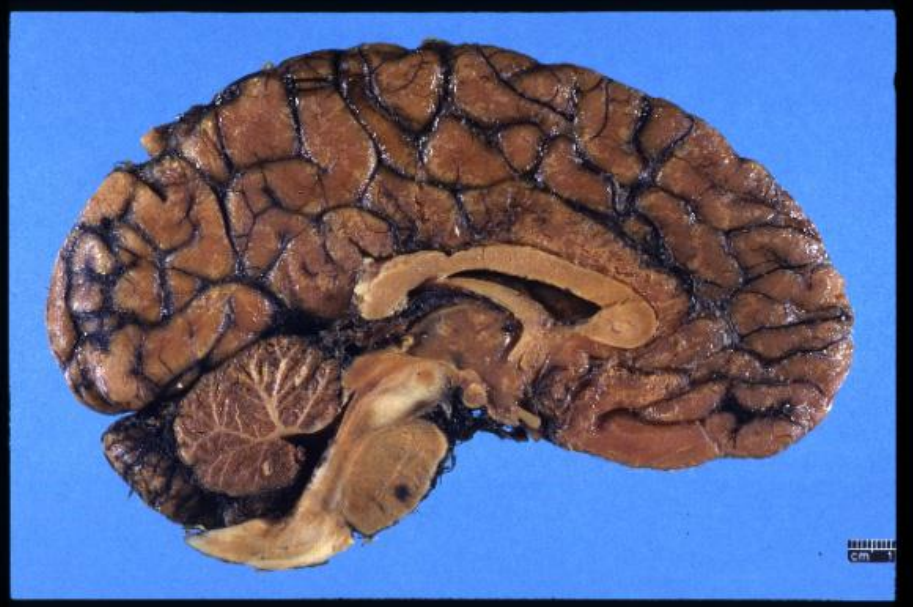
Chapter 12

Aging-Related and Cognitive Disorders

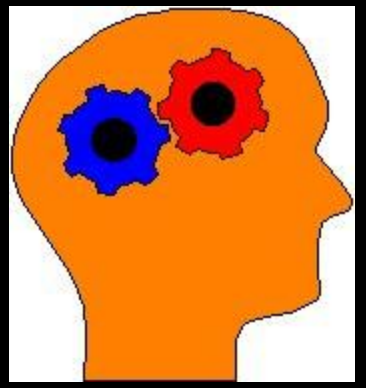


1. Do You Believe that You are More Than Your Body? Why/Why not

http://bodyforlife.com/media/CMSimages/doug_deruyterSM.jpg

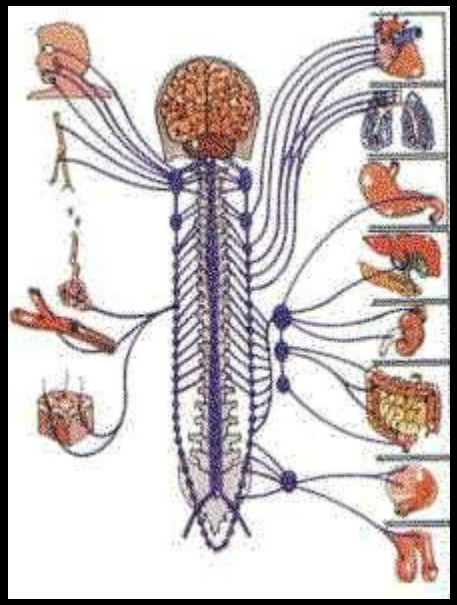
Naturalistic Scientist's Belief About the Mind?

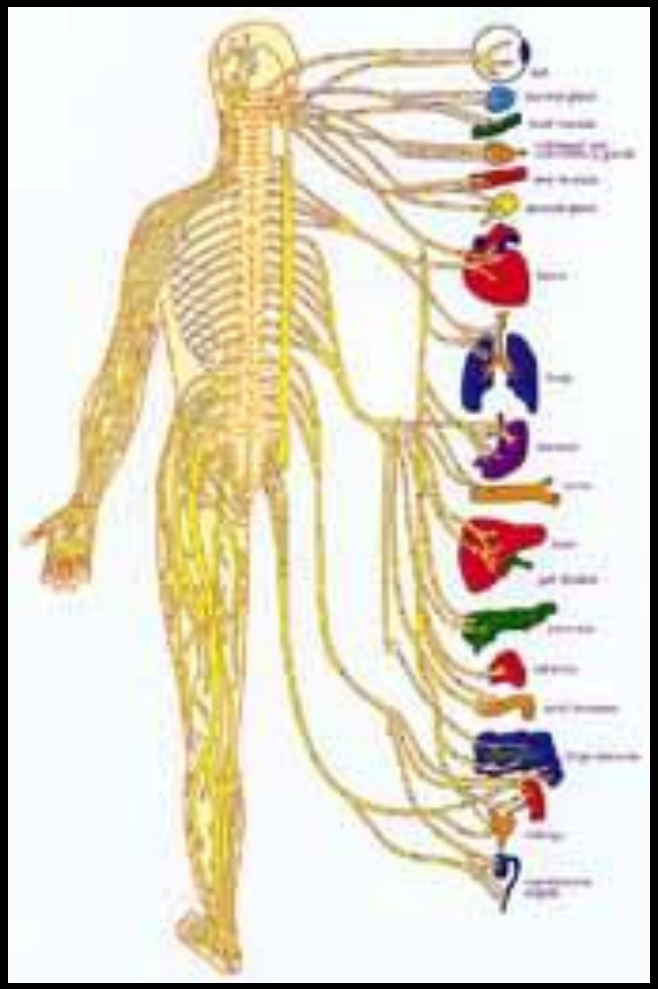
- Reductionism
- That we are all merely material



Organic Syndromes

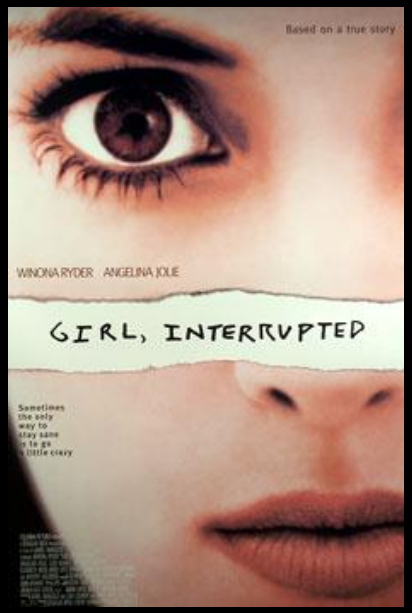
- Caused by known pathology in the structure or function of the nervous system





Functional Syndromes

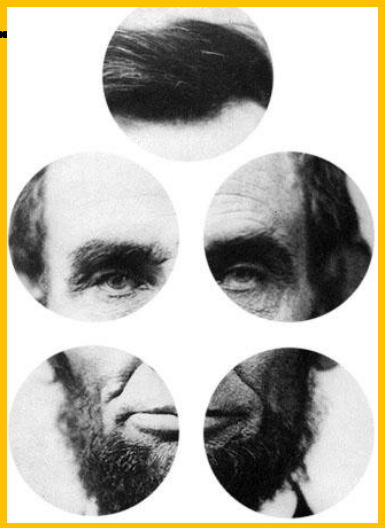
- Are believed to be caused by abnormal experience imposed upon normal brain mechanisms.



2A. When you think of a neurological problem you think of _____.

2B. When you think of a psychological problem you think of _____

http://rwjhamilton.org/images/pic_neurology.jpg



http://www.erasmatazz.com/library/Mind/Visual%20Metaphors/EvolutionaryPsychology.jpg

Computer Metaphor

• Etiology	Organic	Functional
• Medical	Neurology	Psychiatry
• Psychological	Neuropsychology	Clinical psychology
▪ Computer	Hardware	Software

Differential Diagnosis

- Difficult to tell physical from psychological
- Ex. temporal lobe epilepsy
- Symptoms
  - Fear
  - Mood swings
  - Inappropriate affect
  - Bursts of anger
  - Illusions
  - Hallucinations
  - Altered thought processes
  - Bizarre behavior

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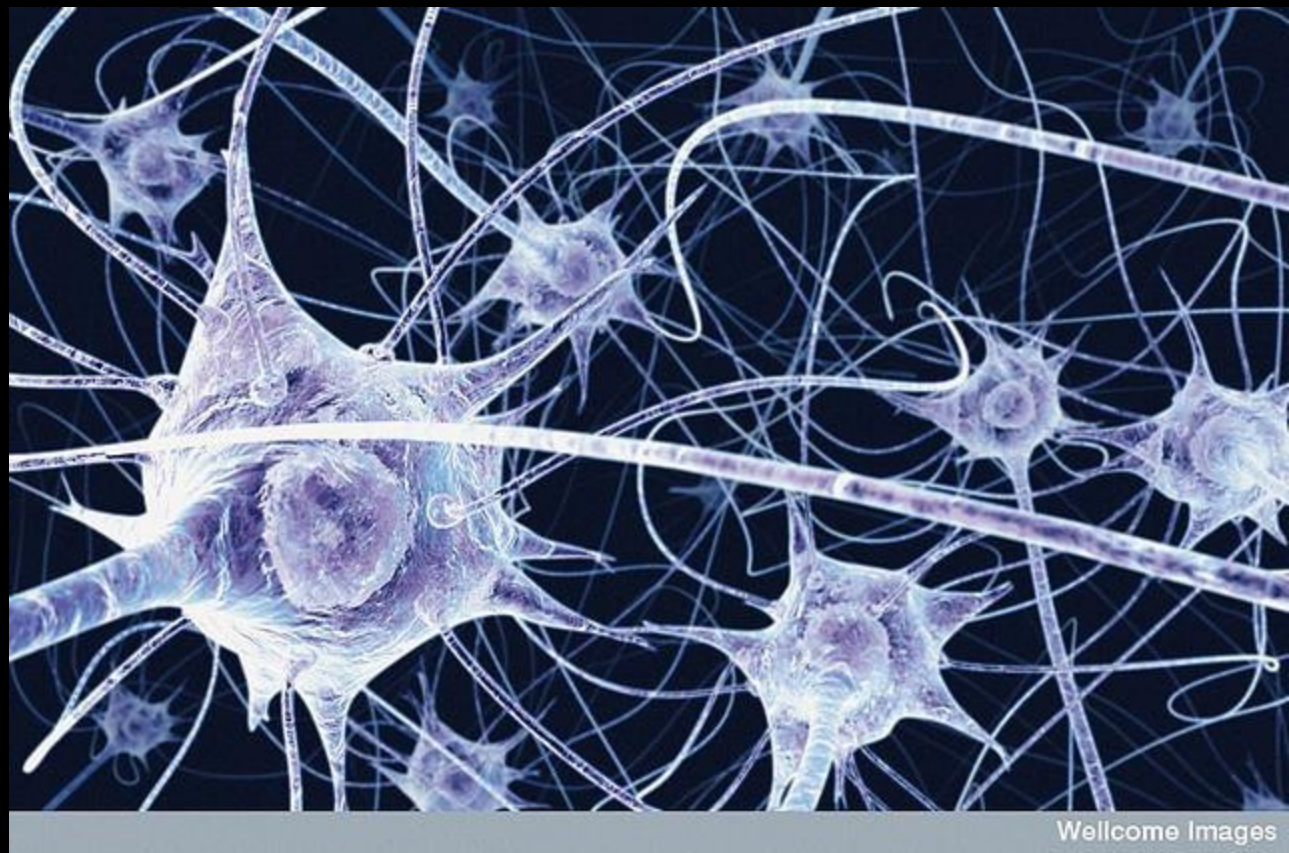
Neurons

