

# BODY AND BEHAVIOR

# I Can

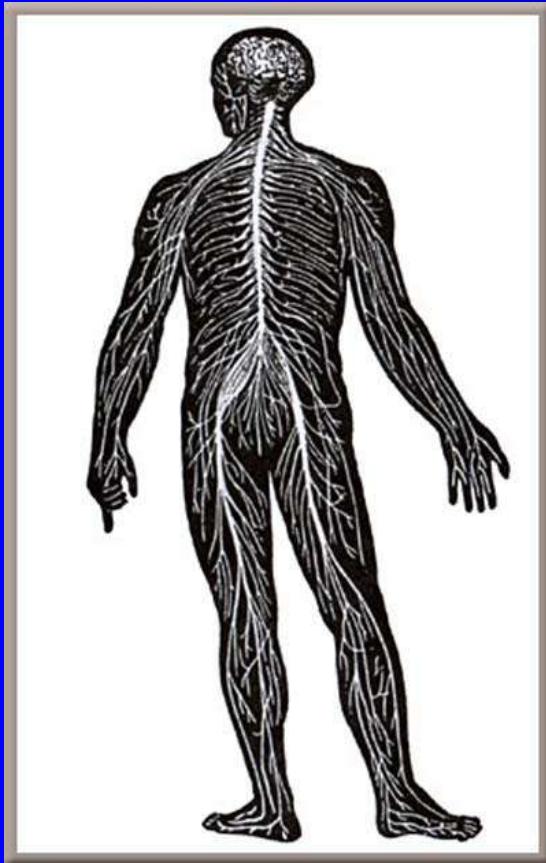
- Identify the parts of the nervous system.
- Describe the functions of the nervous system.

# THE NERVOUS SYSTEM

- Consists of brain and spinal cord
- Never rests
- Controls emotions, movement, thinking, and behavior



# THE NERVOUS SYSTEM



- Composed of 2 parts
  - Central Nervous System
  - Peripheral Nervous System

# The Nervous System

- Central Nervous System

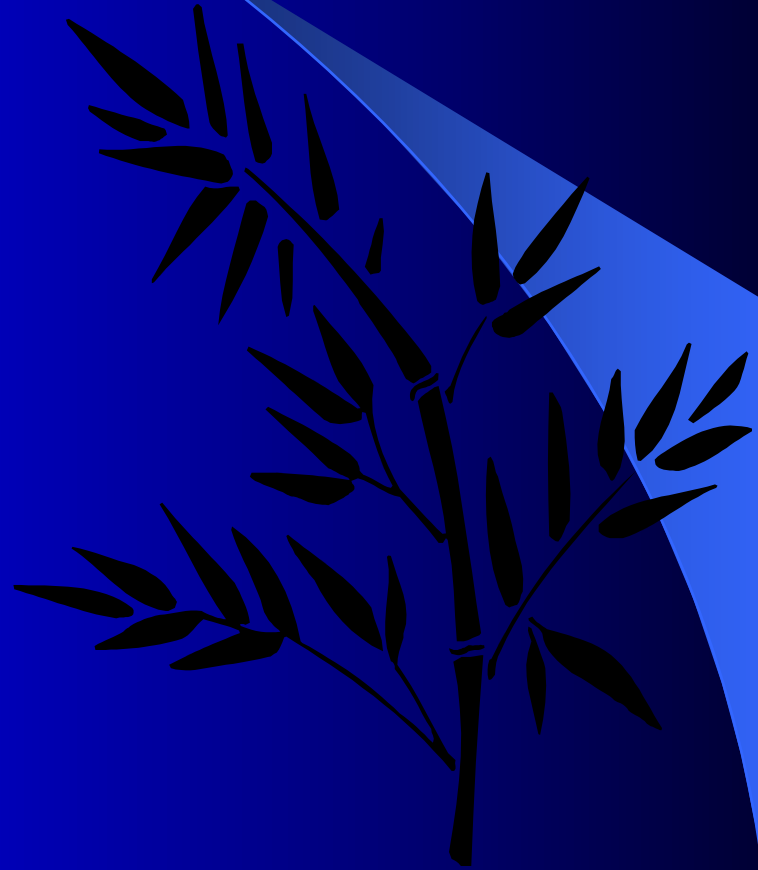
- Brain
- Spinal Cord
  - Nerves that run up and down the length of the back and transmit most messages between body and brain

- Peripheral Nervous System

- Nerves branching out from the spinal cord
- Range from the size of a pencil to invisible
- Carry messages to and from organs

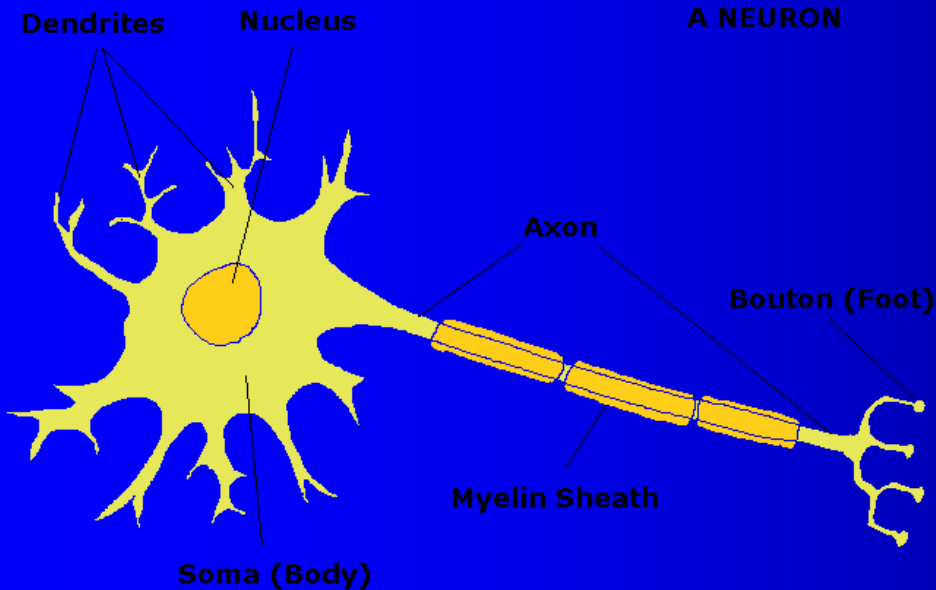
# Neurons

- Long, thin cells of nerve tissue that carry messages to and from the brain.
- Chemical-Electrical signals
- None or all Firing



