

Wednesday, Mar. 13th

Plan For Today:

1. Any questions about projects and future plan?

SHARE CH 12 ARTICLE SUMMARIES AND HAND-IN

2. Intro to Chapter 12 Nervous System

- Nervous System Intro
- Neuron Structure & Function
- Action Potential
- Synaptic Transmission
- The Brain
- Reflex Arc
- Peripheral Nervous System

3. Do practice worksheets



Plan Going Forward:

1. Complete any worksheets and read through the rest of Ch12 in the textbook to prepare for Wednesday after Spring Break.

❖ CH9, 10, OR 11 PROJECT DUE WEDNESDAY, APR. 3RD (DO CH12, 13, OR 14 ALSO)

❖ CH12 MC REVIEW ASSIGNMENT DUE MONDAY, APR. 6TH

○ PART 2 ON CH11 SCANTRON

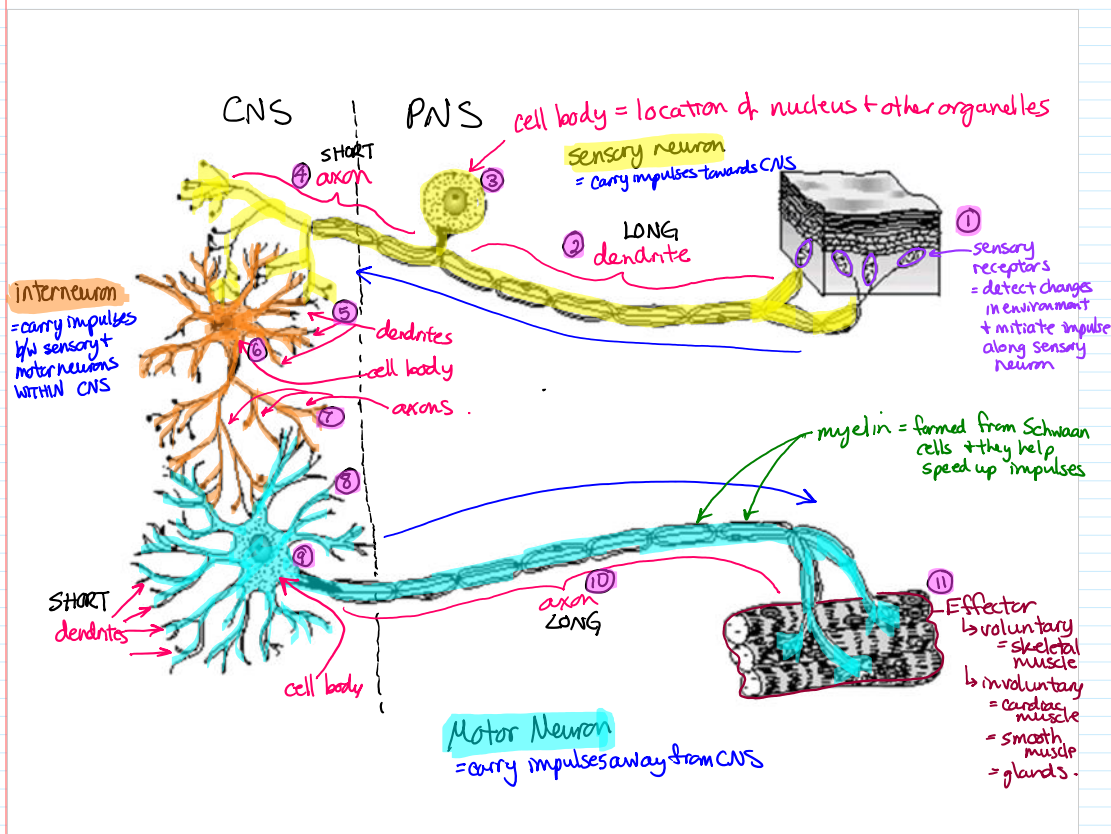
❖ CH12 QUIZ MONDAY, APR. 6TH

2. We will continue Ch12 - Nervous System next class.

HAVE AN AWESOME AND PRODUCTIVE SPRING BREAK!

Please let me know if you have any questions or concerns about your progress in this course. The notes from today will be posted at anurita.weebly.com after class.

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The Nervous System

① Central Nervous System (CNS)

- = Brain : protected by skull + meninges p. 383
- = Spinal Cord : protected by vertebrae + meninges . p. 382.

