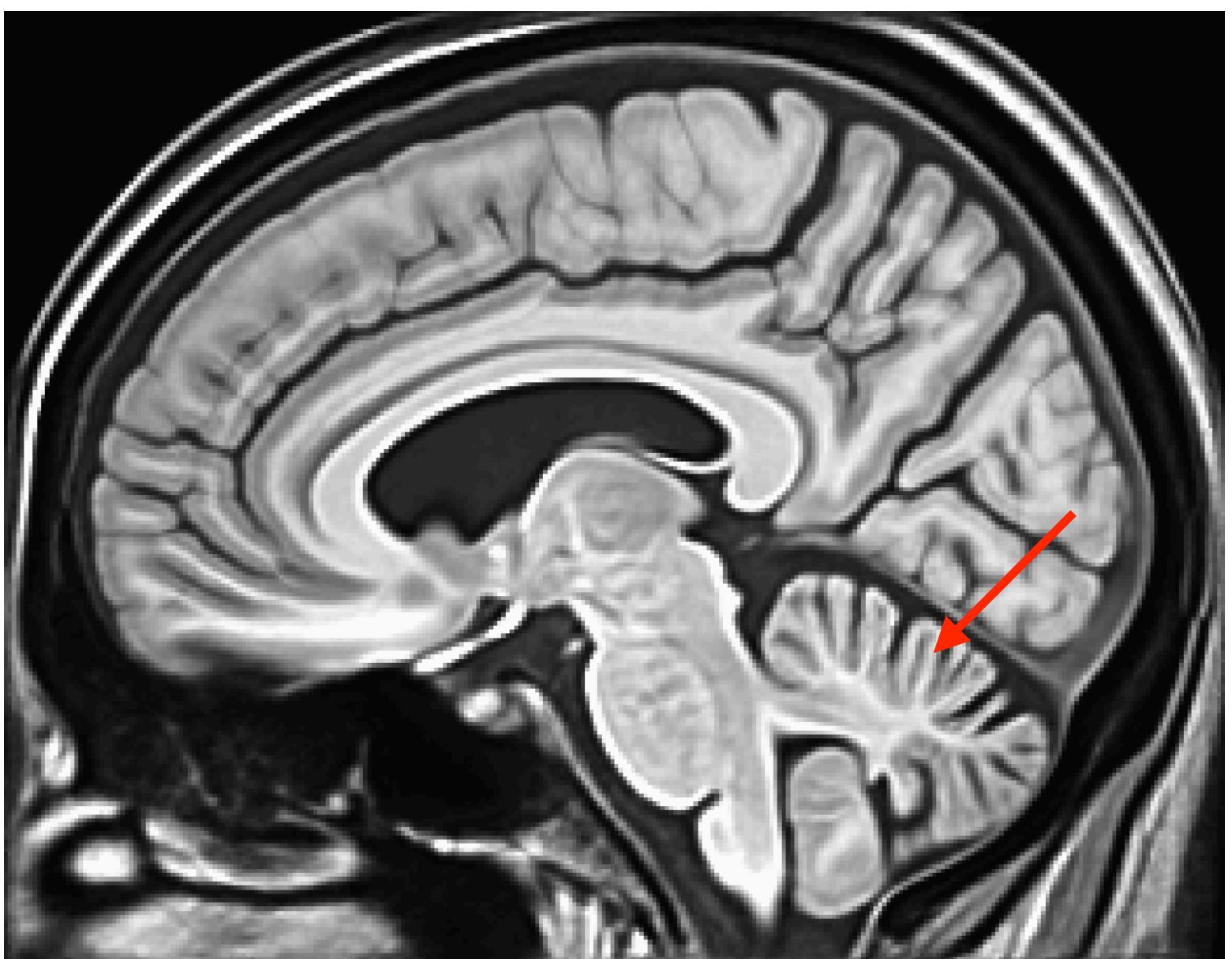
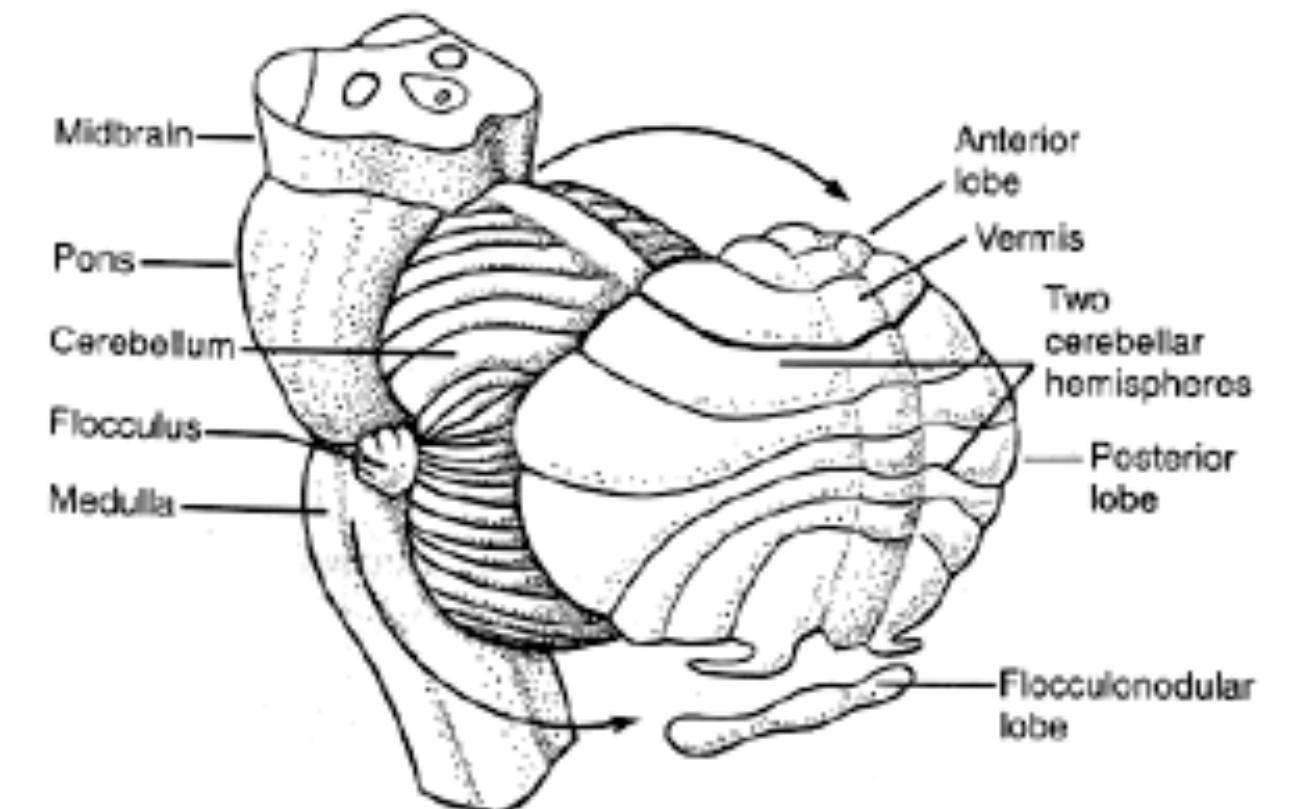
# Cerebellum

## Cerebellum

- Separate structure
- Complex organization
- Receives information from sensory systems, spinal cord etc
- Coordinates posture, balance, coordination, timing for smooth activity
- And....



Cerebellum



# Functional Anatomy

