Neuroscience Education Institute

NEUROLOGY FOR THE PSYCHIATRIST

Learning Objectives

- Discuss common neurological syndromes (stroke, cortical syndromes, different dementias)

- Familiarize psychiatry with neurological syndromes

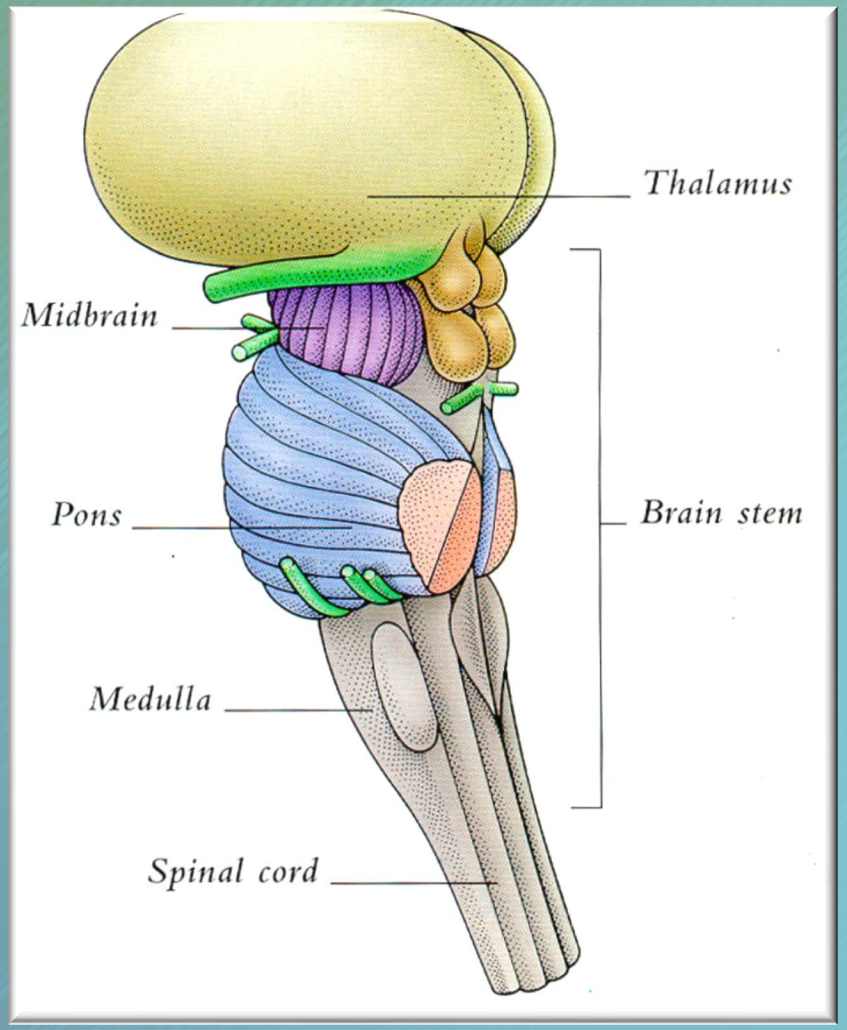
Stroke

- Definition: Neurological dysfunction due to ischemia or vascular

- Localization Patterns
  - Monoplegic: involves single limb
  - Hemiplegic: Involves one side of body
  - Paraplegic: involves both legs
  - Quadriplegic/Tetraplegic: involves all four limbs

Roper A et al. Adams and Victor's Principles of Neurology 11th Edition 2019.

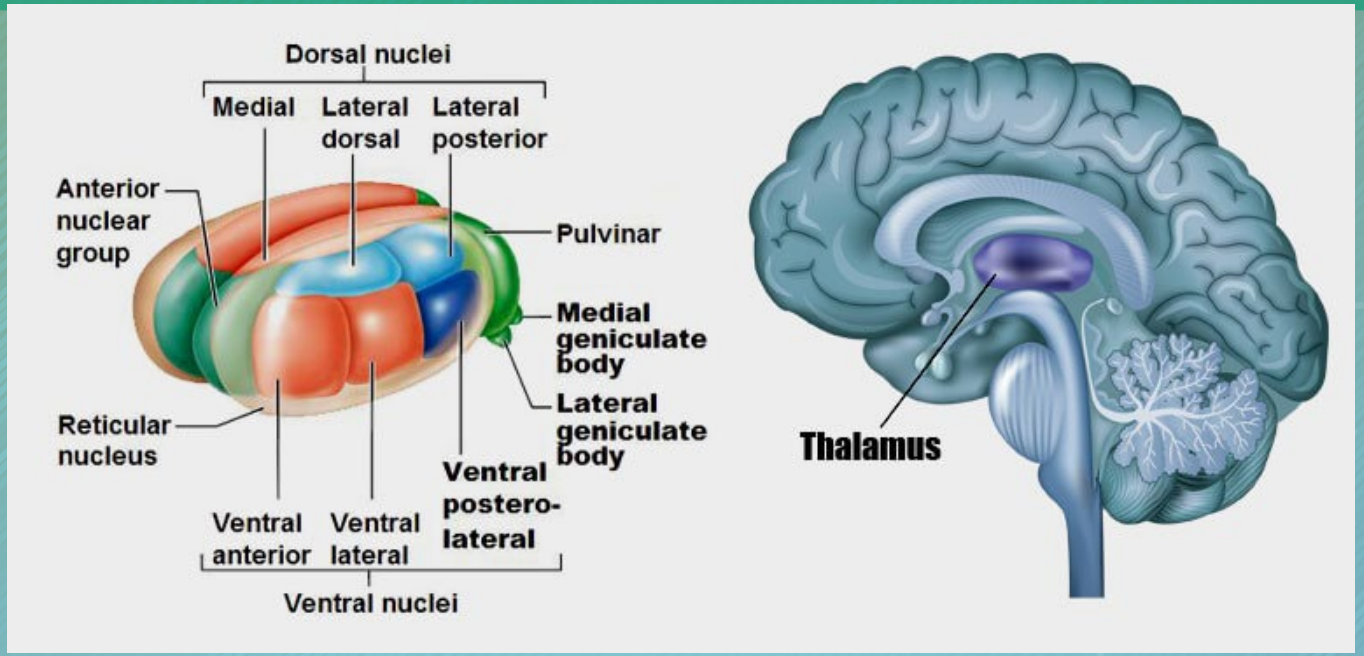
Brainstem



- Medulla: weakness on opposite side with sensory impairment, slurred speech, and cerebellar impairment
- Pons: contralateral weakness and sensory impairment with facial weakness +/- diplopia
- Midbrain: contralateral weakness and sensory impairment with diplopia

Patten J. Neurological Differential Diagnosis 2nd Edition 1998.

