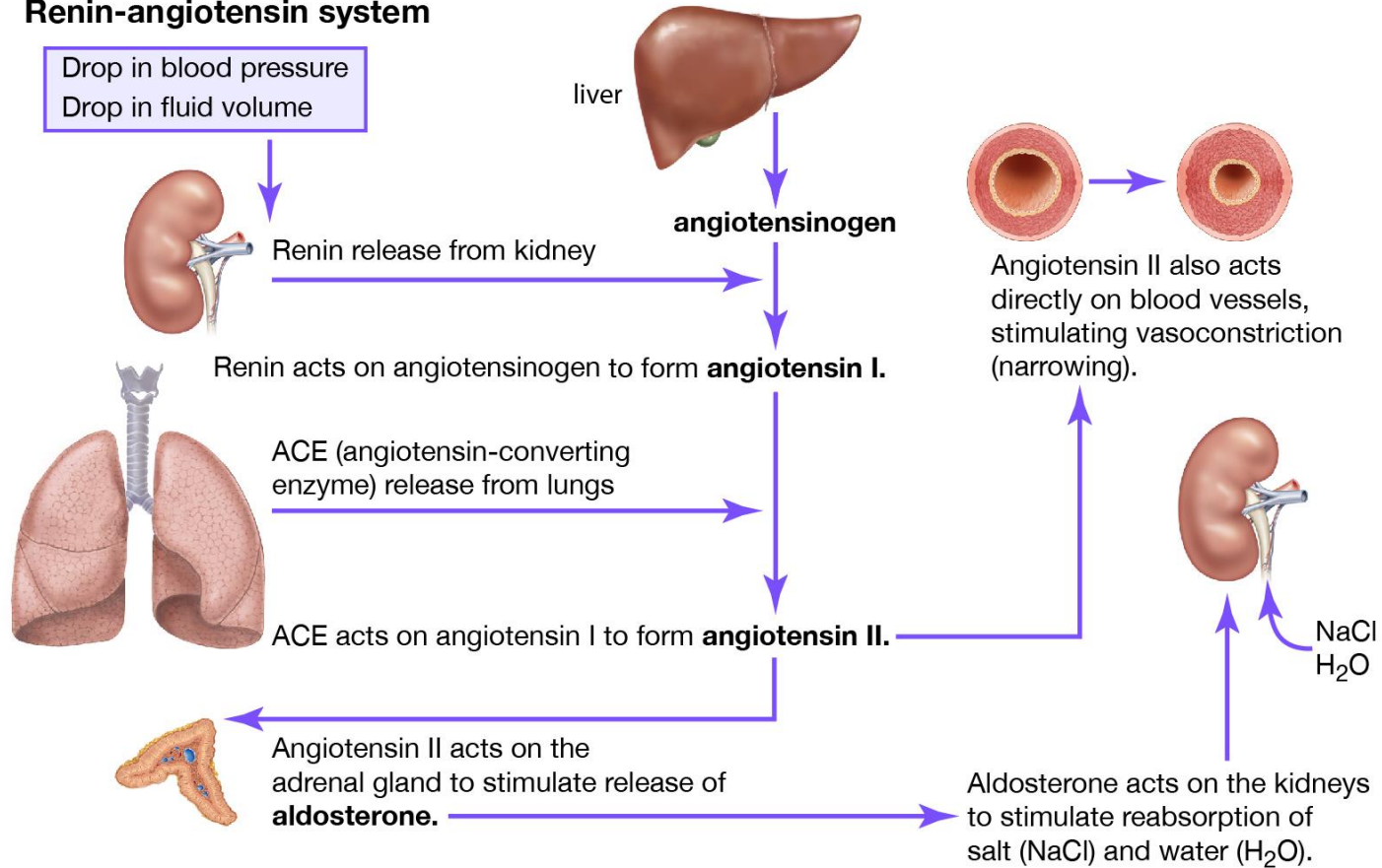


Renin Angiotensin Mechanism

Renin-angiotensin system



Cranial Nerves

- 12 pairs of nerves that mostly serve the head and neck
- Numbered in order, front to back
- Most are mixed nerves, but three are sensory only

Distribution of Cranial Nerves

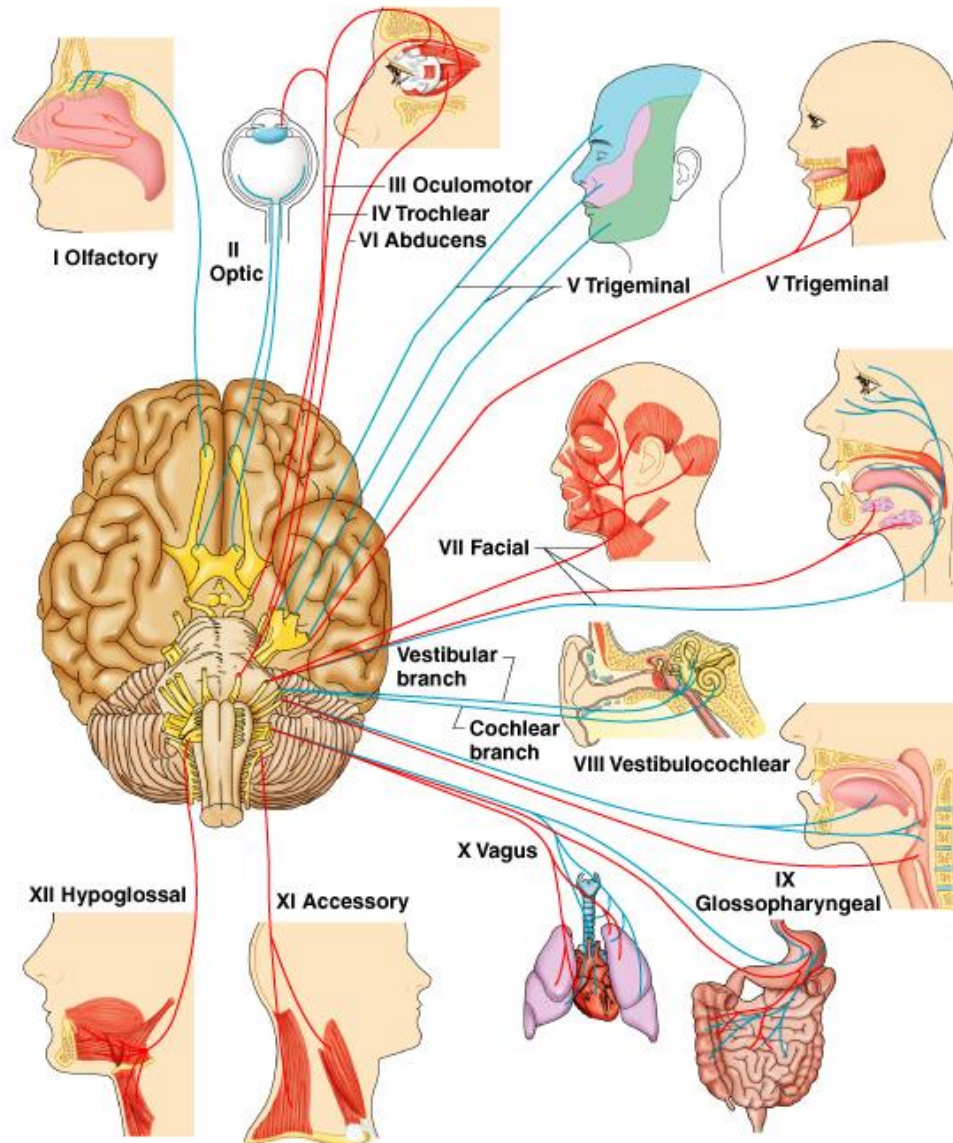


Figure 7.21

Cranial Nerves

- **I** Olfactory nerve – sensory for smell
- **II** Optic nerve – sensory for vision
- **III** Oculomotor nerve – motor fibers to eye muscles
- **IV** Trochlear – motor fiber to eye muscles

