

Basic Anatomy Review

Matthew J Pierson, MD

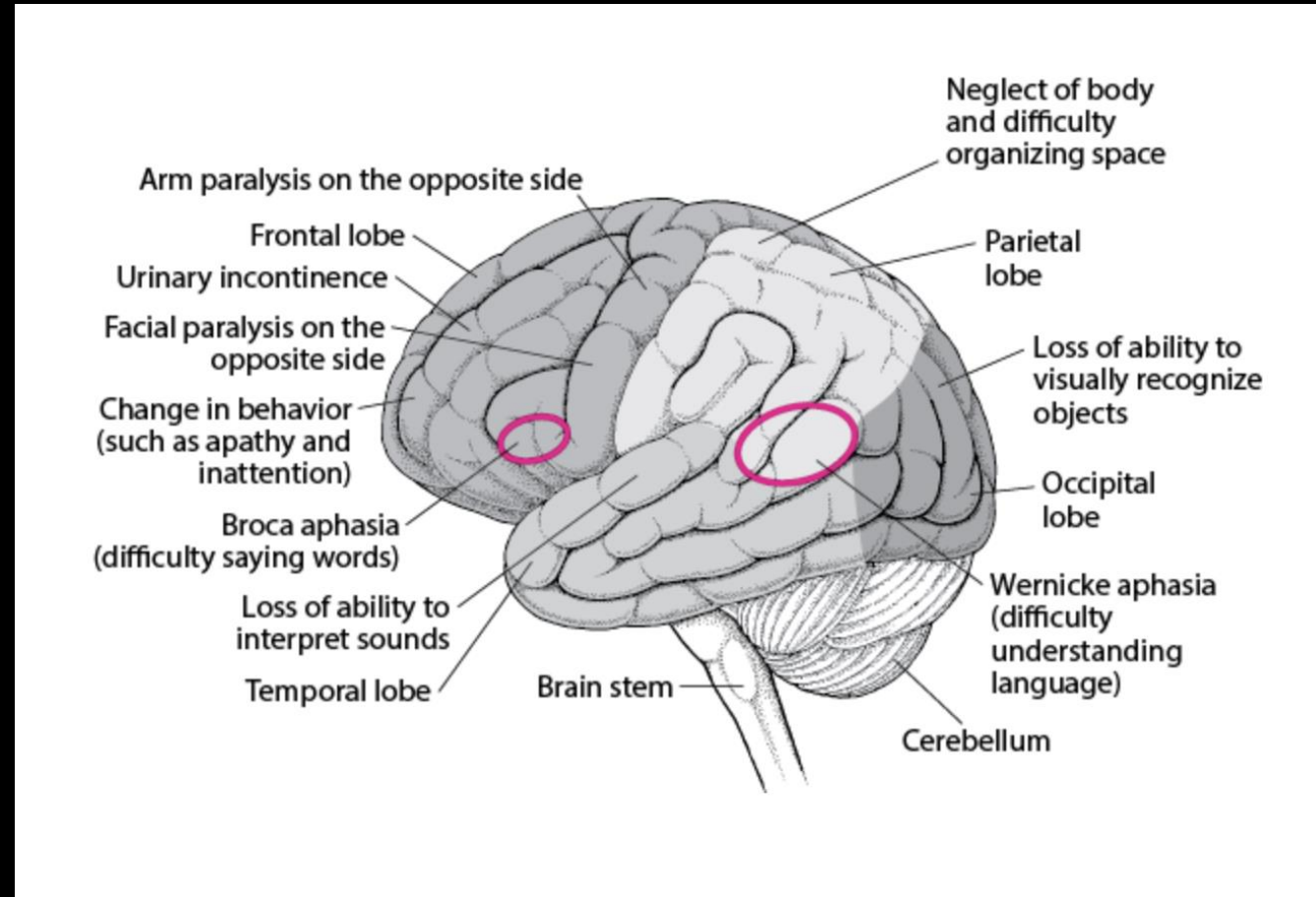
Midwest Neurosurgery Associates

I have no relevant financial disclosures

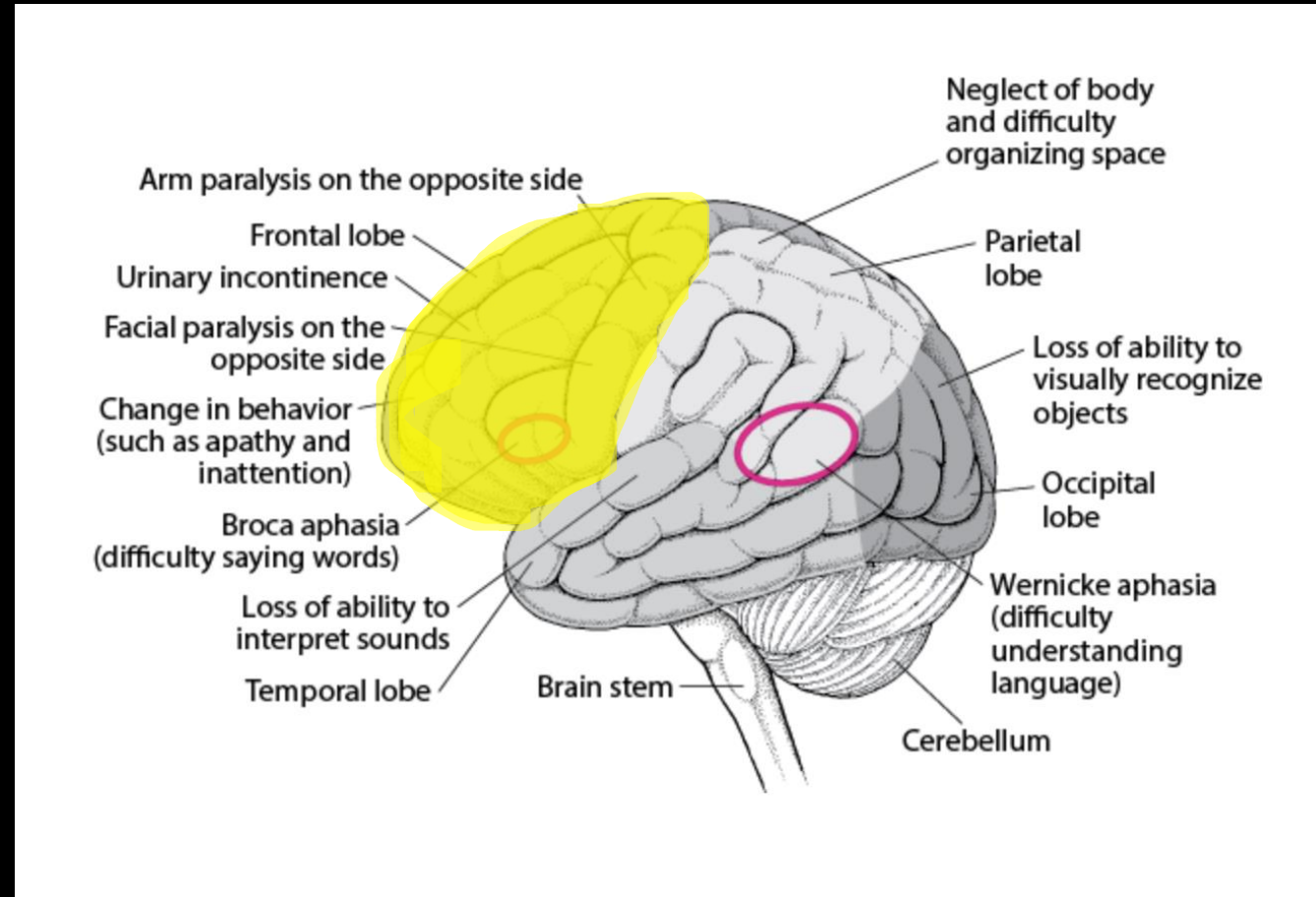
Outline

- Areas of the brain and their function
- Vascular Territories and Stroke Syndromes
- Examples of Neurosurgical Procedures Related to Stroke
- Questions