② Peripheral Nervous System (PNS)

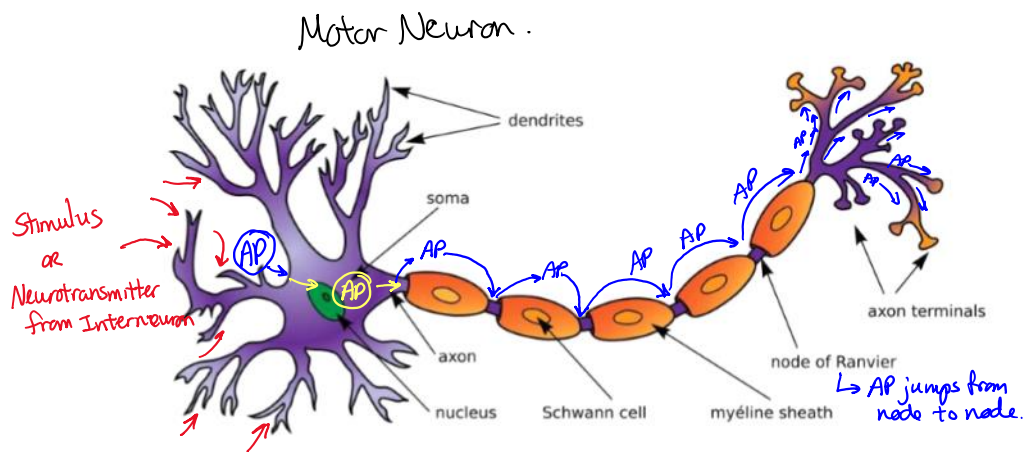
- = Cranial Nerves : to/from brain p. 388
- = Spinal Nerves : to/from spinal cord p. 388 + 390

↓

Nerves consist of neurons which are the single cells that make up the tissue of the nervous system

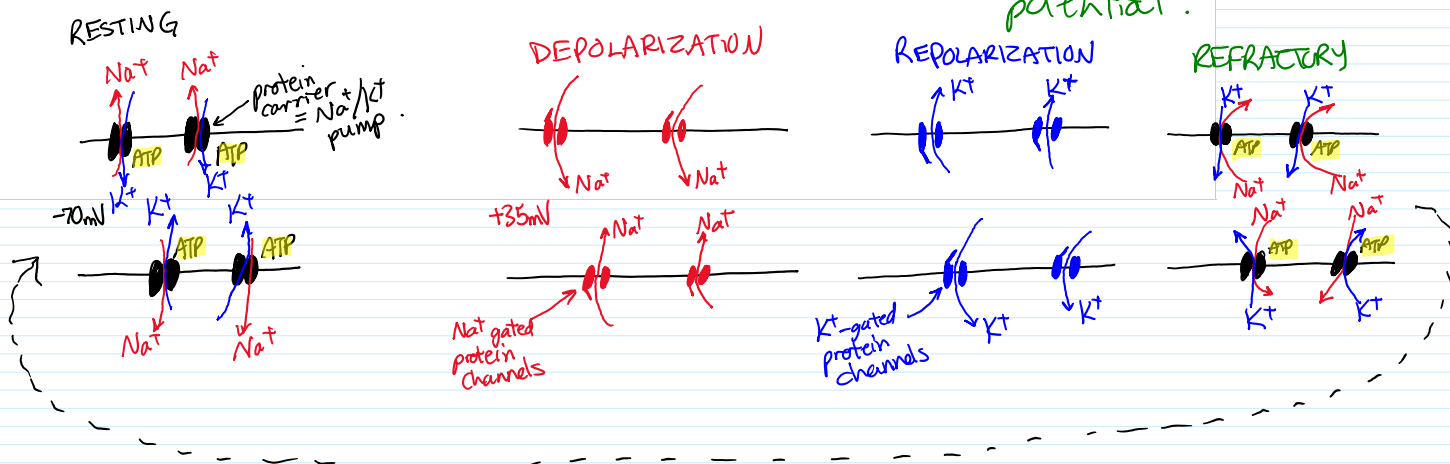
Sensory neurons	motor neurons .
carries impulses <u>TOWARDS</u> CNS	carries impulses <u>AWAY</u> from CNS .
cell body is outside	cell body is inside