Thalamic



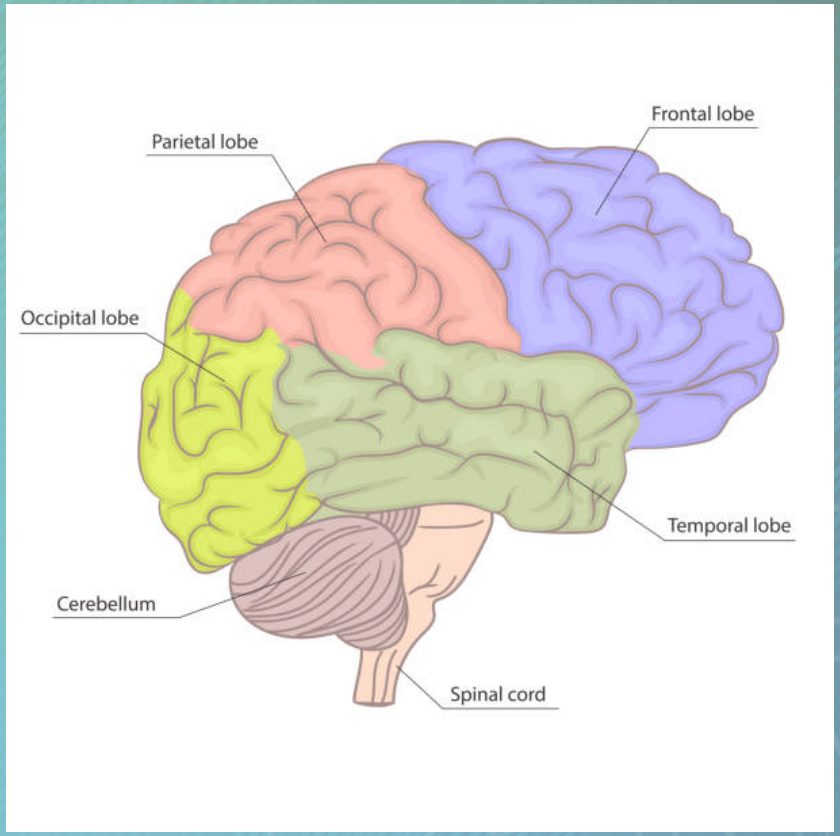
- Thalamus is a set of nuclei (deep brain gray matter) that serves as a relay station for information traveling to or from the cerebral hemispheres
- Impairment of either sensory, motor, visual impairment
- If sizable may cause coma because of impact on reticular activating system

Patten J. Neurological Differential Diagnosis 2nd Edition 1998.

Subcortical

- Internal Capsule: Pure sensory or motor symptoms with involvement of face, arm, and leg

- Corona Radiata: pure motor or sensory with differential involvement of face, arm, and /or leg



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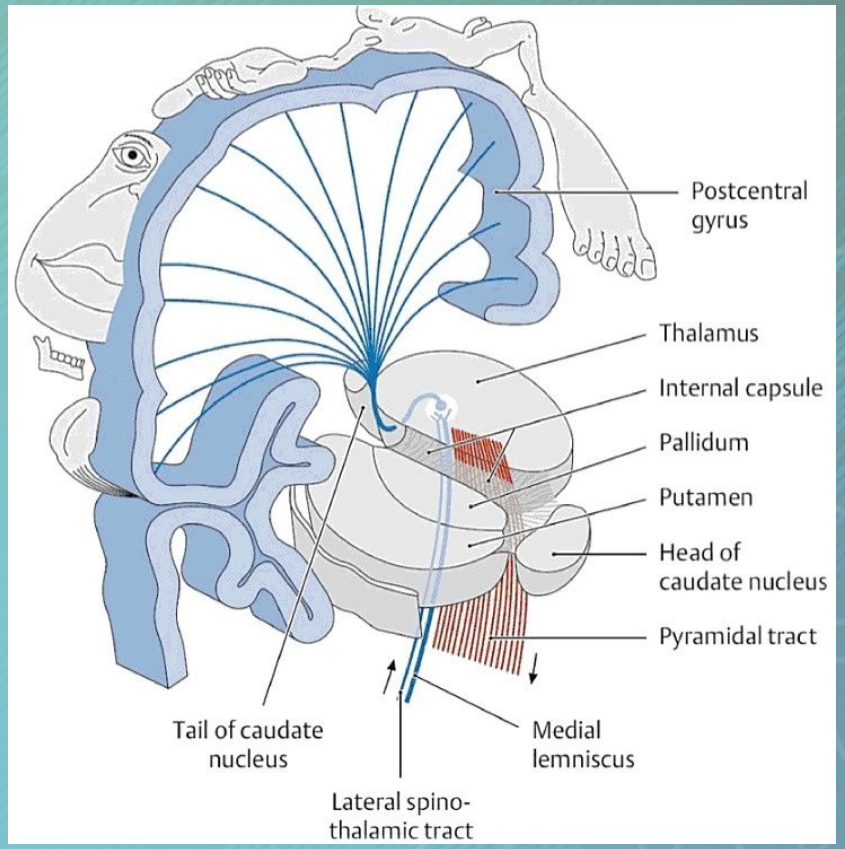