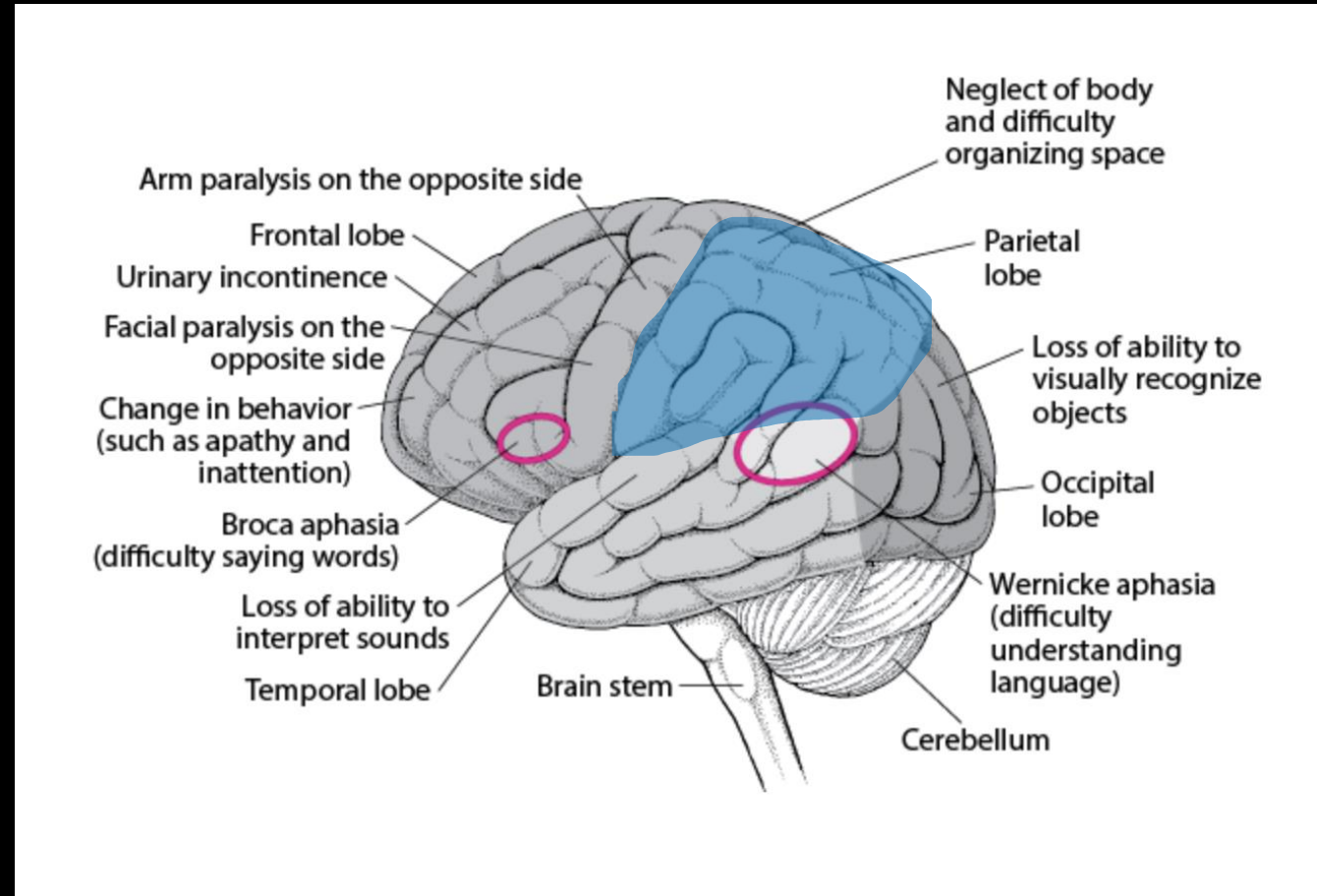
Brain Dysfunction by Location



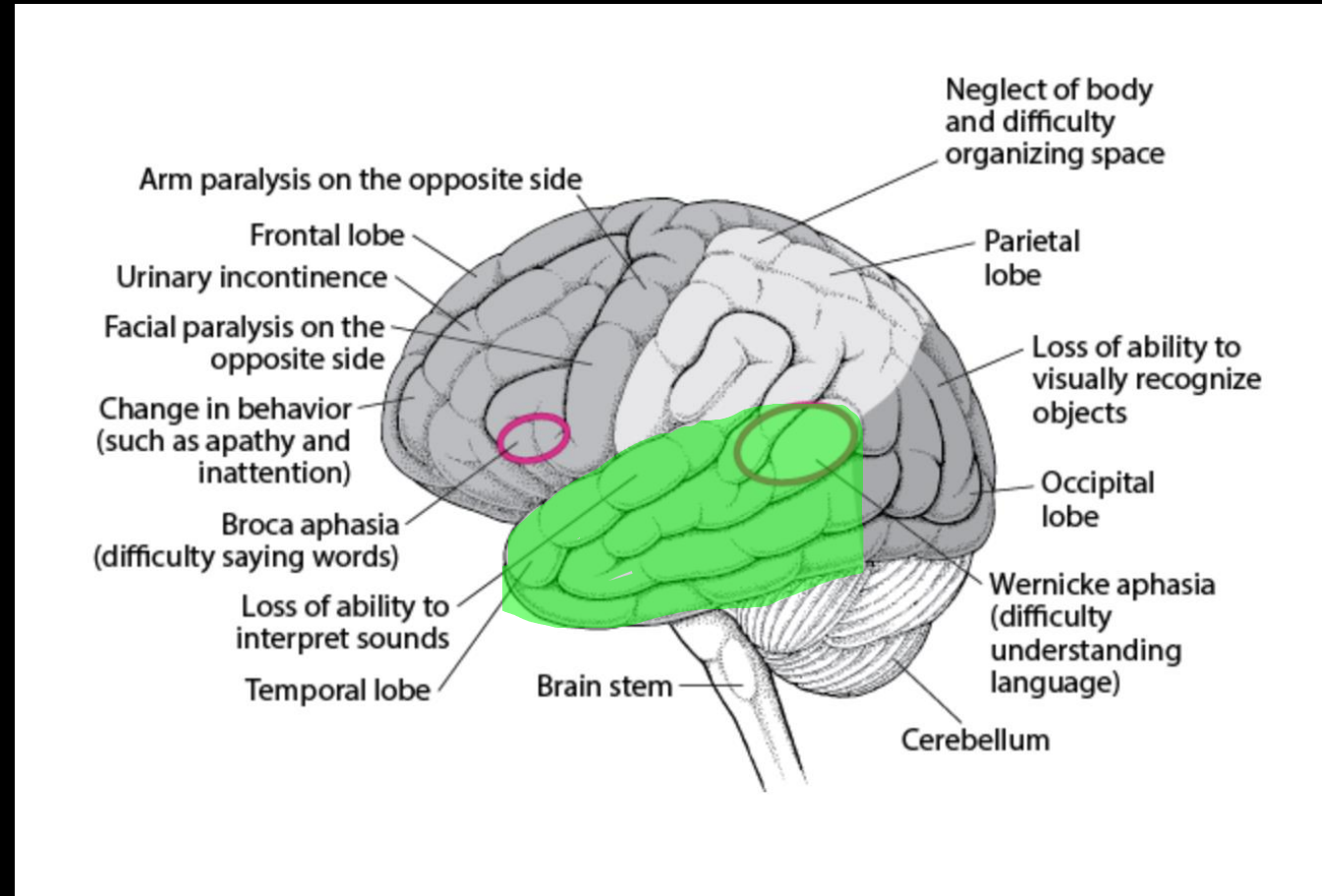
Frontal Lobe



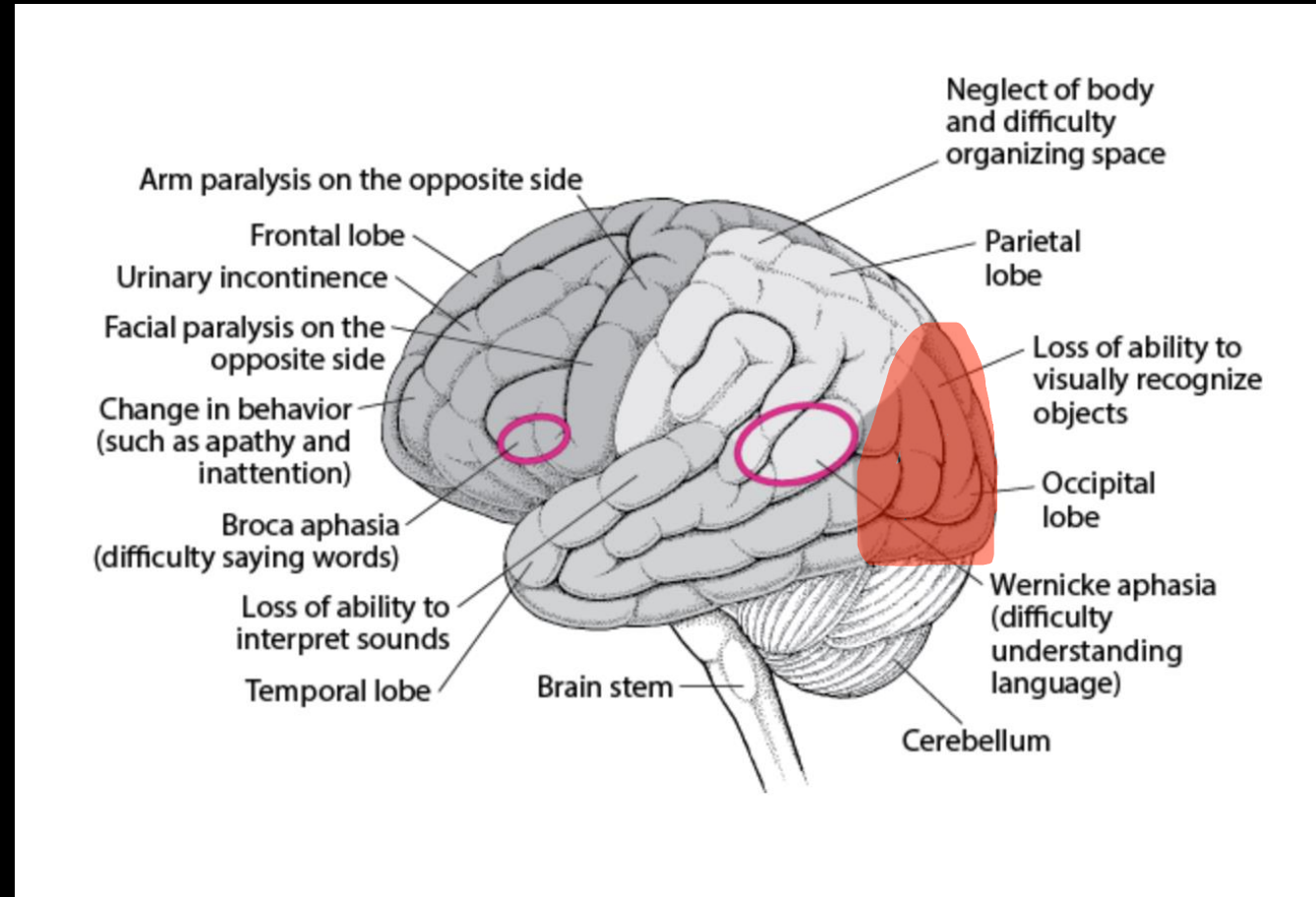
Parietal Lobe



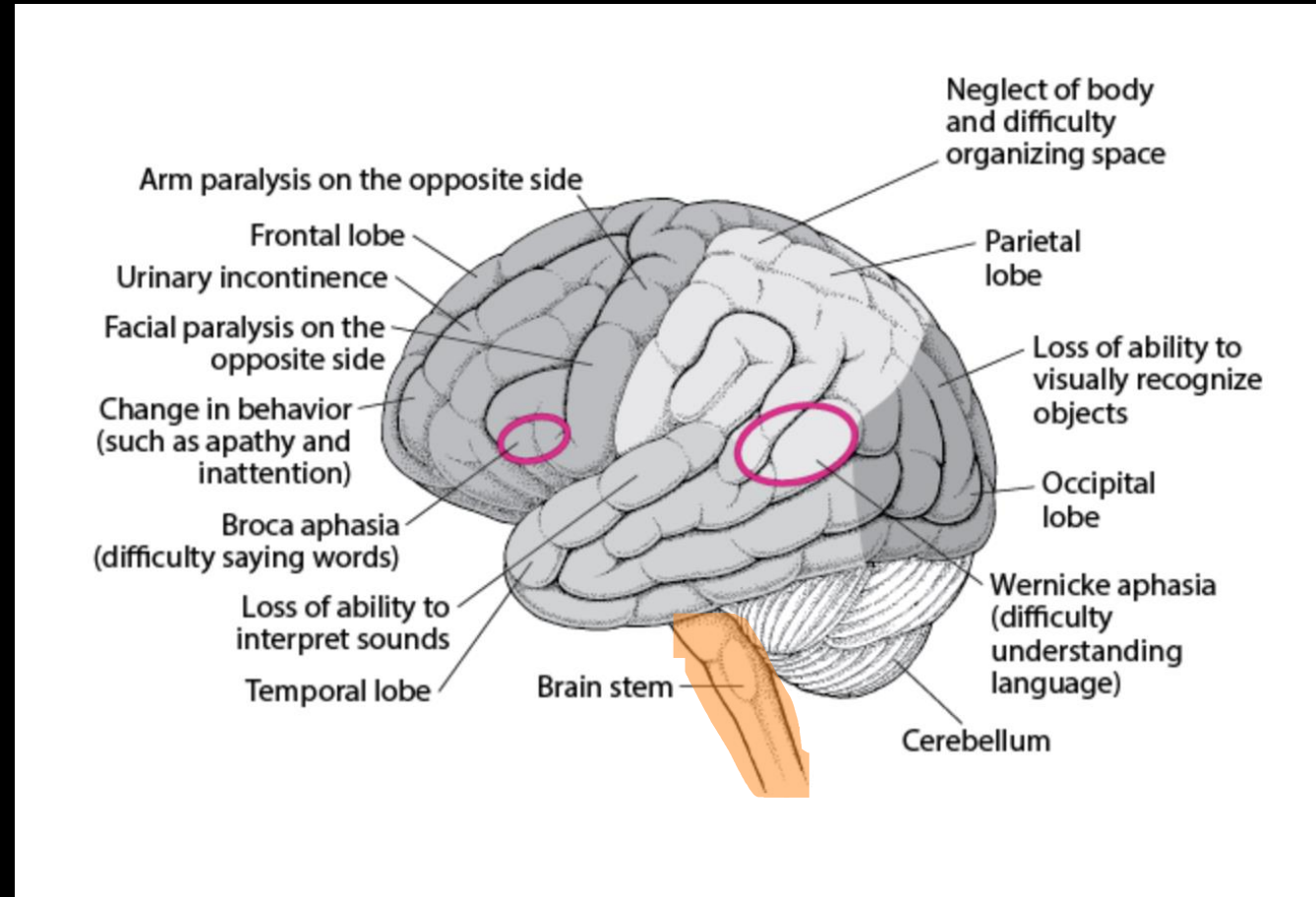
Temporal Lobe



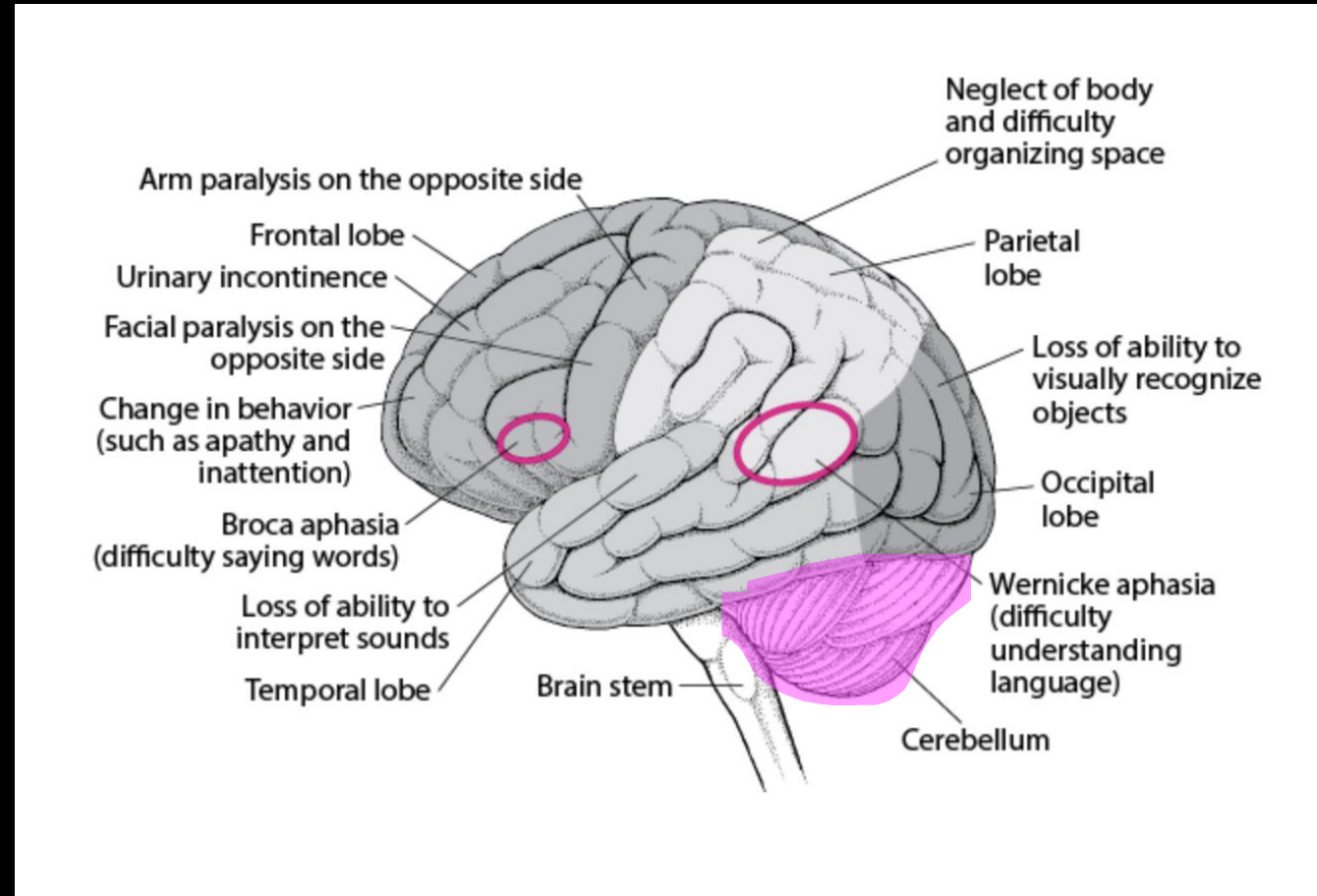
Occipital Lobe



Brainstem



Cerebellum

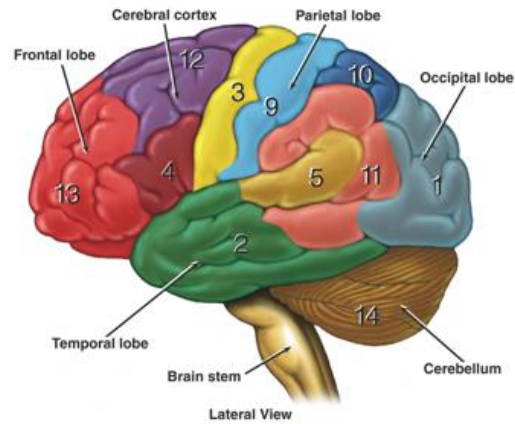


Functional Areas of the Cerebral Cortex

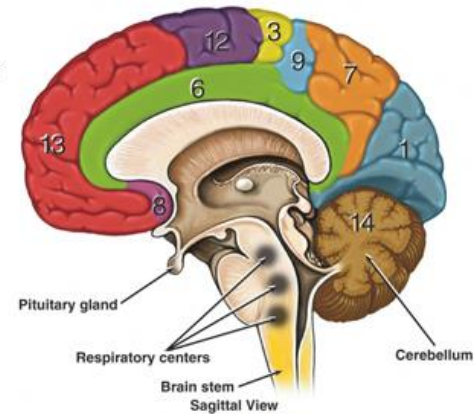
