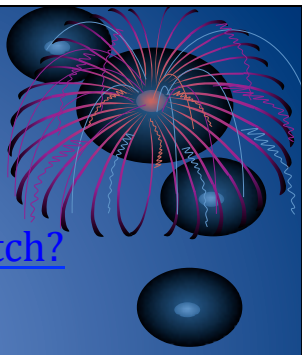
Nervous System 2

McMurray/Tarshish
Intro Psych

Quick Video



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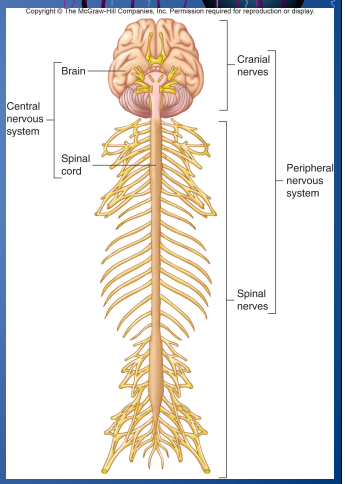
Divisions of Nervous System

Nervous system divisions

- CNS
- PNS
  - Sensory (in)
  - Motor (out)
    - Somatic
    - Autonomic
      - Sympathetic
      - Parasympathetic

Divisions of Nervous System

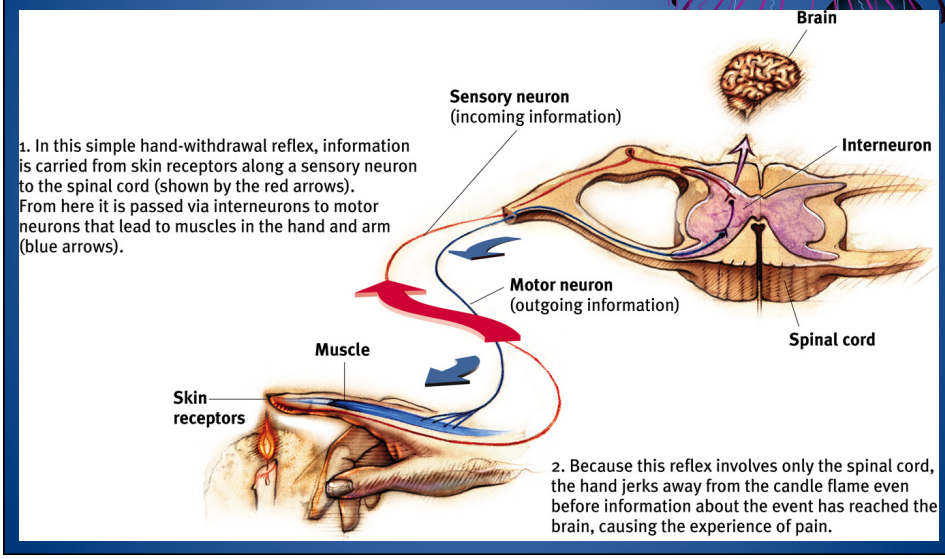
- Central nervous system (CNS)
  - Brain and spinal cord
  - Processes information from the PNS
- Peripheral nervous system (PNS)
  - Consists mainly of nerves that extend from brain and spinal cord
  - Detects stimuli, transmits info to and receives info from the CNS



Divisions of the PNS

- Sensory Neurons
  - Transmits action potentials from receptors to CNS
- Interneurons
  - Process information in CNS
- Motor Neurons
  - Transmits action potentials from CNS to effectors (muscles, glands)

