

Neuroanatomy The lobes, halves and "halve-nots"



Angie Reimer OTD, MOT, OTR, CBIST
areimer@neurorecovery.net

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Types of strokes

- Ischemic- 87%
 - Thrombotic
 - Embolic
 - Lacunar
- Hemorrhagic- 13%
 - Intracerebral hemorrhage (ICH)
 - Subarachnoid hemorrhage (SAH)

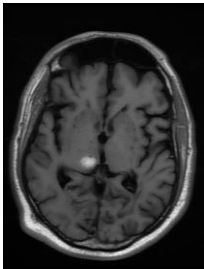
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Thrombotic Stroke

48% of all strokes
Typically occurs during sleep
Slow, progressive onset of deficits
50% are associated with prior TIA

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Embolic Stroke

- 26% of all strokes
- Typically occurs while awake
- Sudden, immediate deficits (sometimes seizures)
- 11% associated with prior TIA

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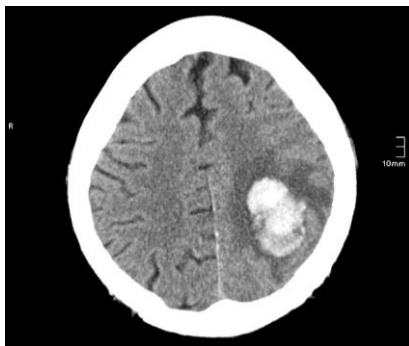
Lacunar stroke

- "Small vessel disease"
- 13% of all strokes
- Small infarcts (<15-20 mm) deep in the brain
- Onset can be gradual or sudden
- 23% associated with preceding TIA
- Often pure sensory or motor symptoms
- Typically no higher cortical function involvement

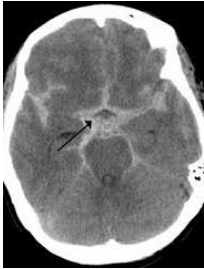
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Intracerebral Hemorrhage (ICH)

- 10% of all strokes
- 90% happen when patient is calm and unstressed
- Major cause is hypertension
- Onset may be gradual or sudden
- 8% are associated with previous TIA



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Subarachnoid Hemorrhage (SAH)

- 3% of all strokes
- Occurs often during strenuous activity
- Cause: ruptured aneurysms and vascular malformations
- Sudden onset
- 7% with preceding TIA

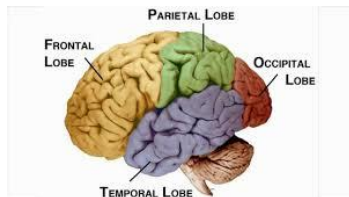
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Left Stroke with Right Hemiplegia	Right Stroke with Left Hemiplegia
Language/Perceptual problems <ul style="list-style-type: none"> • Expressive Aphasia • Receptive Aphasia • Global Aphasia • Alexia, Agraphia, Acalculia • Apraxias; Motor Planning Perceptual Problems Impaired Verbal and Math Skills <ul style="list-style-type: none"> • Word Letter Discrimination 	Perceptual Problems: Distortion of Physical Reality <ul style="list-style-type: none"> • Visual-Spatial Disorders; Depth Perception • Constructional Relationships • Directional Concepts • Neglect • Drawing Abilities • Body Schema Perception Disorders; Perceptual Language Disorders
Behavior: <ul style="list-style-type: none"> • Slow • Anxious • Cautious • Normal Attention Span • Underestimates Ability • Emotionally Labile • Quick Anger and Frustration 	Behavior: <ul style="list-style-type: none"> • Fast • Impulsive • Short Attention Span • Overestimates Ability/Judgment • Denial of Illness (anosognosia) • Lack of inhibition • Inability to Express Emotion/Affect (Flat)

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The cerebrum

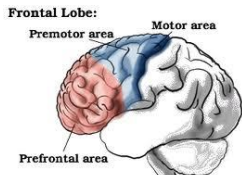
- Frontal lobe
- Parietal lobe
- Temporal lobe
- Occipital lobe



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Frontal Lobe - Functions

- Control Voluntary Movement
- Thinking/problem solving
- Reasoning/judgment
- Personality



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Primary Motor Cortex

- Located on pre-central gyrus
- Controls voluntary movement
- Also known as motor homunculus
- Lesions to this area result in motor deficits and/or paralysis to contralateral side of body



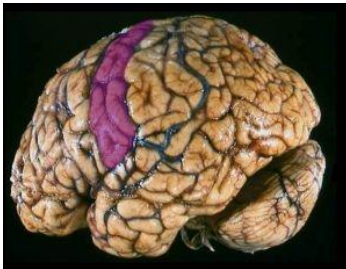
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Premotor Cortex

