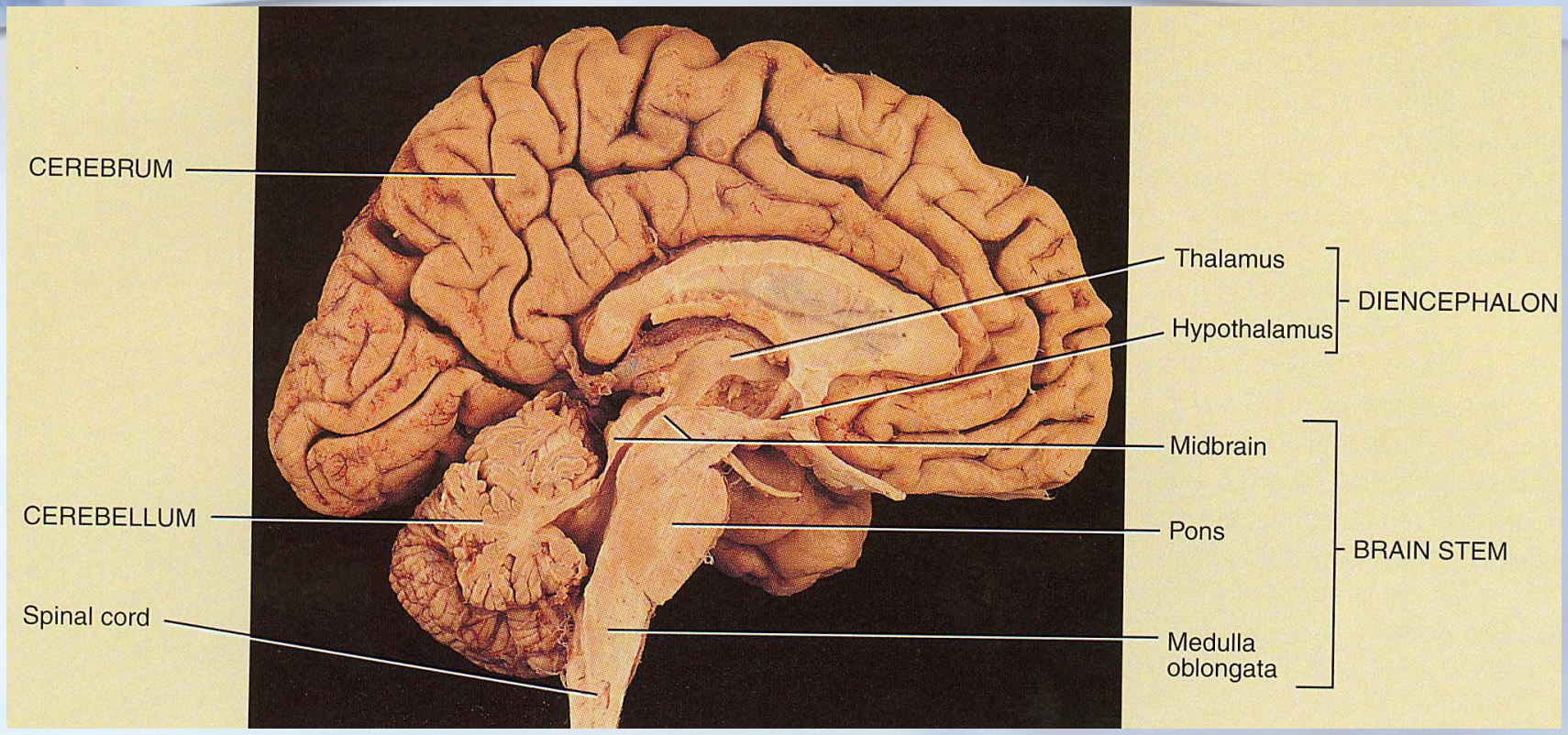
THE NERVOUS SYSTEM

HEADING

VOCABULARY

IMPORTANT INFO

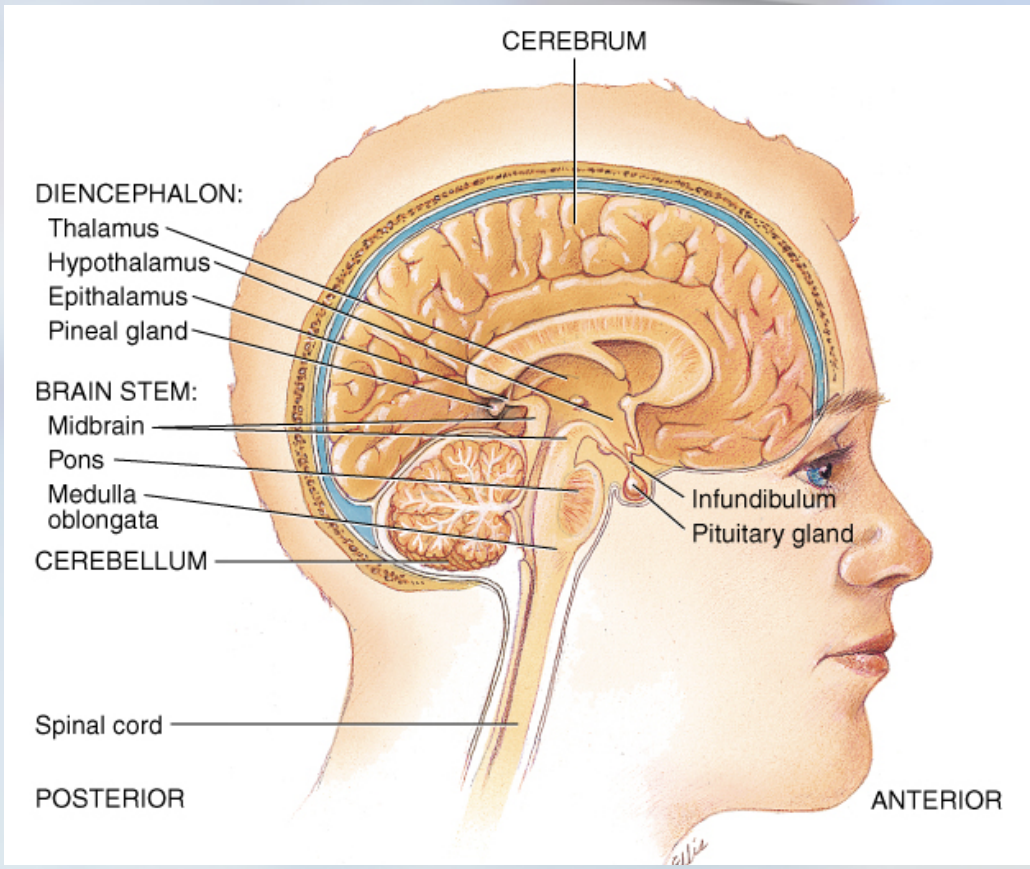
The Brain and Cranial Nerves



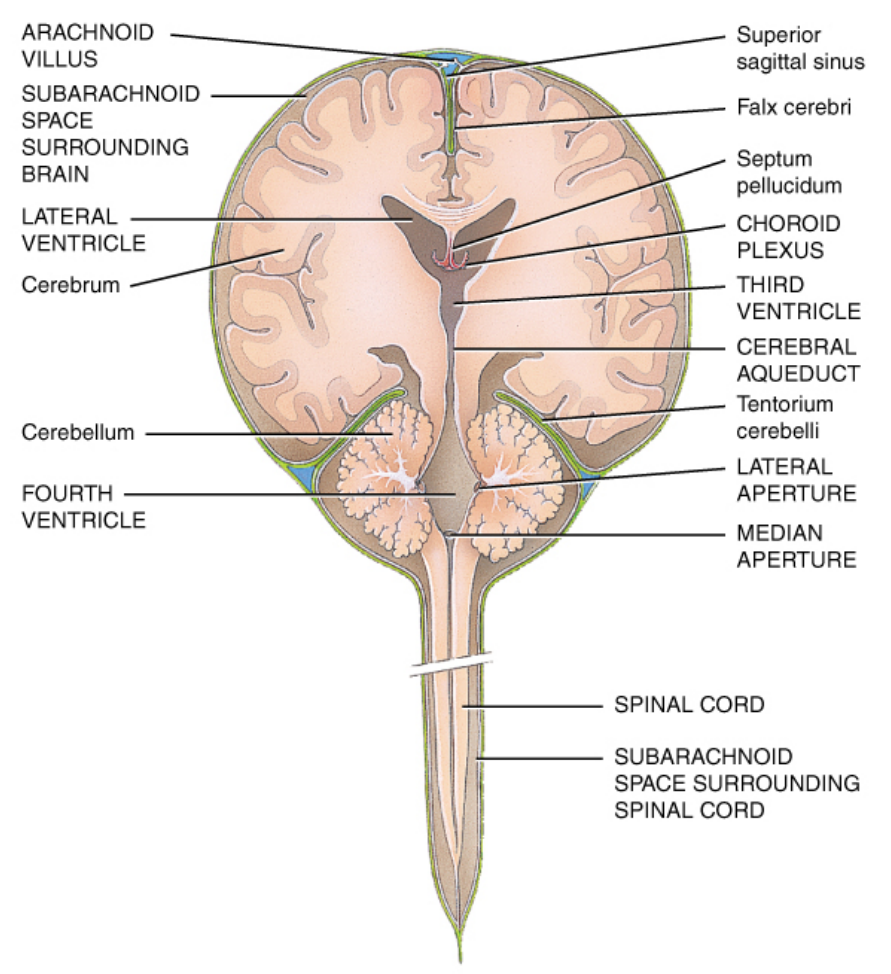
- Largest organ in the body at almost 3 lb.
- Brain functions in sensations, memory, emotions, decision making, behavior

Principal Parts of the Brain