Cranial Nerves

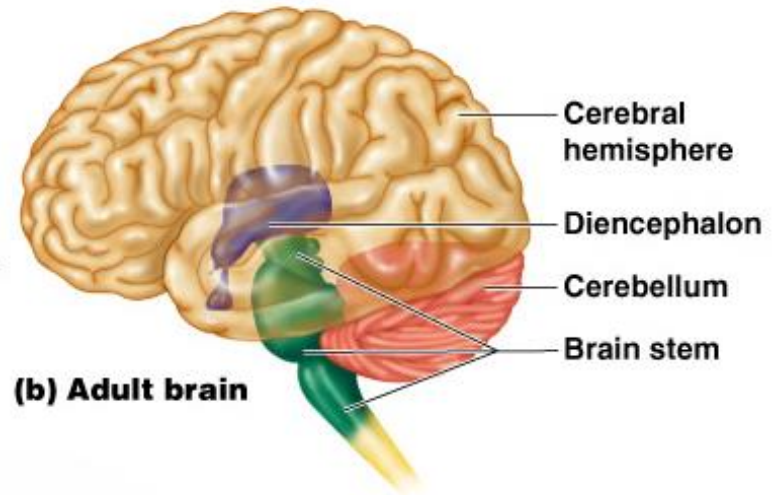
- **V** Trigeminal nerve – sensory for the face; motor fibers to chewing muscles
- **VI** Abducens nerve – motor fibers to eye muscles
- **VII** Facial nerve – sensory for taste; motor fibers to the face
- **VIII** Vestibulocochlear nerve – sensory for balance and hearing

Cranial Nerves

- **IX** Glossopharyngeal nerve – sensory for taste; motor fibers to the pharynx
- **X** Vagus nerves – sensory and motor fibers for pharynx, larynx, and viscera
- **XI** Accessory nerve – motor fibers to neck and upper back
- **XII** Hypoglossal nerve – motor fibers to tongue

Regions of the Brain

- Cerebral hemispheres
- Diencephalon
- Brain stem
- Cerebellum



Cerebral Hemispheres (Cerebrum)

- Paired (left and right) superior parts of the brain
- Include more than half of the brain mass

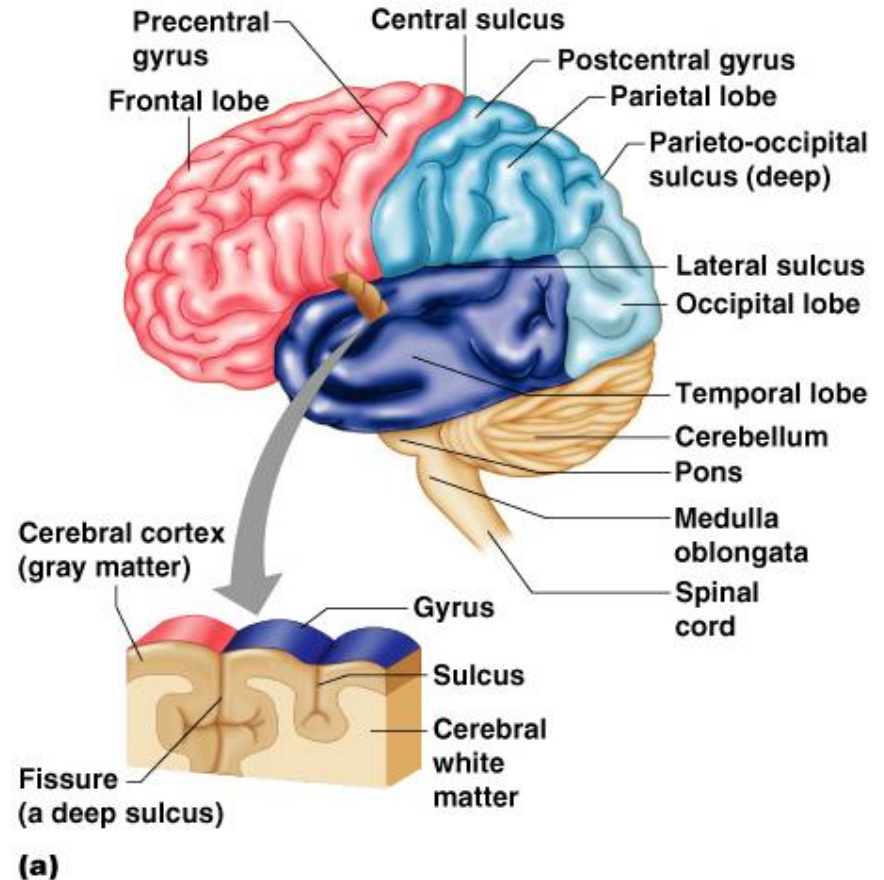


Figure 7.13a

Cerebral Hemispheres (Cerebrum)

- The surface is made of ridges (gyri) and grooves (sulci)

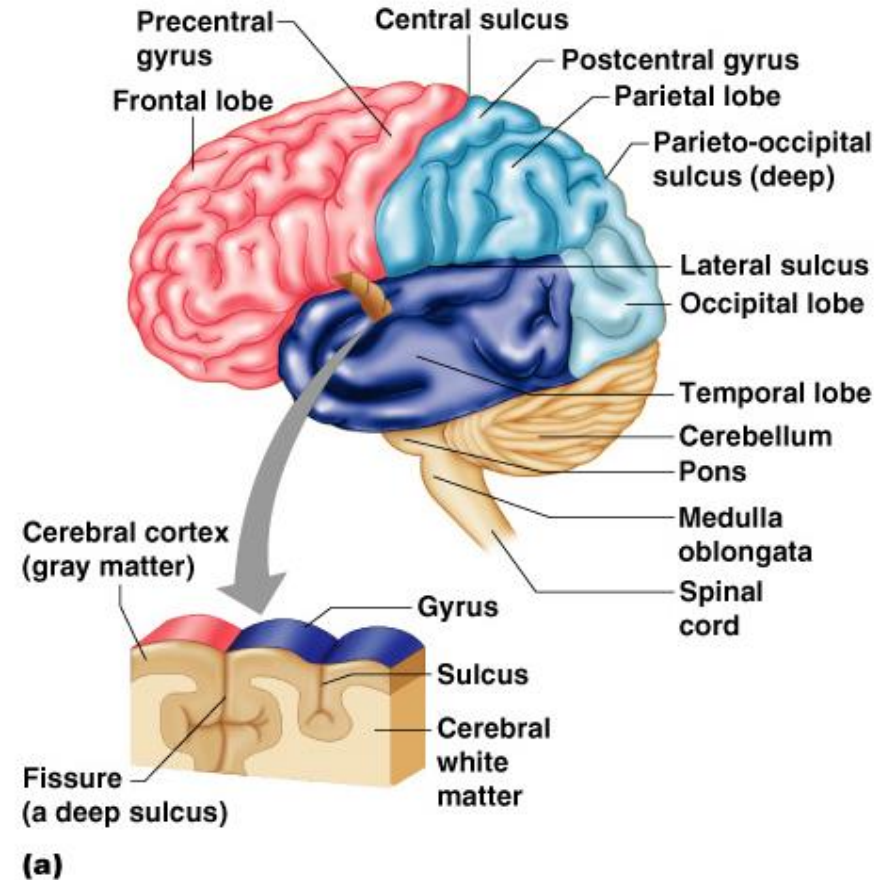


Figure 7.13a

Lobes of the Cerebrum

- Fissures (deep grooves) divide the cerebrum into lobes
- **Surface lobes of the cerebrum**
 - **Frontal lobe:** performs cognitive tasks and controls voluntary movements.
 - **Parietal lobe:** enable body & touch sensation, and make you understand where your body is in space
 - **Occipital lobe:** vision
 - **Temporal lobe:** handles memory, hearing & languages