- Located just anterior to primary motor cortex
- Control actions of trunk and proximal limb muscles
- Responsible for "body part ownership"
- Lesions to this area result in unilateral neglect



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Supplementary Motor Area

- Located medial to premotor cortex
- Motor planning region – stores motor memories and directs activity of primary motor cortex
- Lesions may result in apraxia

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Broca's Area

• Speech motor area (expressive)

• Located only in left side of brain in 90% of people

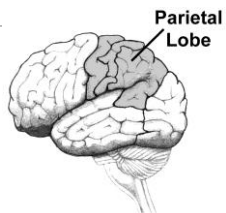


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Parietal Lobe

What it does:

- Perception
- Processing of sensation
- Spatial awareness



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Somatosensory Cortex

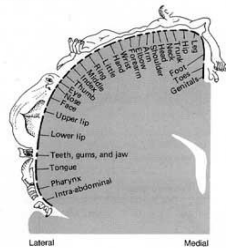
A Sensory homunculus

Location:

- On postcentral gyrus

What does it do?

- Perceives pain, temperature, pressure, touch, vibration and proprioception
- Also called the sensory homunculus



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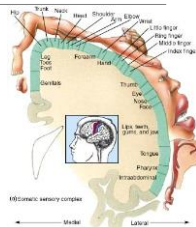
Somatosensory association area

Located

- Posterior to primary sensory cortex

Responsible for:

- Interpretation of somatosensory information
- Stereognosis
- Disorders of body image-unilateral neglect



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Parietotemporal Association Cortex

Located in:

- Posterior and inferior portions of the parietal lobe
- Overlaps parietal and temporal lobe

Involved in:

- abstract thought
- Reading and writing
- Mathematics
- spatial Perception
- Understanding written language (angular gyrus)

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Occipital Lobe

Contains two important regions:
Primary Visual Cortex
Visual Association Cortex



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Primary Visual Cortex

Responsible for:

- Visual perception
- Receiving visual input from the contralateral visual field

Injury results in:

- Injury on one side – hemianopsia
- Bilateral injury – cortical blindness



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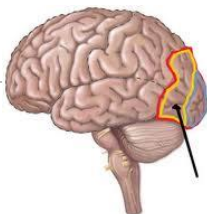
Visual Association Area

Located:

- Anterior to the primary visual cortex

Responsible for:

- Interpretation of visual stimuli
- Spatial perception
- Recognition of faces



Injury results in:

Visual agnosia (patient can see an item; however they cannot recognize it)

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Temporal Lobe

- Limbic system (responsible for emotion and memory)
- Auditory system
- Olfactory system
- Facial recognition

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Wernicke's Area

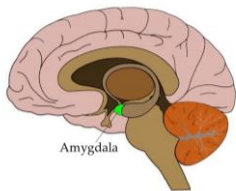
- Important in understanding language (including verbal, sign and written language)
- Located only in the left hemisphere in 90-95% of people
- Corresponding area contralaterally responsible for interpretation of nonverbal communication
- Damage results in receptive aphasia

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Primary olfactory cortex

- Responsible for perceiving odors
- Destruction of area bilaterally results in anosmia (loss of sense of smell)

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Amygdala

Small almond shaped structure on medial side of temporal lobe

- Involves with:
- Processing and consolidating memory
 - Autonomic responses associated with fear
 - Emotional Responses

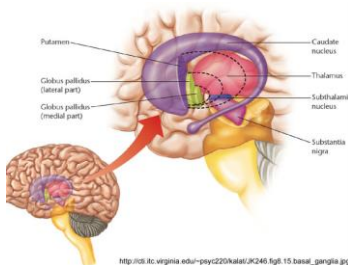
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Hippocampus

Involves in creation of new long-term memories

Damage bilaterally results in anterograde amnesia (inability to establish new long-term memories)

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Basal Ganglia

- Involves in:
- Initiation and inhibition of movement
 - Initiation of thought
 - Initiation of emotion
 - Plays an important part in motor control
 - Directs actions of all motor tracts

http://ictl.itc.virginia.edu/~psyc220/kalat/K246.fgl.15.basal_ganglia.jpg

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Brainstem

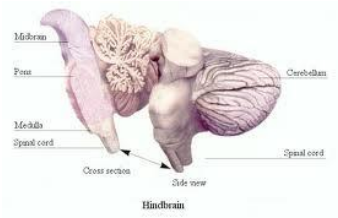
- Heart rate
- Breathing
- Blood pressure
- Eye movement
- Hearing
- Speech
- Swallowing

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Pons

Largest portion of brainstem
 Contains cranial nerves V-VIII

Motor nerve fibers connect motor areas of cerebral cortex to spinal cord and allow voluntary movement
 Damage to these nerves can cause locked in syndrome