- 1 **Visual Area:**
Sight
Image recognition
Image perception
- 2 **Association Area**
Short-term memory
Equilibrium
Emotion
- 3 **Motor Function Area**
Initiation of voluntary muscles
- 4 **Broca's Area**
Muscles of speech
- 5 **Auditory Area**
Hearing
- 6 **Emotional Area**
Pain
Hunger
"Fight or flight" response
- 7 **Sensory Association Area**
- 8 **Olfactory Area**
Smelling
- 9 **Sensory Area**
Sensation from muscles and skin
- 10 **Somatosensory Association Area**
Evaluation of weight, texture,
temperature, etc. for object recognition
- 11 **Wernicke's Area**
Written and spoken language comprehension
- 12 **Motor Function Area**
Eye movement and orientation
- 13 **Higher Mental Functions**
Concentration
Planning
Judgment
Emotional expression
Creativity
Inhibition

Functional Areas of the Cerebellum

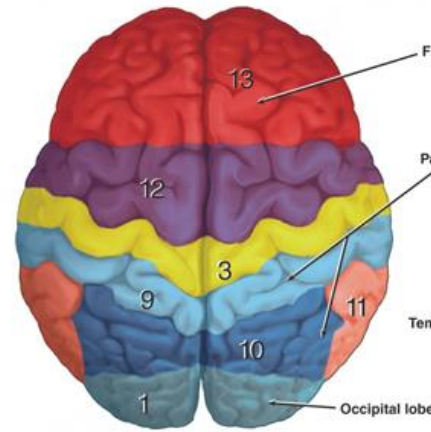
- 14 **Motor Functions**
Coordination of movement
Balance and equilibrium
Posture