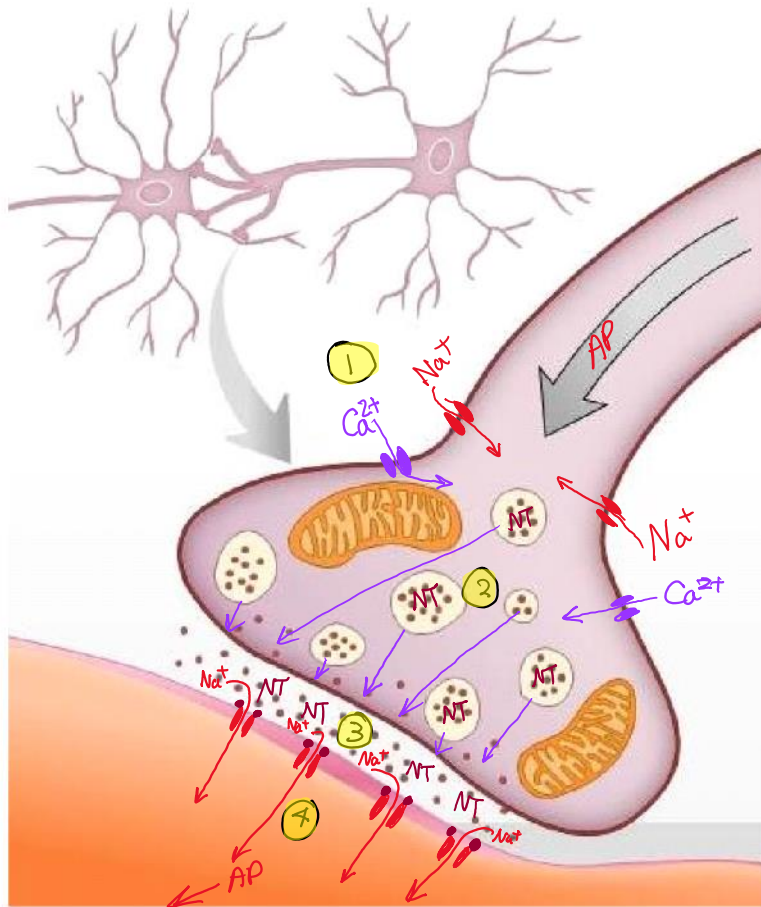
CNS	from CNS .
cell body is outside of CNS	cell body is inside CNS .
long dendrite + myelinated	short dendrite + unmyelinated
short axon + partially myelinated	long axon + fully myelinated



Resting Potential: -70 mV inside neuron is maintained by the Na^+/K^+ pump which actively transports Na^+ out + K^+ into neuron \rightarrow more Na^+ outside + more K^+ inside.

- AP ① Depolarization = Na^+ -gated channels open, Na^+ diffuse (flow) into neuron + potential goes -70 mV to $+35\text{ mV}$
- ② Repolarization = Na^+ gates close, K^+ -gated channels open + K^+ diffuses out of neuron + potential decrease to -90 mV (overshoot = hyperpolarization)
- ③ Refractory = Na^+/K^+ pump (protein carrier) actively (ATP) pumps Na^+ back out + K^+ back into neuron to restore ion distribution + resting potential.