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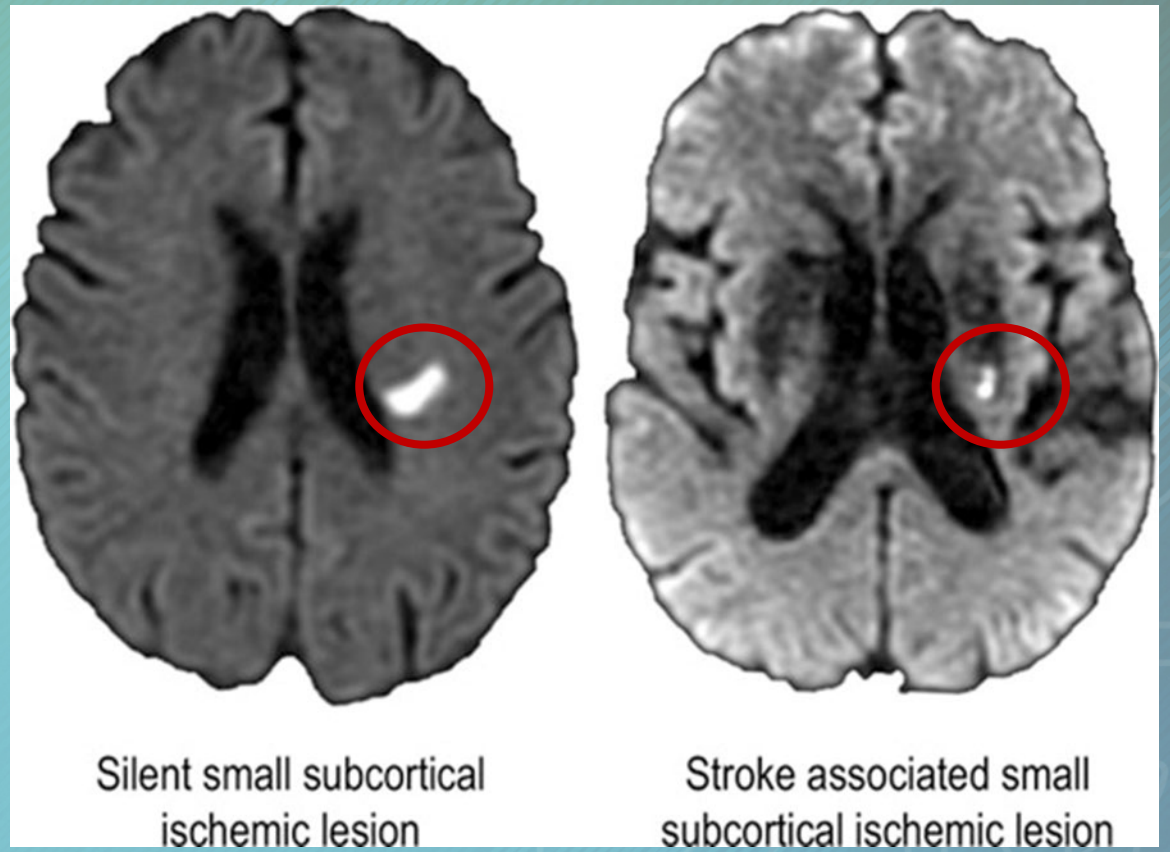

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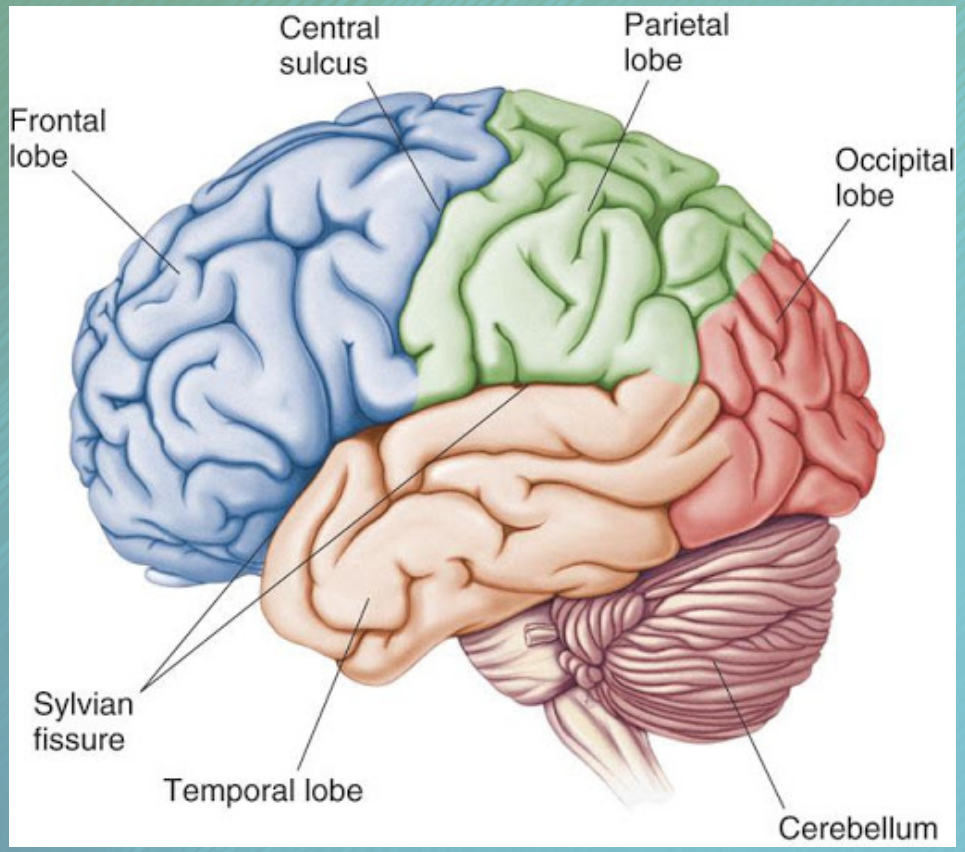
Cortical



- Specific symptoms of cortical stroke depend on location
- Frontal: personality changes, executive function impairment, motor impairment, language impairment
- Parietal: sensory impairment, visuospatial impairment
- Temporal: language impairment and memory impairment
- Occipital: Visual field impairment
- Seizure may be a long-term sequelae of cortical strokes

Blumenfeld H. Neuroanatomy Through Clinical Cases 2nd Edition 2010.

Signs of Cortical Function

- Aphasia
- Agraphia
- Alexia
- Acalculia
- Agnosia
- Amnesia

Blumenfeld H. Neuroanatomy Through Clinical Cases 2nd Edition 2010.