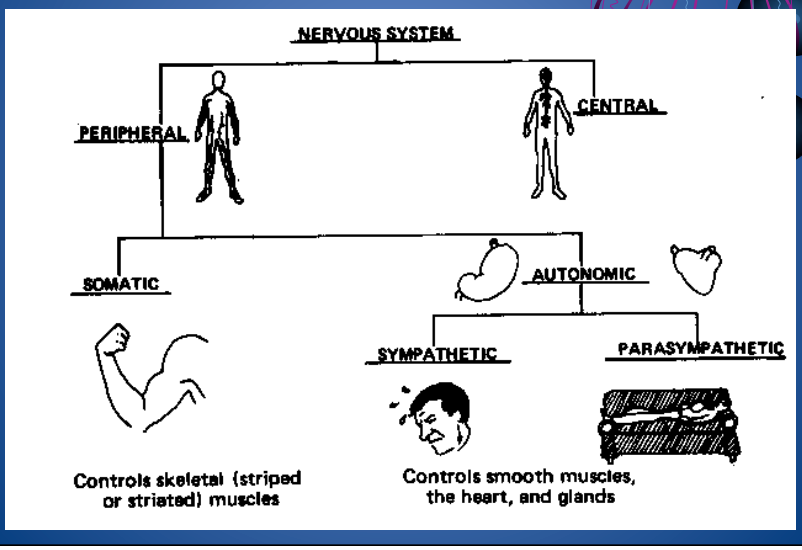
Sensory and Motor - PNS



Motor Division of PNS

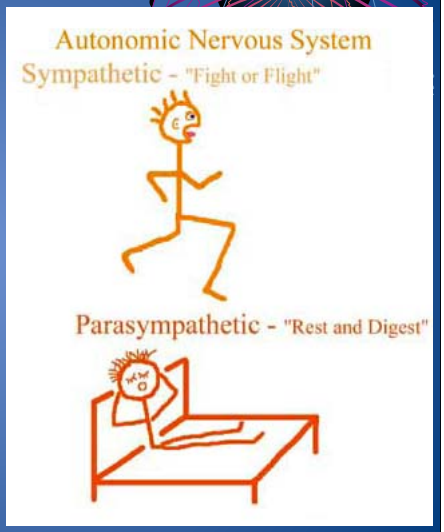
- Somatic nervous system: from CNS to skeletal muscles.
  - Voluntary.
- Autonomic nervous system (ANS): from CNS to smooth muscle, cardiac muscle and certain glands.
  - Involuntary control.

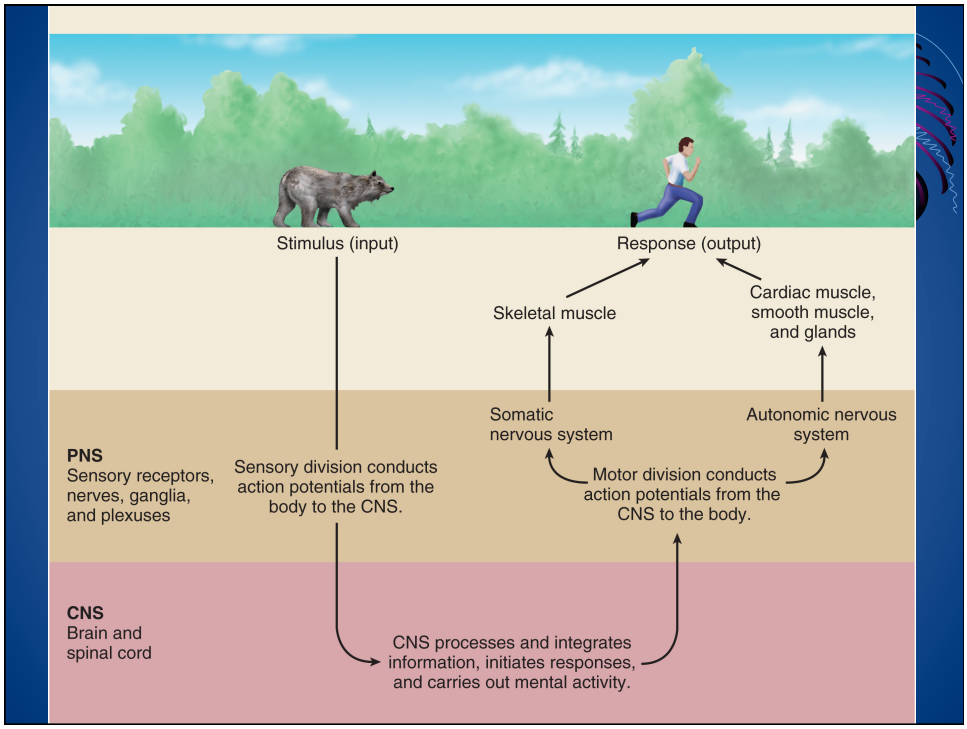
Motor Divisions of PNS



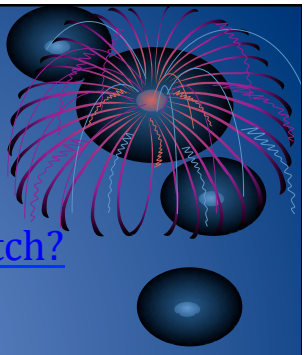
Divisions of the ANS

- **Sympathetic**
  - ✧ Active during physical activity
  - ✧ "the thriller"
  - ✧ Ex. Sweating, heart rate increase.
- **Parasympathetic**
  - ✧ Regulates resting or vegetative functions
  - ✧ "the chiller" think "para"lyzed
  - ✧ Ex. digesting food.