Specialized Areas of the Cerebrum

- **Somatic sensory area** – receives impulses from the body's sensory receptors
- **Primary motor area** – sends impulses to skeletal muscles

Sensory and Motor Areas of the Cerebral Cortex

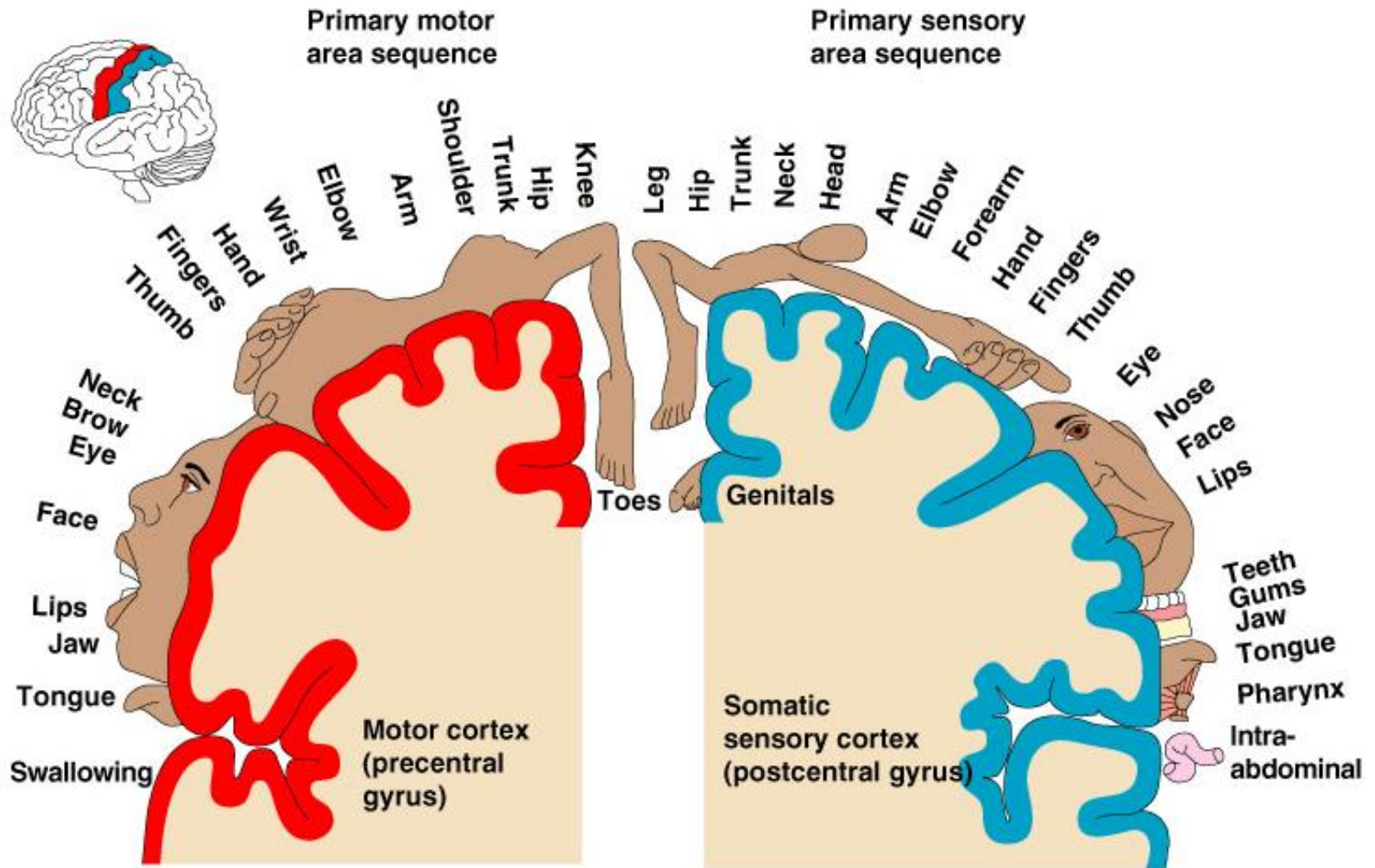


Figure 7.14

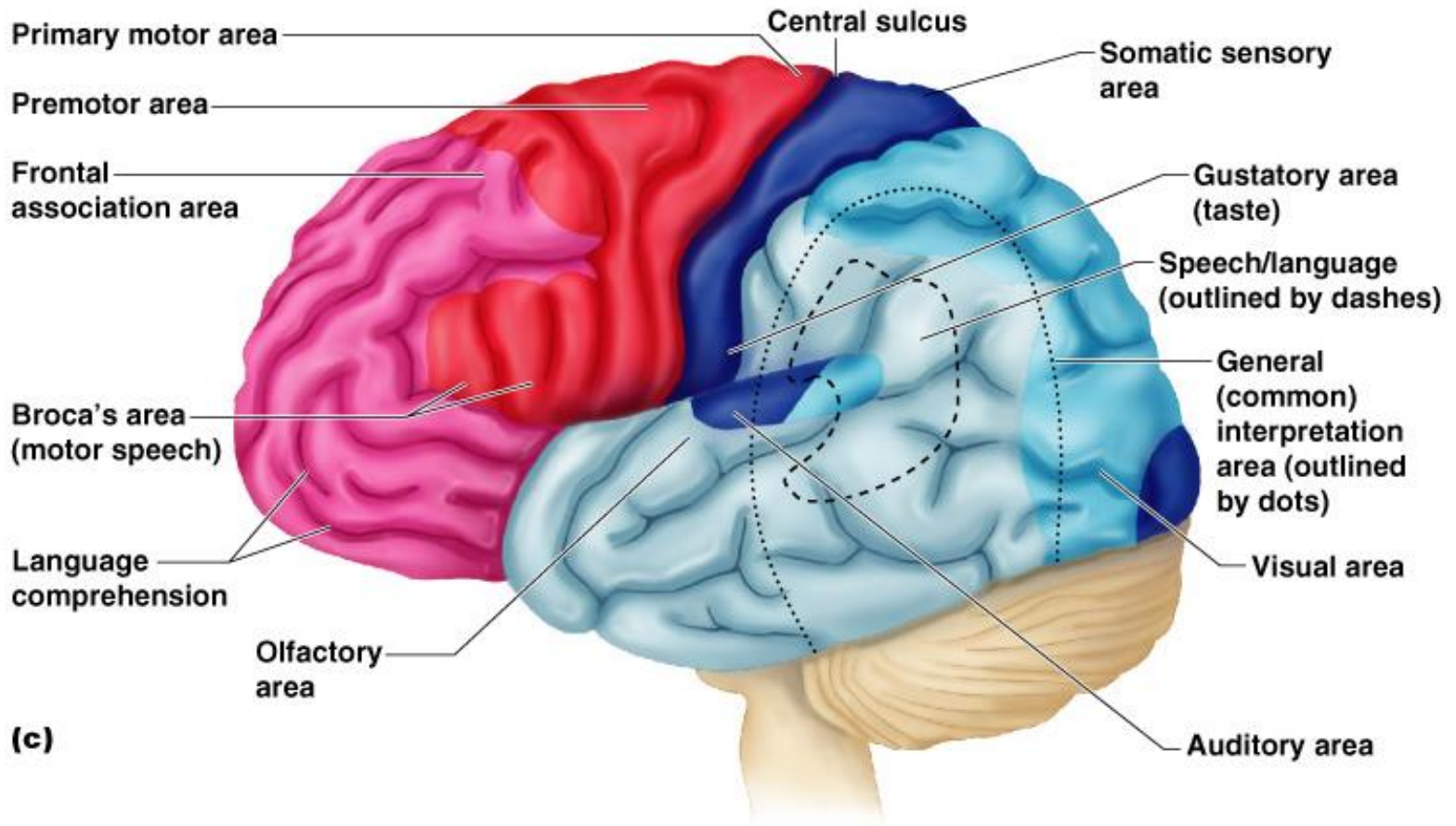
Specialized Areas of the Cerebrum

- Cerebral areas involved in special senses
 - Gustatory area (taste)
 - Visual area
 - Auditory area
 - Olfactory area

Specialized Areas of the Cerebrum

- Interpretation areas of the cerebrum
 - Speech/language region
 - Language comprehension region
 - General interpretation area

Specialized Areas of the Cerebrum



(c)

Figure 7.13c

Languages Areas

- Located in a large area surrounds the left side
- **Major Parts & Functions:**
 - **Broca's area** – involved in our ability to speak (speech preparation and production).
 - **Wernicke's area:** important in language developments and responsible for the comprehension of speech.
 - **Lateral prefrontal cortex**-language comprehension and word analysis
 - **Lateral and ventral temporal lobe**- coordinate auditory and visual aspects of language.

Broca`s area

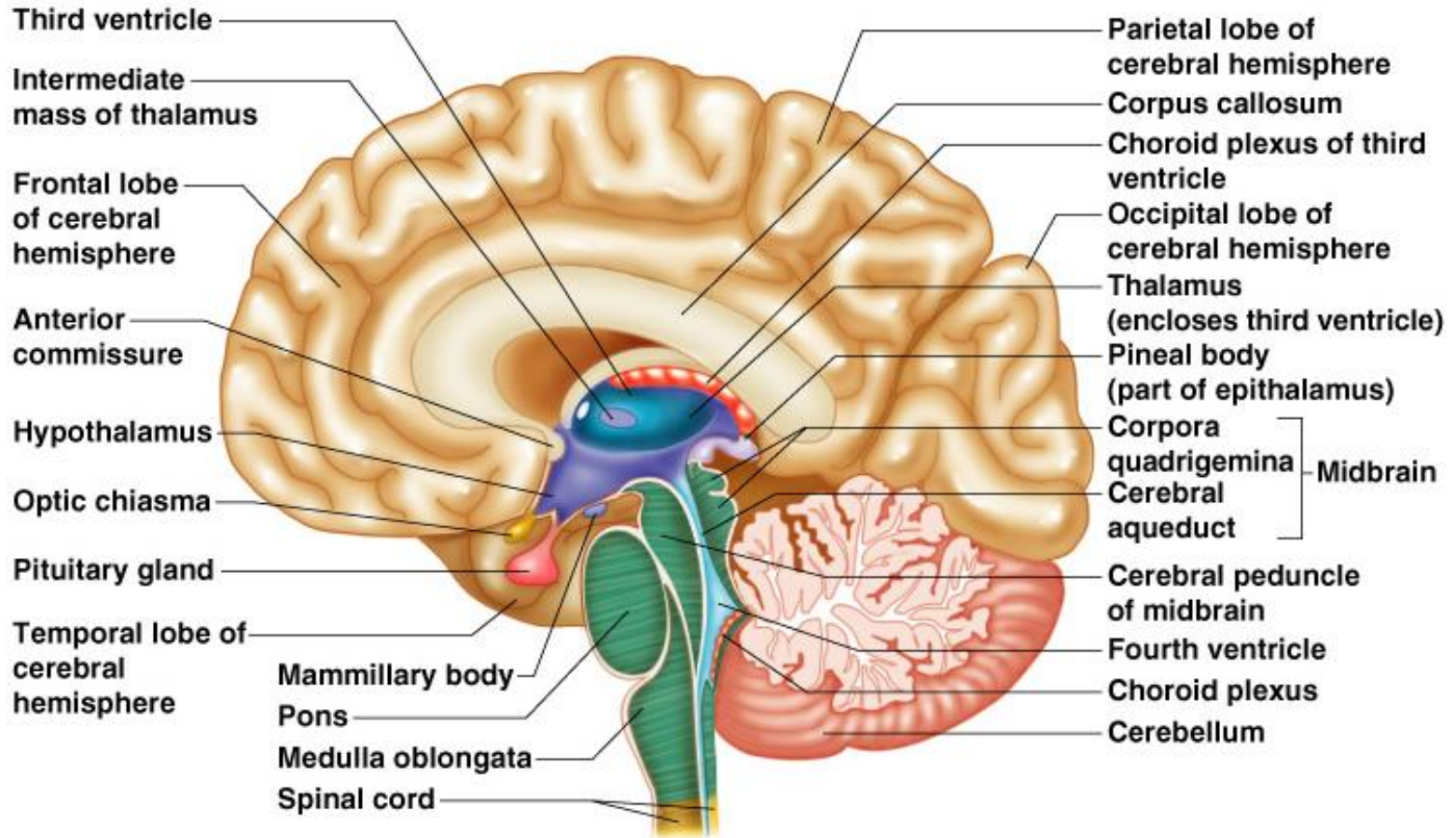
- Located anterior to the inferior region of the premotor area.
- Present in one hemisphere (usually the left)
- A motor speech area that direct muscles of the tongue.
- Is active as one prepares to speak.

Damage to this area, causes inability to say words properly, you know what you want to say but you can not vocalize the words.

Diencephalon

- Sits on top of the brain stem
- Enclosed by the cerebral hemispheres
- Made of three parts
 - Thalamus
 - Hypothalamus
 - Epithalamus
(Basal ganglia)

Diencephalon



(a)

Figure 7.15

Thalamus

- Surrounds the third ventricle
- The relay station for sensory and motor impulses.
- Transfers impulses to the correct part of the cortex for localization and interpretation
- Maintain consciousness, alertness and attention.

Hypothalamus

- Under the thalamus
- Important autonomic nervous system center
 - Helps regulate body temperature
 - Controls water balance
 - Regulates metabolism
- An important part of the limbic system (emotions)
- The pituitary gland is attached to the hypothalamus

Epithalamus

- Forms the roof of the third ventricle
- Houses the pineal body (an endocrine gland)
- Includes the choroid plexus – forms cerebrospinal fluid

Basal Ganglia

- Composed of several nuclei

Damage to Basal ganglia causes a variety of problems with movement and sensation depending on the location characterized by of voluntary movement & appearance of involuntary movements.