Aphasia

- Expressive (Broca): Decreased output, able to follow commands but not repeat
  - Frontal lobe lesion
- Receptive (Wernicke): Cannot follow commands, output can be excessive, cannot repeat
  - Temporal lobe lesion
- Conduction: Follow commands and verbal output, cannot repeat
  - Arcuate Fasciculus

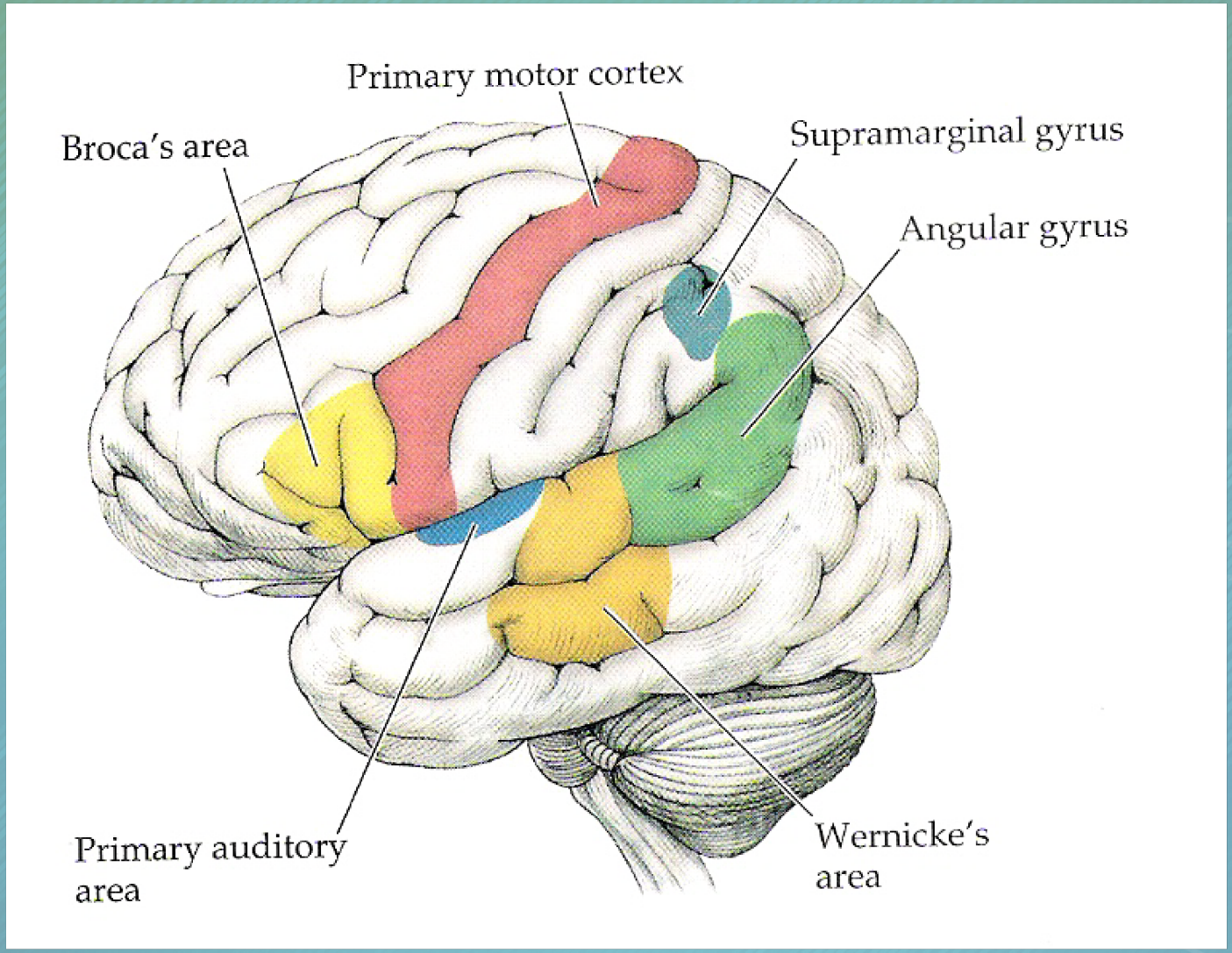
Roper A et al. Adams and Victor's Principles of Neurology 11th Edition 2019.

Aphasia

- Global: Complete! No output, no commands, and no repetition.
- Aphemia: focal lesion results in speech output but not writing
- Transcortical: Three subtypes
  - Expressive: no output, commands intact, repetition is intact (think Broca's with repetition)
  - Receptive: impaired commands, intact repetition, and output is excessive (think Wernicke's with repetition)
  - Global: Almost Complete!! No output or commands but can repeat

Roper A et al. Adams and Victor's Principles of Neurology 11th Edition 2019.

Aphasia



Patten J. Neurological Differential Diagnosis 2nd Edition 1998.

Memory

- Types of Memory
  - Recent
    - Test with short-term testing and digit span
  - Long-term
    - Need verifiable fact
  - Procedural
    - Test with task

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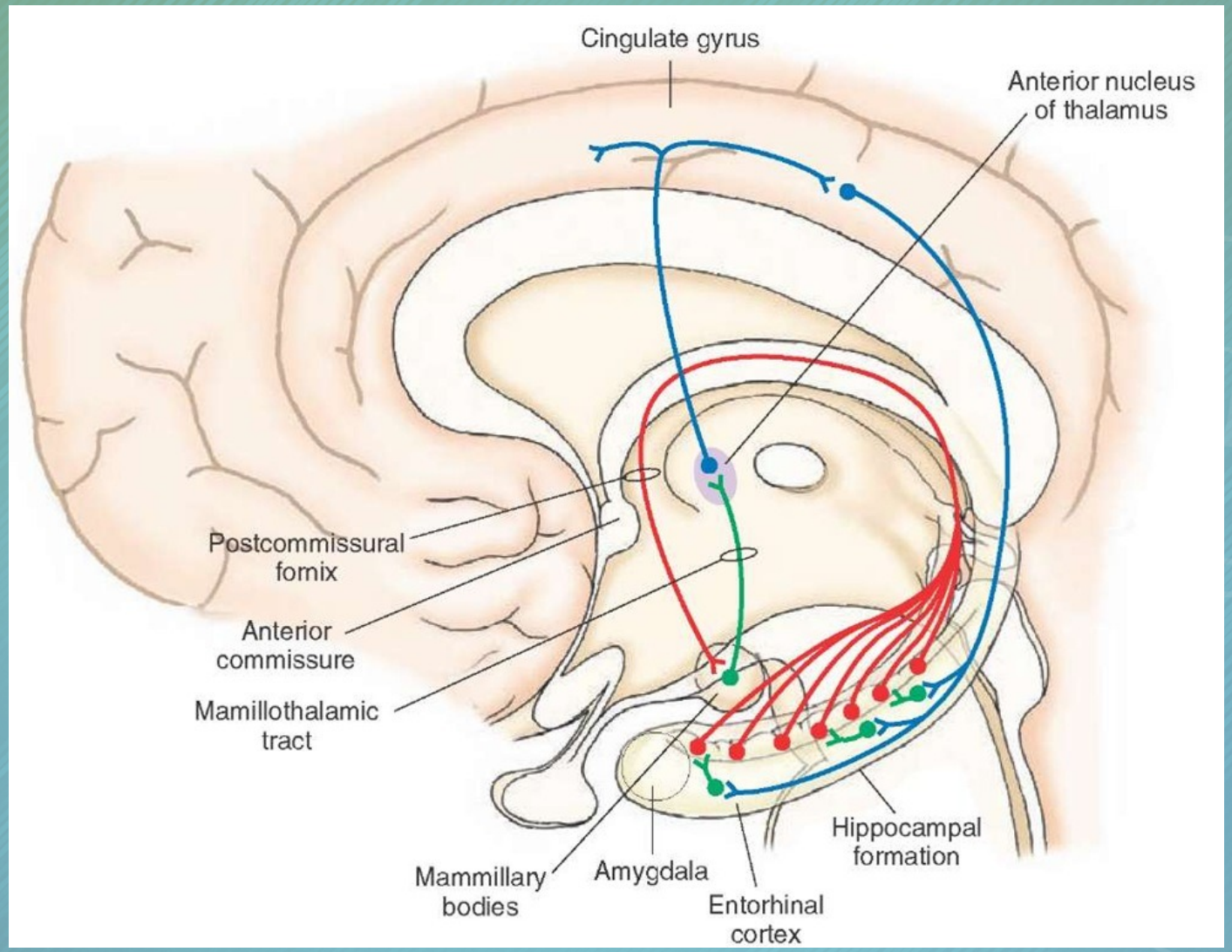
Memory Circuit