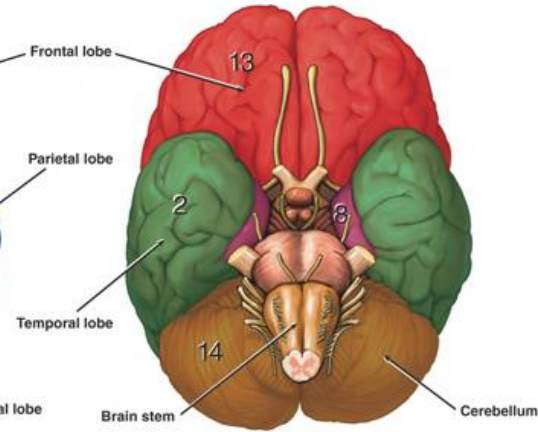
Lateral View



Sagittal View

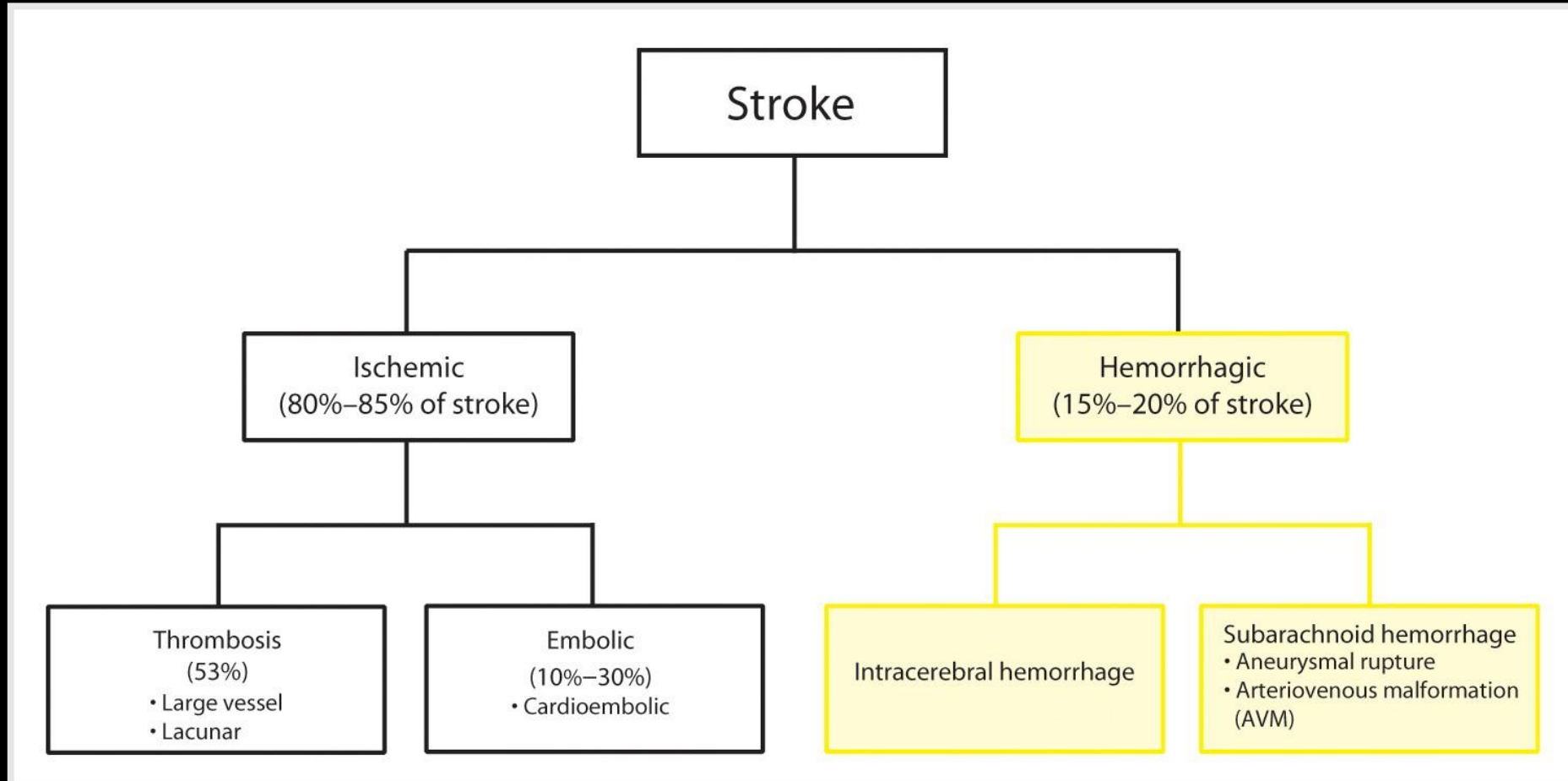


Superior View



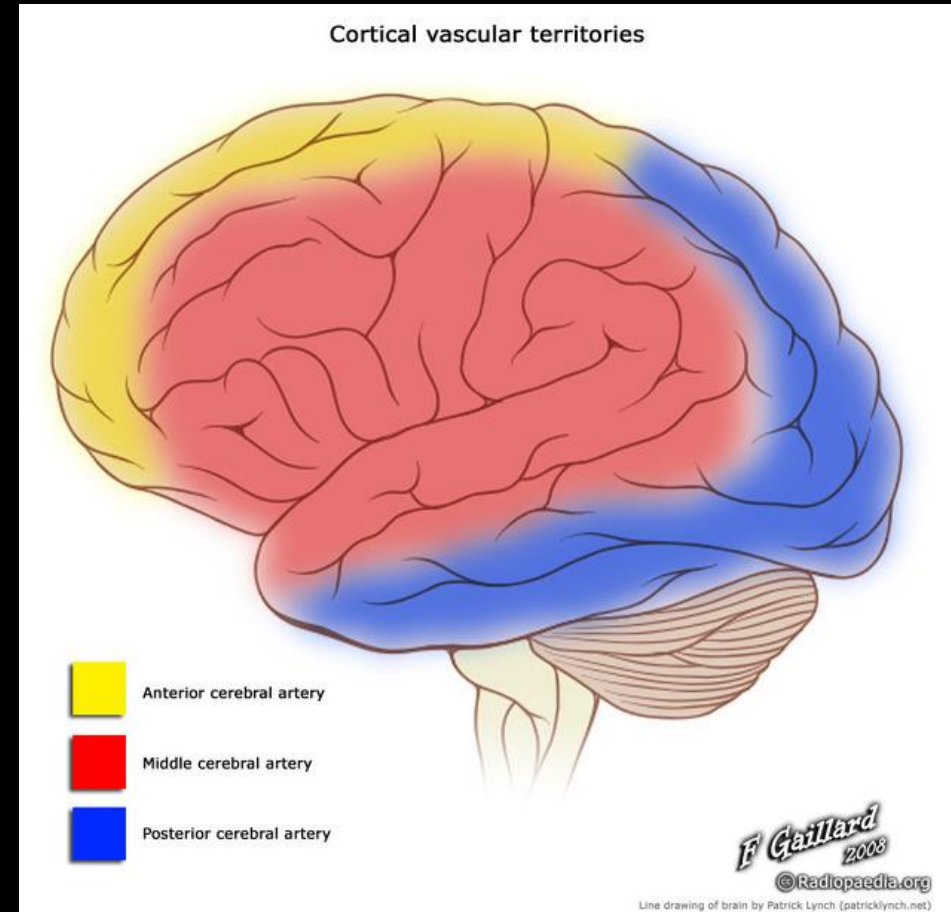
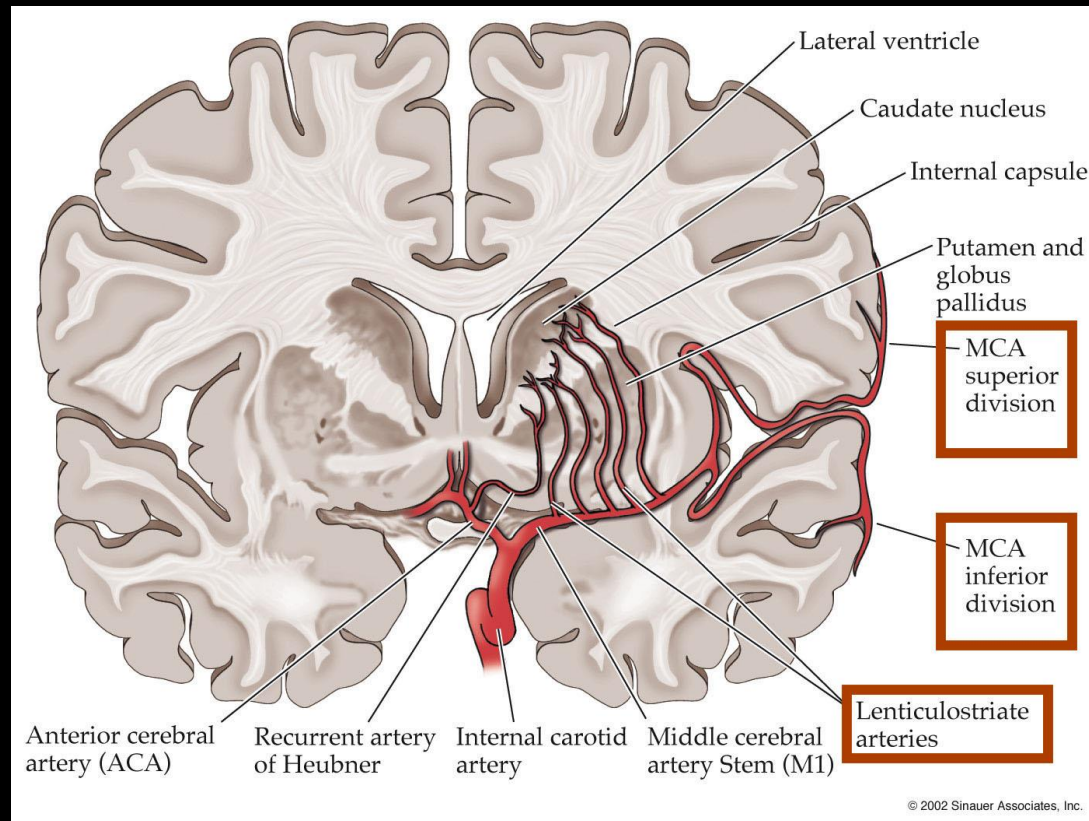
Inferior View