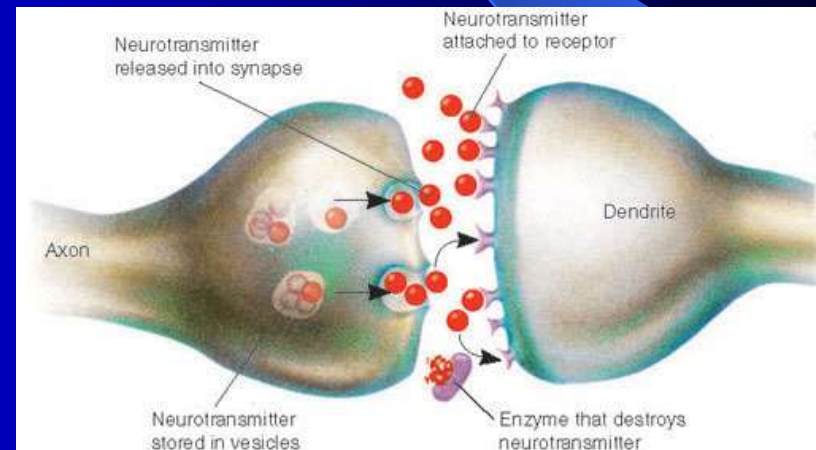
# Neurons

- Three basic parts
  - Cell body
    - Nucleus, produces energy for fuel
  - Dendrites
    - Stick out from cell body
    - Receive messages
  - Axon
    - Carry messages away toward next neuron



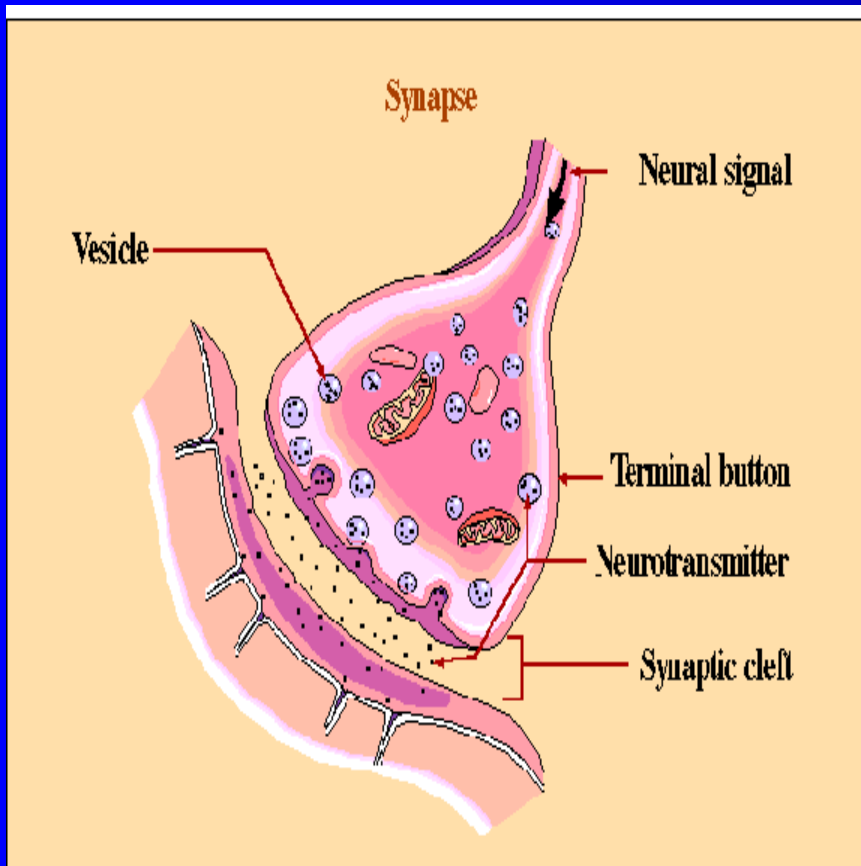
# Neurons

- Other parts of neurons
  - Myelin sheath
    - Insulates and protects axons
    - Missing or hurt causes MS
  - Synapse
    - Space between neurons
    - neurotransmitters





# Neurotransmitters



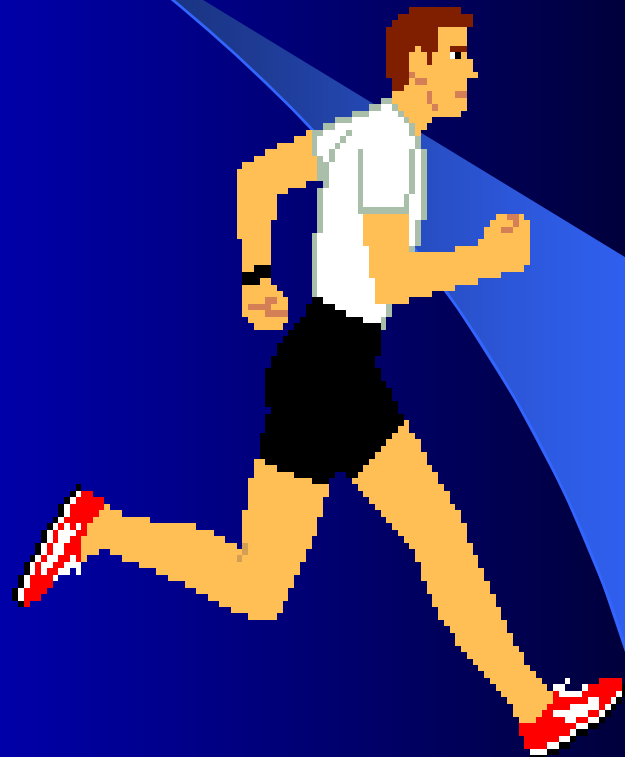
- Chemicals released by neurons, and determine the rate at which other neurons fire
- “Open locks” or inhibit response

# Neurotransmitters

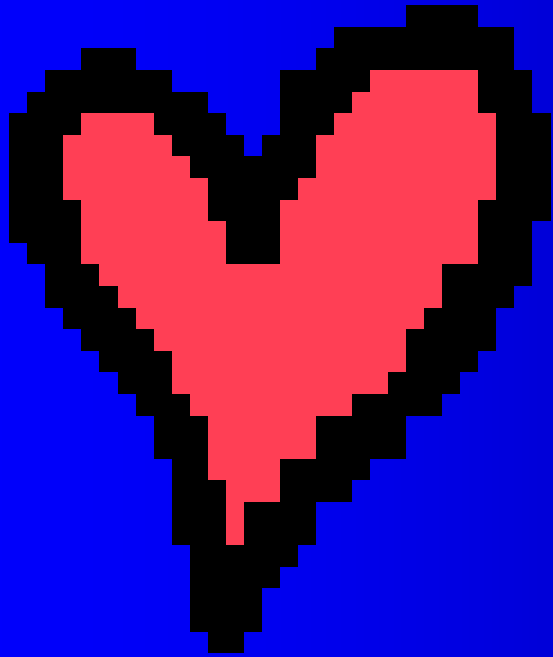
- Many different neurotransmitters
  - Norepinephrine- memory and learning
  - Endorphin- inhibits pain
  - Acetylcholine- movement and memory; too much = paralysis and Alzheimer's
  - Dopamine-learning, arousal, & movement; too much= schizophrenia; not enough= Parkinson's disease
  - Serotonin- too little along with too little norepinephrine = depression

# Voluntary and Involuntary Activities

- Somatic Nervous System
  - Peripheral system, in charge of voluntary movement
  - Running, walking, you can stop/start these activities.