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Amnesia Syndromes

- Anterograde: Impairment with forming new memory
- Retrograde: Impairment with established memory
- Apraxia: loss of ability to perform skilled function

Patten J. Neurological Differential Diagnosis 2nd Edition 1998.

TGA

- Transient Global Amnesia
- Transient: typically less than 24 hours
- Global: Anterograde with a short retrograde
- Amnesia: Loss of memory
- Typically brought on by gastrointestinal/genitourinary (GI/ GU) issue
- Resolves spontaneously
- Not a stroke or seizure
  - Functional MRI shows decreased temporal function and increased frontal lobe activity

Fisher CM. Transient global amnesia: precipitating activities and other observations. Arch Neurol 1982;39(10):605-8; Bartsch T, Deuschl G. Transient global amnesia: functional anatomy and clinical implications. Lancet Neurol 2010;9(2)205-14.

Cortical Syndromes

- Gerstmann syndrome
- Cortical blindness & Anton syndrome
- Alexia without agraphia
- Alien limb syndrome
- Prosopagnosia

Strub R, Black W. Mental Status Exam in Neurology 1st Edition 1977.

Gerstmann Syndrome

- Loss of four specific functions
- Agraphia
- Acalculia
- Finger agnosia
- L-R confusion
- Localization: Non-dominant parietal lobe

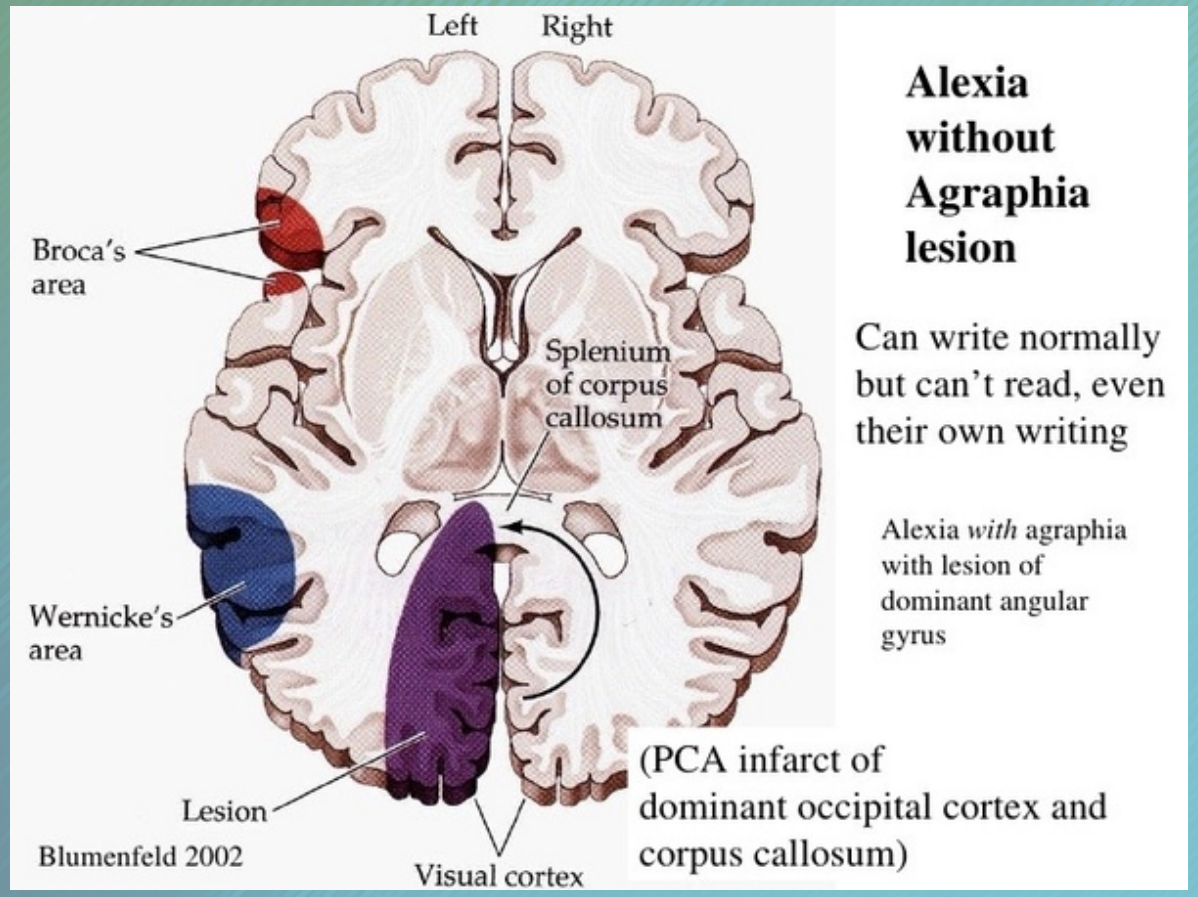
Strub R, Black W. Mental Status Exam in Neurology 1st Edition 1977.

Cortical Blindness

- Inability to see with intact eye function
- Impacts bilateral occipital poles
- Stroke/trauma
- Anton syndrome: cortical blindness with confabulation

Strub R, Black W. Mental Status Exam in Neurology 1st Edition 1977.