Stroke Breakdown



Cerebrovascular Territories

Middle Cerebral Artery



MCA Infarction Symptoms

Contralateral hemiparesis

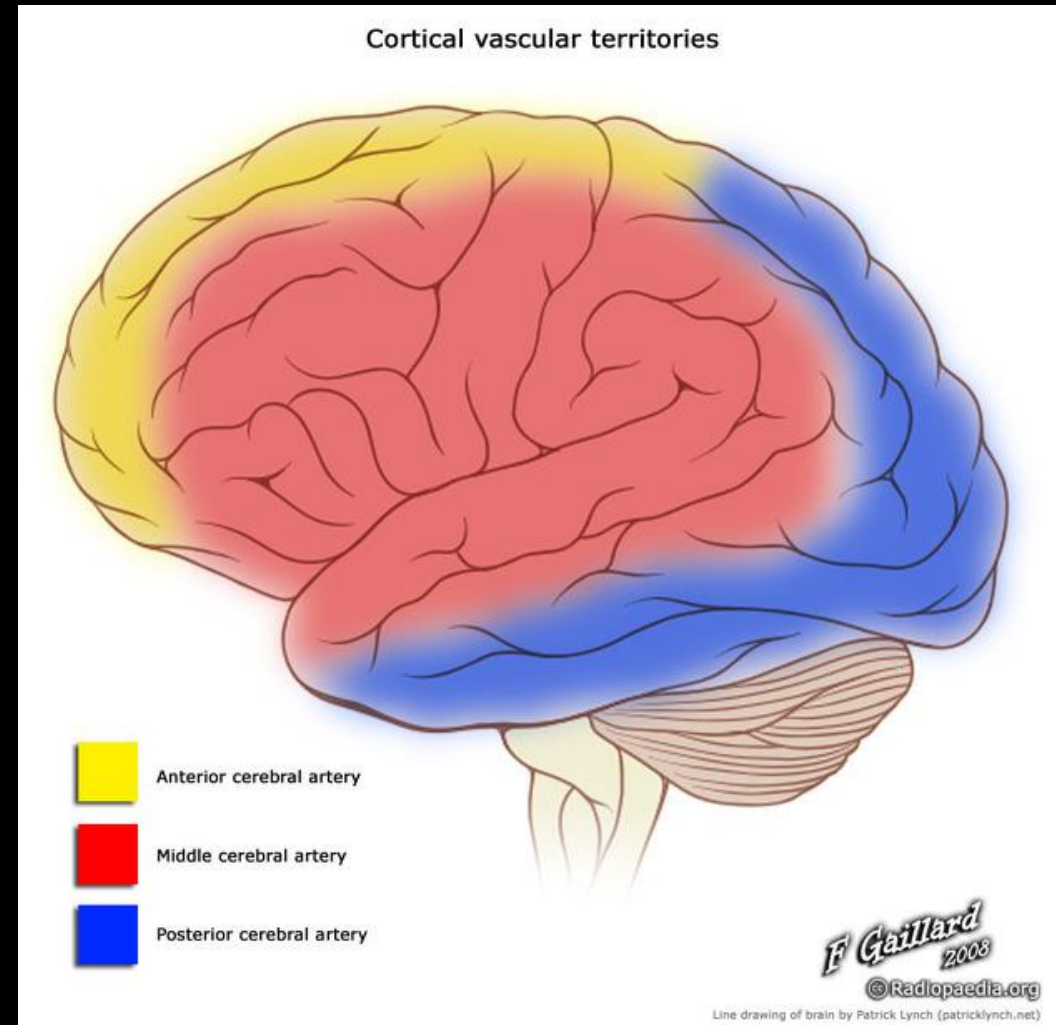
Contralateral Hemisensory Loss

Hemianopia

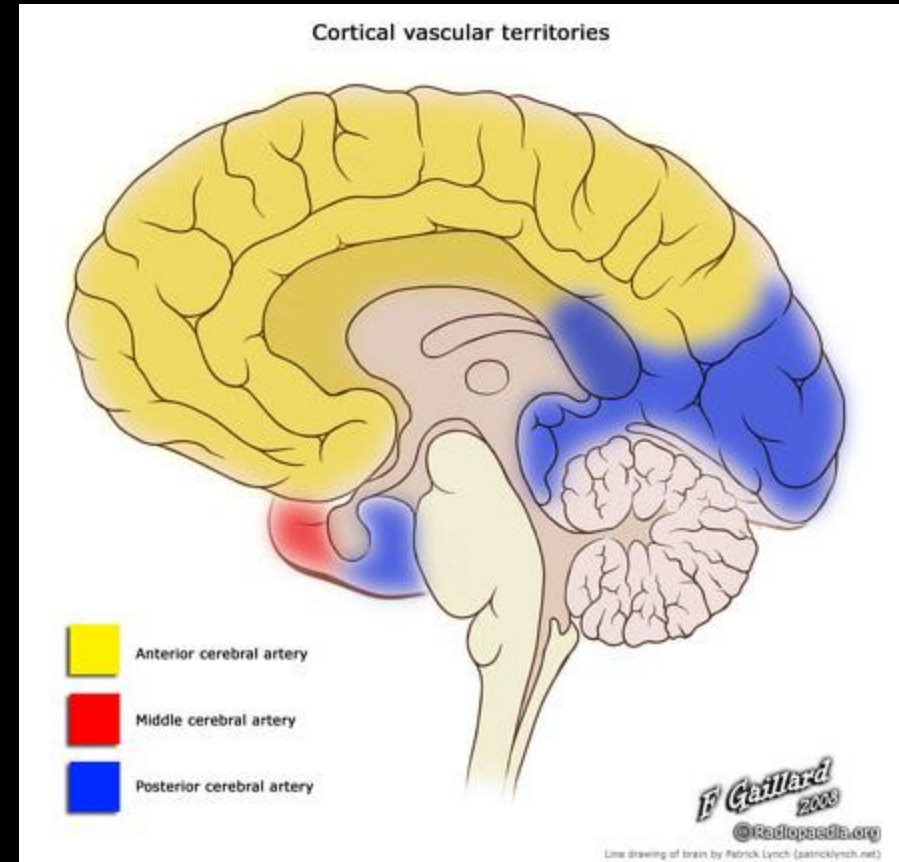
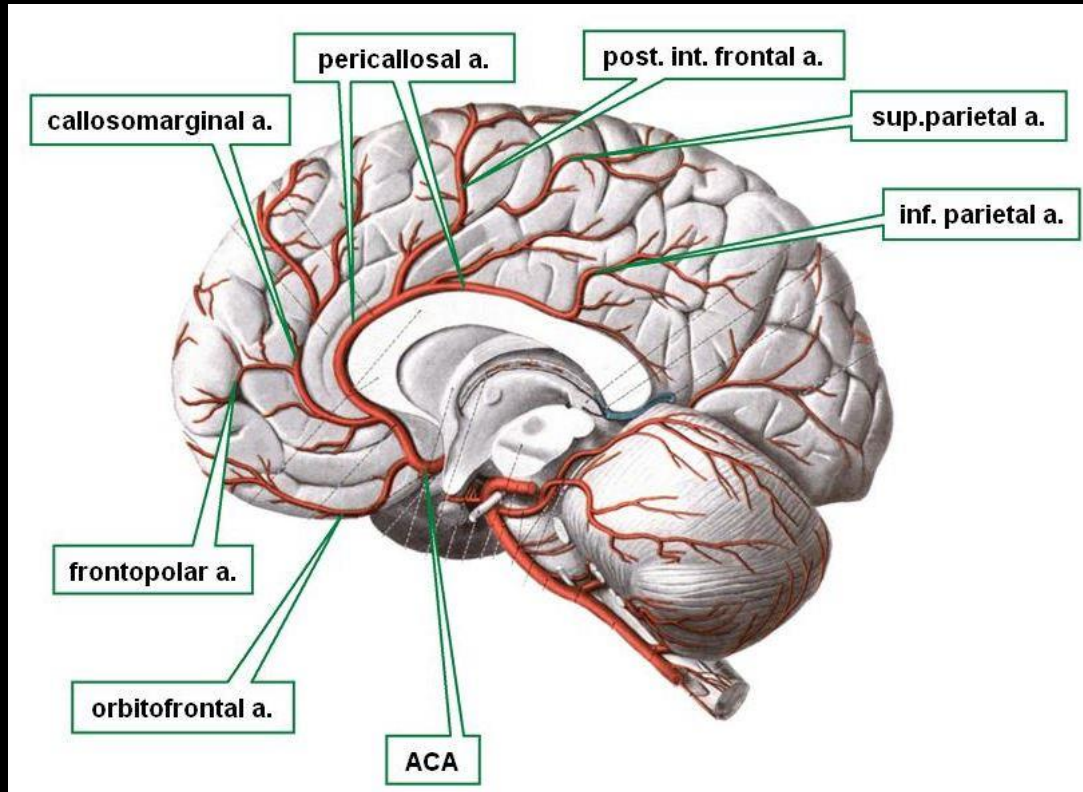
Aphasia (if dominant hemisphere and may be expressive, receptive or global depending on branches involved)

Neglect (non dominant hemisphere)

Edema from large territory MCA infarctions may become life threatening requiring decompressive craniectomy