- Cerebrum(lobes)
- Diencephalon
  - Thalamus, Hypothalamus, Epithalamus, Pineal Gland
- Cerebellum
- Brainstem
  - Medulla, Pons & Midbrain

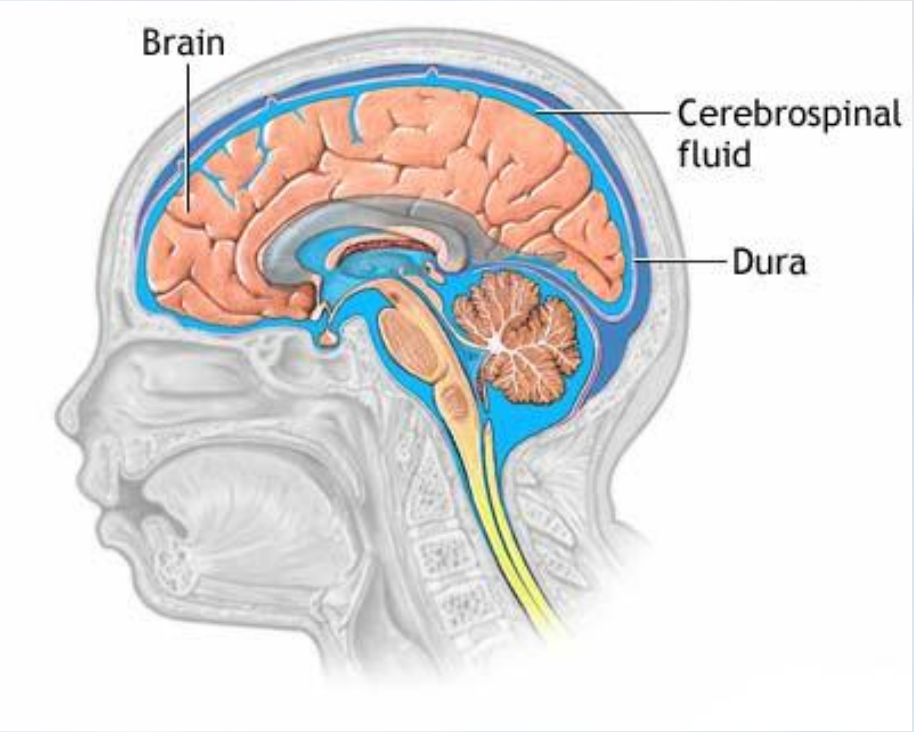


Protective Coverings of the Brain



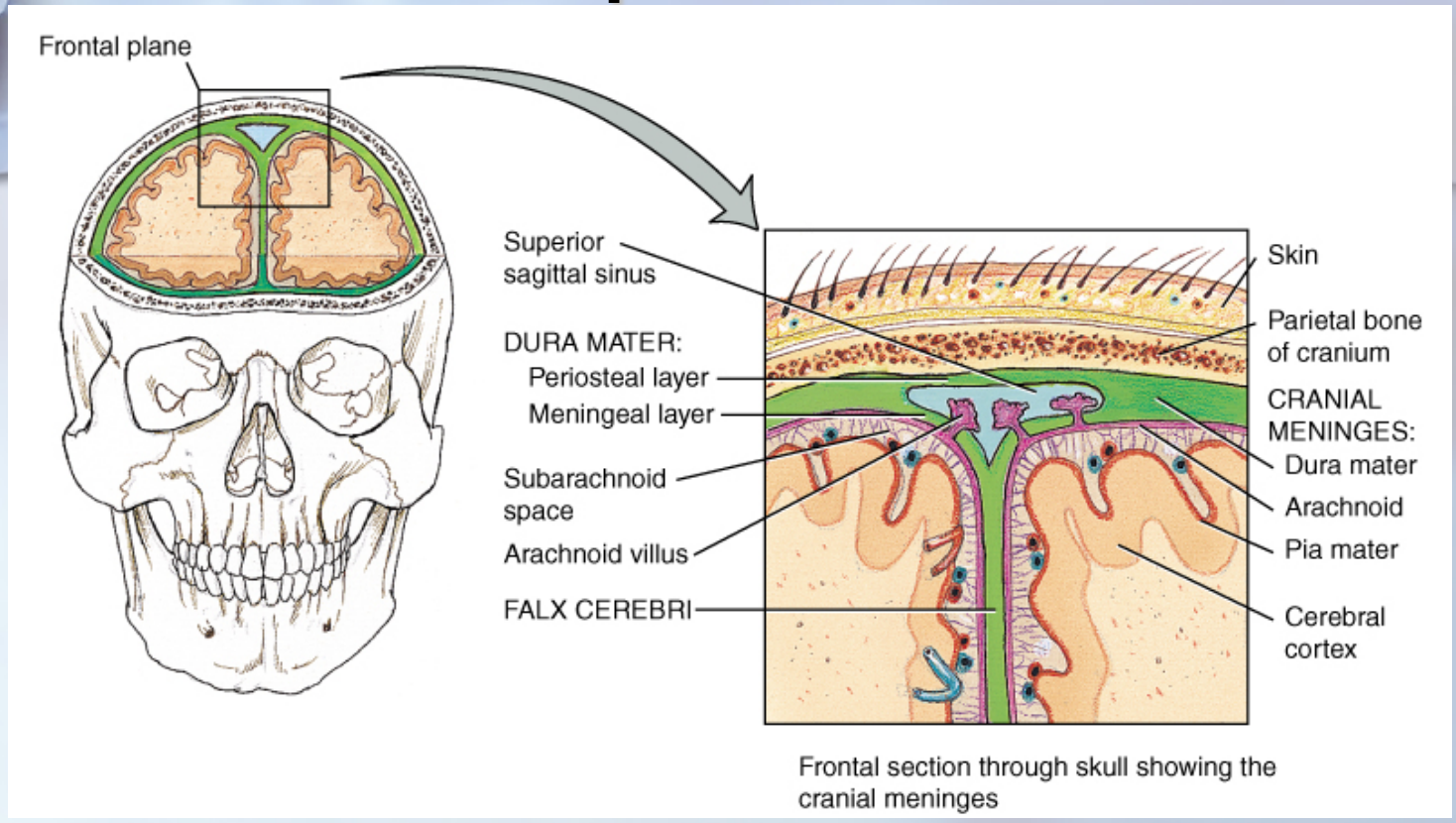
- Bone, meninges & fluid
- Meninges same as around the spinal cord
  - dura mater
  - arachnoid mater
  - pia mater

