Nervous System

How It Works

Sensory input - detection of stimulus

Integration - processing in the brain

Motor Output - response in other body part

Central Nervous System

brain and spinal cord

Peripheral Nervous System

Afferent System (sensory) - receives input from body receptors and transmits signals to CNS

Efferent System (motor) - carries signal from CNS to body

Efferent (Motor) Division

Somatic System

responds to external and internal stimuli by sending signals to skeletal muscles (voluntary)

Autonomic System

involuntary. signals to smooth muscle, cardiac, and organs

1) Sympathetic Nervous System - prepares body for stress, affected by epinephrine

2) Parasympathetic Nervous System - restores body back to normal

Reflex Arc

Simplest type of neural circuit

regulates reflexes

rapid involuntary response to stimuli

integration occurs in spinal cord rather than brain

Neve Signals

Neurons Each Have	enlarged cell body, axon, dendrites
	body- nucleus and organelles
	axon- conducts signals from one neutron to next
	dendrites- receives signals and sends to cell body
***Glial Cells*	not neurons, help provide and support nerve cells.
1) Schwann Cells	wrap around axon of a neuron to provide insulation (high lipid content)
	form myelin sheath
	gaps between them are called *Node of Ranvier*

Na+ / K+ Pump

ATP drives active transport

3 Na+ pumped out - 2 K+ pumped in

...

Membrane Potential	V= V(inside) - V(outside)
	resting potential of neuron is -70mV
Action Potential	depolarization followed by reploarization.
	increase in membrane potential followed by a decrease

Phases

Phase 1: RESTING STATE

before neuron receives stimulus (-70mv)

Na+ channels closed

K+ channels closed

Phase 2: THRESHOLD

depolrization stimulus opens Na+ channels

reaches threshold (-50mV)

Phase 3: DEPOLARIZATION

depolarization opens all Na+ channels, positive feedback

Phase 4: REPOLARIZING

after peak action potential (+30mV)

K+ channels begin to open (flow of K+ depolarizes cell)

Na+ channels begin to close

Phase 5: UNDERSHOOT

K+ channels close very slowly (-80+)

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Synapse

Synapse

cell junction that controls communication between neuron and other body cells

Electrical Synapse

rapid transmission. Current from presynaptic cell flows through postsynaptic cell

channels between adjacent cells

Chemical Synapse

synaptic cleft - gap separating cells

synaptic vesicles - sacs at synaptic terminal containing neurotransmitters

presynaptic membrane depolarized. Ca2+ channels open. Stimulates exocytosis of synaptic vesicle

Neurotransmitters

excitation or inhibition effect

Acetylcholine - triggers muscle contractions, hormones, wakefulness, memory. Most common

Endorphins - released during pleasure or stress

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