Anterior Cerebral Artery

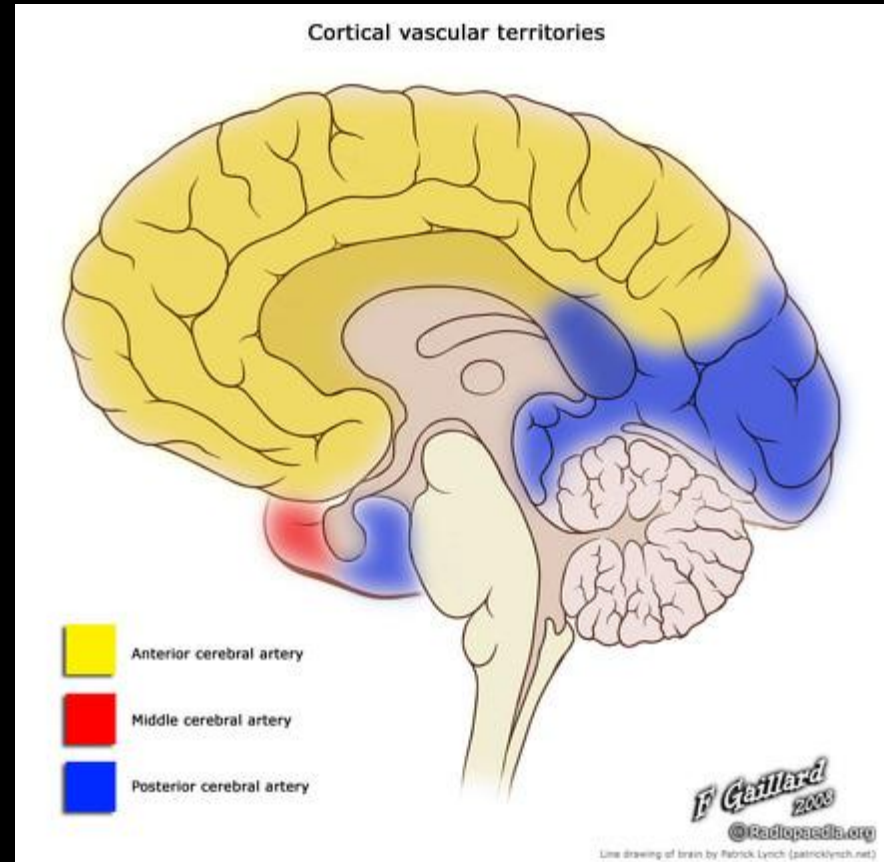


ACA Infarction Symptoms

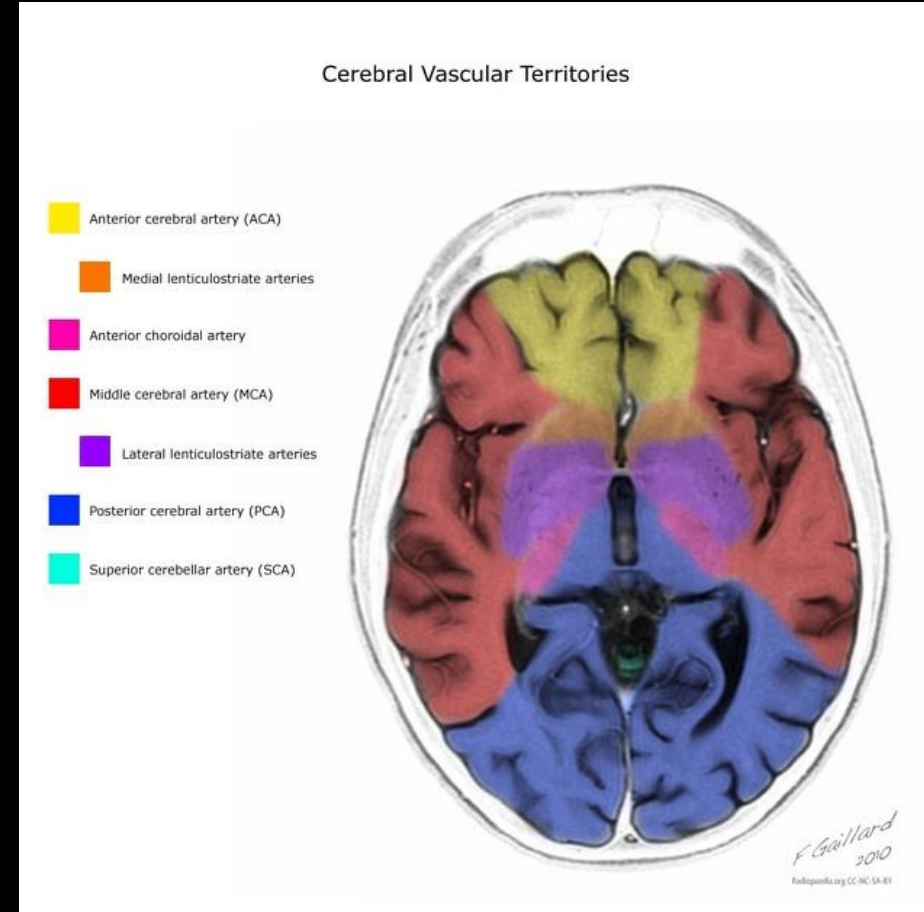
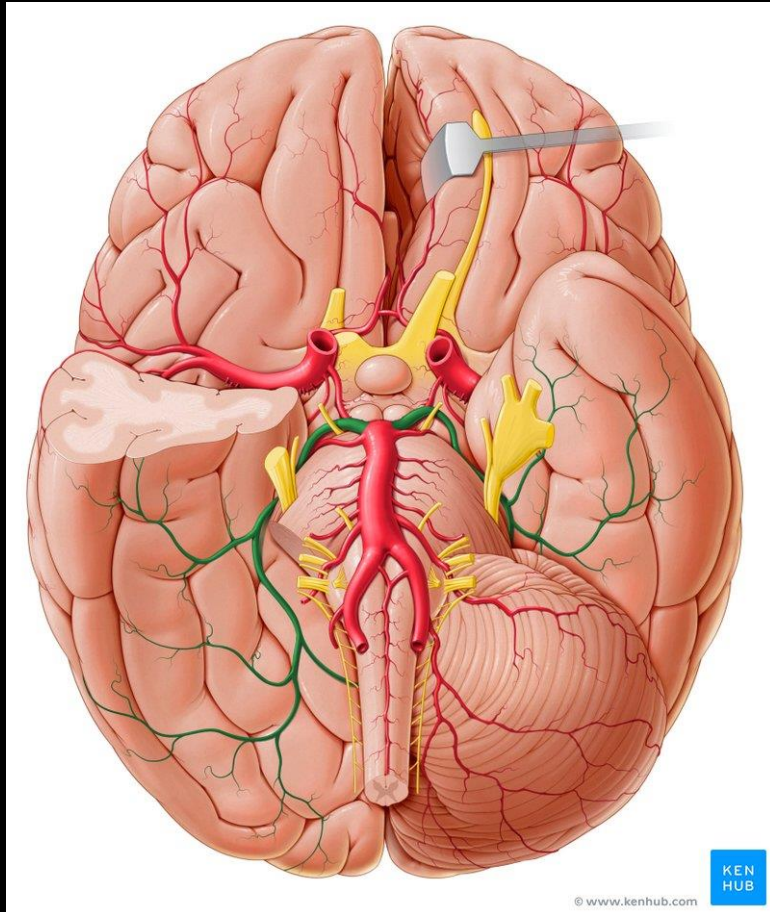
Contralateral Motor Weakness
(leg/shoulder>arm/hand/face)