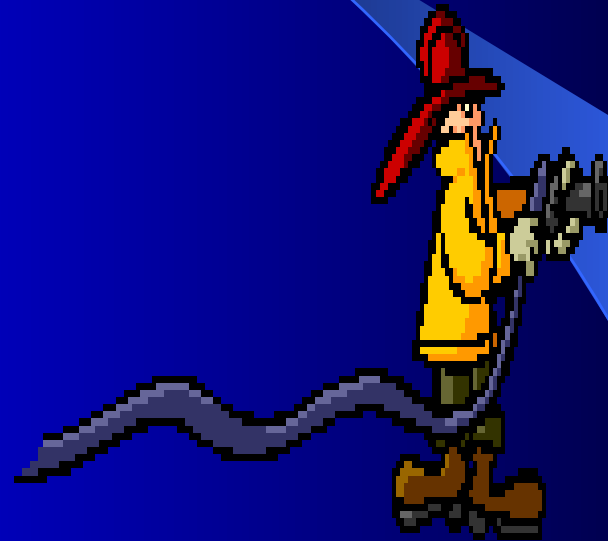
# Voluntary and Involuntary Activities



- Autonomic Nervous System
  - Peripheral system, controls internal biological functions
  - Has two parts
    - Sympathetic nervous
    - Parasympathetic nervous system

# Sympathetic Nervous System

- Prepares body for emergency or strenuous activity.
  - Speeds up heart rate, blood pressure, and can suspend digestion
  - Fight or Flight



# Parasympathetic Nervous System



- Works to conserve energy and recover from strenuous activity.
- Brings body back to normal state
- Takes place automatically

Autonomic Nervous System helps us because we don't have to think every time our body needs some basic maintenance. Things like digestion, sweating, and breathing are all taken care of automatically.

# I Can

- Identify the structure and functions the human brain.
- Discuss the different ways psychologists study the brain.