- “Units" of the nervous system
- Communicate by releasing neurotransmitter substances into the synapse



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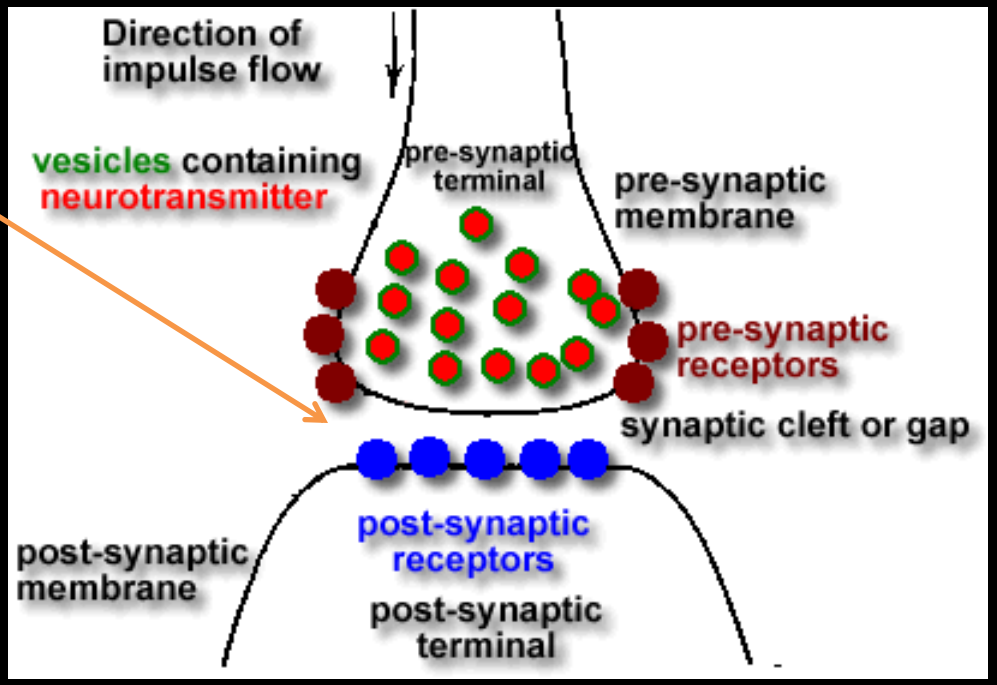
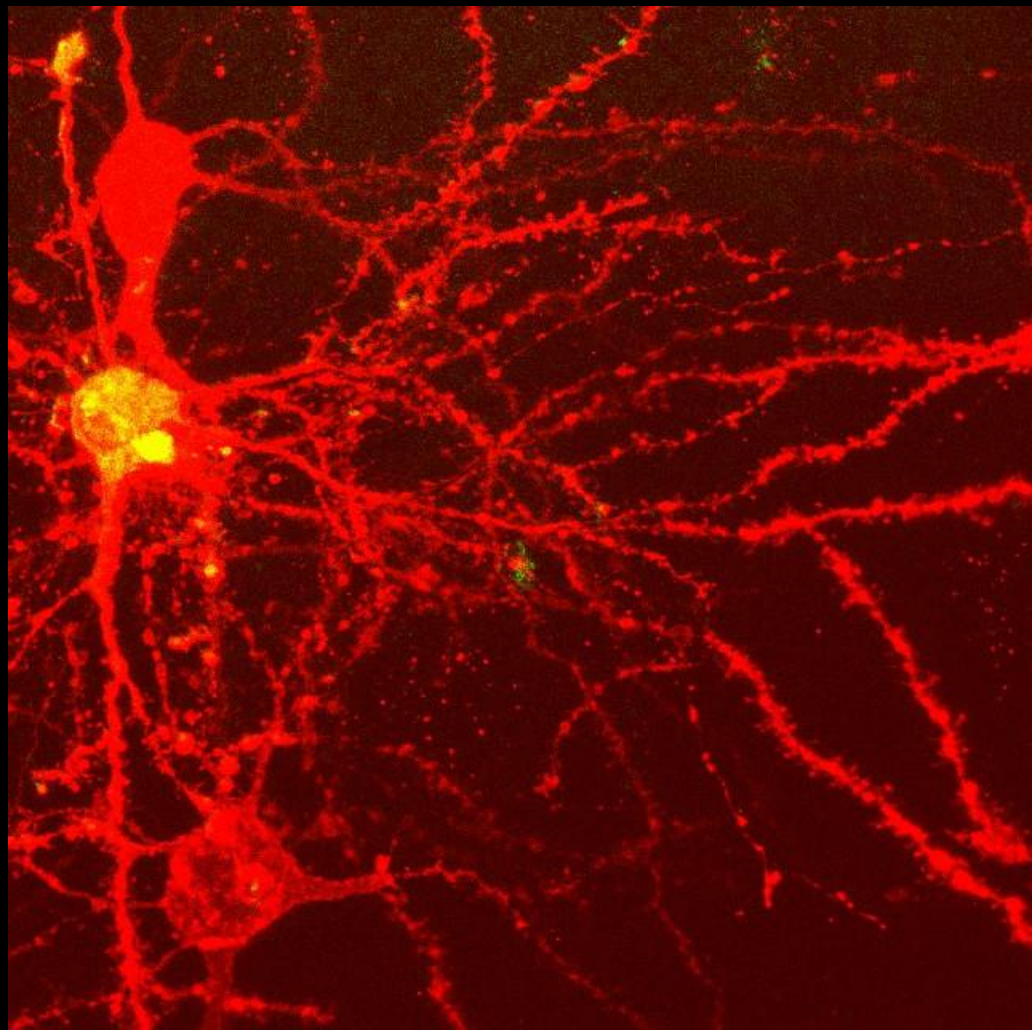
Synapse

Gap separating one neuron from another



How Neurons Work

- Transmitters
- Increase (excite) or
- Decrease (inhibit)
- Activity of other neurons



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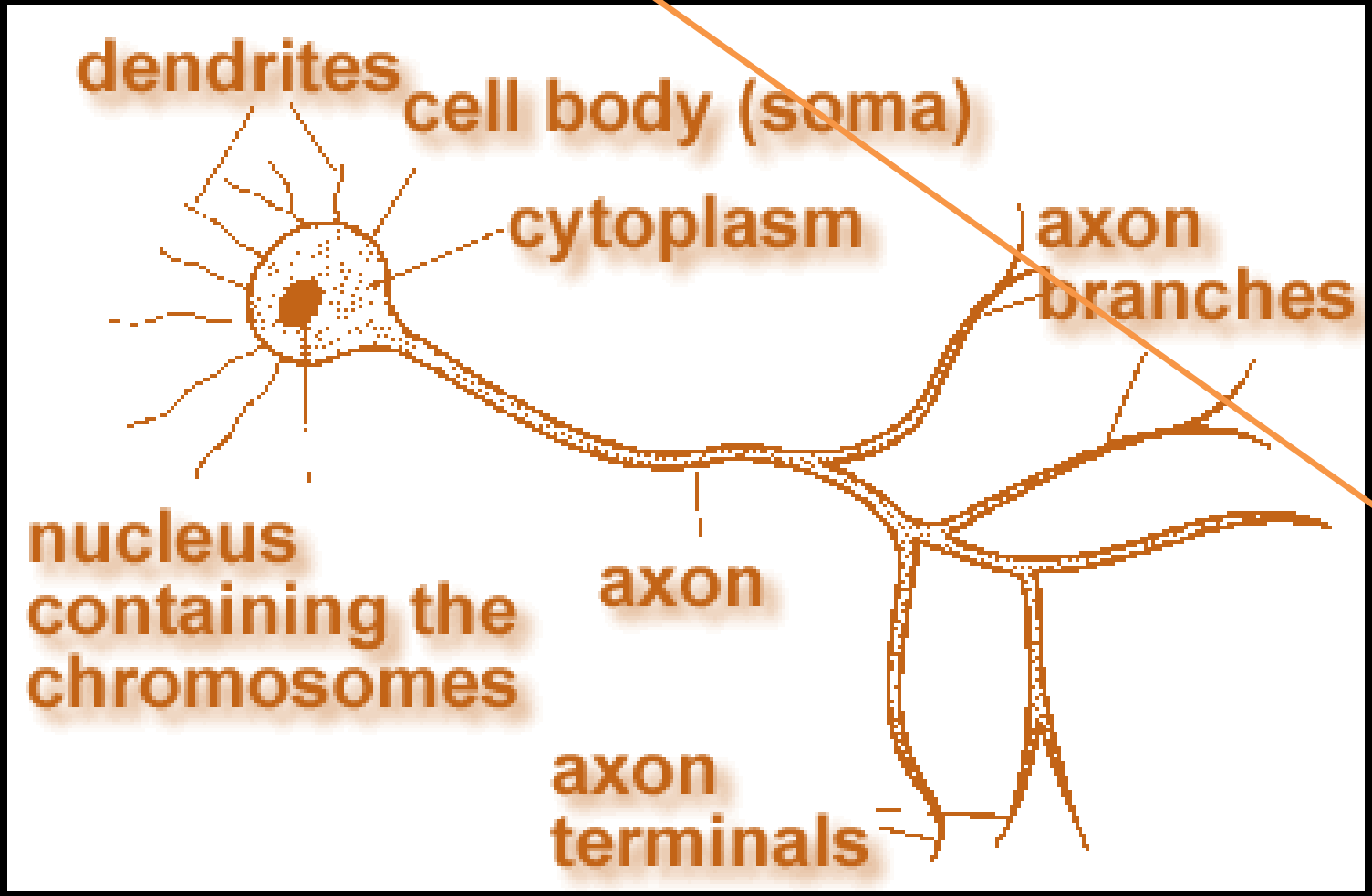
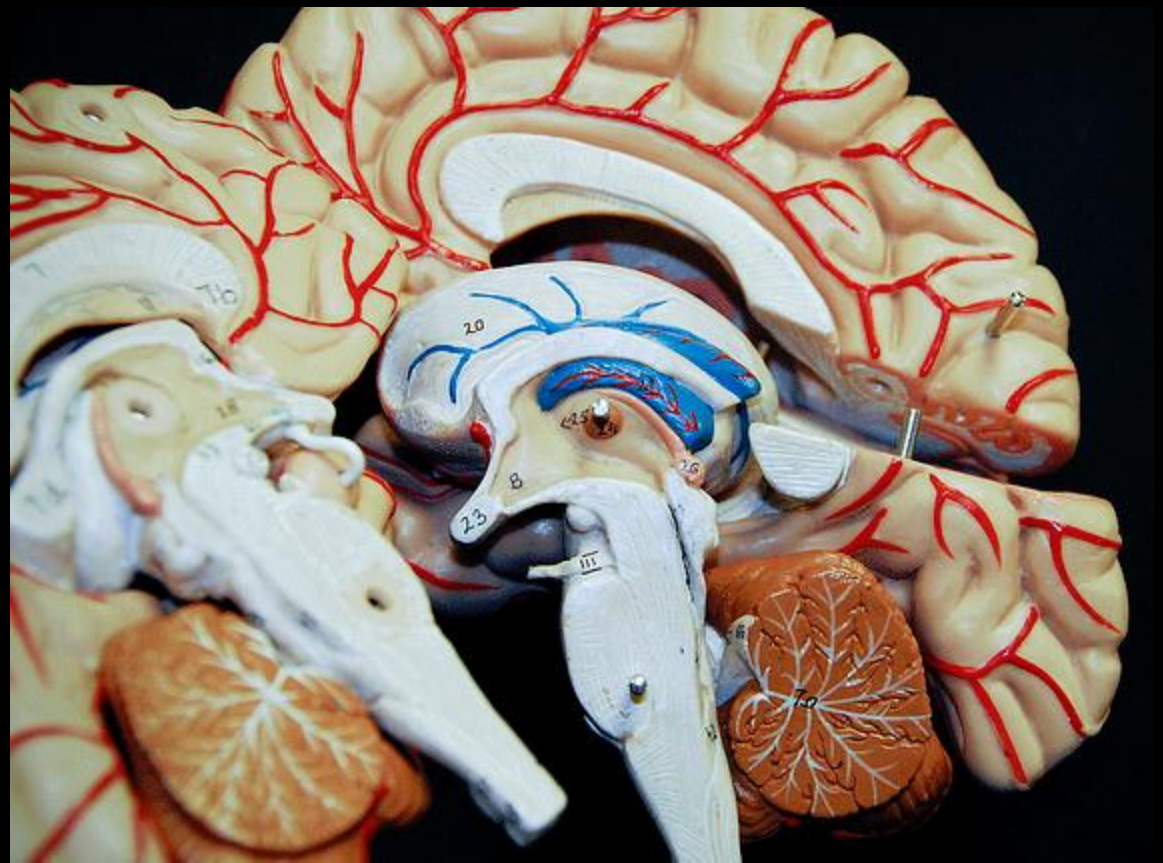
Neuron