Alexia Without Agraphia

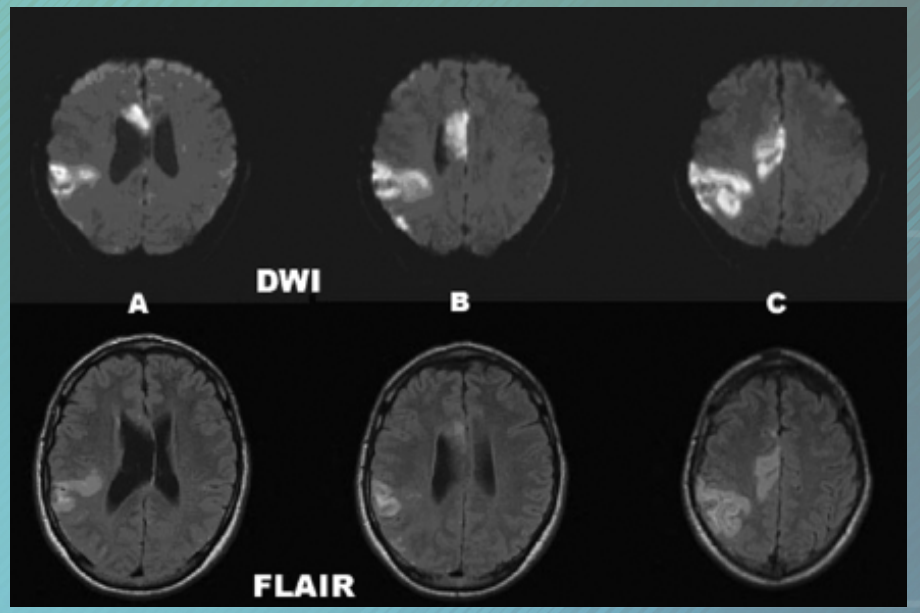


- Inability to read without impairment of writing
- Patient can write a sentence but cannot read it
- Localization: dominant occipital lobe with involvement of splenium of corpus callosum

NORD: www.rarediseases.org; Strub R, Black W. Mental Status Exam in Neurology 1st Edition 1977.

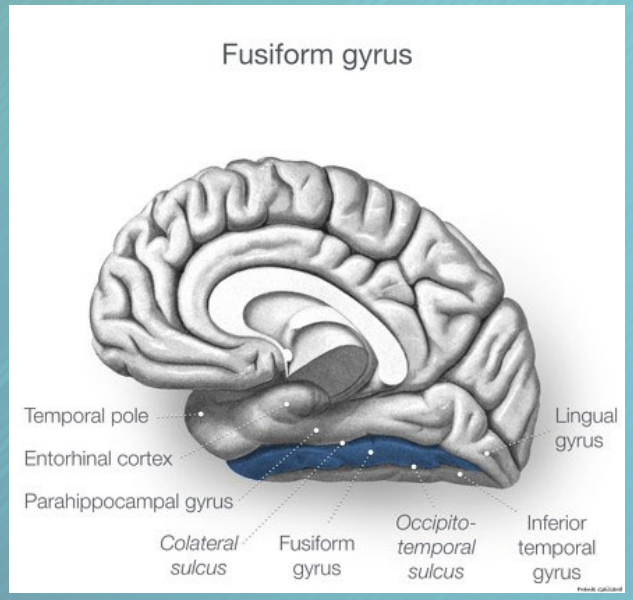
Alien Limb Syndrome

- Loss of recognition of one's limb
- Limb is seen as foreign (not belonging to self)
- Limb functions independently (may be counter to the person's purpose)
- Localization: Non-dominant parietal lobe & anterior corpus callosum
- Corticobasal ganglia degeneration



Patricio S et al. Neurology 2006;67(12):E21;DOI:10.1212/01.wnl.0000249303.88754.48.

Prosopagnosia



- Face blindness
- Inability to recognize faces (including self)
- Localize to non-dominant fusiform gyrus in the temporal lobe

Strub R, Black W. Mental Status Exam in Neurology 1st Edition 1977.

Dementia

- Dementia was named major neurocognitive disorder (NCD) in the DSM-5
- Characterized by cognitive impairment as the most prominent and defining feature of the condition

Complex Attention	Executive Function	Learning and Memory	Language	Perceptual-Motor Function	Social Cognition
Sustained attention, divided attention, selective attention, and information processing speed	Includes planning, decision making, working memory, responding to feedback, inhibition, and mental flexibility	Includes free recall, cued recall, recognition memory, semantic and autobiographical long-term memory, and implicit learning	Includes object naming, word finding, fluency, grammar and syntax, and receptive language	Includes visual perception, visuoconstructional reasoning, and perceptual-motor coordination	Includes recognition of emotions, theory of mind, and insight

DSM-5, Diagnostic Criteria

Dementia

- Alzheimer's dementia
- Lewy body dementia
- Frontotemporal dementia
- Vascular dementia
- Other causes of dementia

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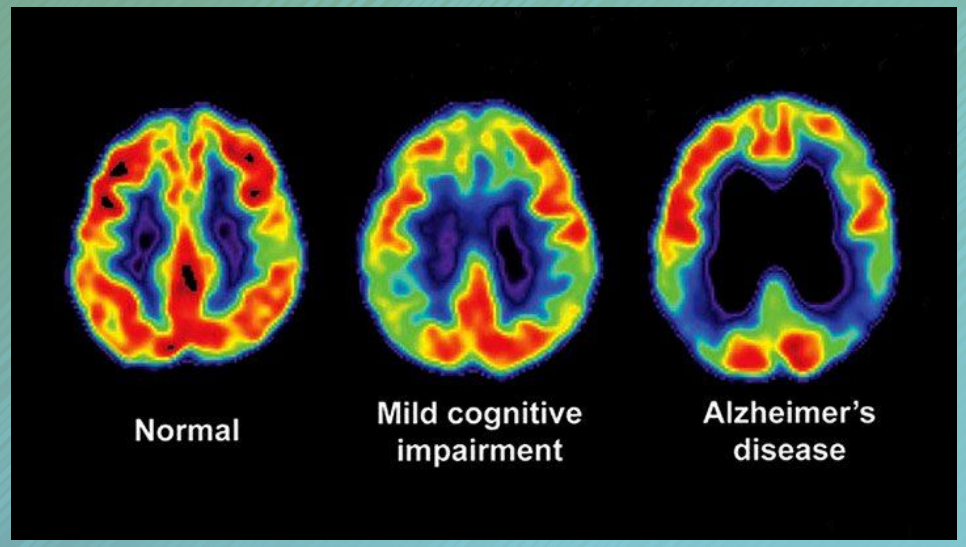
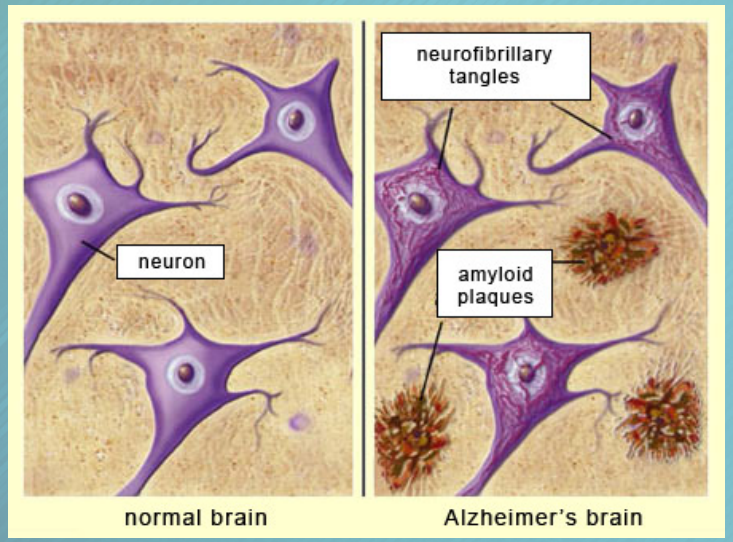
Alzheimer's



