

Neuroanatomical Support for Language

Major divisions of CNS

1. Brainstem
 - a. Medulla (bulb)
 - i. where spinal cord enters the brain
 - ii. origins of cranial nerves VI-XII
 - b. Pons
 - i. connections to cerebellum
 - ii. origins of cranial nerves IV & V
 - c. Midbrain
 - i. connections to cerebrum (through peduncles)
 - ii. origin of cranial nerve III
 - iii. contains red nucleus, reticular formation and substantia nigra
2. Diencephalon
 - a. Thalamus
 - b. Hypothalamus
 - c. Hippocampus
 - d. origin of cranial nerve II
 - e. basal ganglia
 - i. caudate nucleus
 - ii. putamen
 - iii. globus pallidus
3. internal capsule: dense band of motor and sensory nerve fibers
4. Cerebellum
 - a. connected to brainstem through peduncles
 - b. lobes: anterior, posterior, and floccolonodular
 - c. vermis: midline
 - d. cerebellar hemispheres: on each side of the vermis
5. Cerebrum
 - a. Lobes
 - i. Frontal lobe
 - (1) primary motor cortex
 - (2) premotor cortex
 - (3) Broca's area
 - (4) prefrontal cortex
 - ii. Parietal lobe
 - (1) primary sensory cortex
 - (2) association cortices
 - iii. Occipital lobe
 - (1) primary visual cortex
 - (2) association visual cortices
 - iv. Temporal lobe
 - (1) Wernicke's area

- v. auditory/receptive cortex
- b. Connection fibers
 - i. Commissures: provide links between the brain hemispheres
 - (1) corpus callosum
 - (2) anterior commissure: deep in the brain near thalamus
 - (3) posterior commissure: near posterior end of CC
 - ii. Association fibers: connect nearby cortical fibers
 - (1) fasciculi
 - (a) uncinata: connects inferior frontal lobe with anterior temporal lobe
 - (b) arcuate: connects posterior and central regions of temporal lobe with posterior and inferior frontal lobe
 - (c) cingulus: connects deep regions of frontal and parietal lobes with deep regions of temporal lobe and midbrain

Blood supply for CNS

1. Vertebral arteries
 - a. Posterior inferior cerebellar arteries branch from vertebral
 - b. Vertebrals join to form **basilar artery**
 - i. branches from basilar (supplies pons, medulla)
 - (1) anterior inferior cerebellar arteries (supplies pons, cerebellum)
 - (2) superior cerebellar arteries (supplies cerebellum)
 - c. bifurcates into posterior cerebral arteries (PCA) (supplies anterior & inferior temporal lobe, occipital lobes, midbrain)
2. Common carotid arteries
 - a. External carotid: supplies the scalp, face & neck
 - b. Internal carotid
 - i. middle cerebral (MCA)
 - (1) lateral surfaces of frontal, parietal & temporal lobes
 - (2) deep surfaces, basal ganglia & diencephalon, including internal capsule
 - ii. anterior cerebral (ACA)
 - (1) medial surface of frontal and parietal lobes
 - (2) branches include anterior communicating artery
3. Circle of Willis
 - a. Posterior cerebral arteries & posterior communicating arteries
 - b. Internal carotids
 - c. Anterior cerebral & anterior communicating
4. Blood-brain barrier
 - a. Capillary walls in brain are very small
 - b. Prevents most pathogens from entering the brain
5. Also prevents effect of drugs on the brain