dendrites
cell body (soma)
cytoplasm
axon branches
nucleus containing the chromosomes
axon
axon terminals

Spatial Organization (Localization of Function)

- Neurons in the:
  - Same area
    - perform related functions.
  - In different regions
    - perform different functions



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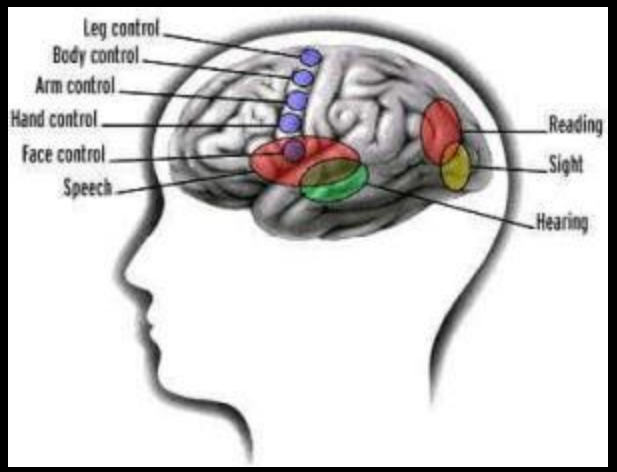
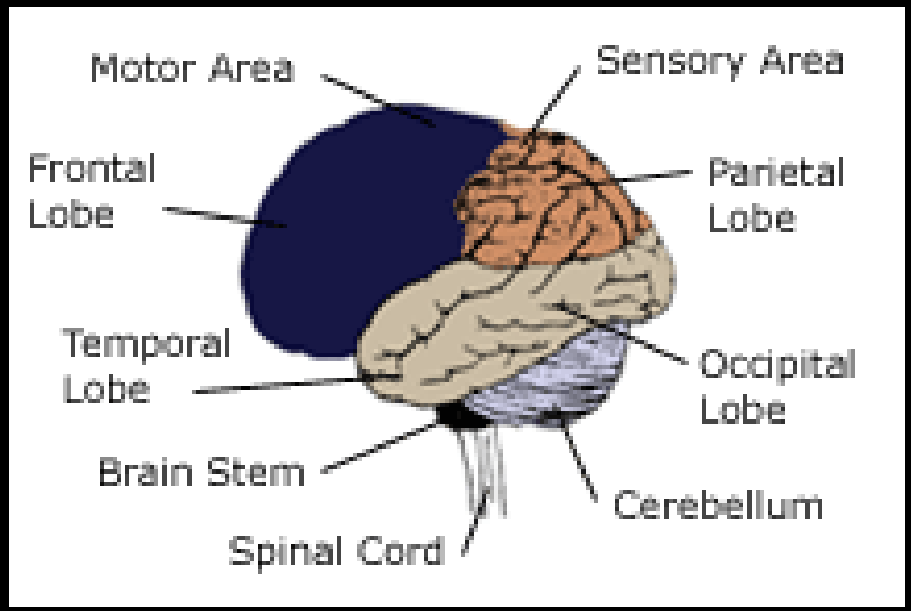
Types of Brain Tissue

- Gray matter is nerve cell bodies processing areas
- White matter is axons concentrated in tracks that connect areas of gray matter

Brain Organization

- Front - motor
- Back – somatosensory





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Brain Organization

- Left brain controls right body
- Right controls left

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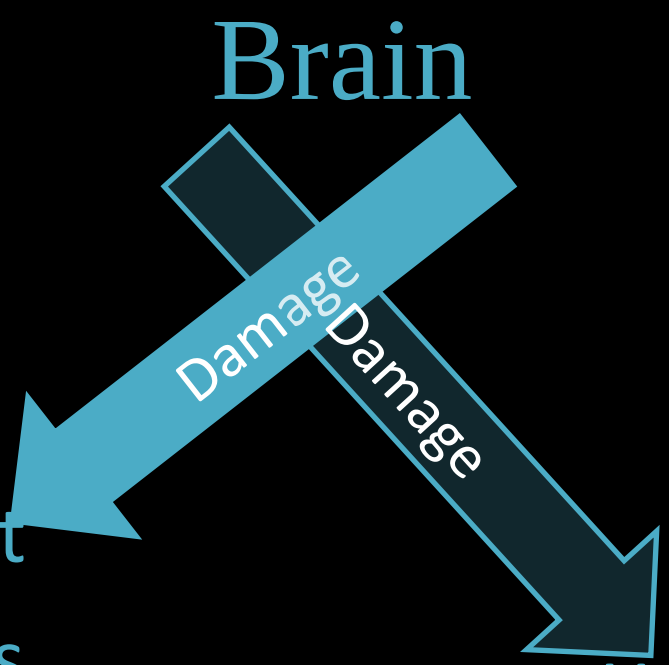
Contralateral Projection



Left

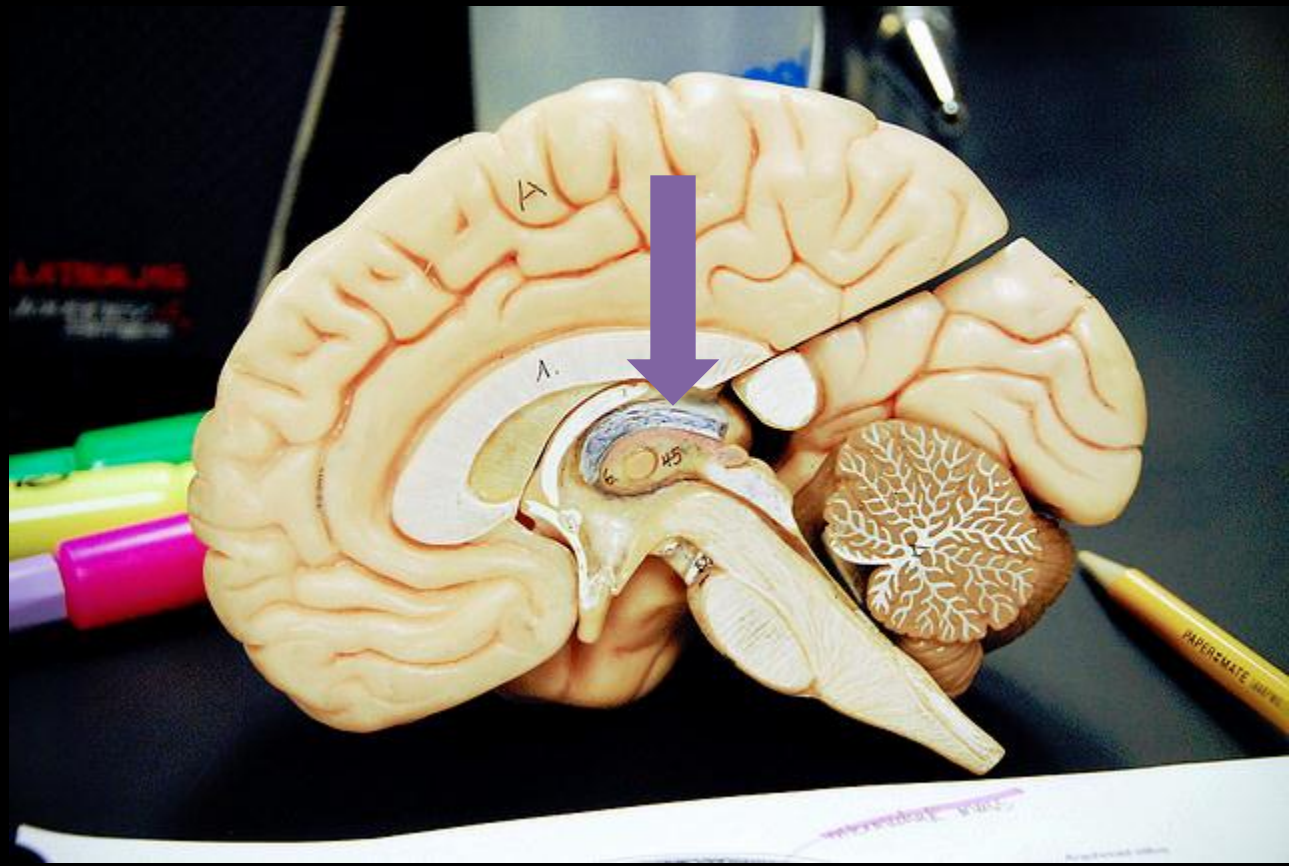
- Weakness
- Paralysis
- Loss of sensation