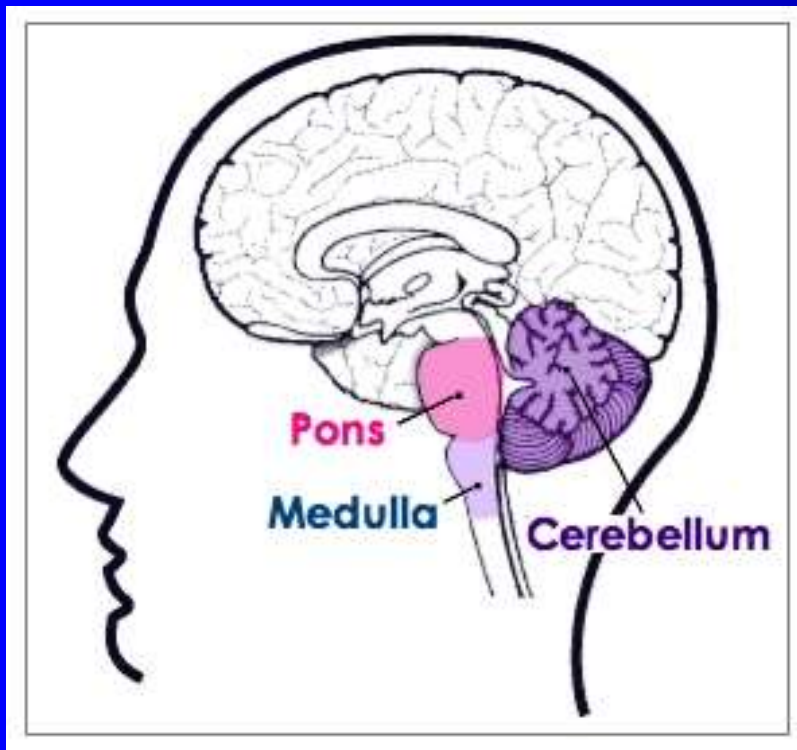


# The Brain

- 3 parts
  - Hindbrain
  - Midbrain
  - Forebrain



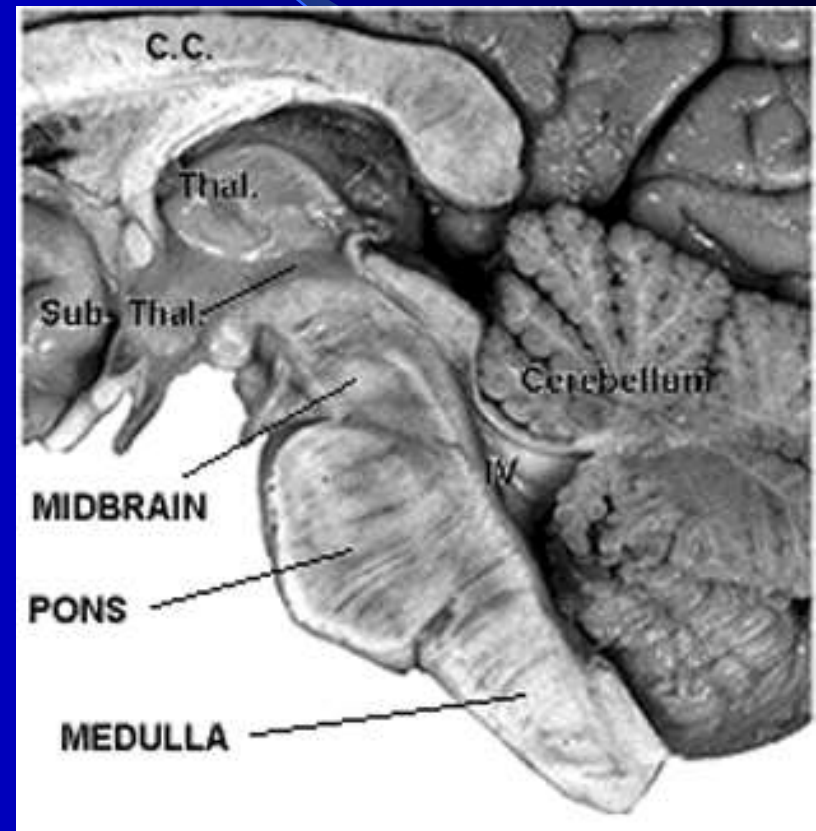
# The Hindbrain



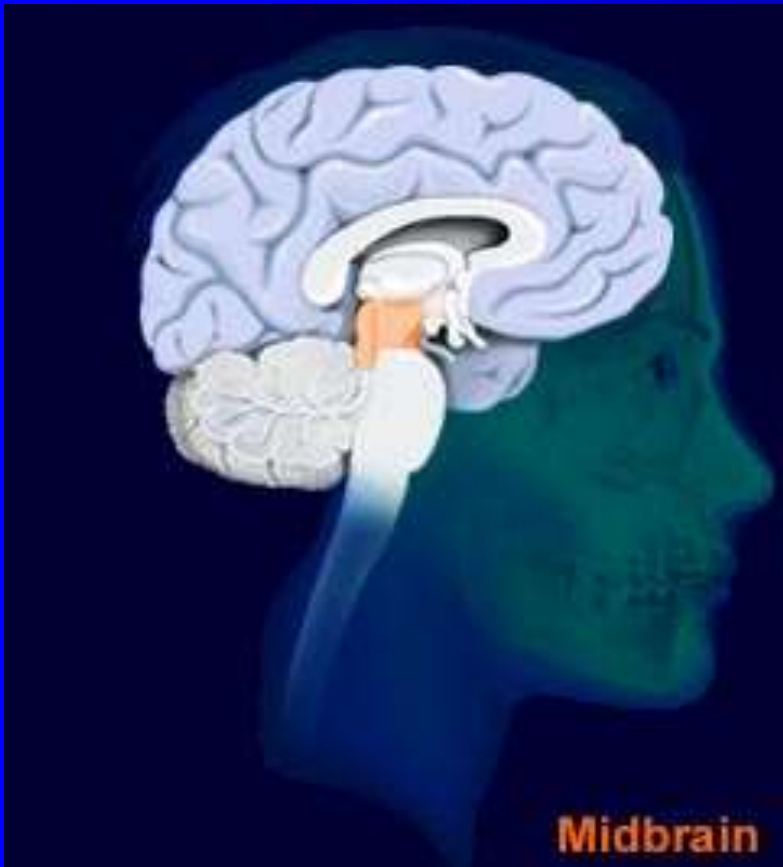
- Located at rear base of skull.
- Regulates basic life processes
- Includes: cerebellum, medulla, and pons.

# The Hindbrain

- The Cerebellum
  - Posture, balance, and voluntary movements
- The Medulla
  - Breathing, heart rate, and reflexes
- The Pons
  - Bridges the spinal cord and the brain, produces chemicals needed for sleep



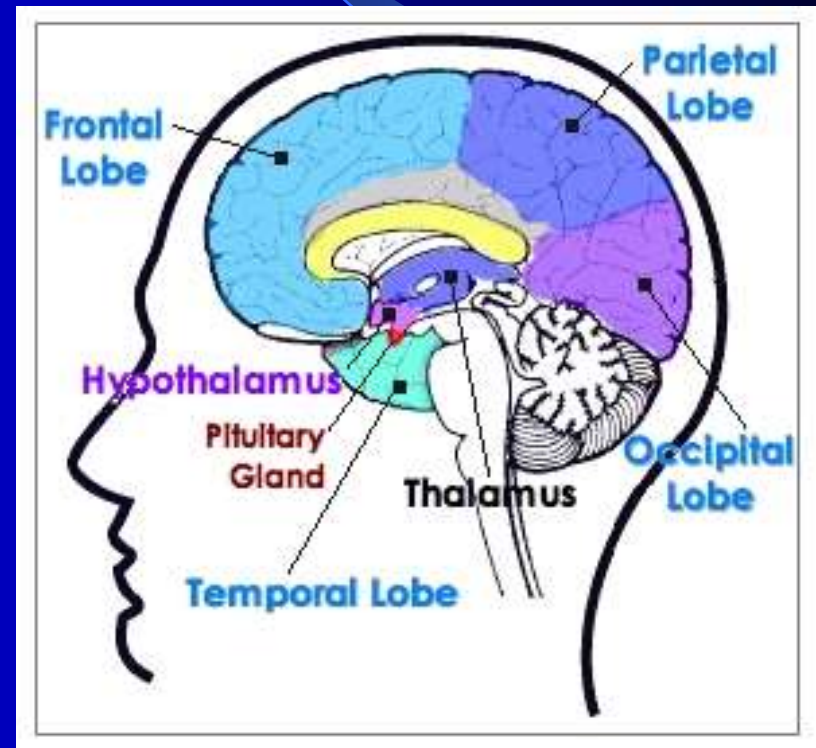
# The Midbrain



- Small part of brain above the pons.
- Along with the medulla and pons, it composes most of the brain stem.
- Integrates information and relays it upward.

# The Forebrain

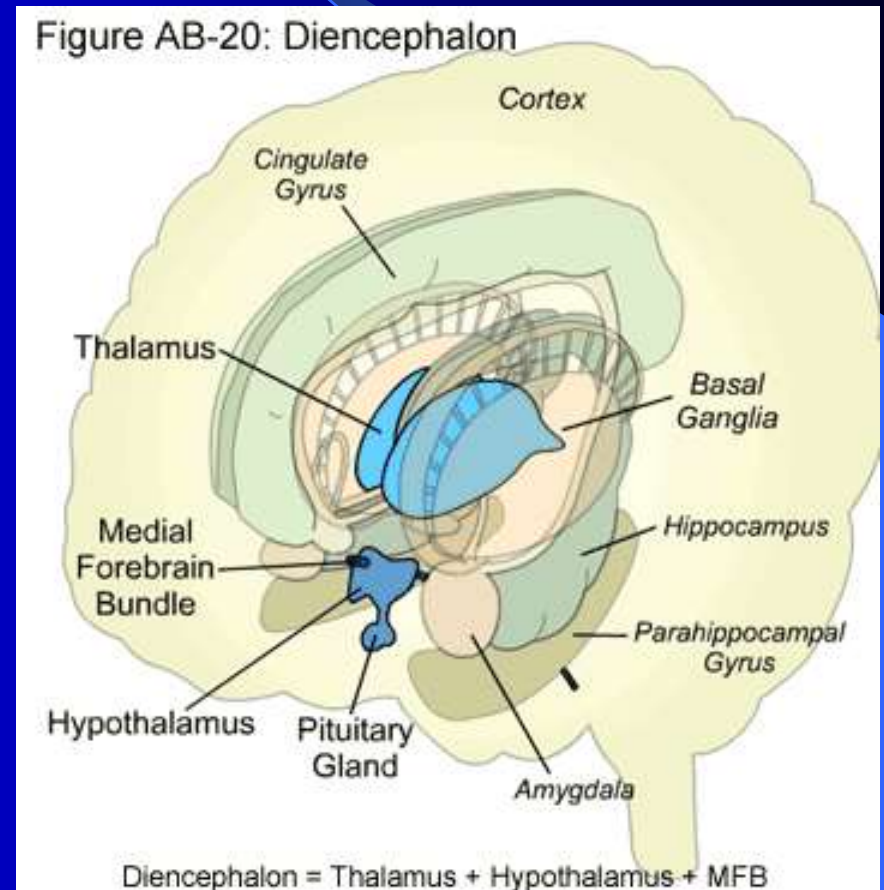
- The rest of the brain, it covers the central core.
- Composed of many smaller systems