- Most common form of dementia
- Typically temporo-parietal
- Short-term memory impairment
- Gradual loss of cortical function
- Variations impact language and frontal lobe function
- Pathology: neurofibrillary tangles and plaques



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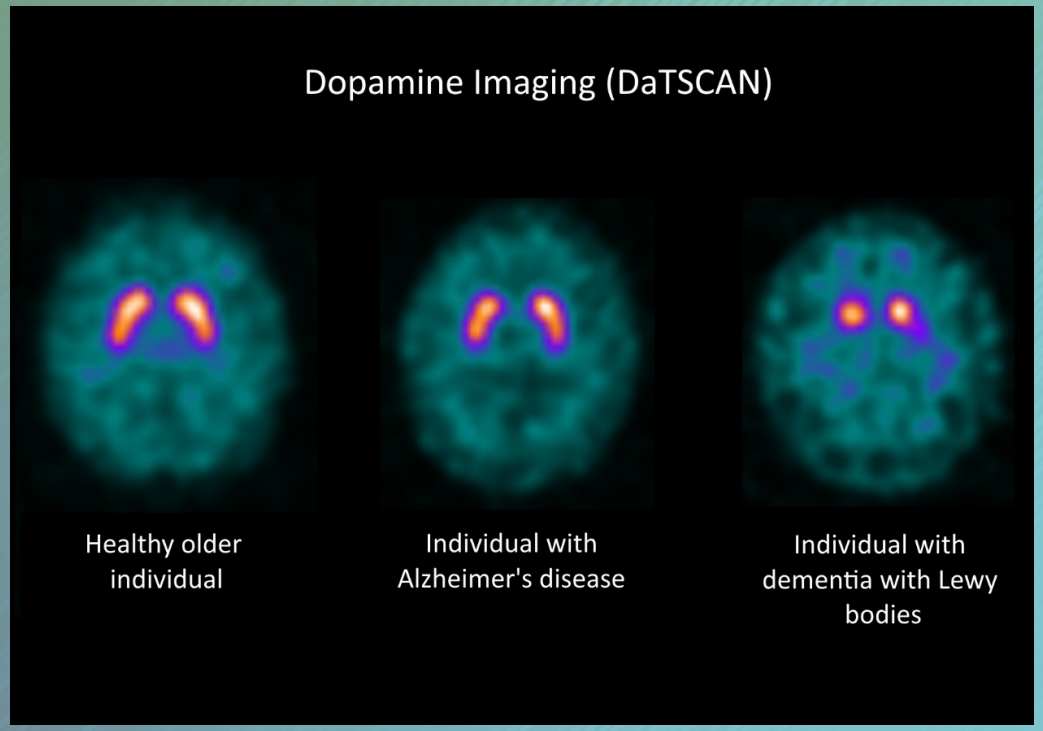
Lewy Body Dementia



- 3rd most common form of dementia
- Prominent waxing/waning mental status
- Parkinsonism
- Visual hallucinations and sensitivity to neuroleptics
- Also seen in patients with PD (Parkinson's Disease Dementia)

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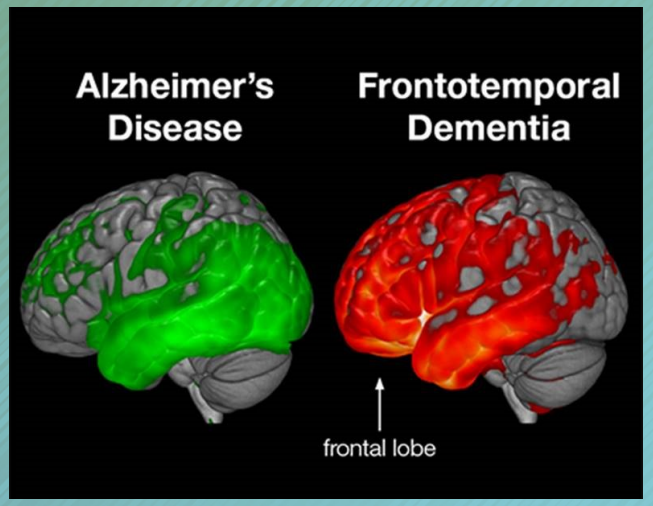
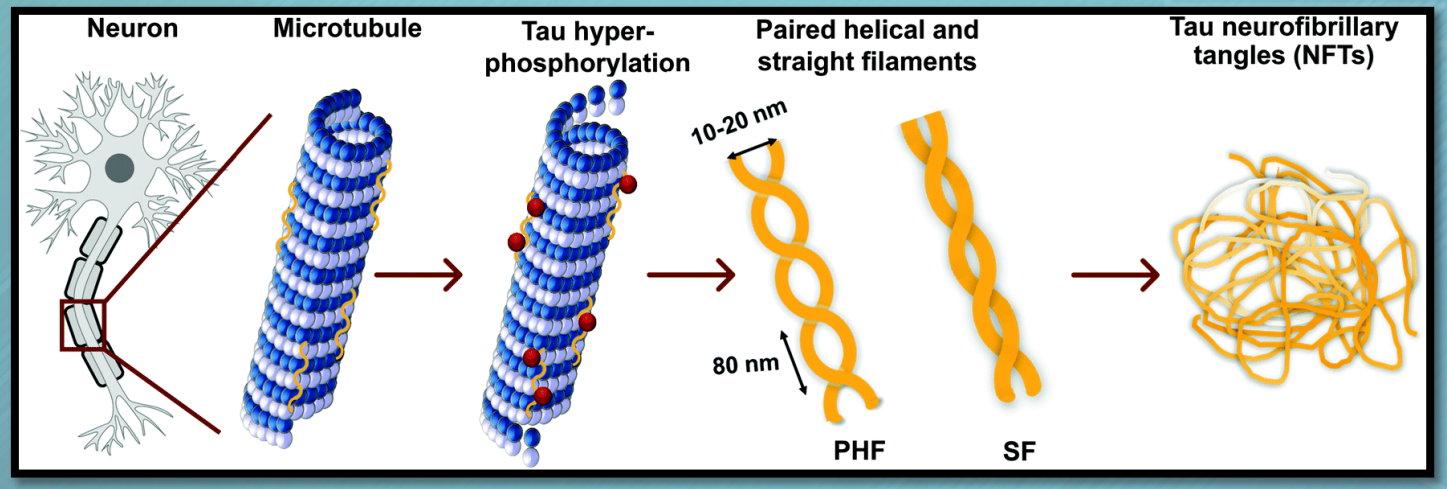
Frontotemporal Dementia