after depolarization p. 379

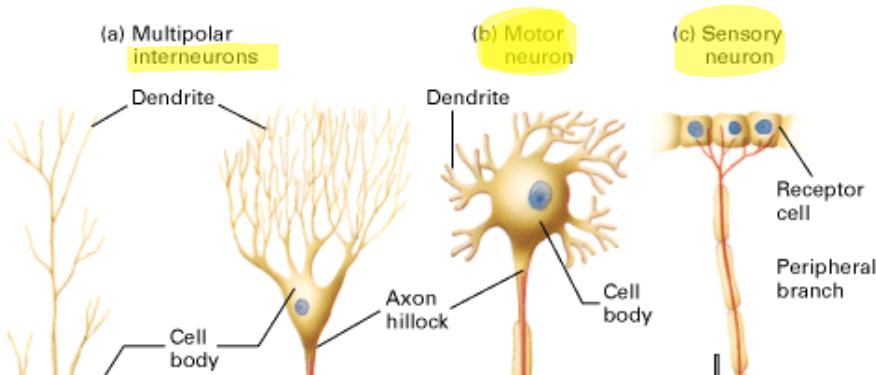
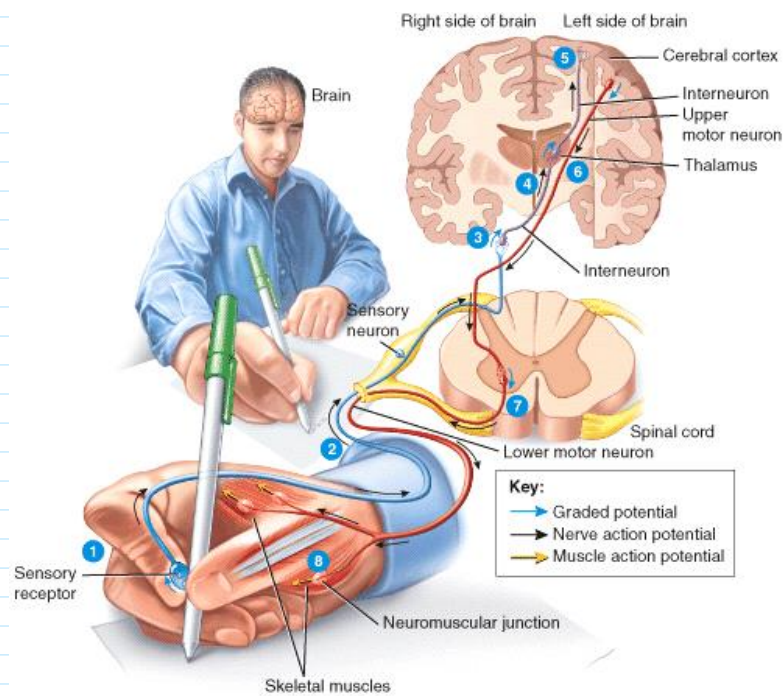
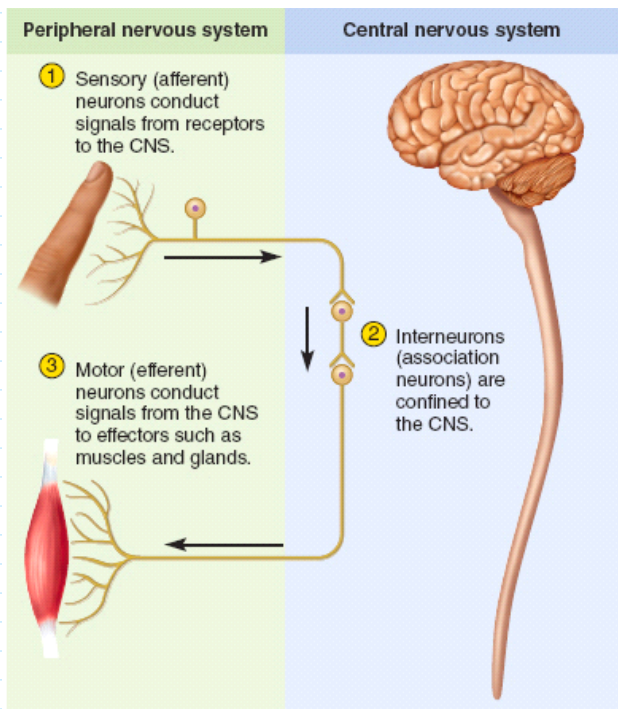
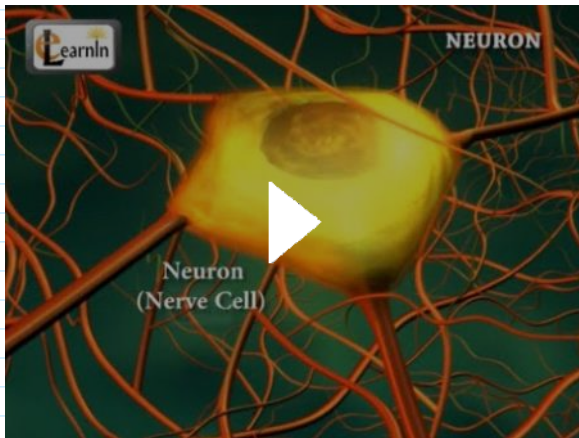
- ① NT can be broken down by enzymes or
- ② NT can be taken back into vesicles by endocytosis (reuptake)