# The Forebrain

- Pituitary Gland
- Cerebral Cortex
- Cerebrum
- Limbic System
  - Amygdala
  - Hypothalamus
  - Thalamus
  - hippocampus



# The Forebrain

Pituitary Gland	Secretes hormones that influence growth
Cerebral Cortex	Learn and store info.
Cerebrum	Intelligence, personality, sensory input, planning, etc.
Amygdala	Central to the expression of negative emotions
Hypothalamus	Hunger, thirst, sex
Thalamus	All sensory info, but smell
Hippocampus	Memory

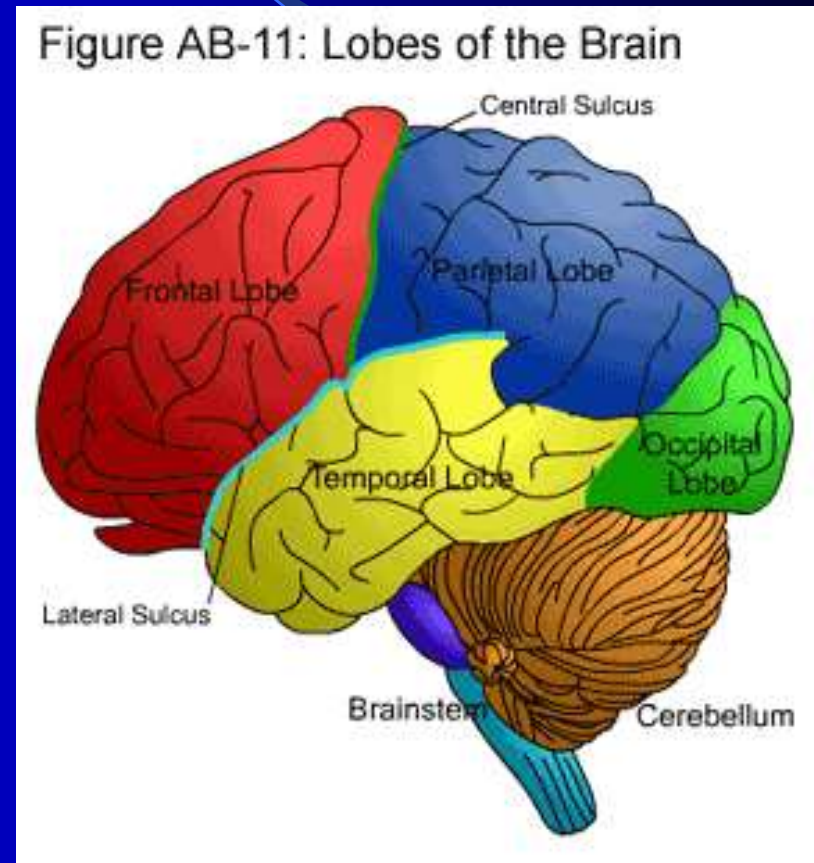
# The Cerebrum

- Has 2 sides, or hemispheres
- Connected by the Corpus Callosum
- Each hemisphere has deep grooves which mark off regions or lobes.

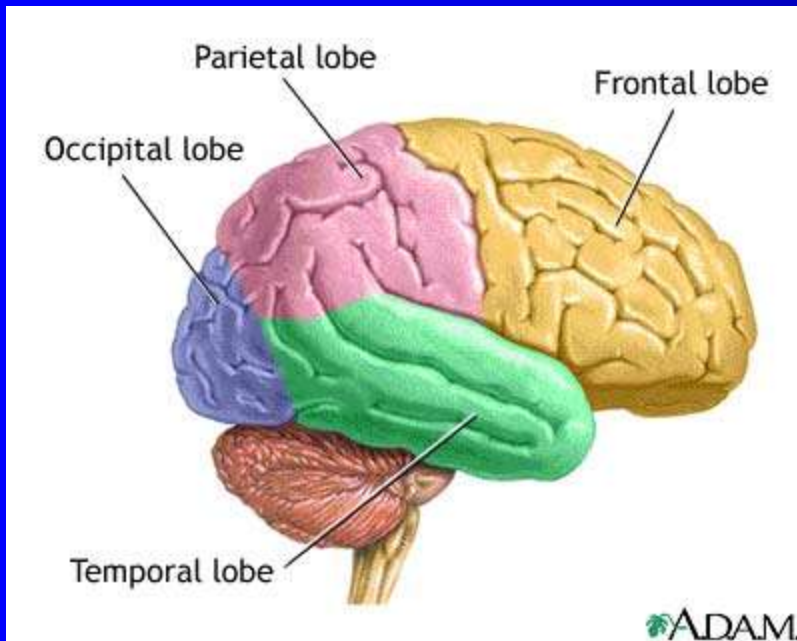


# The lobes of the Brain

- Occipital Lobe
  - Visual signals
  - Damage = vision problems
- Parietal Lobe
  - Sensory info from body
- Temporal Lobe
  - Hearing, memory, emotion, and speech
- Frontal Lobe
  - Organization, planning and creativity