Right

- Weakness
- Paralysis
- Loss of sensation

Brain Organization

- Higher levels inhibit lower levels
- Higher levels more abstract--thought
- Lower levels more basic—life support



Perseveration

- Patient tends to continue doing what he is doing
- Difficulty in making transitions between activities
- Indicative of frontal damage

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Widespread Disorders

- Result from nutritional deficiencies
- Due to lack of blood
- Due to atherosclerosis
- Suffocation
- Toxins
- Infections trauma
- General degeneration

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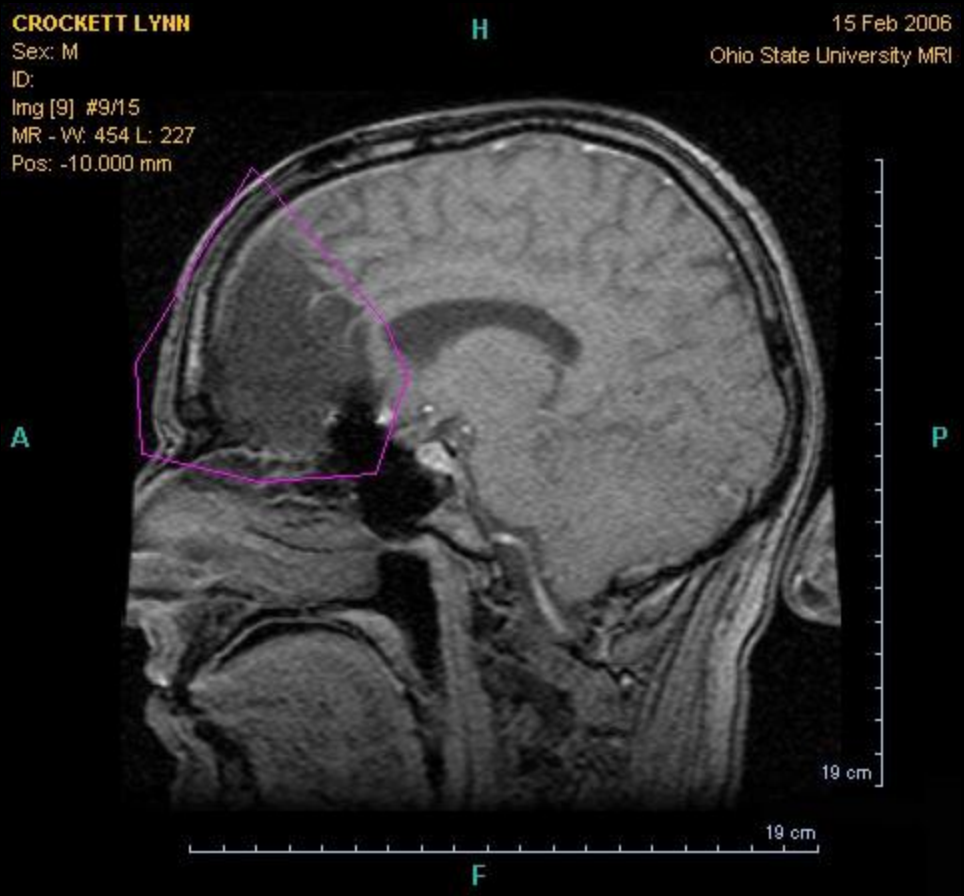
Localized Symptoms

- Tumors



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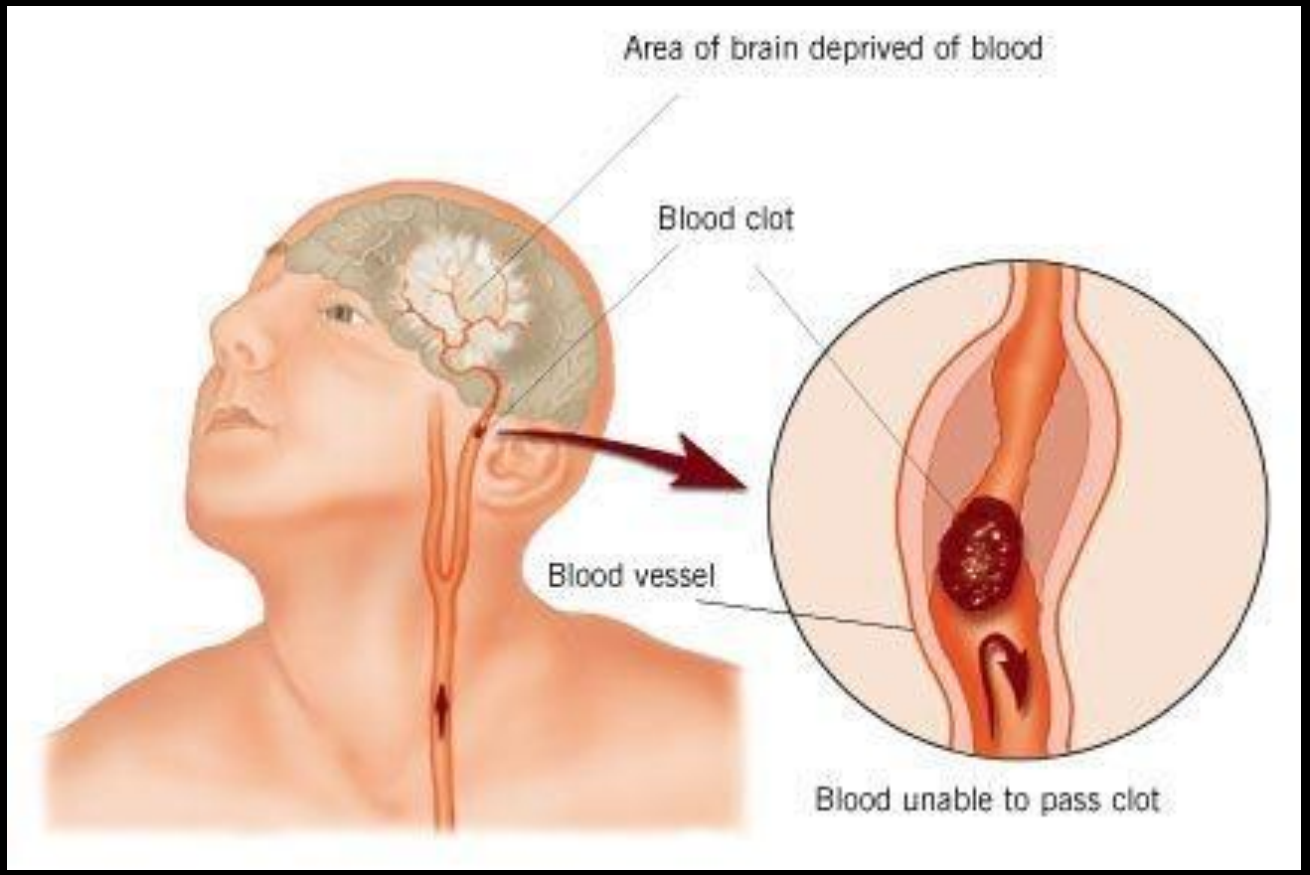
Localized Symptoms

- Stroke



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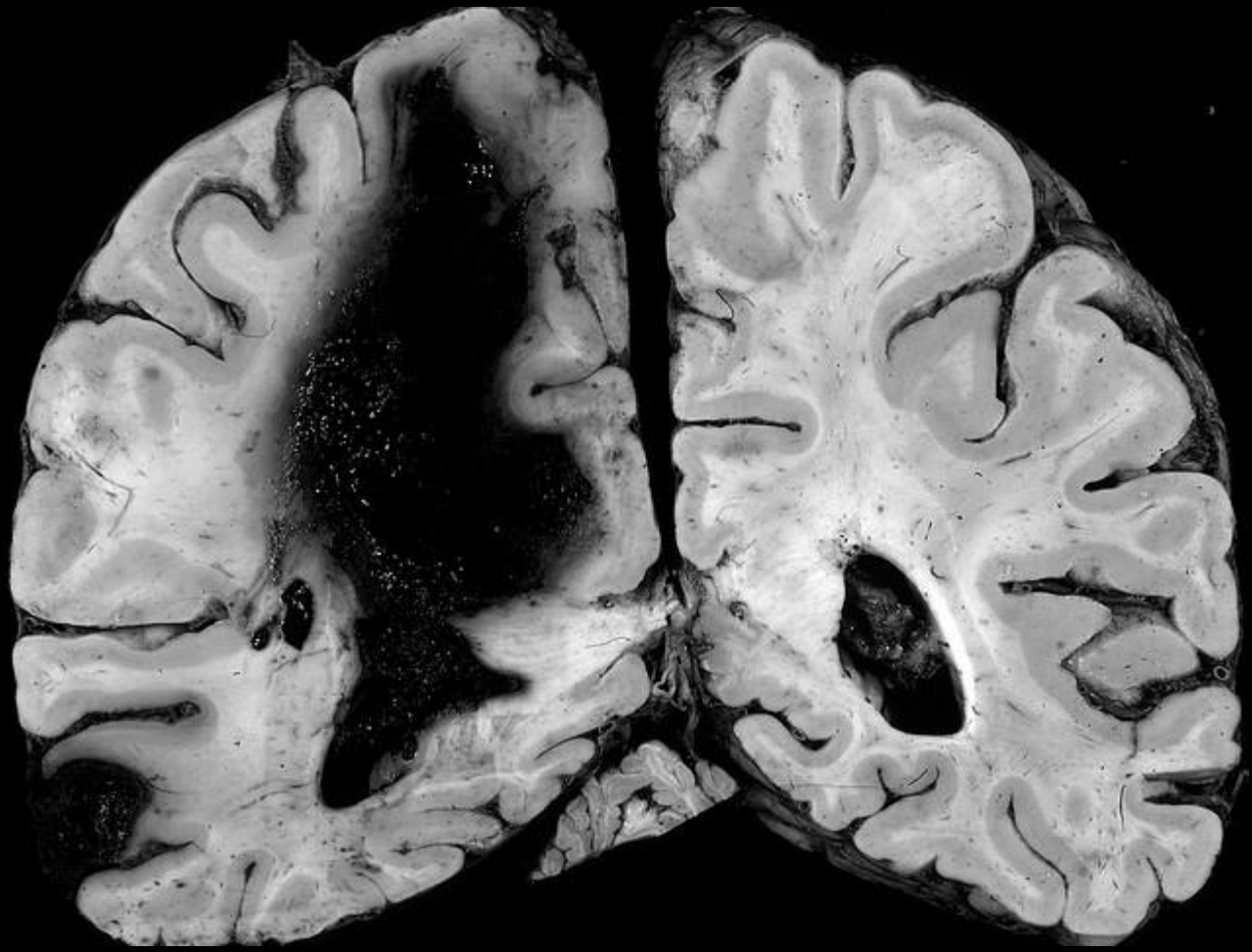
Localized Symptoms