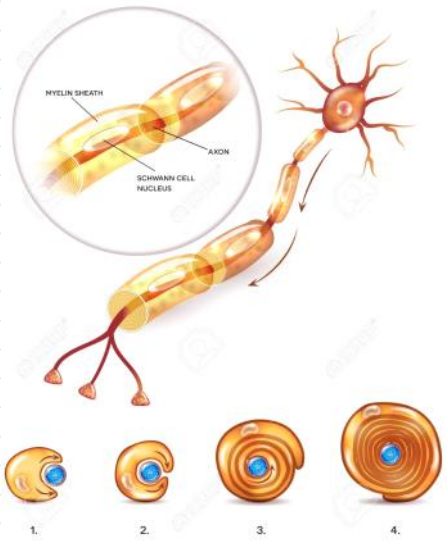
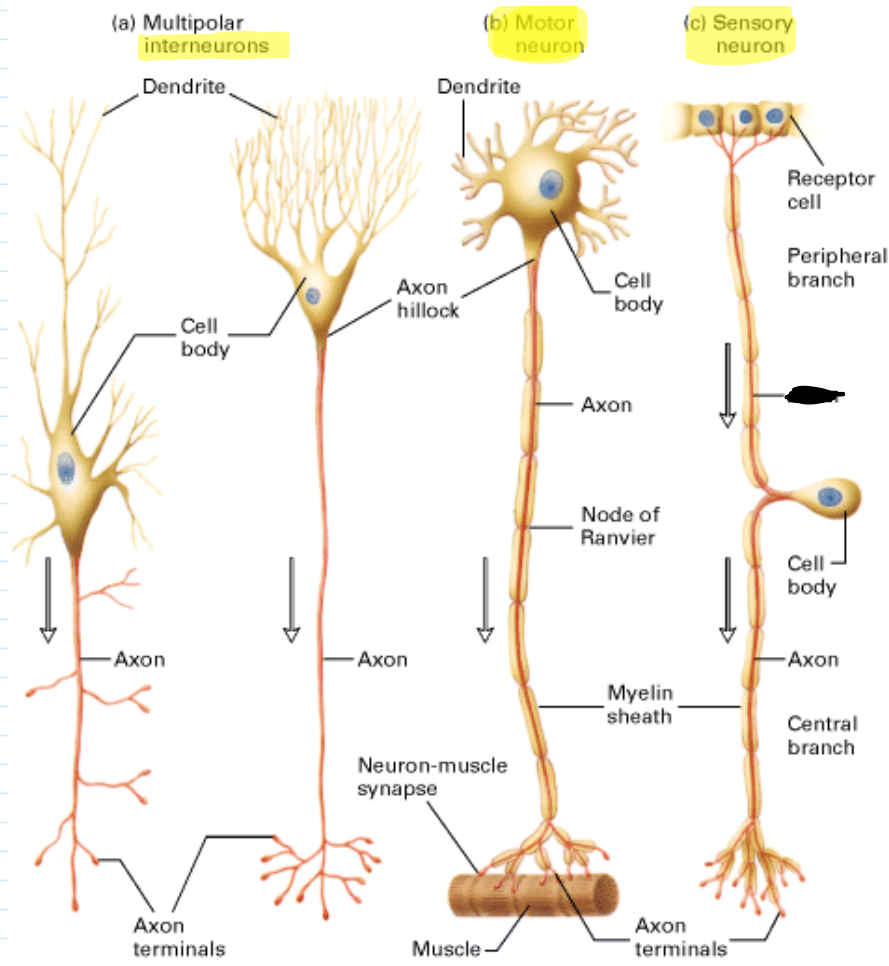
AP reaches axon-terminal (Na^+ gates open + depolarization occurs)

- ① Calcium gates open + Ca^{2+} flow (diffuse) into axon terminal
- ② Ca^{2+} causes contractile proteins to pull vesicles containing neurotransmitter (NT) towards pre-synaptic membrane.
- ③ vesicles fuse with pre-synaptic membrane + exocytosis occurs
 • NT is released into synaptic cleft (gap) + diffuses across to post-synaptic membrane
- ④ NT attaches to receptors on Na^+ gates on post-synaptic membrane + cause gates to open • Na^+ flows into neuron + depolarization occurs (AP continues)

Neuron Structure

Neurons or nerve cells - Structure function and types of neurons | Human Anatomy | 3D Biology