Quick Video



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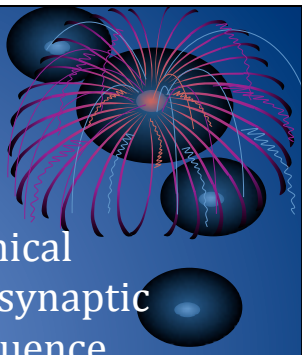
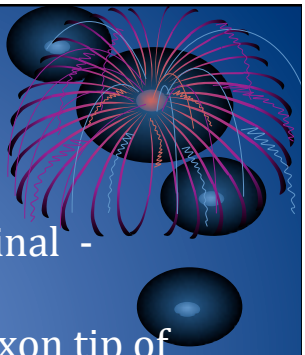
Neurotransmitters

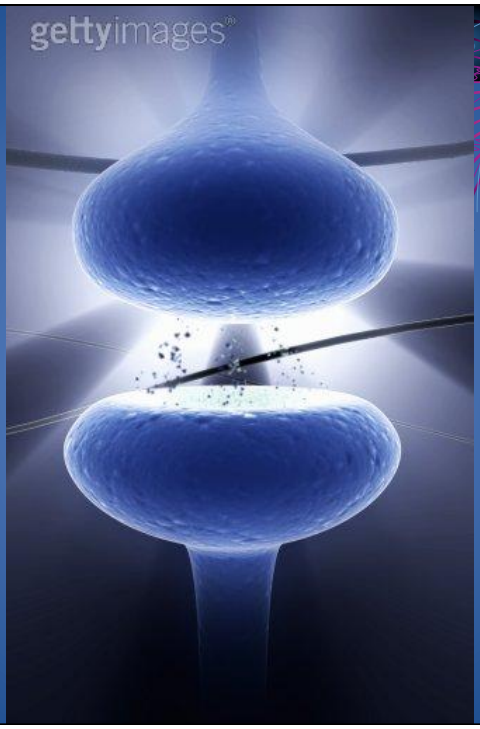


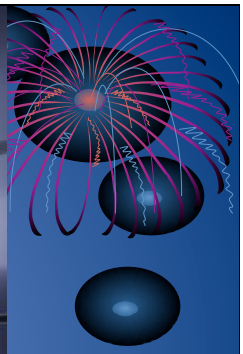
- "language of neurons" – chemical messengers that traverse the synaptic gap between neurons and influence whether it will generate a neural impulse

Synapse

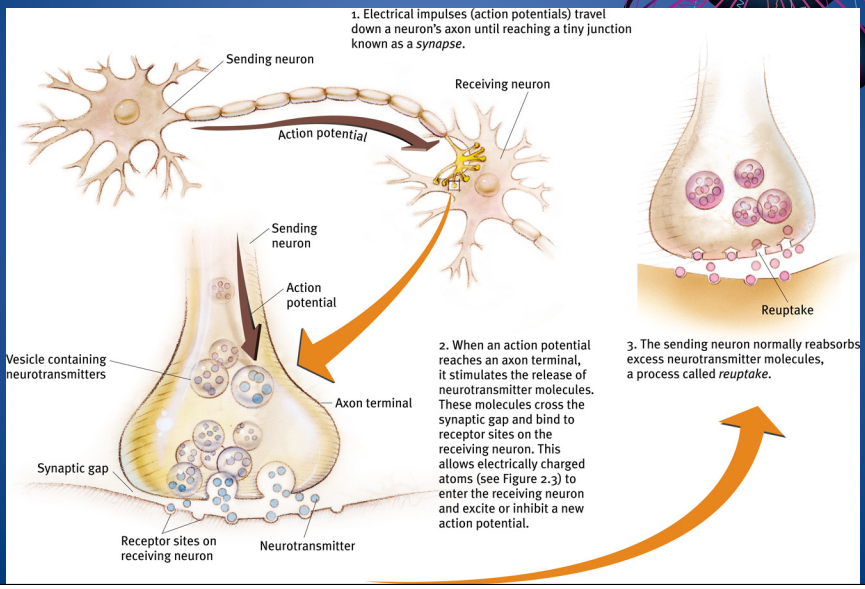


- Vesicles – found at axon terminal - contains neurotransmitters
- Synapse – junction between axon tip of sending neuron and dendrite of receiving neuron
- Synaptic gap – space between axon tip and dendrite
- Receptors – on the dendrite - receive the neurotransmitters





Neurons



Neurotransmission

- Process of signals flowing through the nervous system
- Chemical and electrical process
  - Charged Ions facilitate the process
  - Initiate action potentials → release of neurotransmitters

Neurotransmission

- When the impulse gets to the terminal button the process becomes chemical
- The impulse causes the neurotransmitter to be released from the vesicles
- The neurotransmitters flow out into the synaptic gap and bind to the receptor sites of the next neuron
- If the total effect on the receiving neuron reaches threshold the impulse continues
- After the neurotransmitters "do their job" reuptake occurs.