- Hemorrhage



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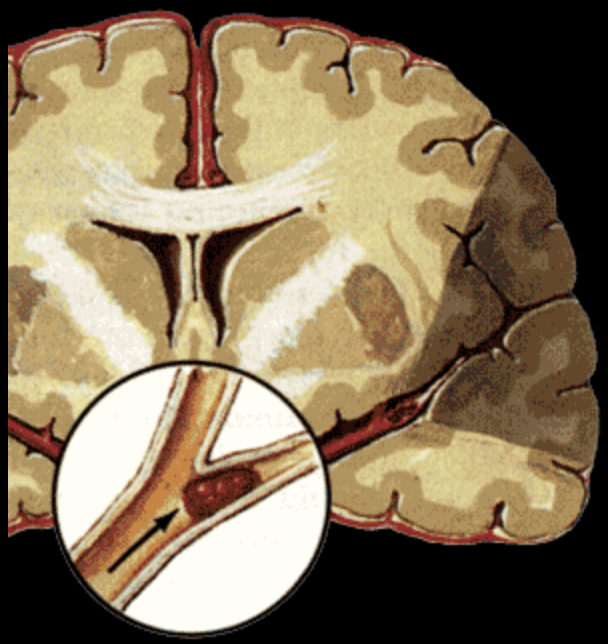
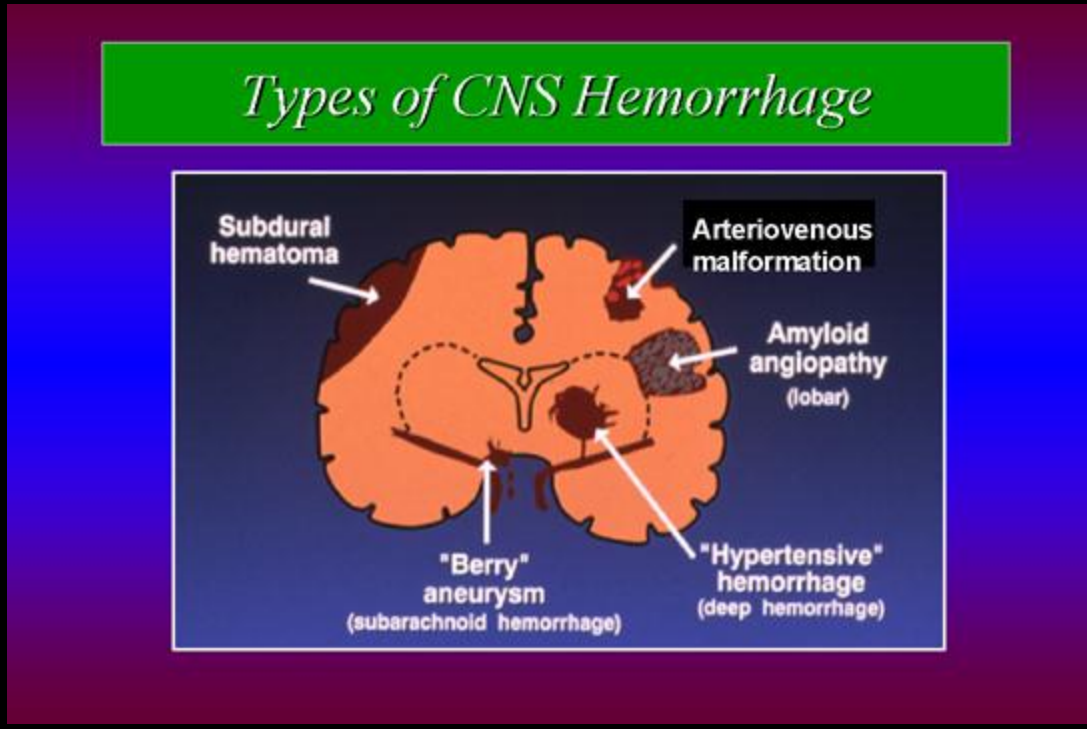
Stroke vs. Hemorrhage

- Stroke occlusion of blood vessels
- Hemorrhage ruptured arteries that leak blood





Epilepsy

- Irritable tissue that leads to synchronized activity seizures etc. positive symptoms

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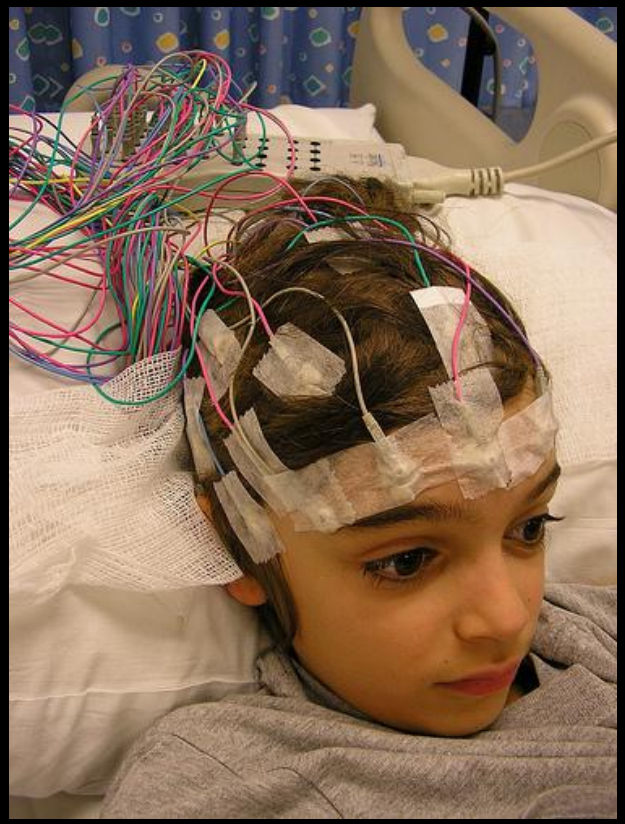
Symptoms

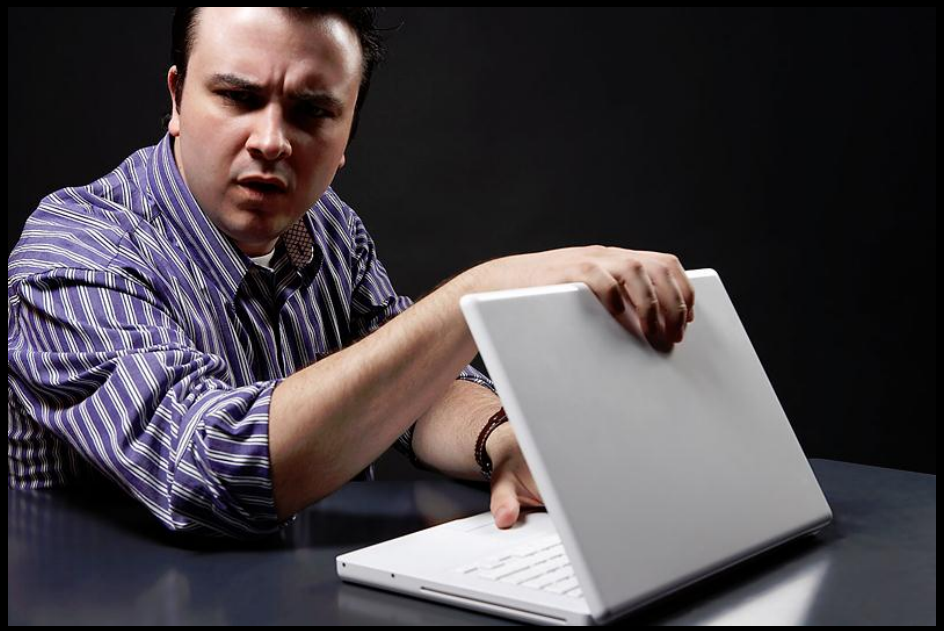
Positive

- Epilepsy



Negative

- Aphasia
- Amnesia



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Positive Symptoms

- Reasons for "positive" symptoms
  - First damage cause irritation
  - Second damage decreases inhibition.
- Positive symptoms:
  - more activity in the nervous system
  - more behavior in the organism.