Cerebrospinal Fluid (CSF)



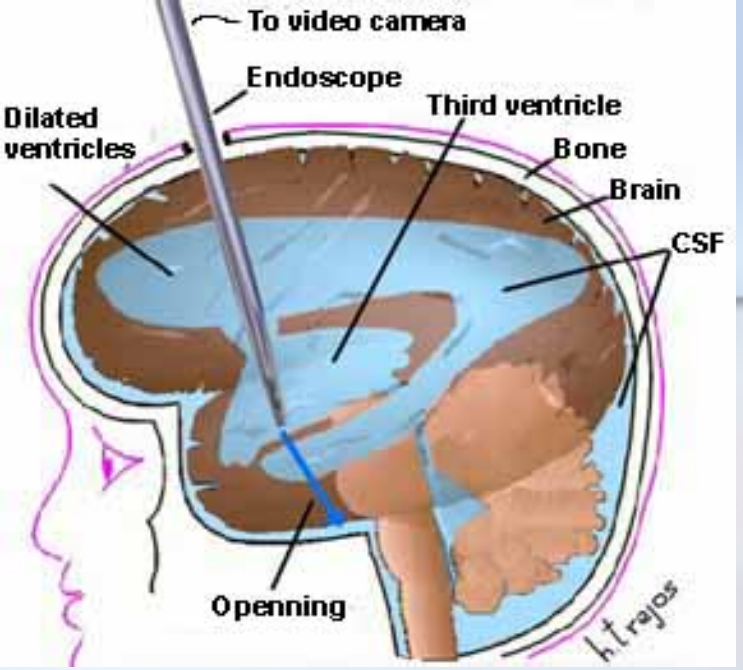
- 80-150 ml (3-5oz)
- Clear liquid containing glucose, proteins, & ions
- Functions
  - Mechanical Protection
    - floats brain & softens impact with bony walls
  - Chemical Protection
    - optimal ionic concentrations for action potentials
  - Circulation
    - nutrients and waste products to and from bloodstream

Reabsorption of CSF



Frontal section through skull showing the cranial meninges

- Reabsorbed through Arachnoid Villi
  - grapelike clusters of arachnoid penetrate Dural Venous Sinus
- 20 ml/hour reabsorption rate = same as production rate

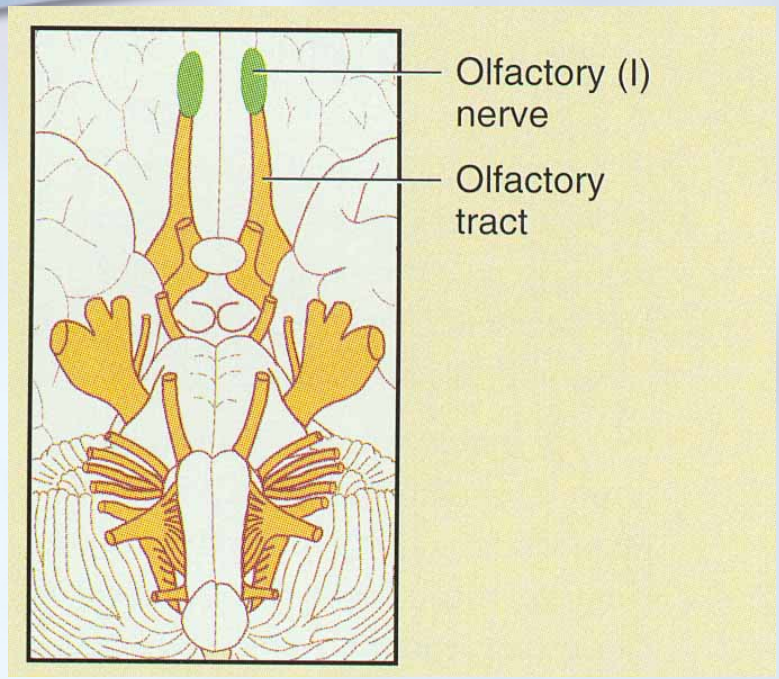


Hydrocephalus

- **Blockage of drainage of CSF (tumor, inflammation, developmental malformation, meningitis, hemorrhage or injury**
- **Continued production cause an increase in pressure**
- **In newborn or fetus, the fontanels allow this internal pressure to cause expansion of the skull and damage to the brain tissue**
- **Neurosurgeon implants a drain shunting the CSF to the veins of the neck or the abdomen**

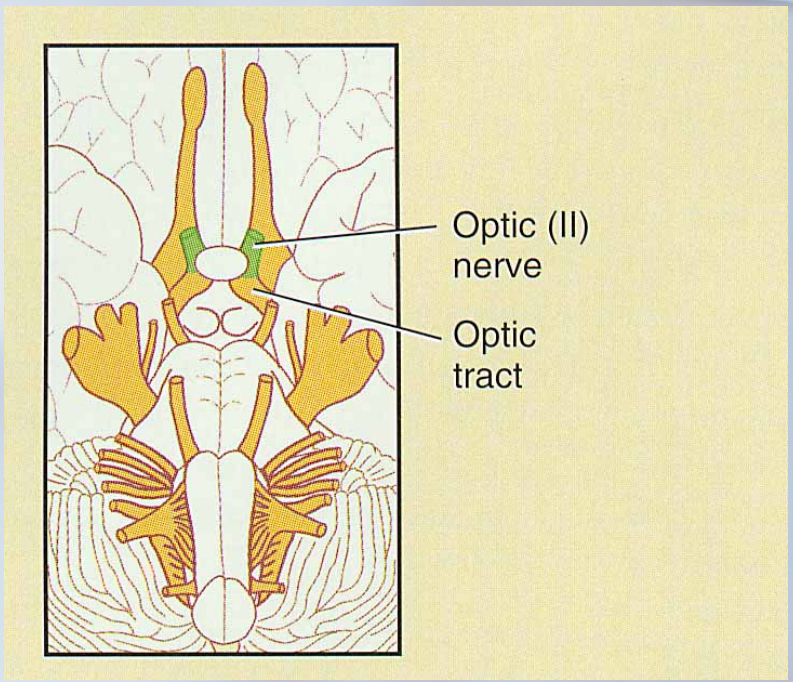
Label Each Nerve, 1-12 on the Picture in your Notes