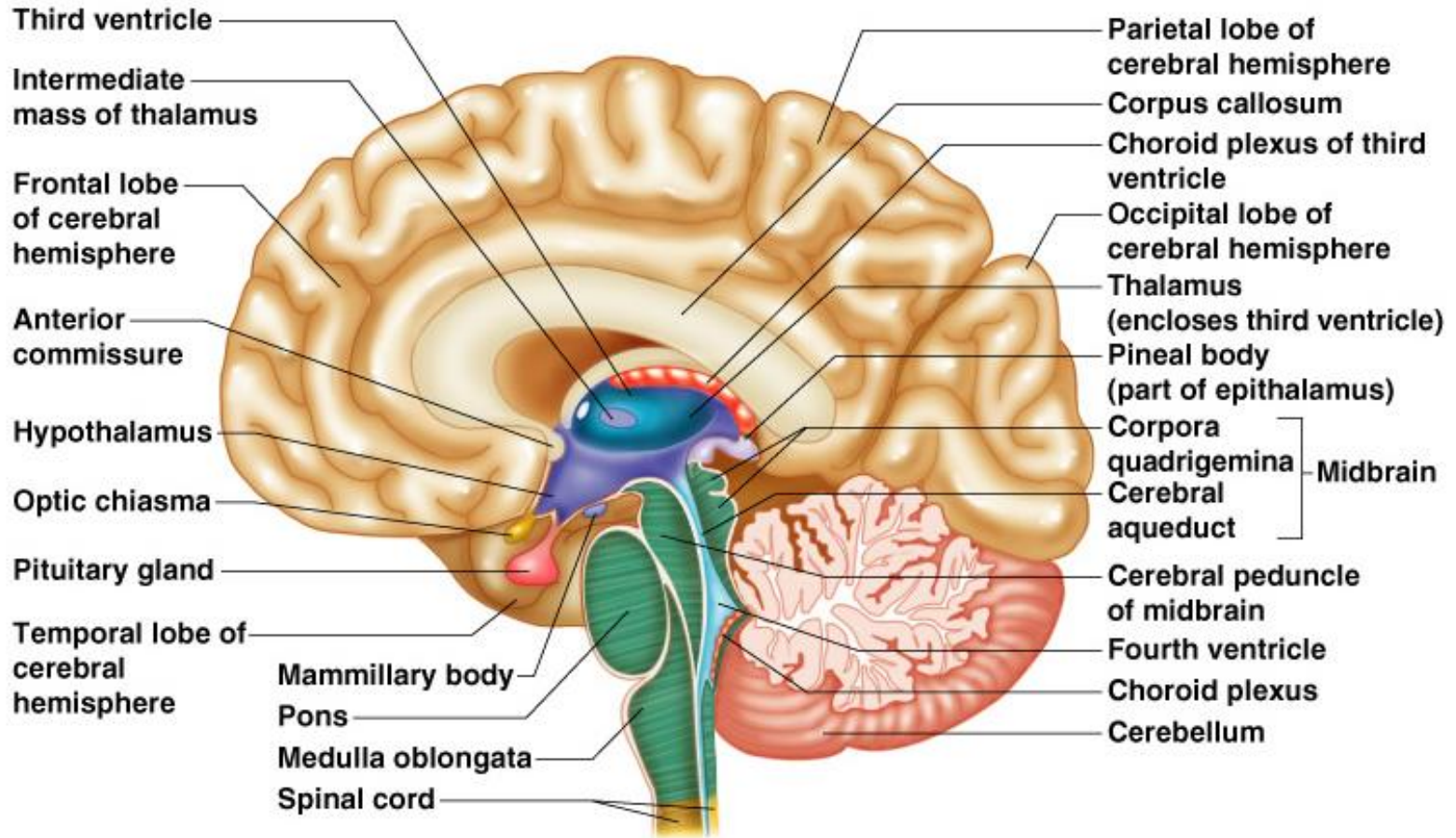
Brain Stem

- Attaches to the spinal cord, regulate some aspects of breathing and HR.

Damage to the brain stem has important effects on motor & sensory information

- Parts of the brain stem
 - Midbrain
 - Pons
 - Medulla oblongata

Brain Stem



(a)

Figure 7.15a

Midbrain

- Mostly composed of tracts of nerve fibers for CNIII and CNIV, which connects to the muscles that moves the eyes .
 - Reflex centers for vision and hearing

Pons

- The bulging center part of the brain stem
- Contains of several nuclei involved in hearing, balance and the control of breathing
- Contains nuclei of CN V, VI, VII.

Damage to Pons results paralysis of muscles responsible for moving the eyes horizontally.

Large lesion in the anterior pons may cause locked in syndrome (person is conscious but can not talk and is quadriplegic).

Medulla Oblongata

- The lowest part of the brain stem
- Merges into the spinal cord
- Contains nuclei for CN VIII to CNXII.
- Contains important control centers
 - Heart rate control
 - Blood pressure regulation
 - Breathing
 - Swallowing
 - Vomiting

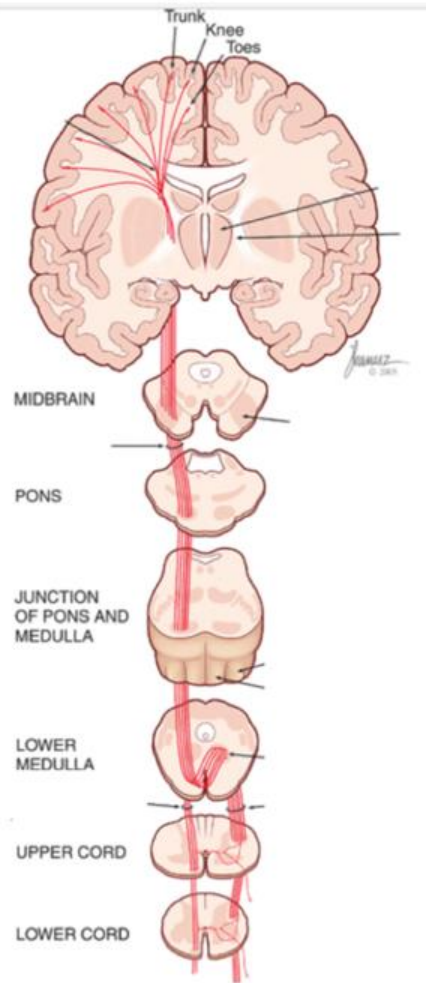
Damage to it Causes Vertigo, paralysis of muscles in the throat, larynx and combination of sensory loss in the limbs and face.