Limb apraxia

Urinary incontinence



Posterior Cerebral Artery

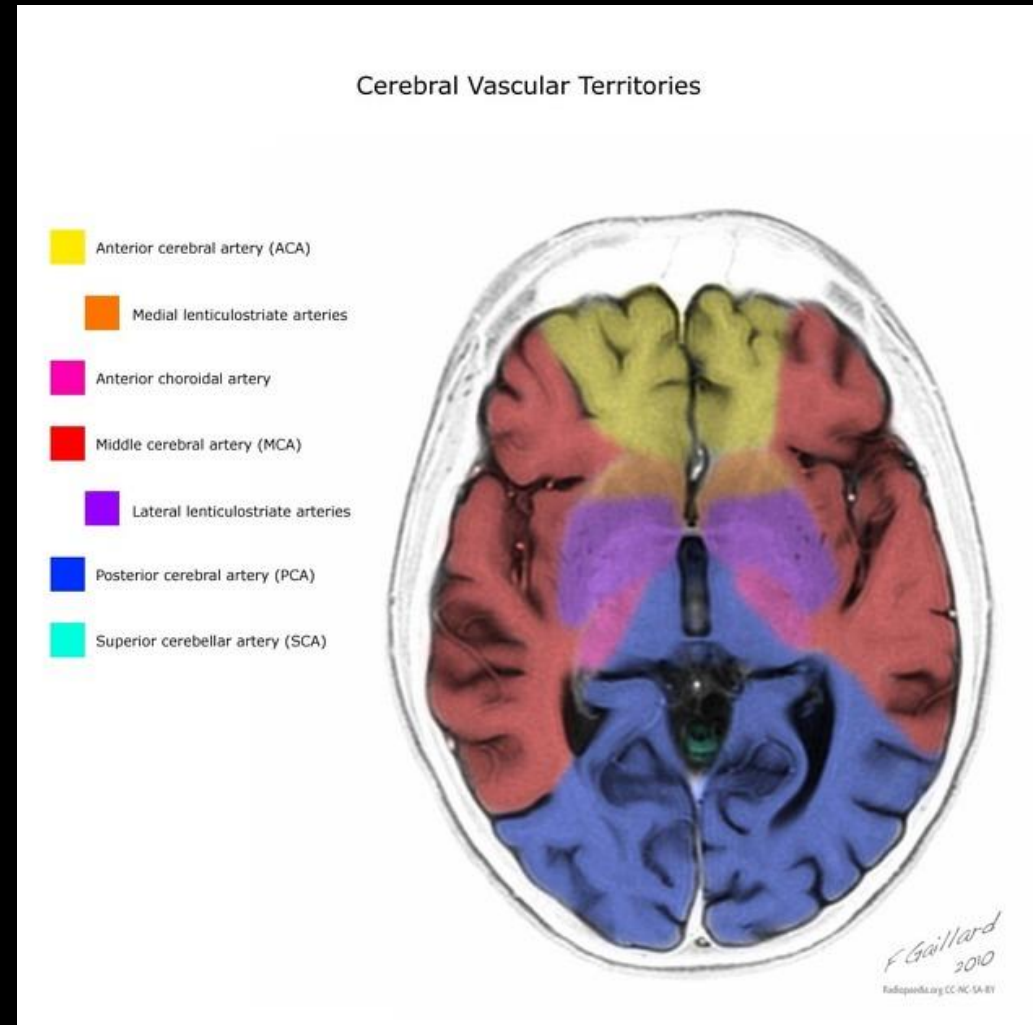


PCA Infarction Symptoms

Contralateral homonymous hemianopia

Contralateral hemisensory loss

Cortical blindness if bilateral PCA strokes



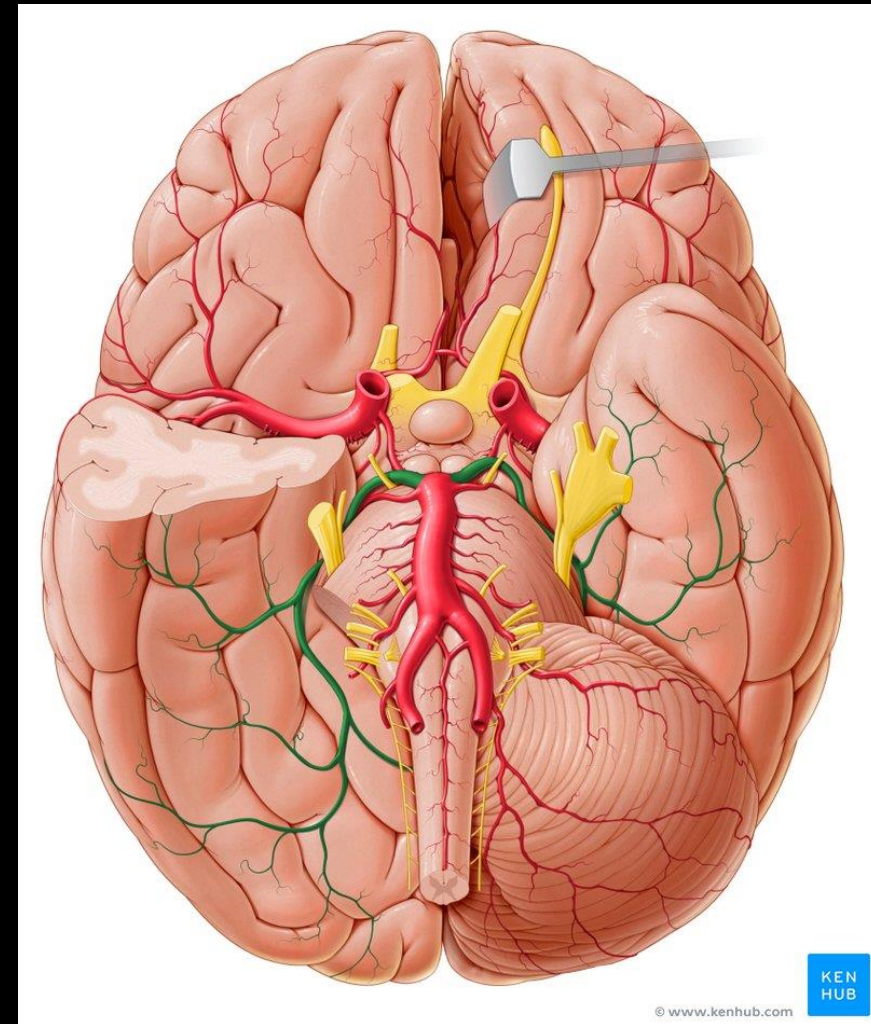
Vertebrobasilar Infarctions

May affect areas of the brain stem, cerebellum or both

Deficit dependent on area of brain stem affected

Cerebellar infarctions may present with ataxia, nausea, vomiting, vertigo

Large territory cerebellar infarctions may cause life threatening edema

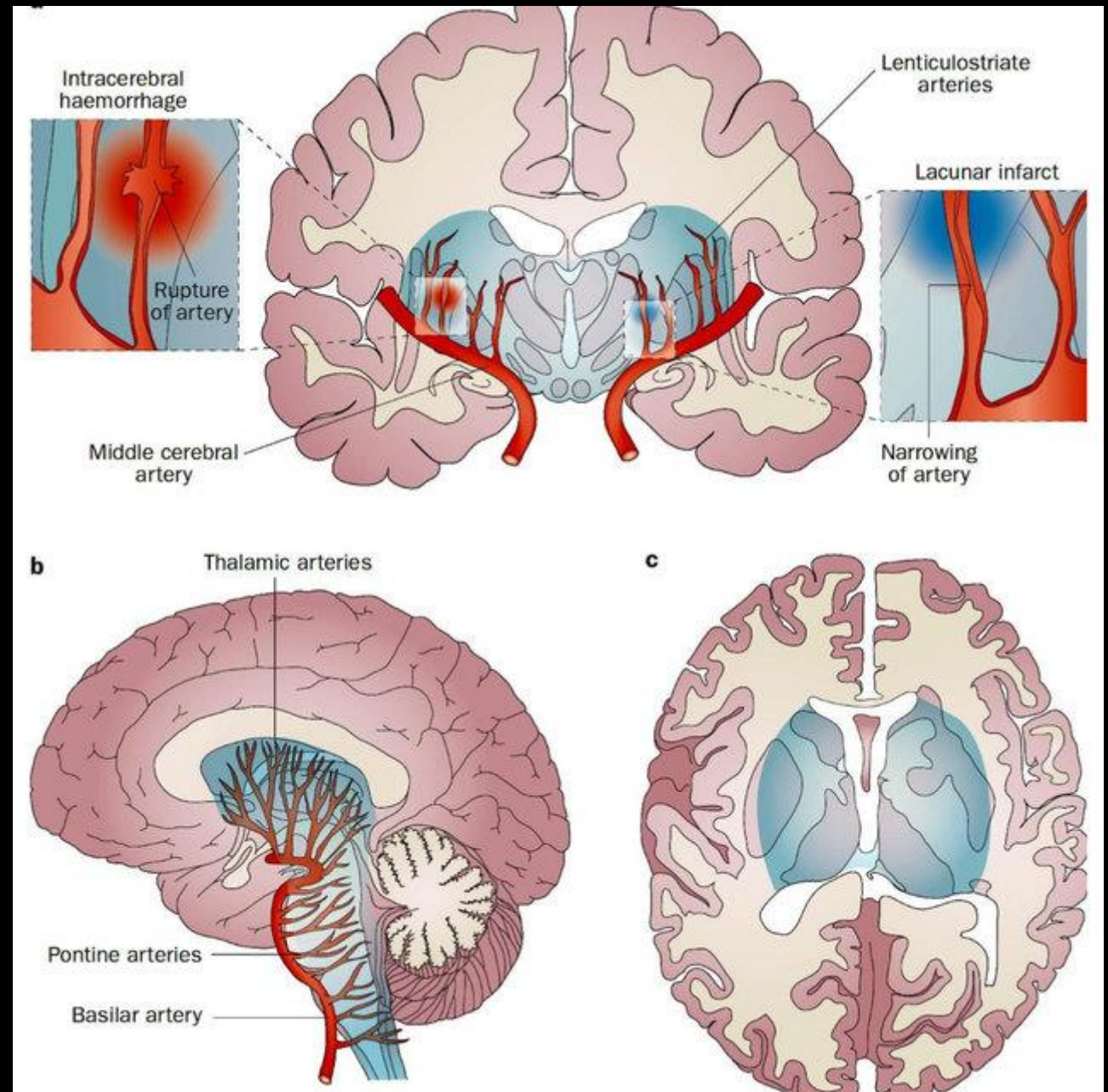


Lacunar Infarctions

May be ischemic or hemorrhagic

Occur due to occlusion or hemorrhage of small perforating vessel to the deep structures

Symptoms can include contralateral hemiparesis, sensory changes, ataxias, coma



Questions

Which lobe contains the motor strip and when damaged can cause hemiplegia, expressive aphasia and apathy?

Frontal Lobe

True or False: Hemorrhagic strokes are more common than ischemic strokes.

False

Occlusion of what major cerebral artery causes contralateral weakness Leg>arm, limb apraxia and urinary incontinence?

Anterior Cerebral Artery

Bilateral occlusion of this cerebral vessel can cause cortical blindness.

Posterior Cerebral Artery

Questions?

Thank you!