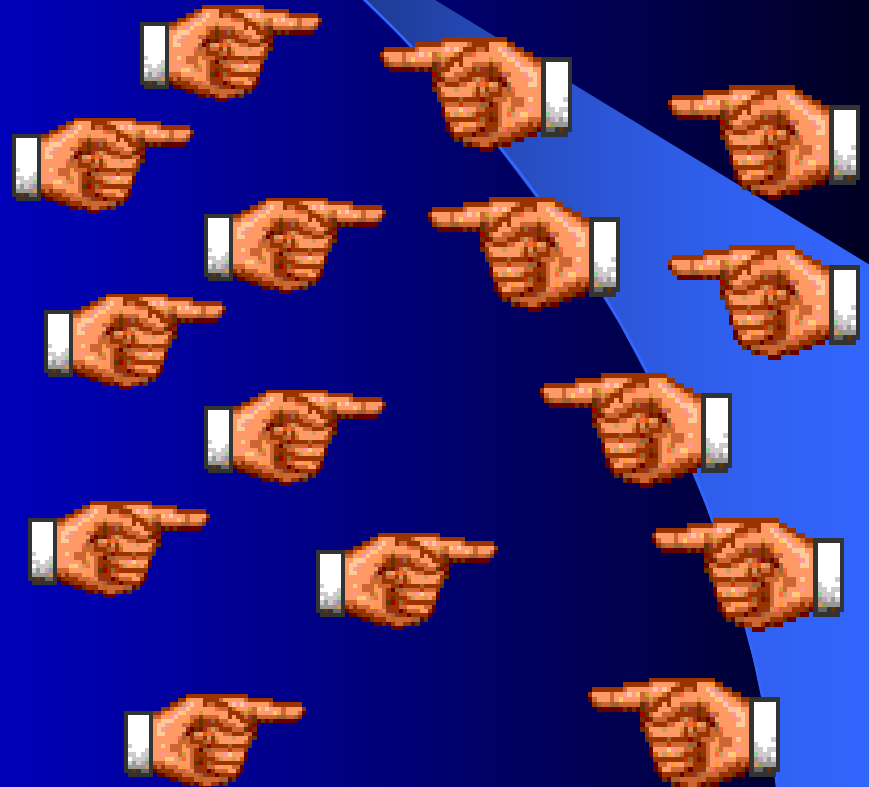
# The lobes



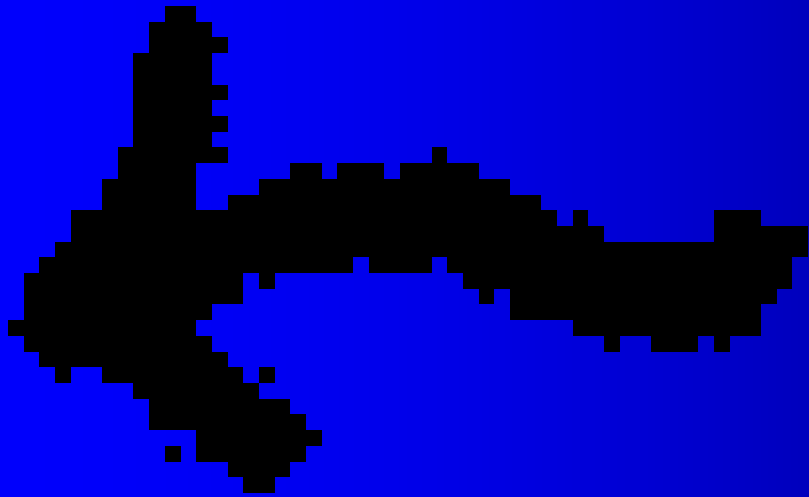
- The more sophisticated the task, or movements of the body, the bigger the brain area involved in controlling the task.
- Speech vs. Calf muscle

# Righty or Lefty?

- Right and Left side complement each other.
- Corpus Callosum relays messages
- Control opposite sides of body



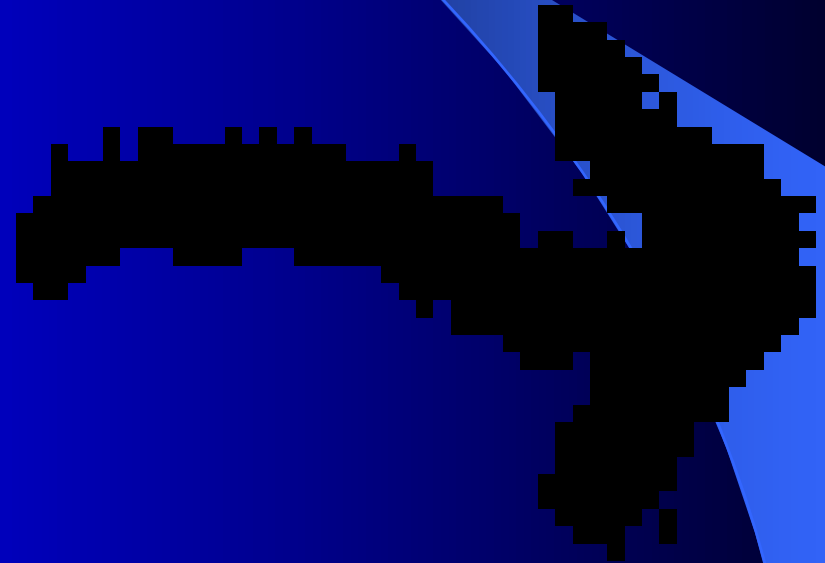
# The Left Side



- Speech
- Mathematic ability
- Calculation
- Logic
- Damage to this side of the brain will impact your right side.

# The Right Side

- Visual and Spatial relations
- Perception
- Recognizing patterns
- Music, and Art
- Creativity and Intuition
- Damage impacts left half of body



# Working together

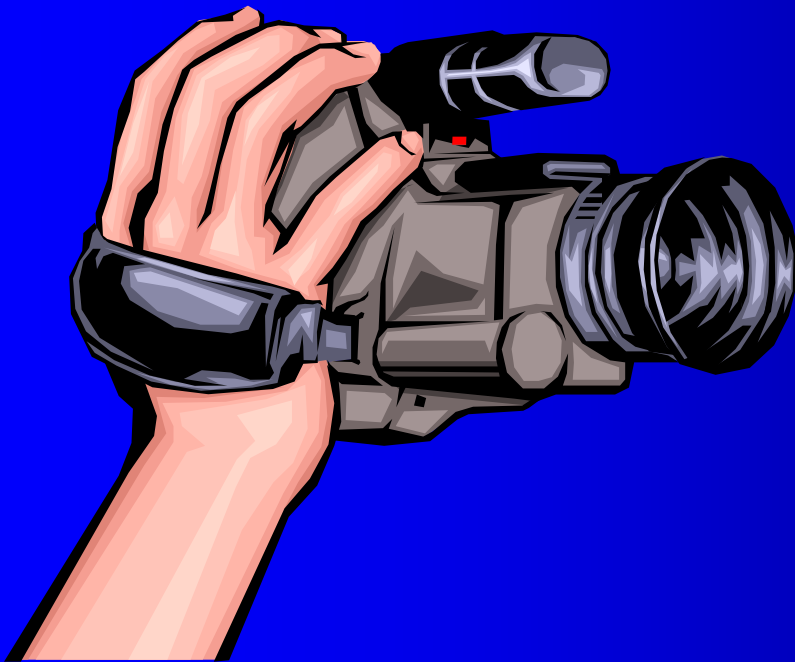
- Normally the 2 sides work together
- People who have Grand Mal seizures (severe) have split brains
- The brain is surgically separated to reduce seizures
- It does reduce number and severity
- Consequences? Ball in hand, Personality, intelligence, emotion.