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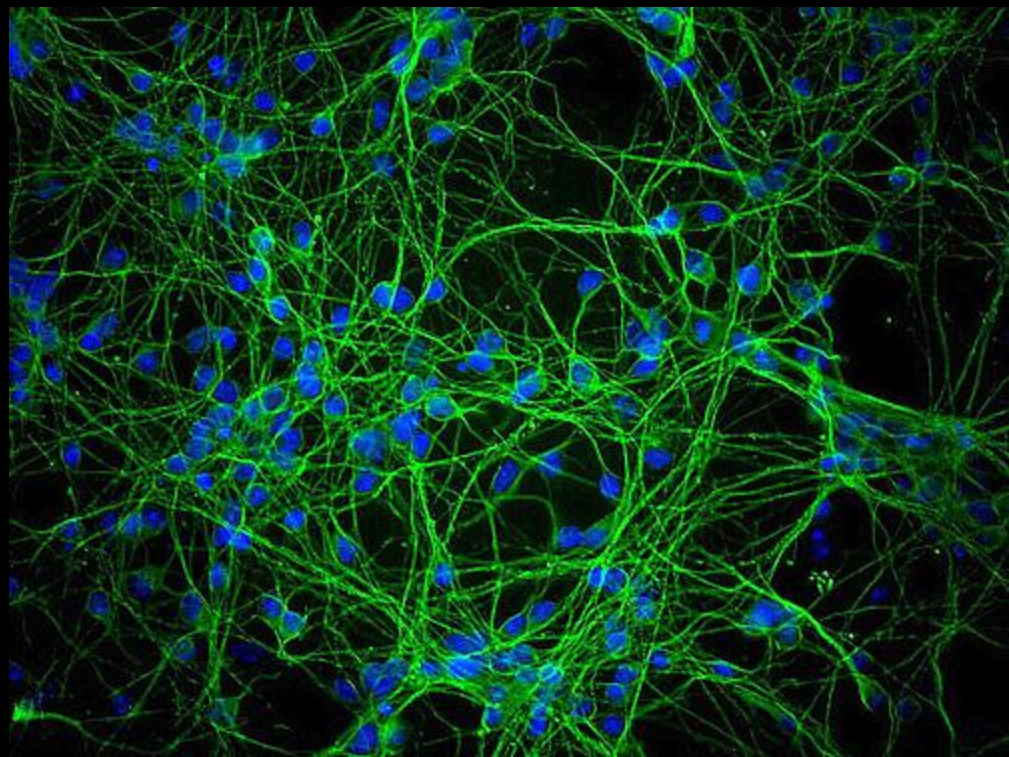
Brain Resists Damage

- Redundant neurons,
- More neurons than absolutely necessary
- Alternative pathways that can accomplish the same end
- People learn alternative strategies of performing the same task.



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3. Have you ever had any scan test done on you? Which one

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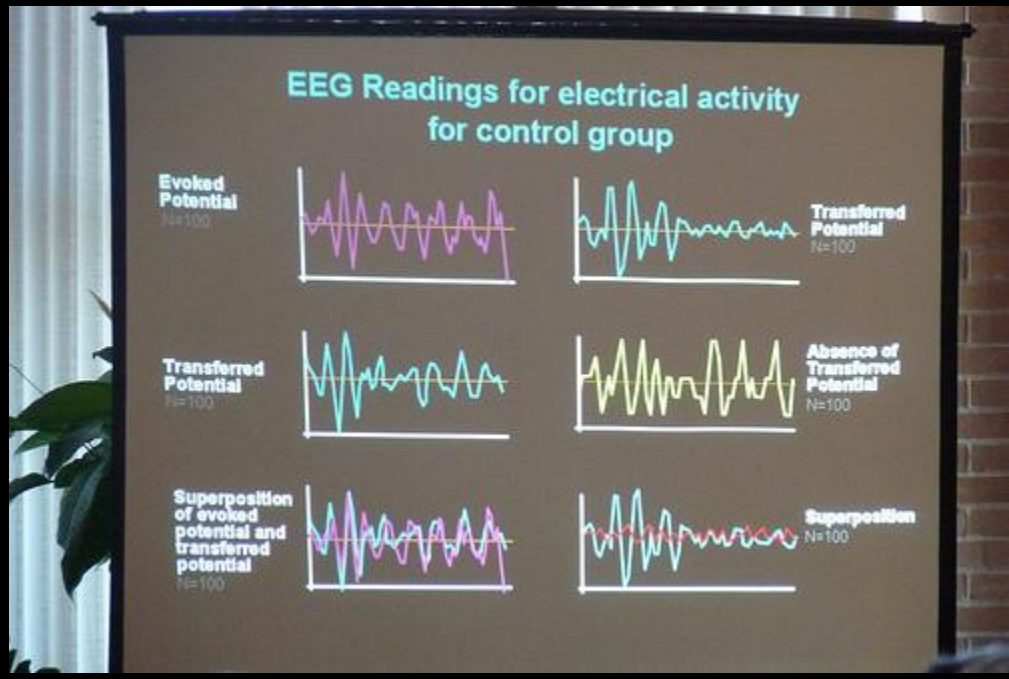
Electroencephalogram -- EEG

- Detects electrical differences
- Using wires taped to the surface of the head and scalp.
- Record the electrical changes during epileptic seizures by location



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Computer-Assisted Tomography -- CAT

- X-ray image of the brain
- Abnormal tissue absorbs X rays to a different degree than bone or normal brain tissue.
- Using a series of X-rays of the brain taken at different angles –
- A three-dimensional representation is constructed
- Abnormal tissue within the brain can be located.

Magnetic Resonance Imaging

- More sensitive than the CAT scan
- A magnetic field is imposed on the brain
- A pulsed radio frequency wave is applied that causes each atom of any particular element to behave as a tiny spinning magnet that resonates or wobbles at a frequency that is characteristic for that element.
- The signal emitted by the resonating atoms is detected by a sensor.
- The distribution of resonating atoms of any particular element is analyzed by computer and reconstructed as an image representing the concentration of that element in different parts of the brain.

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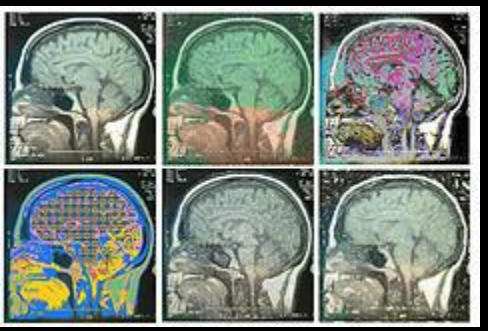

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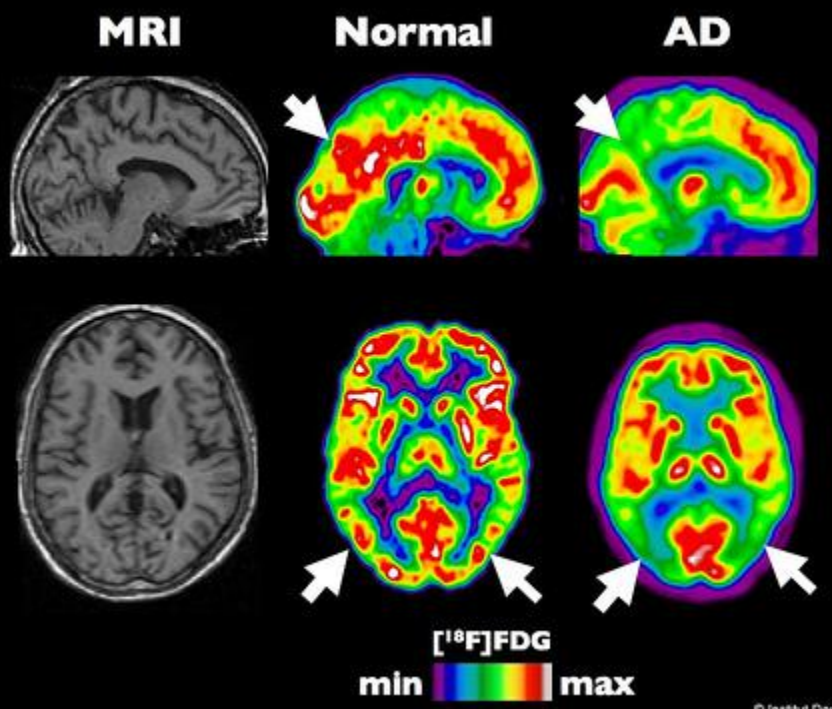
Positive Emission Tomography PET

- Measure of brain activity
- A radioactive substance that is usually glucose or oxygen is incorporated directly into the neuron in proportion to the neuron's metabolic rate.
- A representation of the metabolic rate in different brain regions is produced



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Nature of Cognitive Disorders

- **Impairment of:**
  - **Thought**
  - **Memory**
  - **Attention**
- **Arising from:**
  - **Brain trauma**
  - **Disease**
  - **Exposure to toxic substances**

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DSM-IV Diagnoses Include

- Delirium
- Dementia
- Amnesia

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3. Have you ever been conscious but unable to think clearly? If so when?

Delirium

- Temporary
- Clouded consciousness
- Unaware of what is happening around them
- Unable to focus or pay attention.
- Foggy memory
- Disoriented.
- Also include:
  - Delusions
  - Illusions
  - Hallucinations
  - Anxiety
  - Euphoria
  - Irritability

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Delirium: Causes

- Substance intoxication
- Substance withdrawal
- Head injury
- High fever
- Vitamin deficiency

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Delirium: Prevalence

- Any age,
- More common in:
- Hospitalized older adult patients

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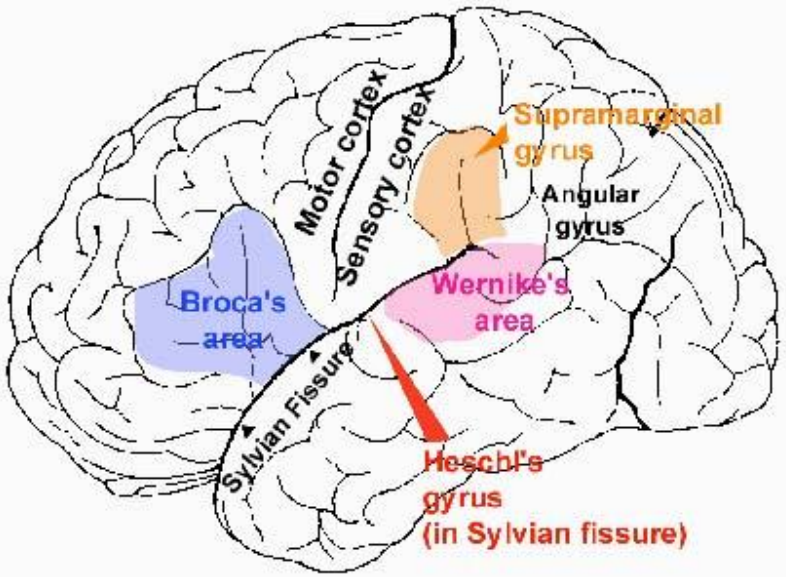
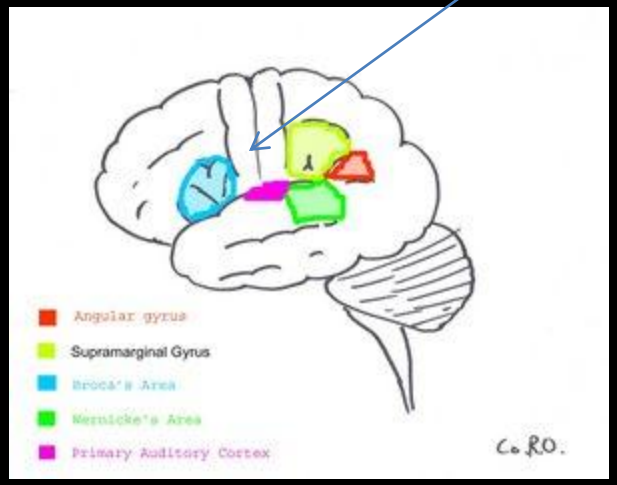
Aphasia