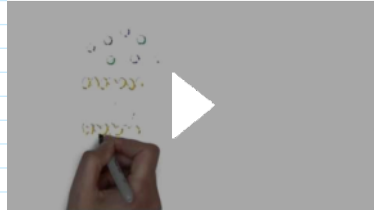


Action Potential

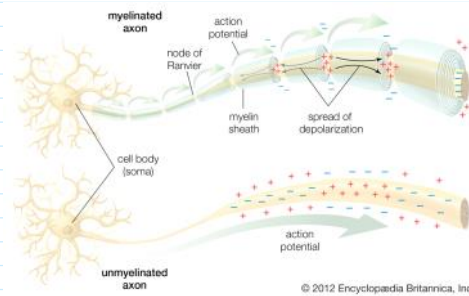
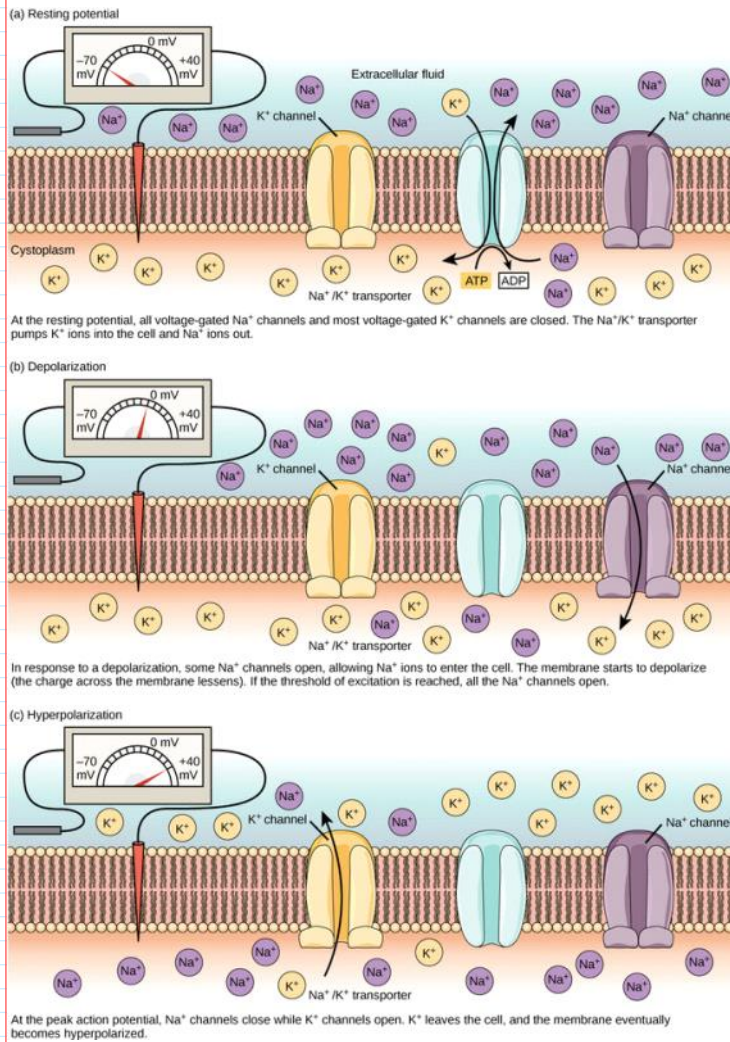
Action potential in the brain



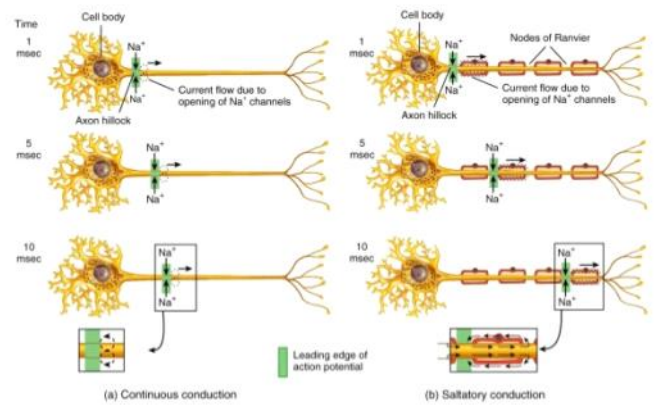
2-Minute Neuroscience: Membrane Potential



The Schwann Cell and Action Potential

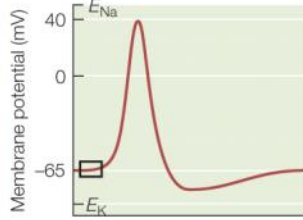
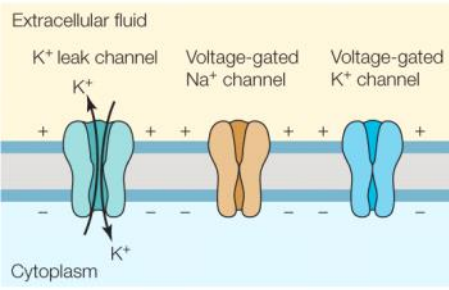