- Prominent memory impairment
- Frontal lobe dysfunction—abnormal behavior
- Variants: primary progressive aphasia—language dysfunction
- Pathology: Tau protein, neurofibrillary tangles



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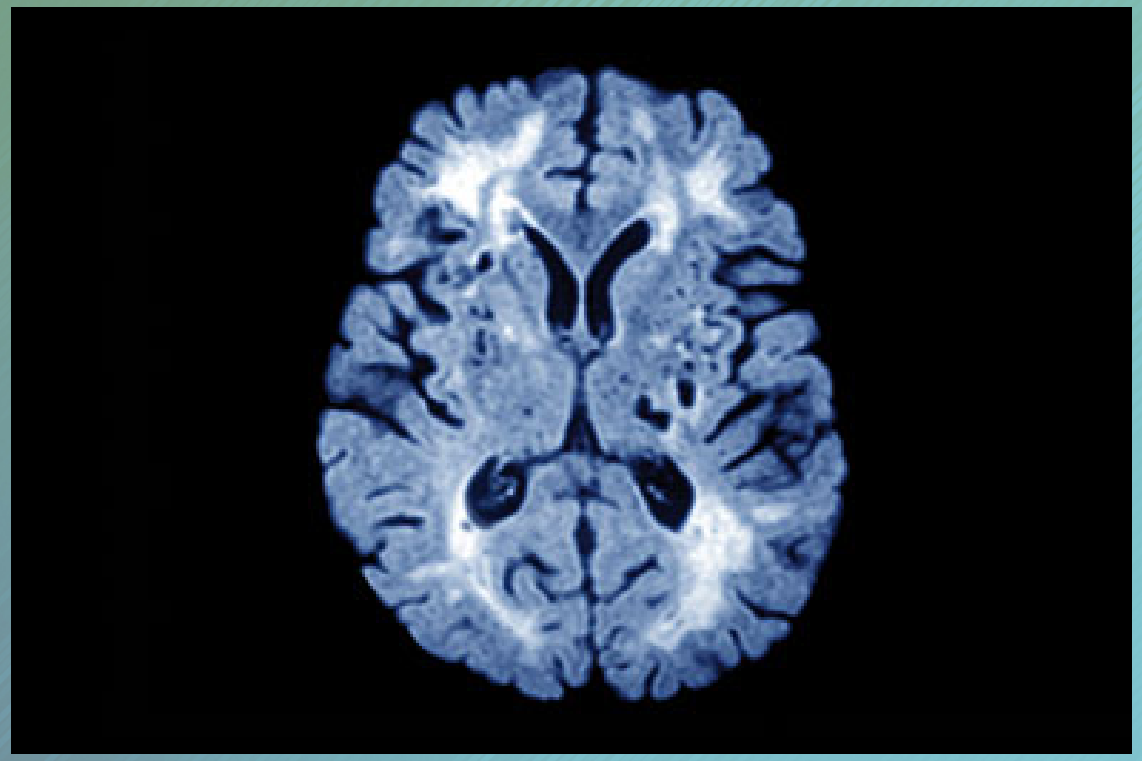
Vascular Dementia



- Vascular lesions resulting in cognitive impairment
- Single stroke impacting frontal or temporal lobe
- More likely: confluent subcortical white matter changes
- Dementia involves slowed mental processing, personality change, executive dysfunction, absence of cortical signs

Roper A et al. Adams and Victor's Principles of Neurology 11th Edition 2019.

Other Causes of Dementia

- Nutritional
  - -Thiamine
  - -B12 deficiency
- Mass
  - -Meningioma
  - -Metastasis

Patten J. Neurological Differential Diagnosis 2nd Edition 1998.

Other Causes of Dementia

- Prion disease
  - Sporadic: CJD or new variant CJD
  - Familial syndromes
  - Large scale destruction of neurons
  - Rapid onset and rapidly progressive
- Paraneoplastic
  - Autoimmune: antibodies attack neurons
  - Rapid progressive (weeks)

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Summary

- There are many neurological syndromes that psychiatrists should be aware of when treating mental health conditions
- Understanding the various types of stroke, and the resulting neurological consequences, is important for psychiatrists
- Examining different cortical syndromes may help improve treatment for patients with comorbid psychiatric conditions
- Distinguishing the various types of dementia is essential to implementing effective treatment strategies

Posttest Question 1

- Mark is a 65-year-old male who recently suffered a stroke to his left parietal lobe to the angular gyrus and, as a result, is experiencing the following symptoms: agraphia, acalculia, finger agnosia, and left-right confusion. This patient likely suffers from _____.

1. Transient Global Amnesia
2. Gerstmann Syndrome
3. Alien Limb Syndrome
4. Prosopagnosia
5. Dementia

Posttest Question 2

- When it comes to amnesia syndromes, which constitutes the loss of ability to perform skilled function?

1. Anterograde memory
2. Retrograde memory
3. Apraxia
4. All of the above
5. None of the above