Motor Pathways

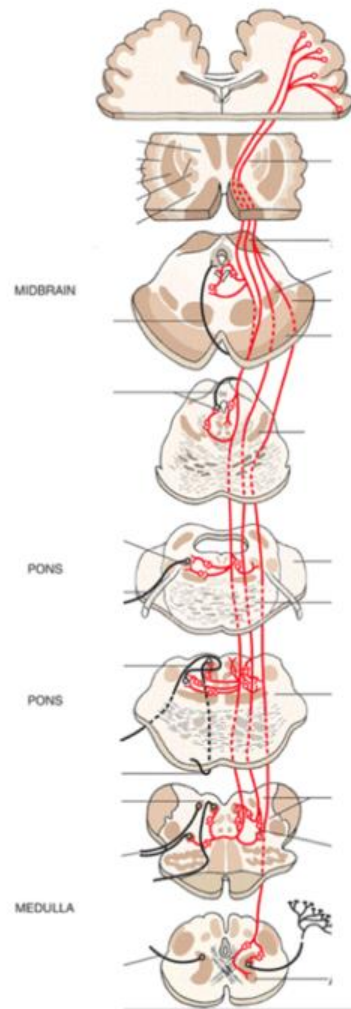
- **Corticospinal tract:** begins from cerebral cortex to spinal cord, controls muscles responsible for volitional movements of trunk & limbs.
- **Corticobulbar tract:** begins from cerebral cortex to brain stem, serves the muscles for cranial nerves for speech.
- **Vestibulospinal tract:** from brain stem to spinal cord, control muscles responsible for quick movements in response to sudden changes in body position.

Motor Pathways

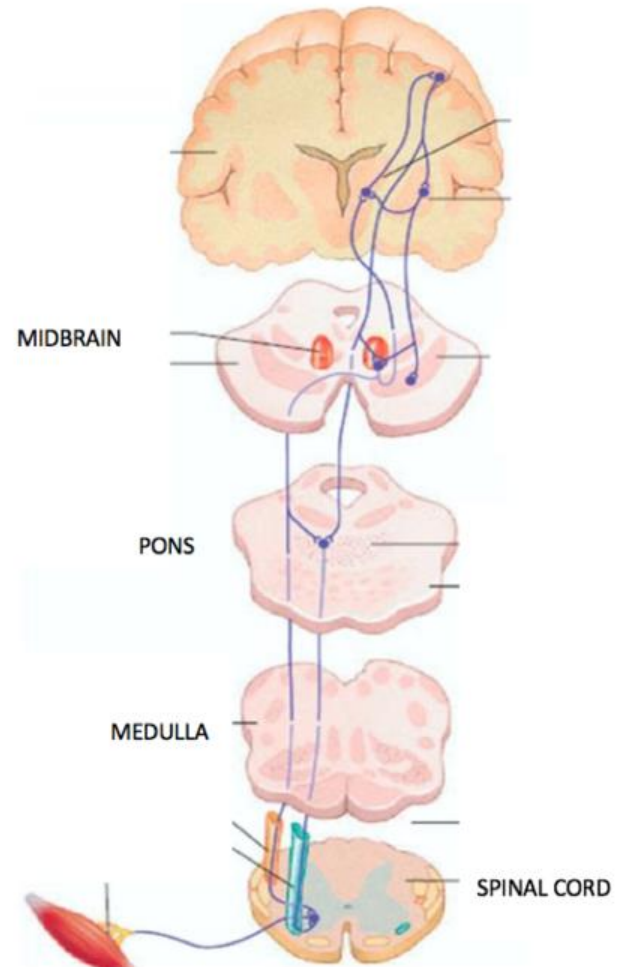
Corticospinal tract



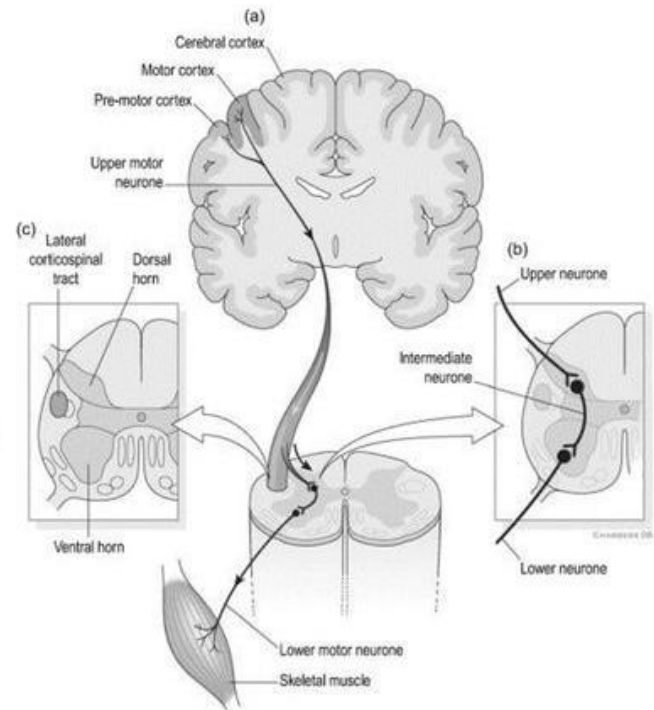
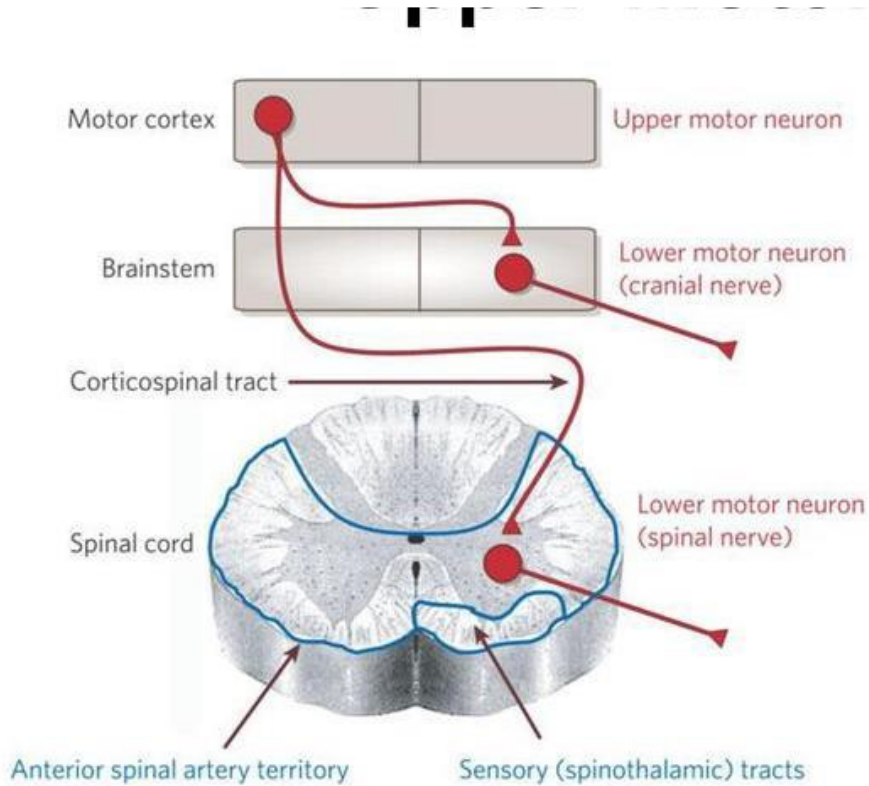
Corticobulbar tract