Continuous vs. Saltatory Conduction

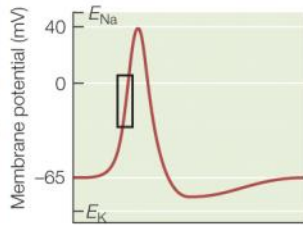
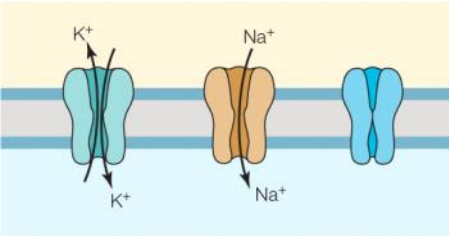


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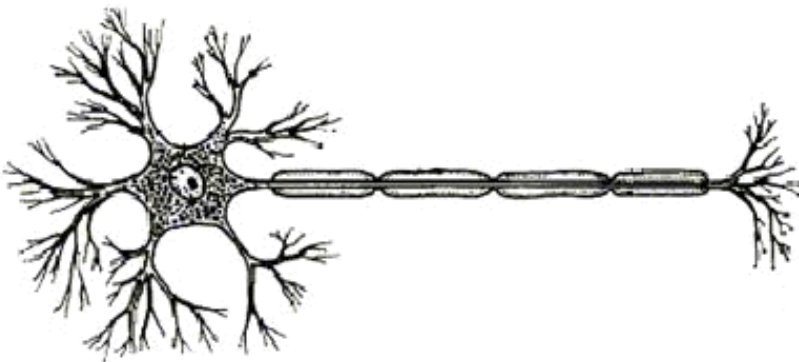
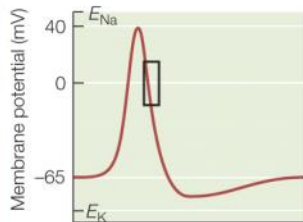
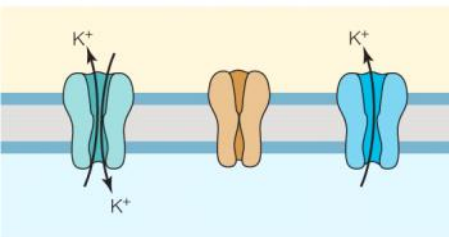
(A) Resting membrane potential