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Thalamus

- “Executive assistant” to cerebral cortex
- Almost all information that ends up in the cortex passes through here first
 - Sensory integration
 - Motor integration

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Hypothalamus

Controls ANS
regulates activity of endocrine glands
connects physiological responses to emotions

- Regulates
- water balance
 - Hunger
 - Thirst
 - Sexual drive
 - Sleep/wake cycles
 - Body temperature



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Cerebellum

- Vestibulocerebellum**
 - Coordinates balance
- Spinocerebellum**
 - Coordinates posture and gait
 - Coordinates proximal limb muscles
- Cerebrocerebellum**
 - Coordinates distal limb movements and movements of small muscles used for speech
 - Regulates force, timing, and direction of movement
 - Involved in detecting and correcting movement errors
 - Plays a role in motor learning, nonverbal communication and the ability to shift focus of attention

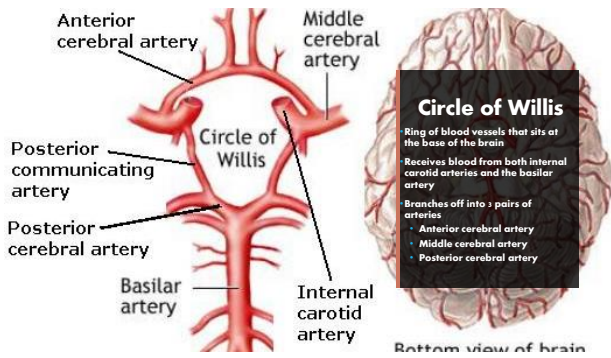
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Blood supply to the brain

- 4 Major arteries:
 - 2 internal carotid arteries
 - 2 vertebral arteries

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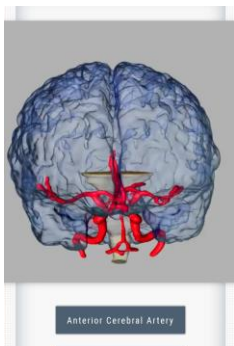


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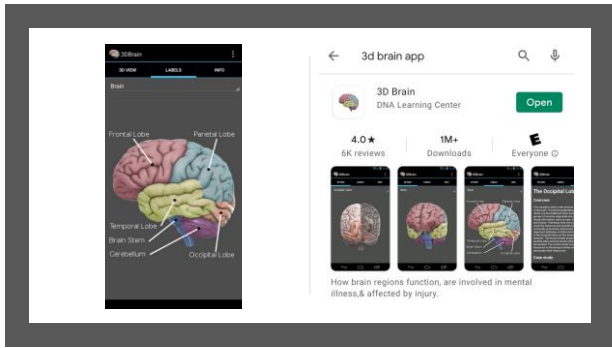
Artery	Supplies
Anterior Cerebral Artery	Anterior frontal lobe
Middle Cerebral Artery	Lateral portion of both cerebral hemisphere Thalamus Hypothalamus
Posterior Cerebral Artery	Occipital lobe Thalamus Midbrain
Basilar Artery	Pons Part of cerebellum
Vertebral Artery	Medulla Oblongata Part of Cerebellum

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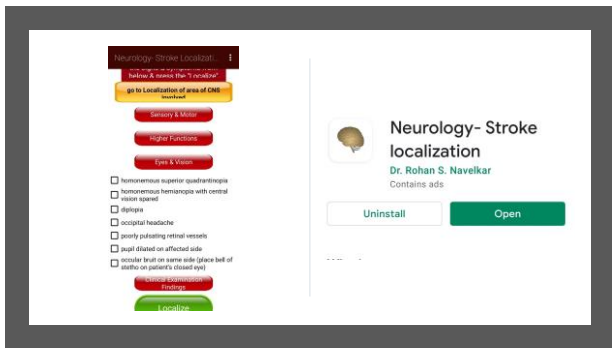


<https://www.neuroanatomy.ca/>

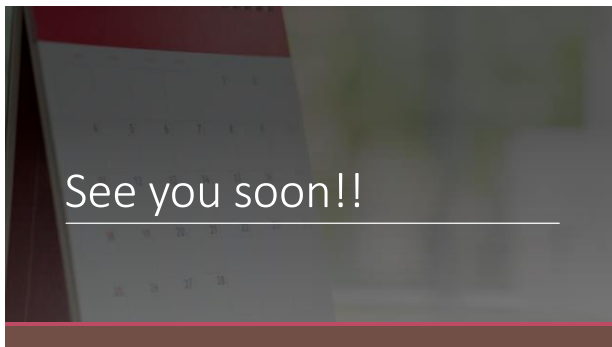
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