# Studying the Brain

- Physiological Psychologists or psychobiologists
- Methods include:
  - Recording
  - Stimulating
  - Lesioning
  - Imaging



# Recording

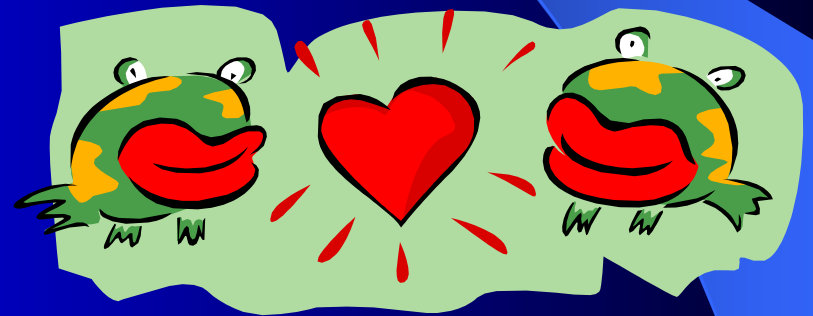


- Using electrodes to record electrical activity
- Electroencephalograph (EEG) – records electrical activity of neurons
- Activity is rhythmic



# Stimulation

- Using electrodes to force neurons to fire.
- Tiny electrical currents
- Relief of pain, violent behavior, can bring back memories



# Lesions



- Cutting or destroying part of a brain.
- Changes in behavior after are assumed to be associated with the damaged part of the brain.
- Rhesus monkeys

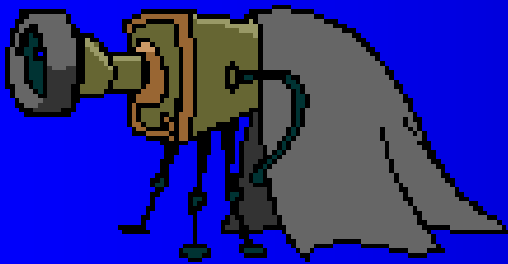
# Accidents

- Learning from tragedies
- 1848 Phineas Gage
- Damaged areas can cause changes in behavior. Attribute this area to change



# Images

- Computerized Axial Tomography  
CAT scan- x-ray beams are sent around and through a subjects head
- Radiation is absorbed differently depending on density of tissue

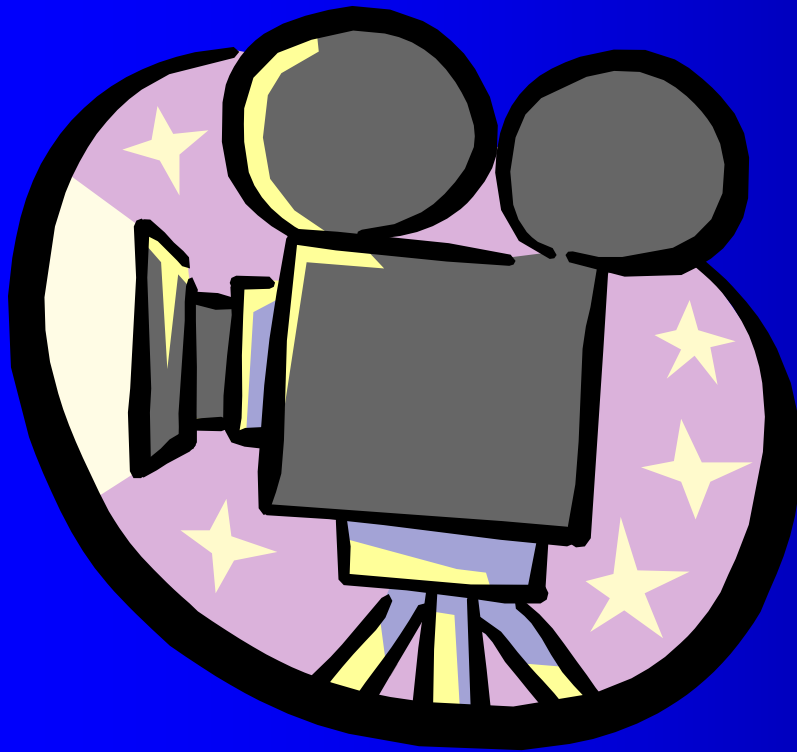


# Images

- Positron emission tomography- PET scan – takes pictures of different parts of the brain as they are being used
- Uses radioactive solution
- Active neurons absorb more than nonactive



# Images



- Magnetic Resonance Imaging – MRI – study both activity and brain structure
- Combines PET and CAT

# I Can

- Describe the endocrine system.
- Identify hormones and their function in the endocrine system.

# The Endocrine System



- The second system that can send info. to and from the brain.
- Messages are chemicals called hormones



# Hormones

- Chemical messages produced in the endocrine glands and spread by blood and body fluids.
- Site specific