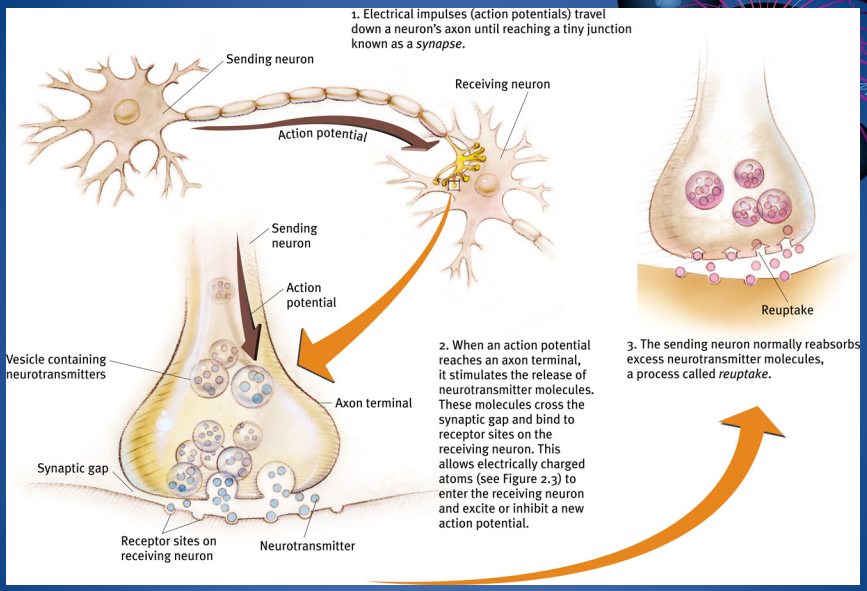
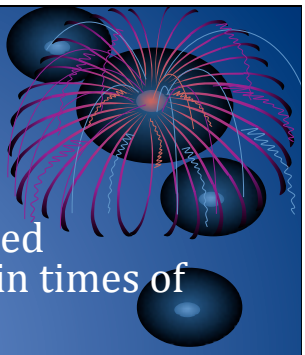


Figure 2.4 How neurons communicate
Myers: Psychology, Eighth Edition

Drugs

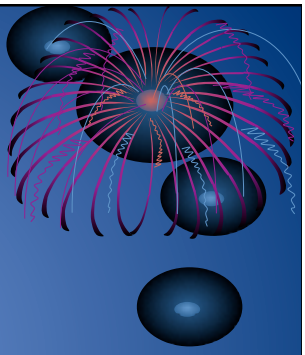
- Ways drugs influence neurotransmission
  - Increase the release of a NT
  - Act as if it is the NT – binding to the receptor site
  - prevent the reuptake (reabsorbtion of the NT)
  - Prevent the release of the NT

Endorphins



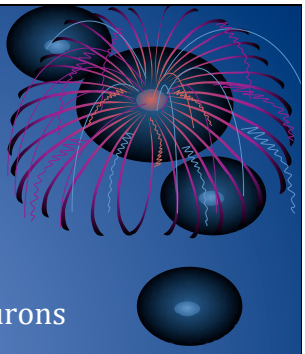
- Brain has a natural opiate called endorphins that are released in times of pain
- Runners high, acupuncture, and ability to ignore pain by some injured people
- Morphine is chemically similar to endorphins

Neurotransmitters



- Dopamine
  - High levels = Schizophrenia
  - Low levels = Parkinson's disease
  - Low levels = Tourette's syndrome
  - Low levels = ADHD
  - Ritalin prevents reuptake of dopamine
  - Ecstasy increases release of dopamine
- Serotonin
  - Affects hunger, sleep, arousal, mood
  - Low levels = depression
  - Prozac increases release of seratonin

Neurotransmitters



- GABA
  - Low levels = anxiety
  - Also found in sensory and motor neurons
- Acetylcholine (Ach)
  - Linked to parts of the brain responsible for memory and learning – hippocampus
  - Deterioration of Ach neurons = Alzheimer's disease
  - Found at junction of motor neurons and muscles – therefore responsible for muscle movement

Neurotransmitters

- Norepinephrine
  - Involved in emotion and mood
  - High levels = autonomic arousal – anxiety and agitation
  - Low levels = memory impairment & depression
  - Cocaine prevents reuptake thus increase effects = agitation, elevated mood & arousal
- Epinephrine
  - Adrenaline
  - Associated with energy, emotional arousal, memory