I -- Olfactory Nerve



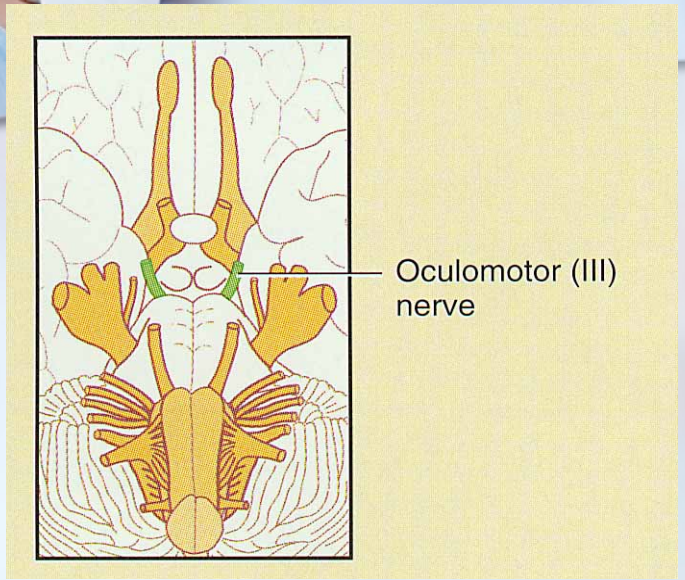
- Extends from olfactory mucosa of nasal cavity to olfactory bulb
- Sense of smell

II -- Optic Nerve



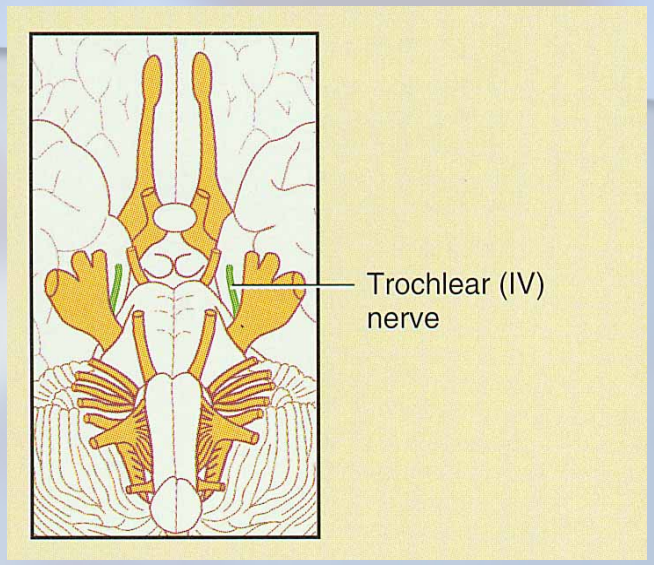
- Connects to retina supplying vision

III = Oculomotor Nerve



- **Levator palpebrae raises eyelid**
- **4 extrinsic eye muscles**
- **2 intrinsic eye muscles**
  - **Accomodation for near vision (changing shape of lens during reading)**
  - **constriction of pupil**

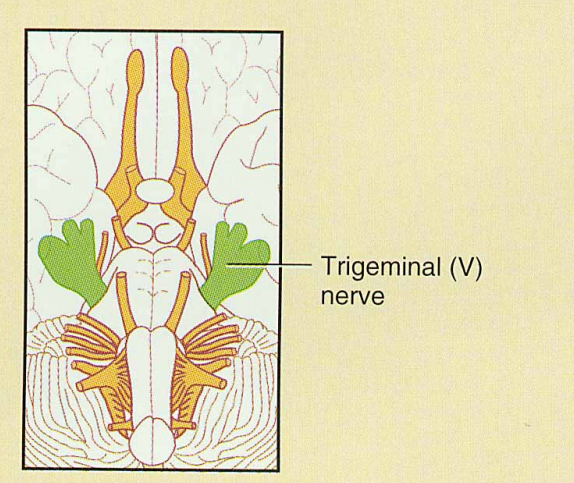
IV = Trochlear Nerve



- Superior oblique eye muscle

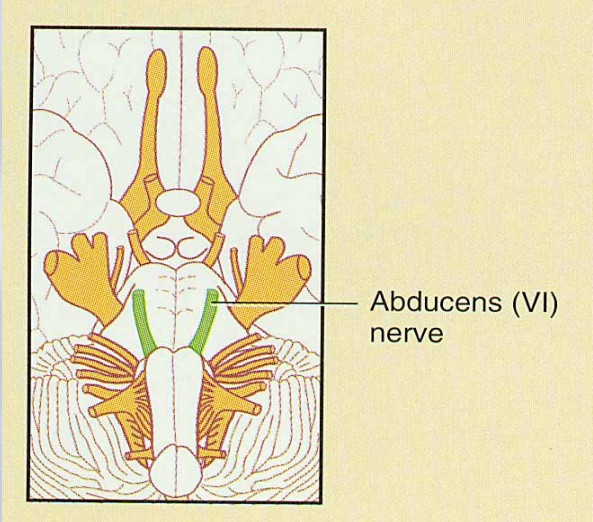
Label Each Nerve, 1-12 on the Picture in your Notes

V = Trigeminal Nerve



- **Motor portion**
  - **muscles of mastication (chewing)**
- **Sensory portion**
  - **touch, pain, & temperature receptors of the face**
    - **ophthalmic branch**
    - **maxillary branch**
    - **mandibular branch**