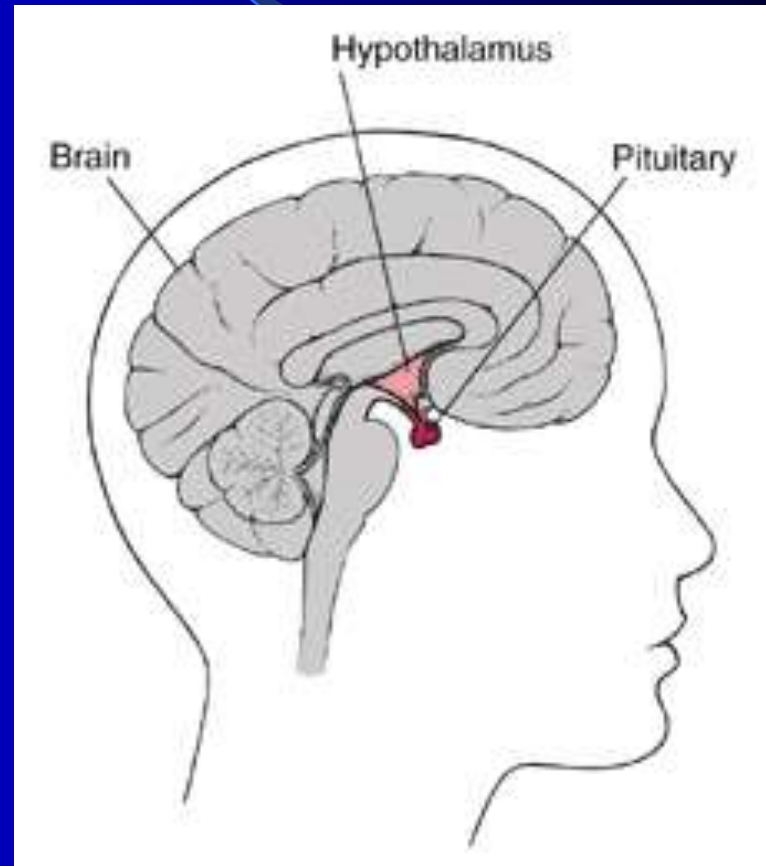
# Hormones

- Have various effects:
  - Growth
  - Metabolism
  - Prepare for stress
  - Moods and drives

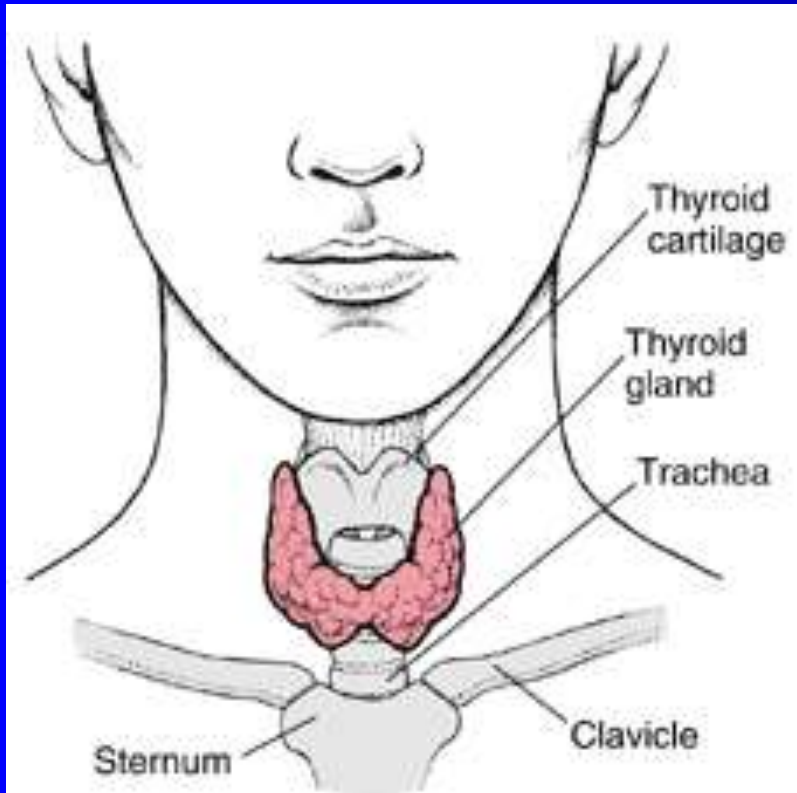


# Pituitary Gland

- Directed by hypothalamus
- Master gland
- Corrects hormone imbalances
  - Carry messages to organs to continue cell metabolism



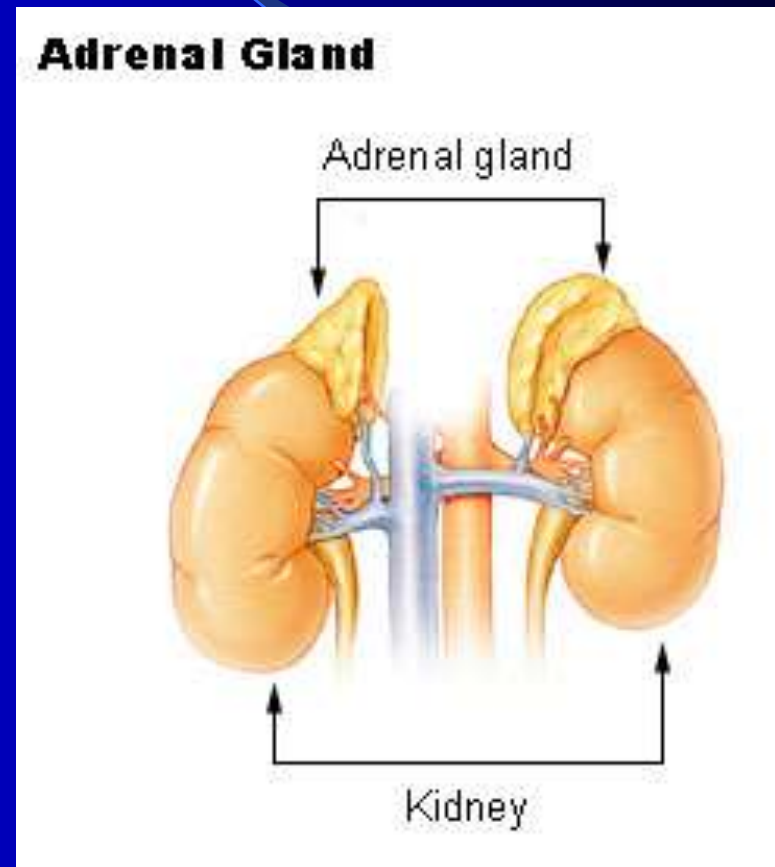
# Thyroid Gland



- Produces thyroxine
  - Too little : laziness
  - Too much: lose weight and sleep

# Adrenal Glands

- Become active when angry or frightened.
- Release epinephrine and norepinephrine (adrenaline)
- Cortical Steroids



# Sex Glands



- Testes
- Ovaries
  - Produce chemicals that are important throughout life for reproduction and physical development

# Hormones vs. Neurotransmitters

- Both work to affect the nervous system
- Neurotransmitters are released right where it needs to work.
- Hormones are distributed all over the body.



# I Can

- Give examples of the effects of heredity and environment on behavior.
- Summarize research on the effects of heredity and environment on behavior.



# Heredity and Environment



- Genetic transmission of characteristics
- Nature = inheritable
- Nurture = environment

# Genes and Behavior

- One way to see if a trait is inherited or learned is twins.
- Identical: single egg
- Fraternal: two eggs



# Twin Studies



- Study twins separated at birth
- Different environments
- Similar behaviors, such as jobs, hobbies, and lives

**End of Unit!**