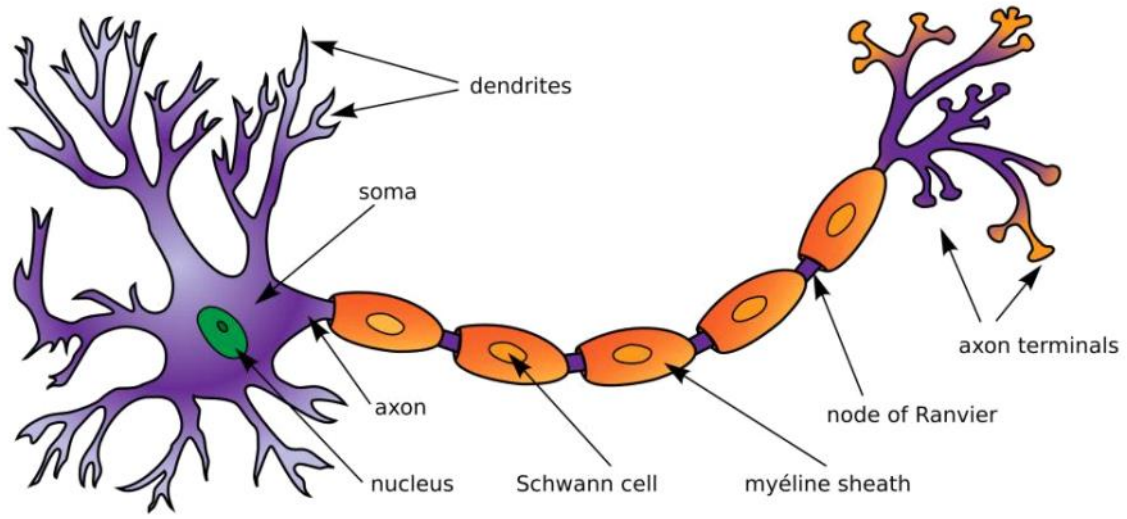
(B) Rising phase of action potential



(C) Falling phase of action potential

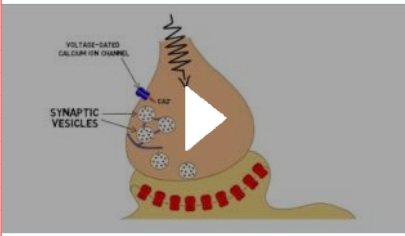


NEURON

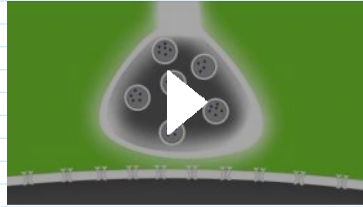


Synaptic Transmission

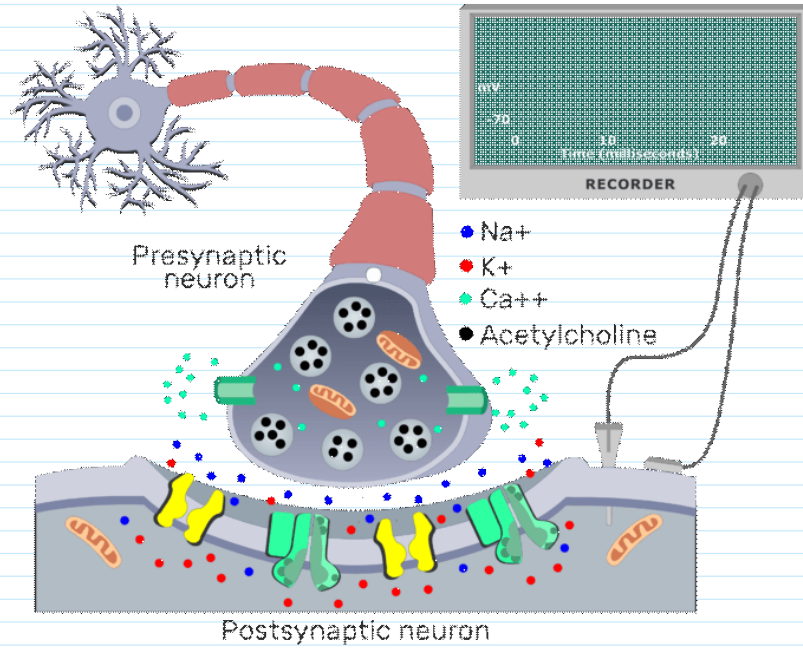
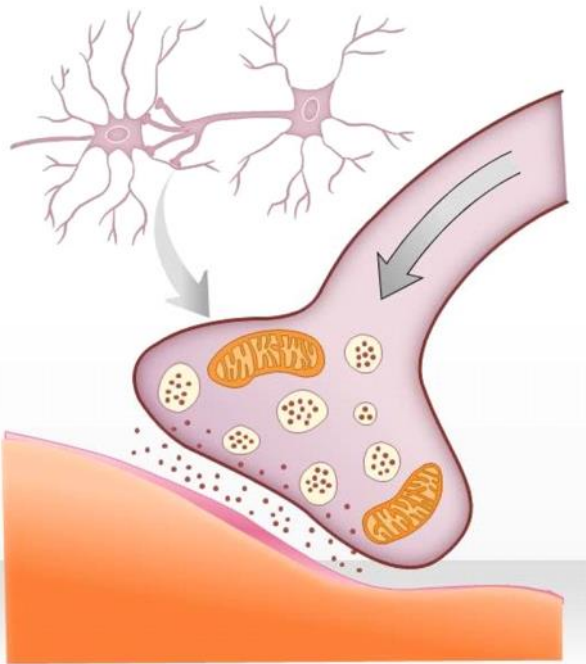
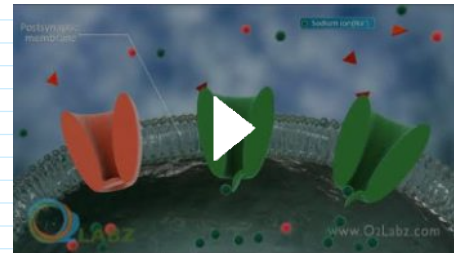
2-Minute Neuroscience: Neurotransmitter Release



Summary of AP and Synapse
Lights, Camera, Action Potentials!



Nerve Synapse Animation - GOOD



How Drugs Affect Neurotransmitters:



- Vesicles with neurotransmitter are pulled down towards pre-synaptic membrane
- Neurotransmitter attaches to receptors.
- Vesicles with neurotransmitter fuse with pre-synaptic membrane
- Sodium gates open and depolarization continues along next neuron
- Calcium gates open and calcium ions enter axon bulb