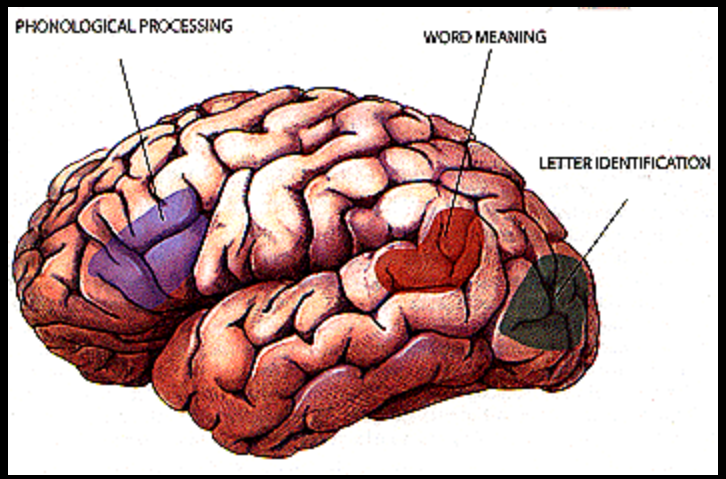
- The lack of speech
- Most major language disorders
- Have a well defined neurological basis



Damage to Broca's area

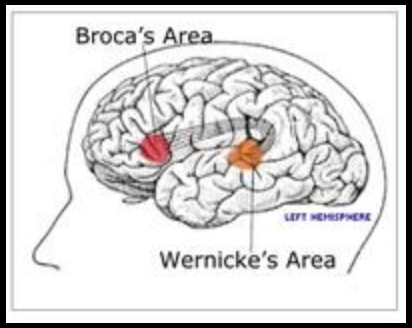
- Leads to expressive aphasia
- Left frontal lobe





Damage to Wernicke's area

- Leads to receptive aphasia.
- Left temporal lobe



Dyslexia: Difficulty in Learning to Read

Developmental

- Out of proportion to the child's development
  - intellectual
  - emotional.

Acquired

- Adults who once knew how to read well.

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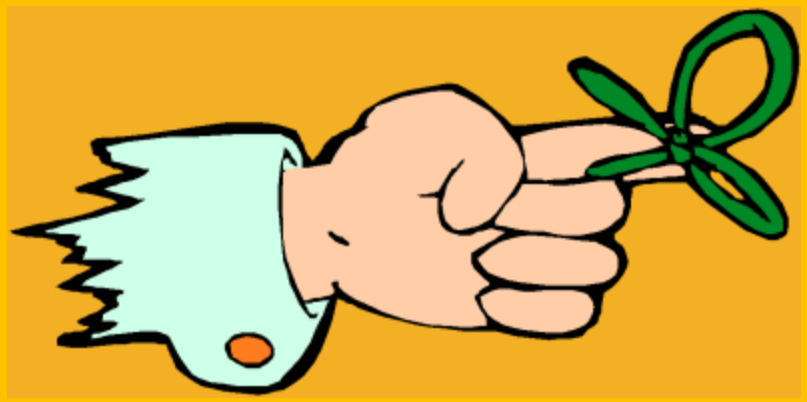
5. How often do you forget something that you want to remember (other than on a test)?



Amnesic Disorder: Symptoms

- Biological inability to
  - Recall previously learned information
  - Register new memories

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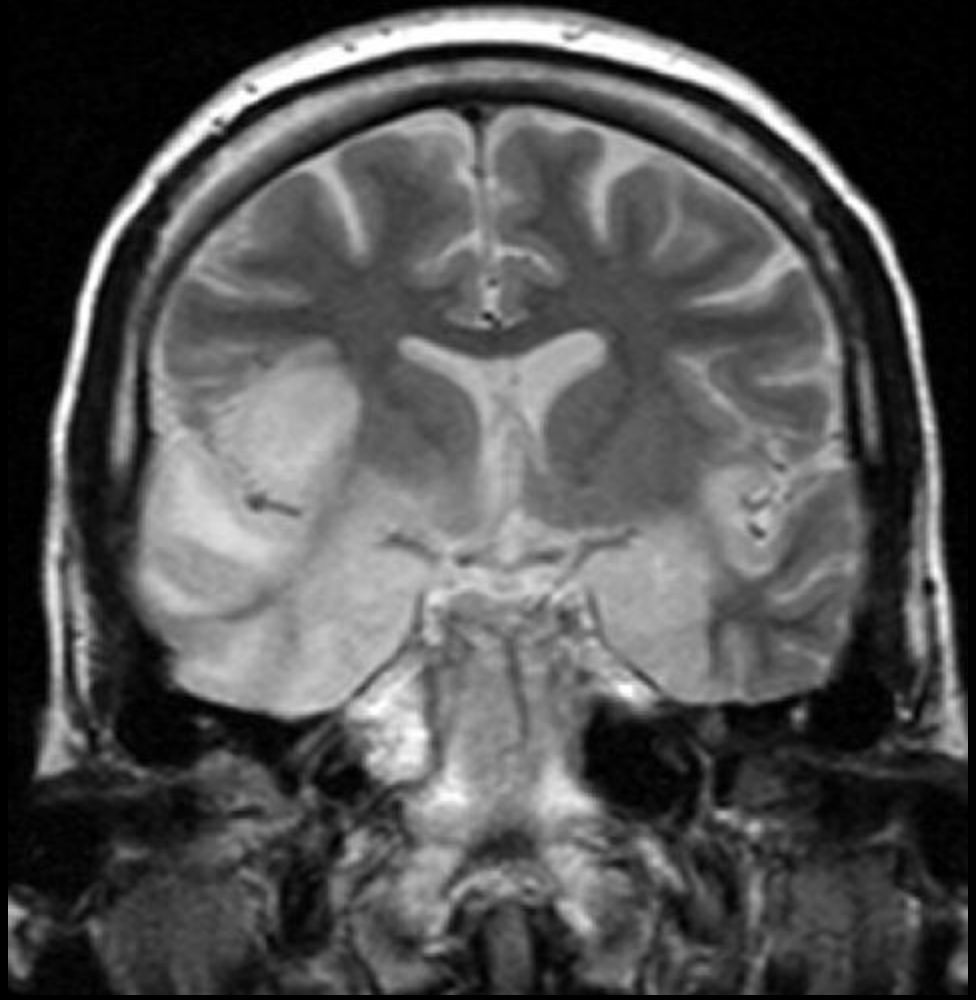
Amnesic Disorder: Causes

- Substances:
  - Medications
  - Illicit Drugs
  - Chronic alcohol use
  - Lead
  - Mercury
  - Industrial Solvents
  - Insecticides

http://www.flickr.com/photos/tomswift/3698516141/sizes/o/in/photostream/

Amnesic Disorders: Causes

- Medical condition
  - head trauma,
  - loss of oxygen,
  - herpes simplex



http://www.radpod.org/2007/03/24/herpes-simplex-encephalitis/

Amnesic Disorders: Course

- Chronic
- Transient

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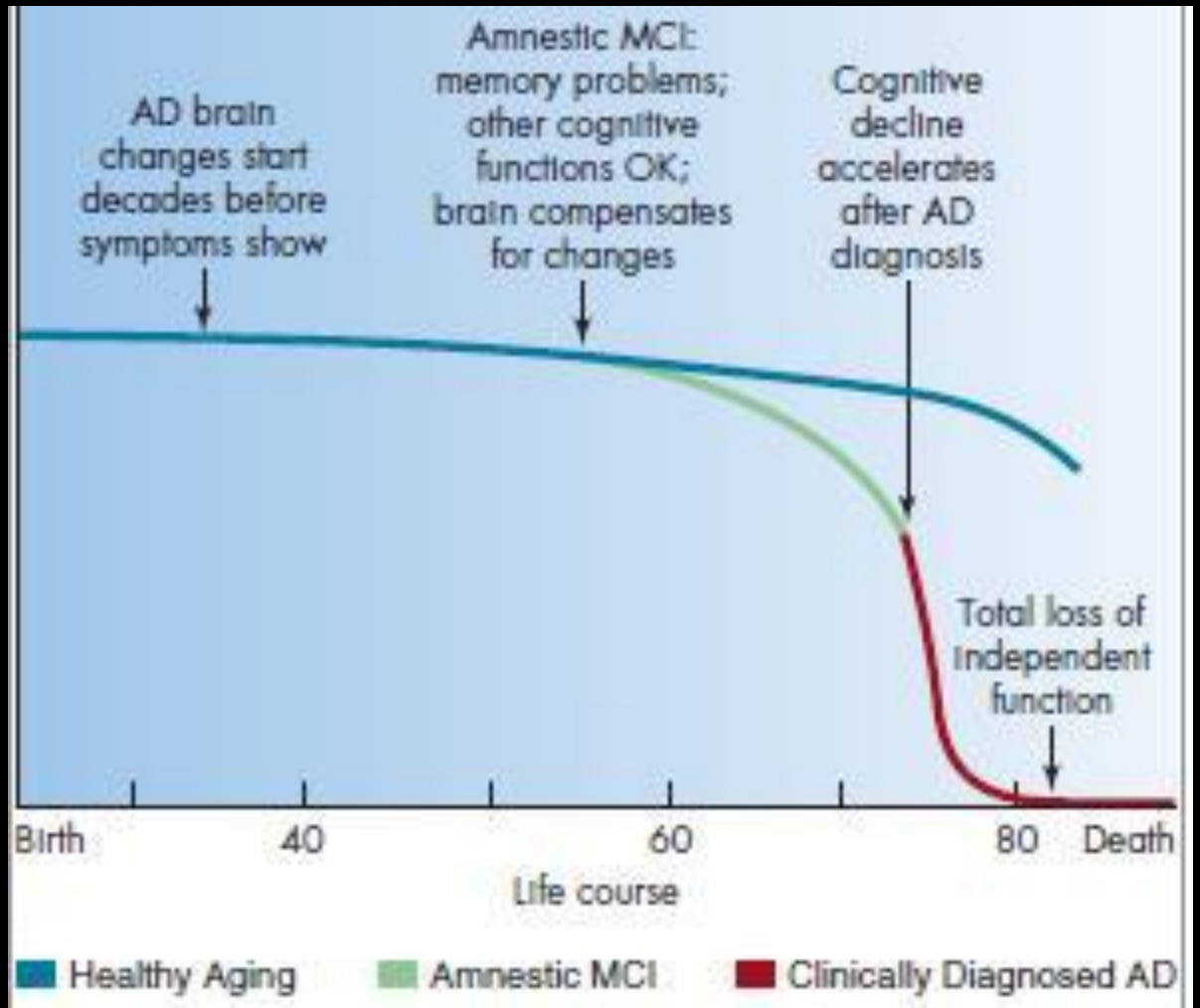
Course


AD brain changes start decades before symptoms show
Amnestic MCI: memory problems; other cognitive functions OK; brain compensates for changes
Cognitive decline accelerates after AD diagnosis
Total loss of independent function
Birth
40
60
80
Death
Life course
Healthy Aging
Amnestic MCI
Clinically Diagnosed AD

Amnesia rarely occurs without Loss of Consciousness

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Functional vs. Organic Amnesia

- The retrograde amnesia in functional amnesia often extend back into childhood;
- People with the neurologically based amnesiac syndrome rarely forget their childhood or their name, unless they are at the end of a long period of senile degeneration, in which they lose the ability for intelligent performance on any task.