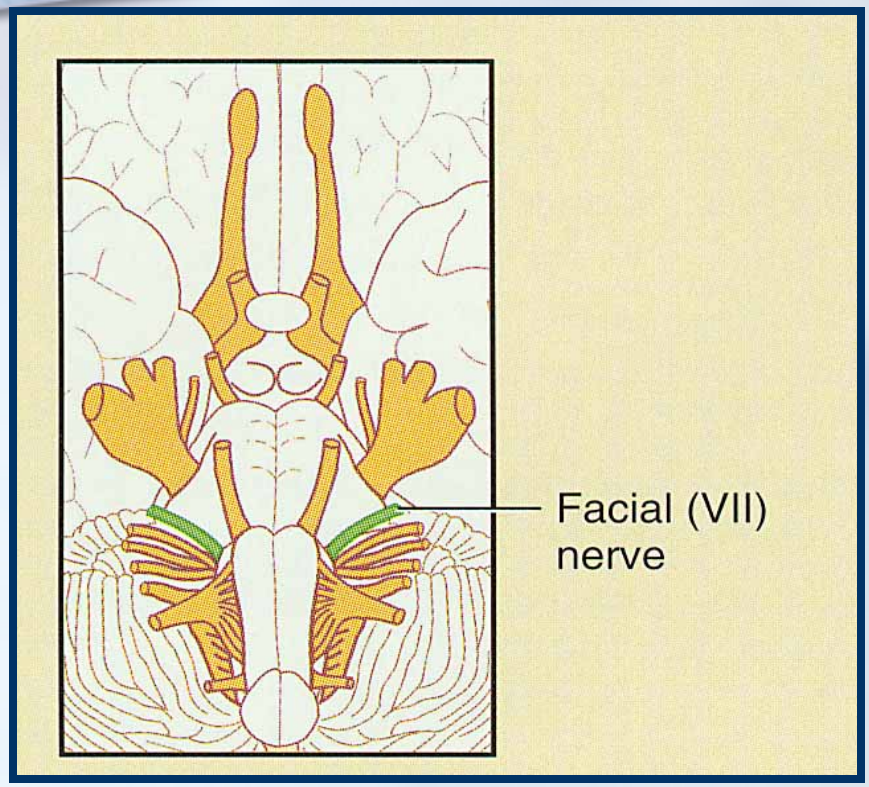
VI = Abducens Nerve



- Lateral rectus eye muscle

Label Each Nerve, 1-12 on the Picture in your Notes

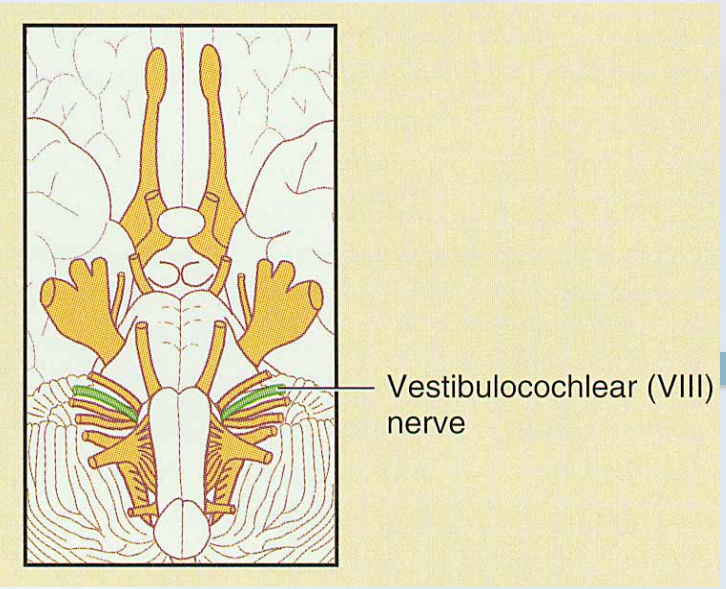
VII = Facial Nerve



- Motor portion
  - facial muscles
  - salivary & nasal and oral mucous glands & tears
- Sensory portion
  - taste buds on anterior 2/3's of tongue

Label Each Nerve, 1-12 on the Picture in your Notes

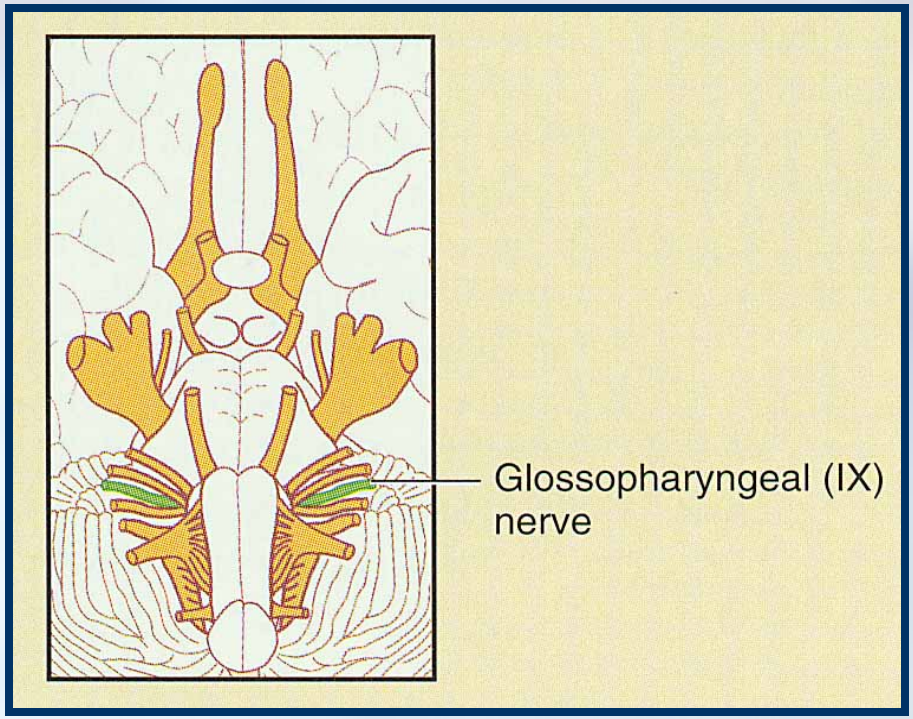
VIII = Vestibulocochlear Nerve



- **Cochlear branch begins in medulla**
  - **receptors in cochlea**
  - **hearing**
  - **if damaged deafness or tinnitus (ringing) is produced**
- **Vestibular branch begins in pons**
  - **receptors in vestibular apparatus**
  - **sense of balance**
  - **Vertigo (feeling of rotation)**
  - **Ataxia (lack of coordination)**

Label Each Nerve, 1-12 on the Picture in your Notes

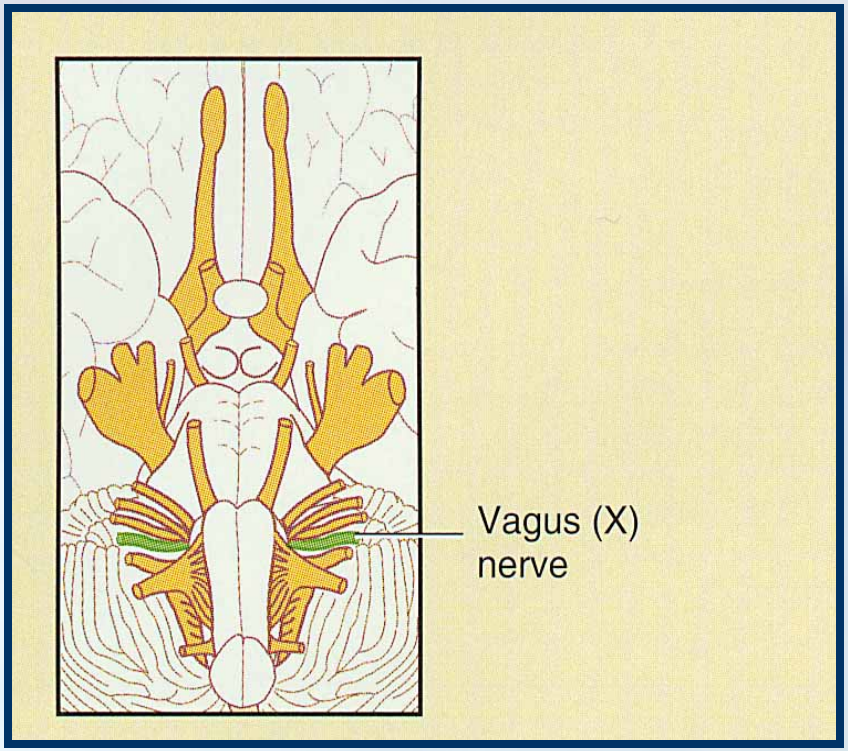
IX = Glossopharyngeal Nerve



- Stylopharyngeus m. (lifts throat during swallowing)
- Secretions of parotid gland
- Somatic sensations & taste on posterior 1/3 of tongue