Extrapyramidal tract

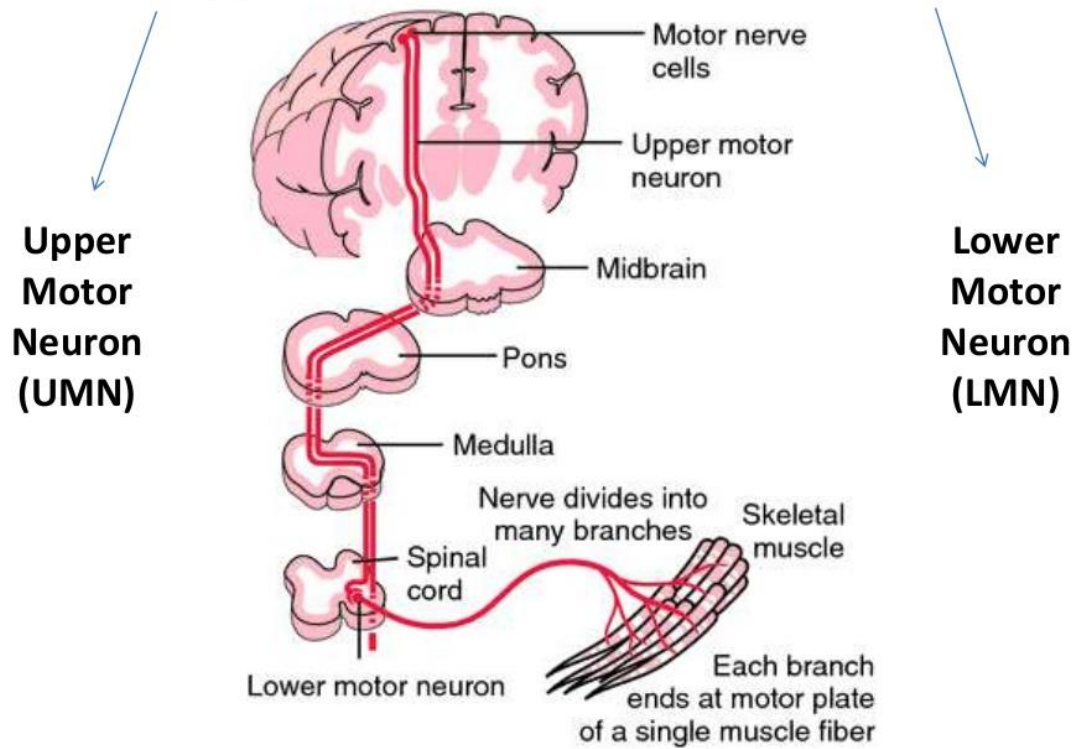


UMN & LMN



UMN & LMN

Types of Motor Neurons

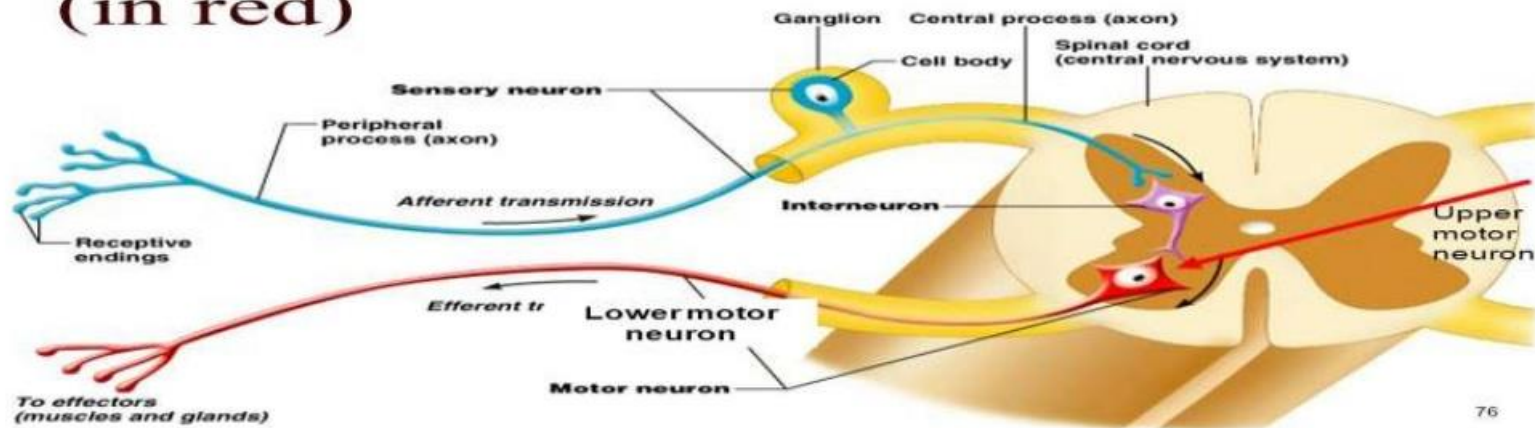


Definition of LMNL : Destruction of motors which supply the muscles.

It starts from anterior horn cell ends at the muscles.

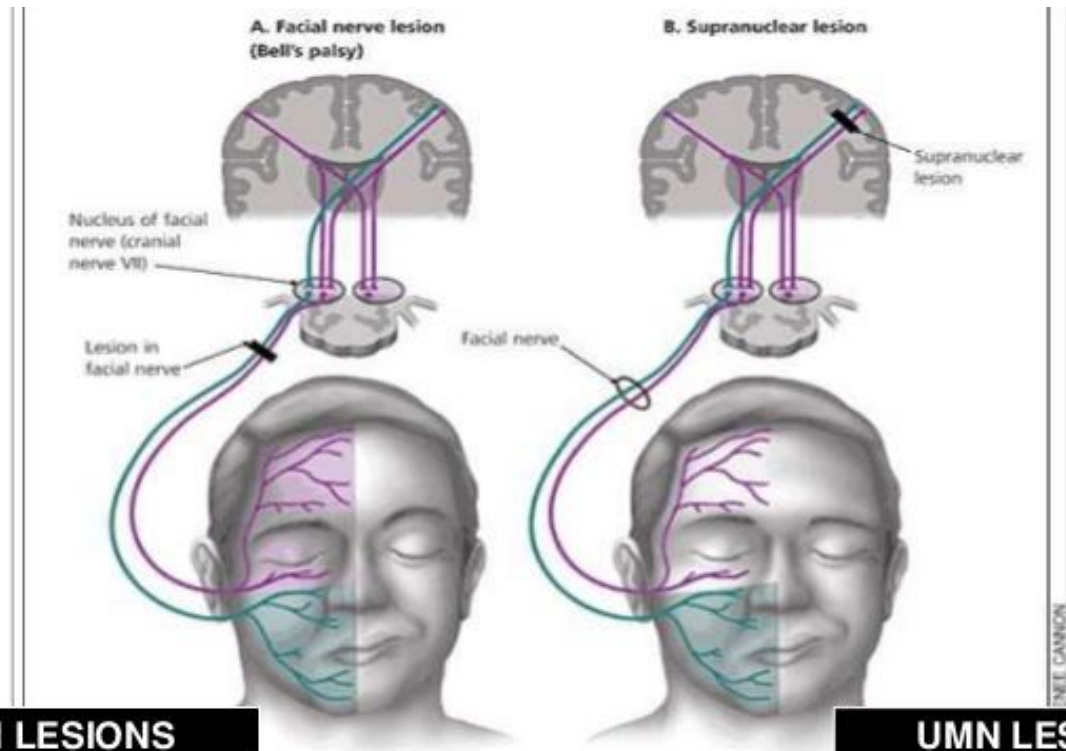


Upper and Lower Motor Neurons (in red)



- Lesion to the UMN causes:
 - *spasticity (tight or stiff muscle and inability to control those muscles).*
 - *Decrease in motor control*
 - *Babinskis sign*
- Lesion to the LMN causes:
 - *Decrease reflexes*
 - *Decrease strength*
 - *paralysis*