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Dementia

- Generalized progressive deficits in
  - Memory—first sign
  - Learning
  - Communication
  - Judgment
  - Motor coordination

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Dementia: Other Symptoms

- Aphasia
- Apraxia--loss of the ability to execute or carry out skilled movements and gestures
- Agnosia—cannot recognize people and objects
- Disturbance in Executive Functioning

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Traumatic Brain Injury (TBI)

- Damage to the brain caused by exposure to trauma

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Alzheimer's disease

- Kind of dementia for which the causes are not clearly known.

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Alzheimer's Dementia

Multiple cognitive deficits associated with dementia, probably caused by biological abnormalities involving the nervous system.

- Subtypes
  - With delirium
  - With delusions
  - With depressed mood
  - Uncomplicated

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Alzheimer's Dementia

Stages

- Forgetfulness
- Early confusional
- Late confusional
- Early dementia
- Middle dementia
- Late dementia

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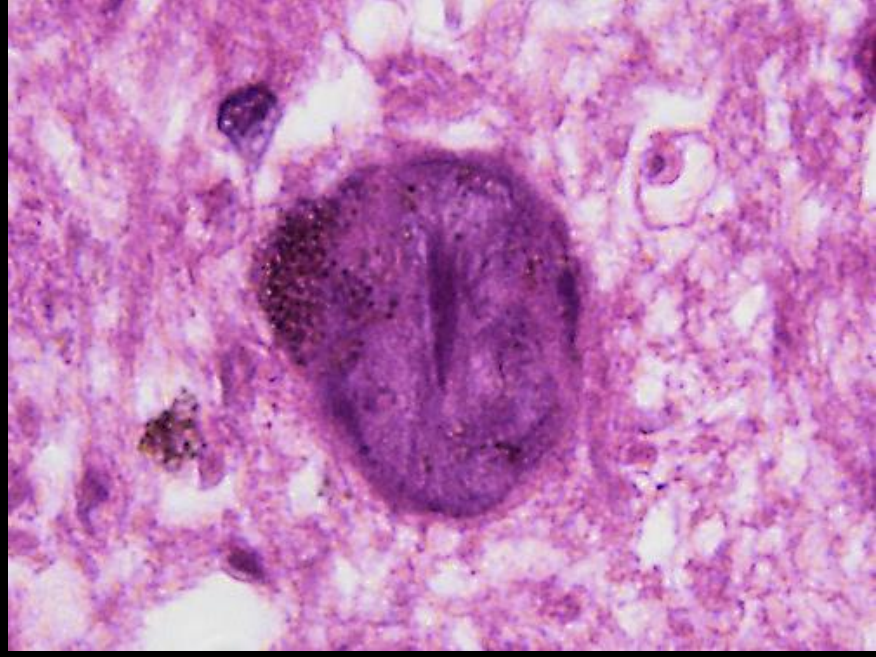
Alzheimer's Dementia



- Biological features
  - Neurofibrillary tangles.
  - Amyloid plaques.
  - Deficits in neurotransmitter acetylcholine.
  - 40 to 50 percent twin concordance rate.
- Environmental factors must play a role because, otherwise, concordance would be higher, but specific factors are not yet confirmed.

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Alzheimer's Treatment

- Medication
  - Slow breakdown of acetylcholine.
  - Antioxidants target free radicals that may damage neurons.
- Behavioral management
  - Target both patient and caregiver to:
    - Increase patient independence.
    - Eliminate wandering and aggression.
    - Provide social support for caregivers.

Down's syndrome and Alzheimer's disease

- All people with Down's syndrome (a form of mental deficiency) who live past forty-five years of age develop Alzheimer's disease.
- A recent study on patients with familial Alzheimer's disease found a defective gene that was located on the same region
  of the same chromosome that carries the defective gene
  for Down's syndrome.

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Parkinson's Disease

- Disorder of movement that
- Biochemical basis is too little dopamine.
- Tremor of the hands
- Rigidity
- Difficulty in initiating movement.

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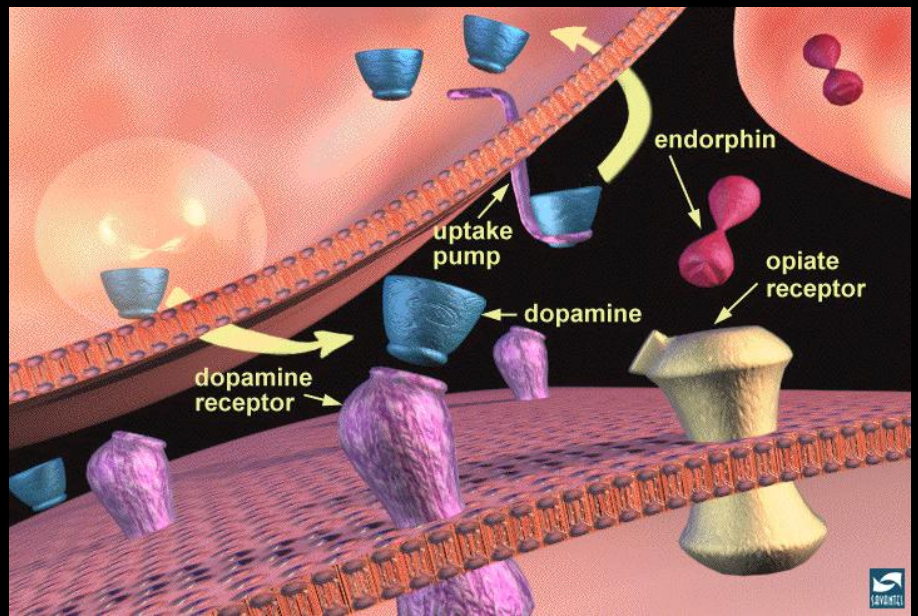
Parkinson's disease, Schizophrenia, and Dopamine

- PD to little dopamine
- High levels of L-DOPA induce schizophrenia symptoms
- Schizophrenia too little dopamine
- Reducing dopamine activity can lead to the symptoms of Parkinson's disease.



http://drugabuse.gov/pubs/teaching/teaching2/largegifs/slide8.gif

Parkinson's Disease

- Involves neuronal degeneration of subcortical structures controlling movements.
- Dementia occurs in up to 60% of Parkinson's patients.

http://www.flickr.com/photos/oakleyoriginals/4718715766/sizes/m/

Parkinson's Disease Symptoms

- Hands, ankles, or head may shake involuntarily.
- http://www.youtube.com/watch?v=_L_WF6gv5BI
- Bradykinesia: General slowing of motor activity.
- Akinesia: Muscular rigidity, difficulty initiating movement.
- Loss of fine motor coordination.
- Slowed, shuffling gait.
- Difficulty starting or stopping movement like walking.
- Expressionless appearance.
- Loss of normal rhythmic speech quality.

Confabulation

- Making up stories that sound true from incomplete memories.
- They are honest lies in that the person is trying to tell the truth but unable to assemble the information.

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Various Dementias

- AIDS Dementia
- Lewy Body Dementia

http://www.flickr.com/photos/en321/2306328842/sizes/m/

Pick's Disease

- Frontal lobe dementia.
- Variable mild memory deficits
- little or no visual-spatial impairment
- Marked personality change
- Socially inappropriate behavior.

http://www.mda-sy.com/pathology/TUTORIAL/CNS/CNSDG009.HTM

Various Dementias

- Frontotemporal Dementias
- Huntington's Disease
- Creutzfeldt-Jakob Disease
- Vascular Dementia

http://www.nytimes.com/imagepages/2007/03/18/us/18huntington1.html

Pseudodementia

- False dementia
- Caused by depression
- Mimics early stages of Alzheimer's.

http://www.flickr.com/photos/jurvetson/3262487410/sizes/m/

Treatment and Prognosis Nervous System Diseases

- Inability to make new neurons
- Possibility for damaged neurons to recover
- Principle of redundancy

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Patients Concerns

- Referral to a neurologist
- Makes patient anxious
- Nervous system disease is feared more than
- A "psychological" disorder for most people

Psychologist & Neurological Problems

- Rehabilitation
- Many neurological patients suffer from depression, insecurity, or fear.
- Feelings can exacerbate their neurological symptoms and prevent recovery.
- Psychotherapy can be valuable

http://www.flickr.com/photos/worldbank/2347596791/sizes/o/

Neurological Approach--Virtues

- Help to understand normal function.
- Likely be neurological explanations for some functional disorders.

http://www.flickr.com/photos/worldbank/2944928696/sizes/m/

Neurological approach: limitations

- Psychological disorders can be more serious
- Neurological problems cannot all be treatment
- Neurological damage and disease is weakly linked to maladaptiveness
- Different people respond differently to the same disease.

http://www.flickr.com/photos/tar_zan/2713046098/sizes/m/

Neurological approach: limitations

- Do not expect too much from the neurological approach
- Some types of pathology do not have a basis in neuropathology.
- Knowing that depression is "caused" by low levels of serotonin does not tell us what depression is like
- Nor that depressives have a characteristic attributional style.
- May be different levels of explanation that are useful in different ways.

http://www.flickr.com/photos/gregor_y/18872803/sizes/m/