Label Each Nerve, 1-12 on the Picture in your Notes

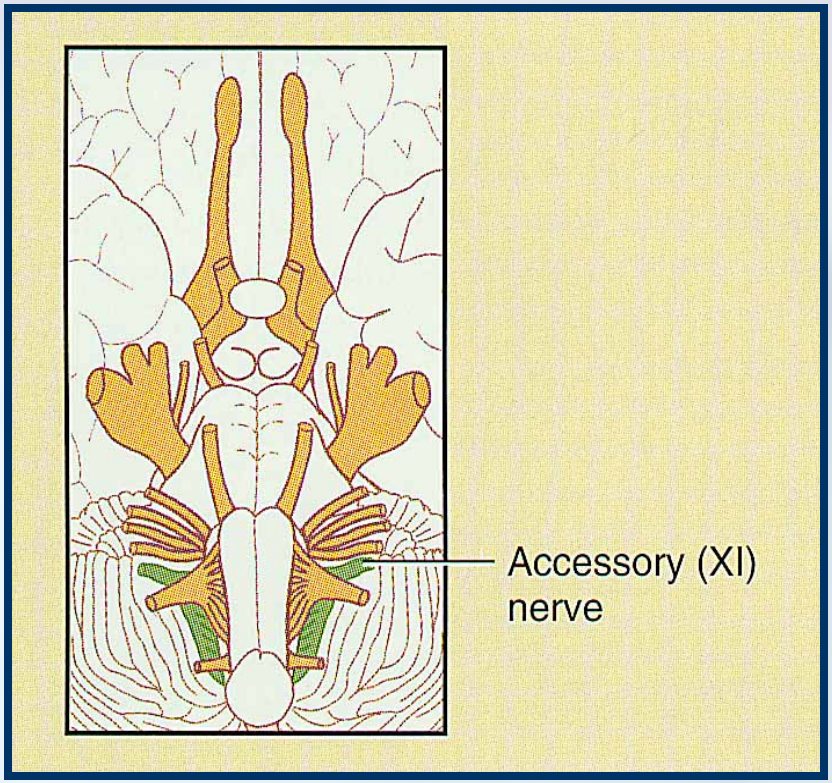
X = Vagus Nerve



- Receives sensations from viscera
- Controls cardiac muscle and smooth muscle of the viscera
- Controls secretion of digestive fluids

Label Each Nerve, 1-12 on the Picture in your Notes

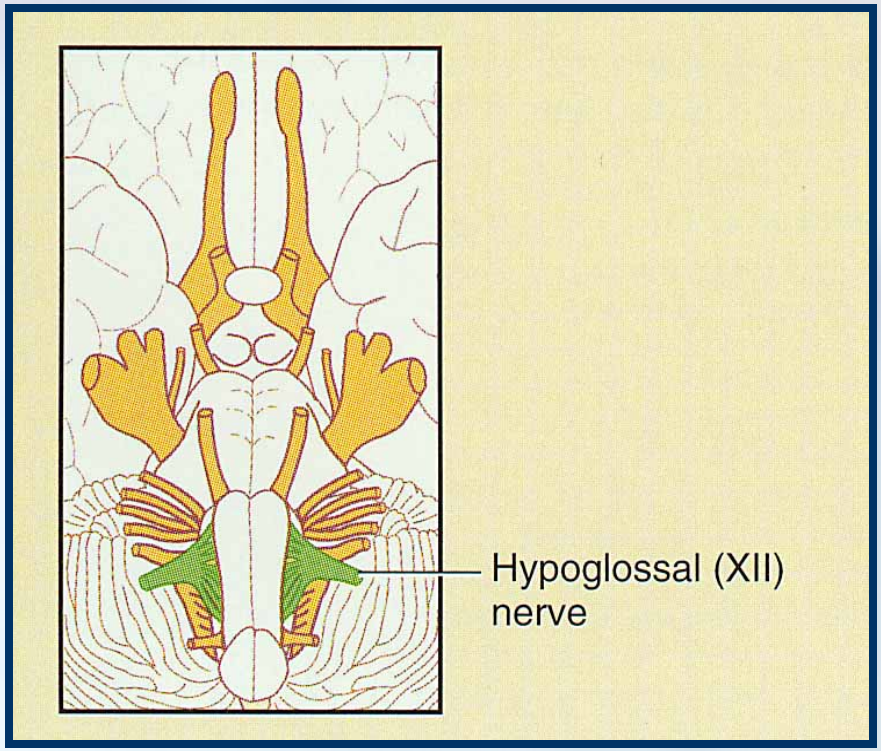
XI = Spinal Accessory Nerve



- Cranial portion
  - arises medulla
  - skeletal mm of throat & soft palate
- Spinal portion
  - arises cervical spinal cord
  - sternocleidomastoid and trapezius mm.

Label Each Nerve, 1-12 on the Picture in your Notes

XII = Hypoglossal Nerve



- Controls muscles of tongue during speech and swallowing
- Injury deviates tongue to injured side when protruded
- Mixed, primarily motor

Label Each Nerve, 1-12 on the Picture in your Notes

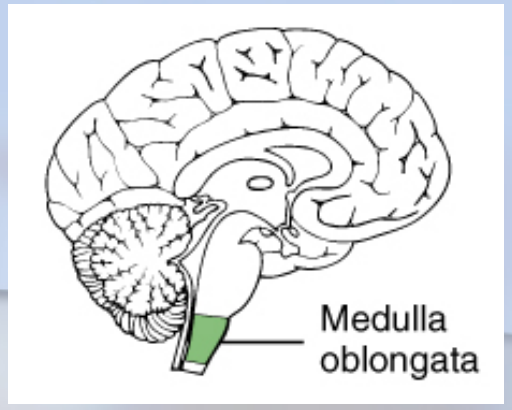
The Cranial Nerves - Assignment

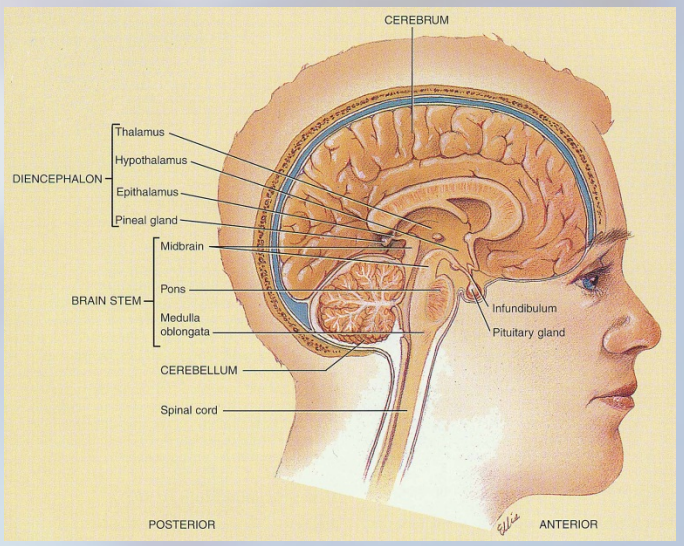
Make a 12 box chart for the cranial nerves

Include:

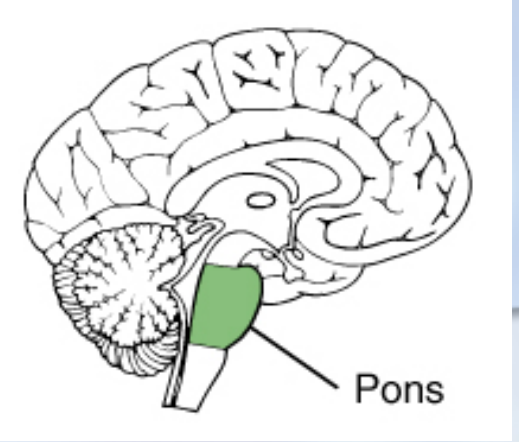
- CN#
- Name
- What it controls
- Picture

Medulla Oblongata

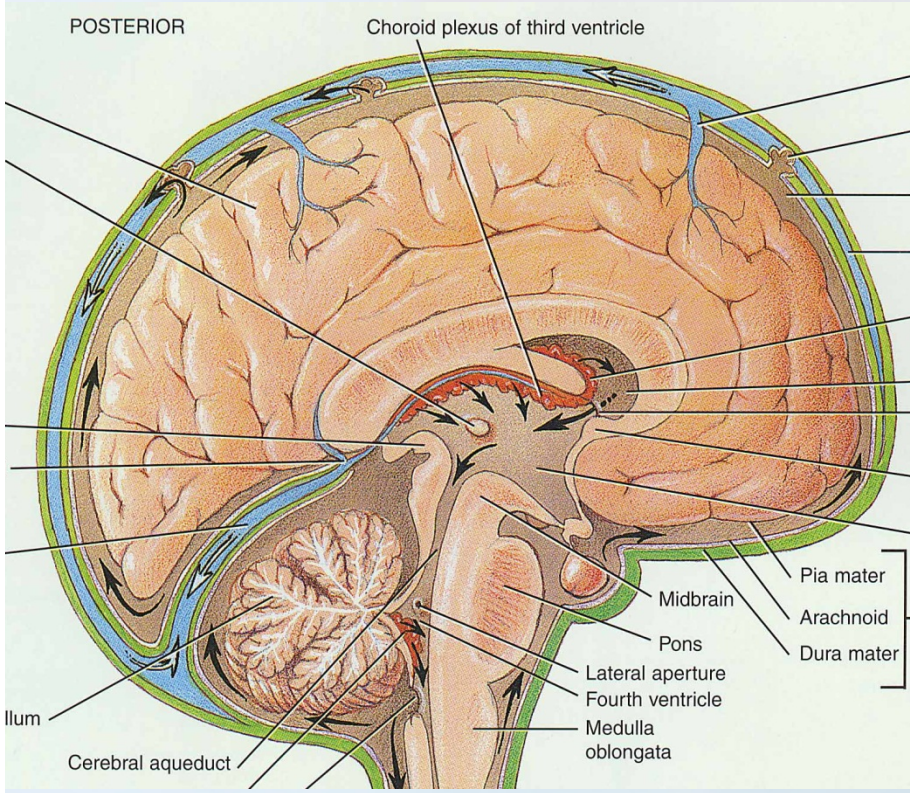




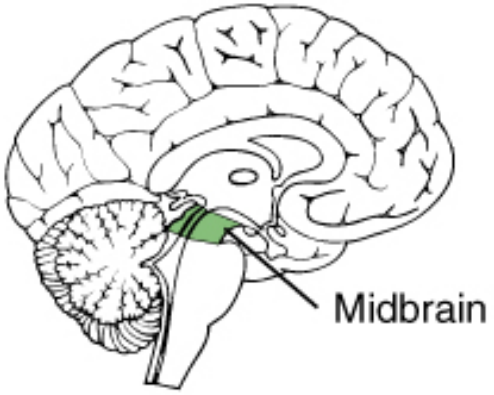
- Continuation of spinal cord
- Ascending sensory tracts
- Descending motor tracts
- Nuclei of 5 cranial nerves
- Cardiovascular center
  - force & rate of heart beat
  - diameter of blood vessels
- Respiratory center
  - medullary rhythmicity area sets basic rhythm of breathing
- Information in & out of cerebellum
- Reflex centers for coughing, sneezing, swallowing etc



Pons

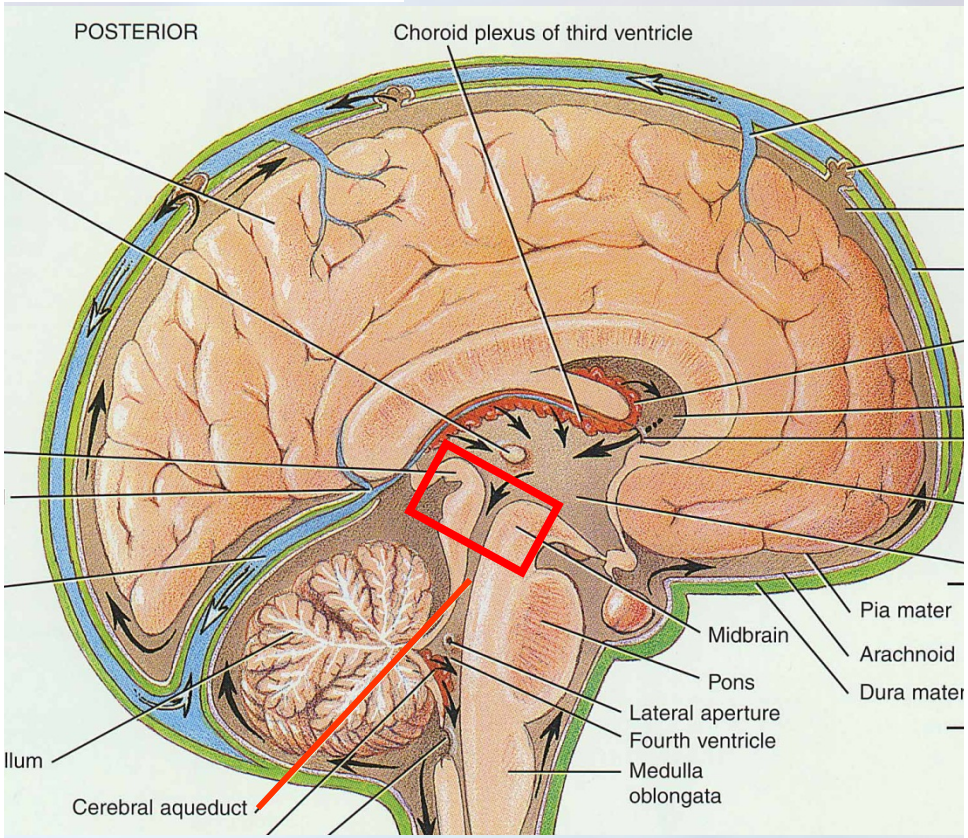


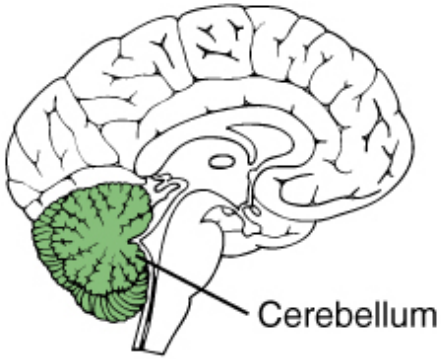
- One inch long
- White fiber tracts ascend and descend
- Pneumotaxic & apneustic areas help control breathing
- Middle cerebellar peduncles carry sensory info to the cerebellum
- Cranial nerves 5-7