Lesions in the motor neurons



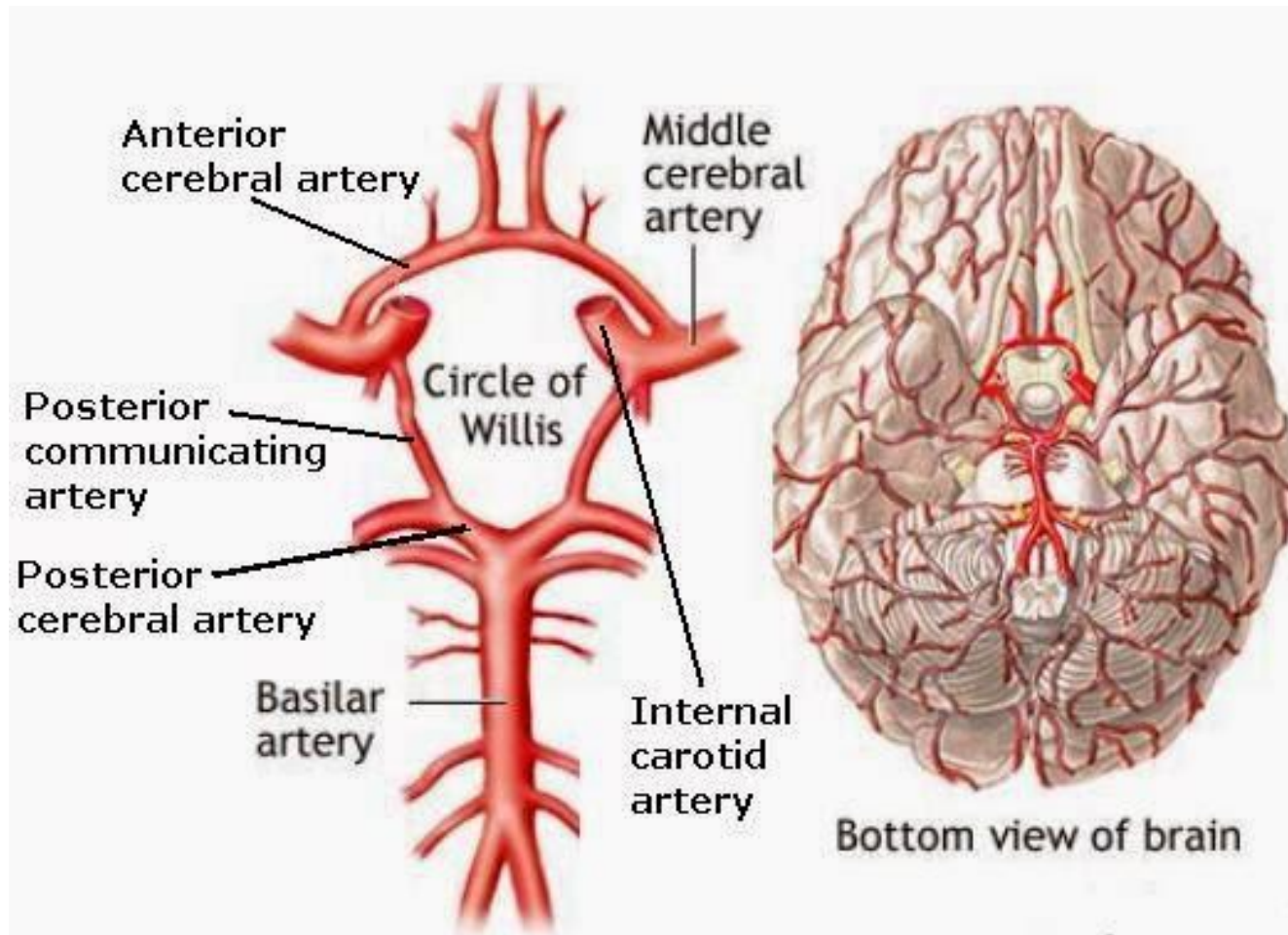
LMN LESIONS

- ☐ Totally half side of the is affected.
- ☐ Half of the Mid face is only paralysed.
- ☐ Eye brow's can't move normally.

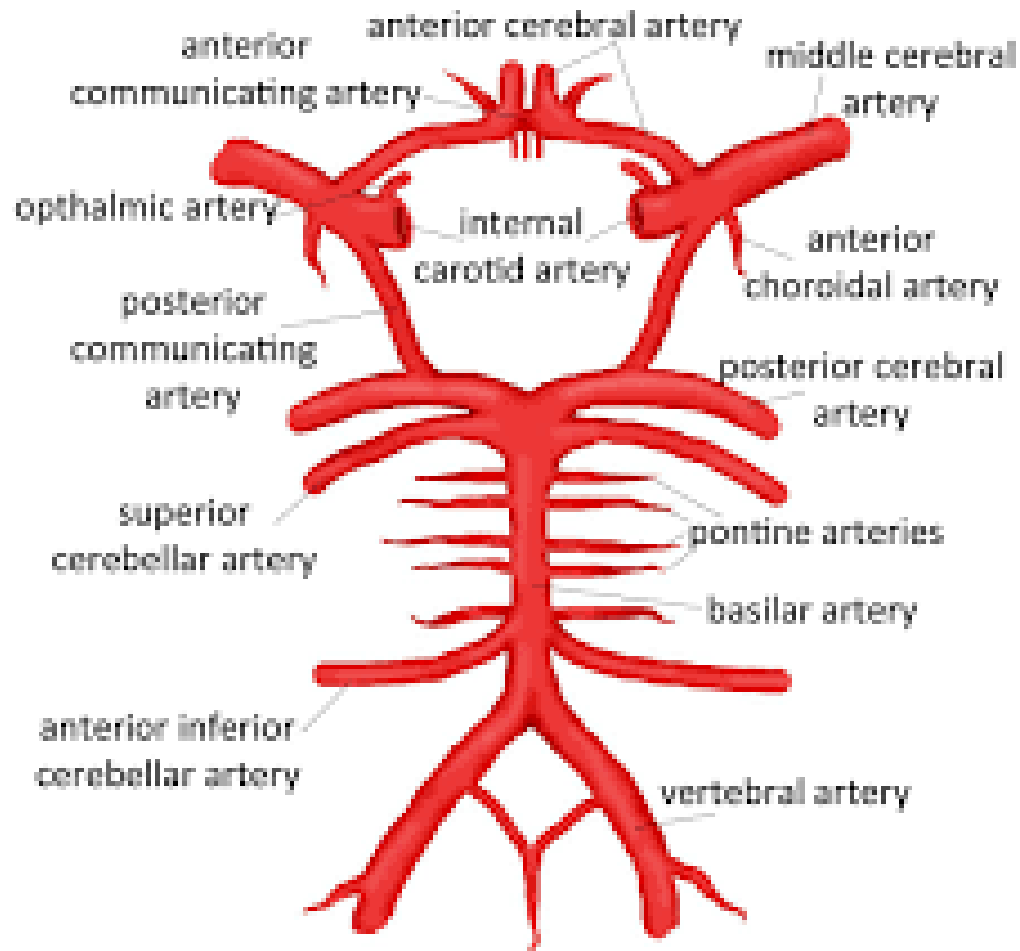
UMN LESIONS

- ☐ Only lower 2/3 rd of the facial muscles are affected.
- ☐ Mid face is paralysed.
- ☐ Eye brow's can move normally.

Circle of Willis



Circle of Willis



Blood Supply to the Brain