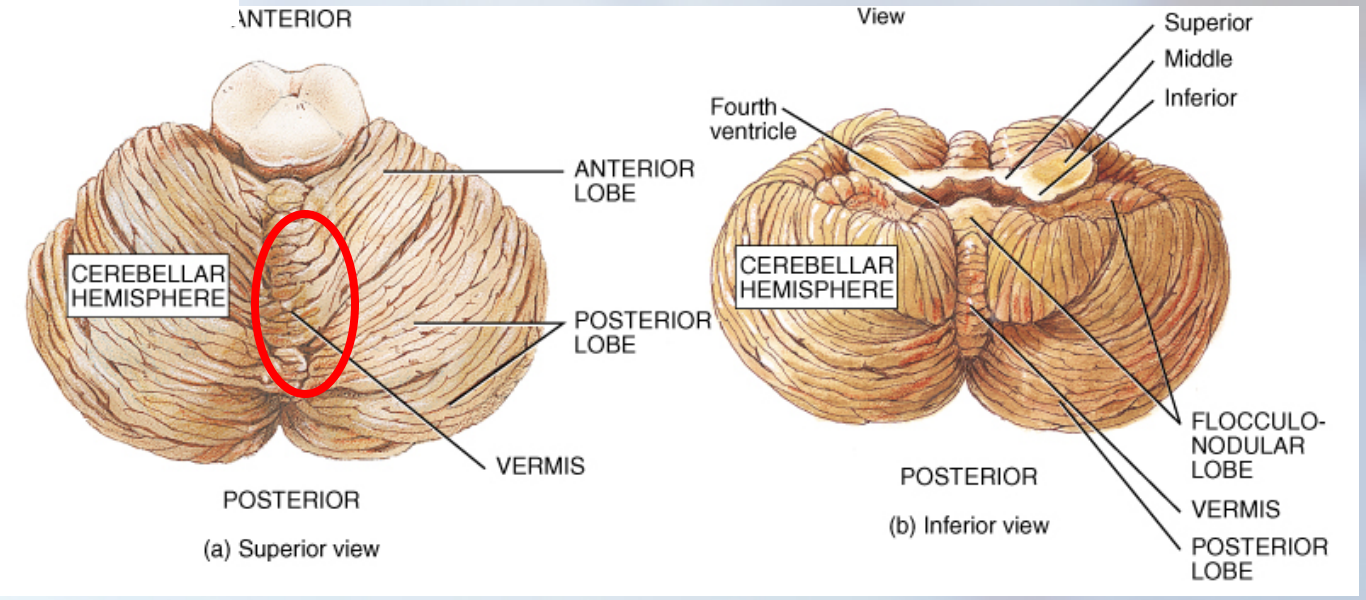
Midbrain

- One inch in length
- Extends from pons to diencephalon
- Cerebral aqueduct connects 3rd ventricle above to 4th ventricle below



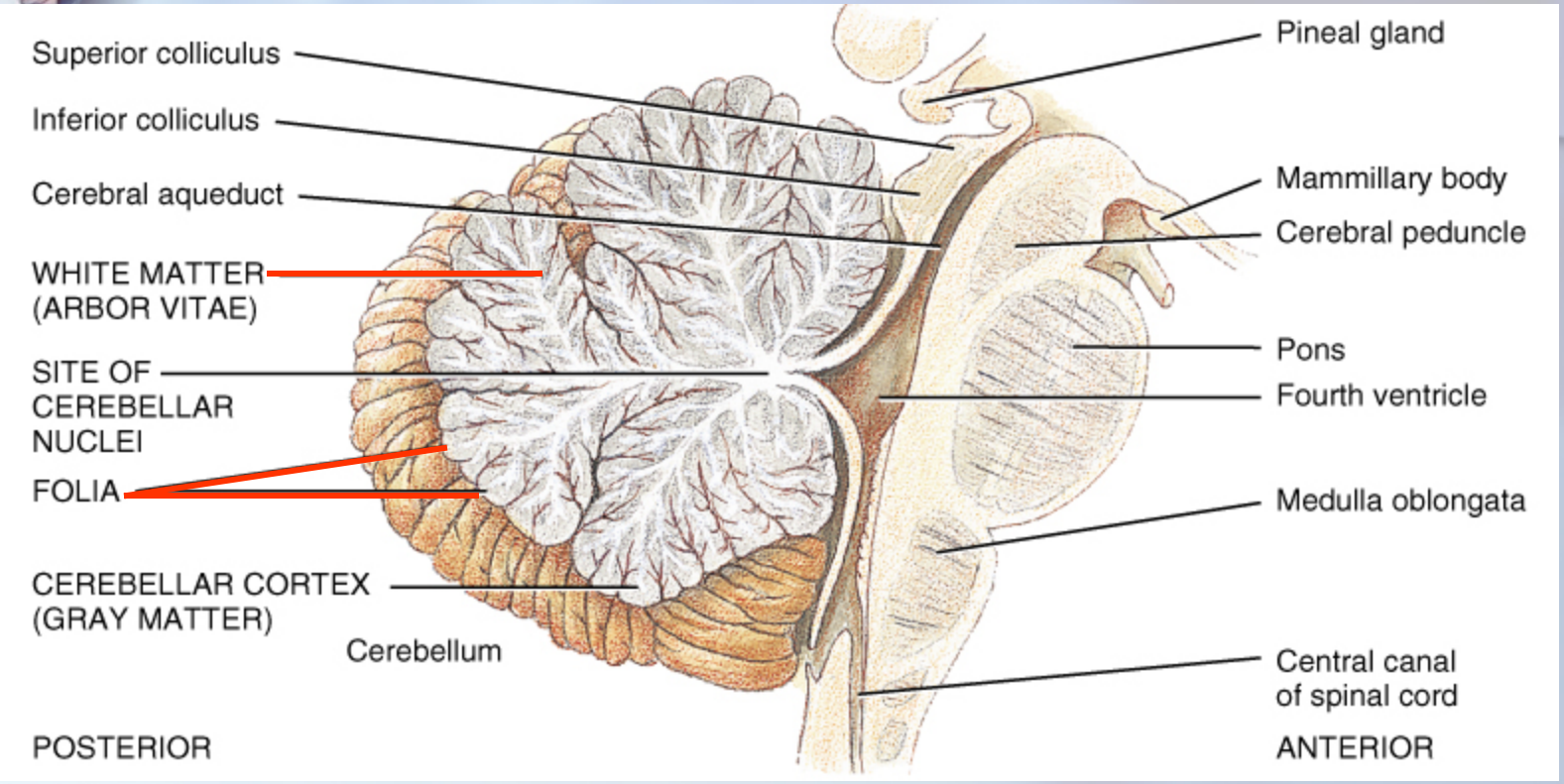


Cerebellum



- 2 cerebellar hemispheres and Vermis (central area)
- Function
  - correct voluntary muscle contraction and posture based on sensory data from body about actual movements
  - sense of equilibrium

Cerebellum



- Transverse fissure between cerebellum & cerebrum
- Cerebellar cortex (folia) & central nuclei are grey matter
- Arbor Vitae = tree of life = white matter