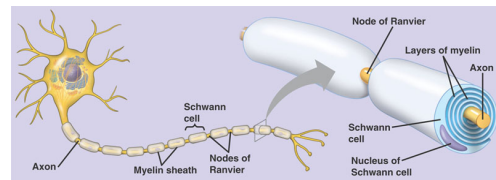
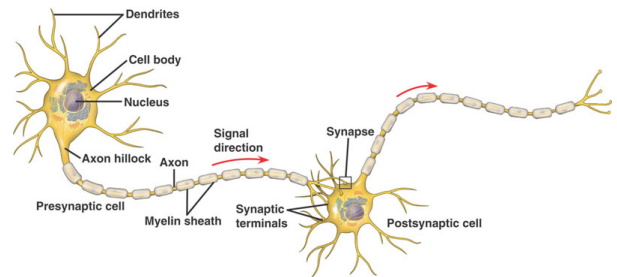
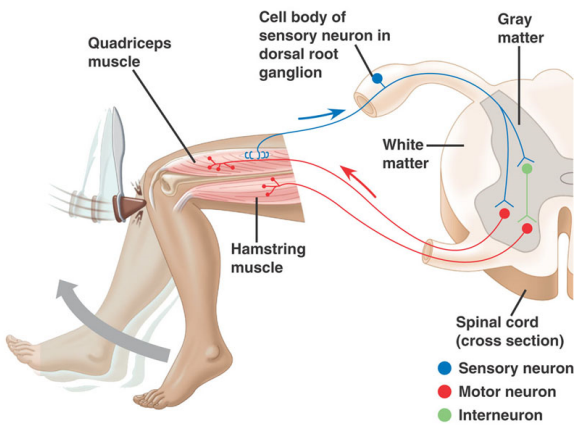
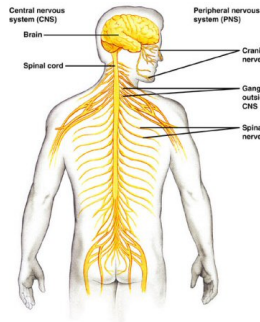
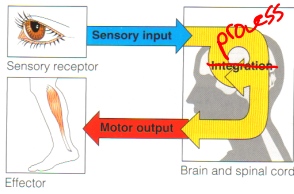


1. Which part of the nervous system is involved in each of the following?

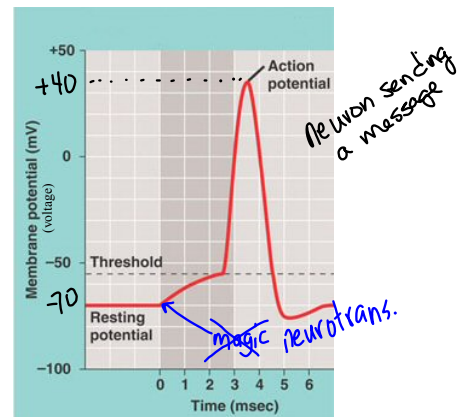
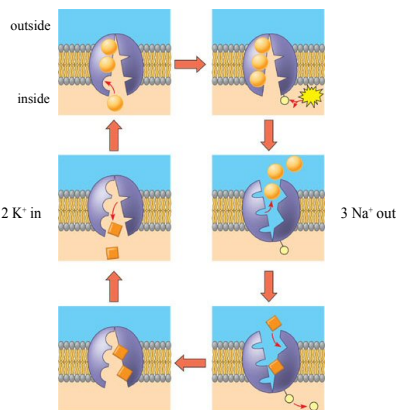
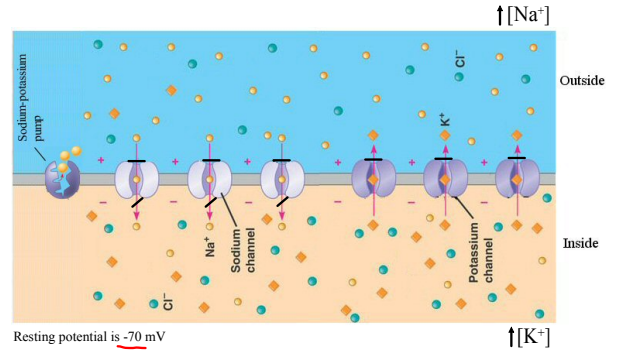
- a) throwing a ball
- b) releasing bicarbonate from the pancreas
- c) falling asleep
- d) increasing your breathing rate slightly
- e) running away from a vampire

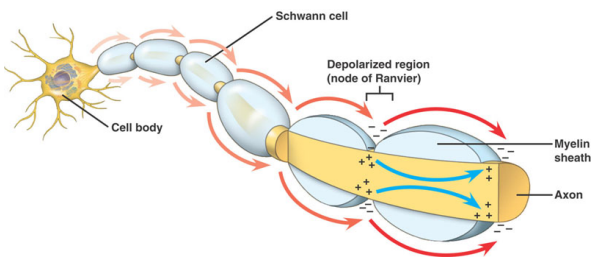
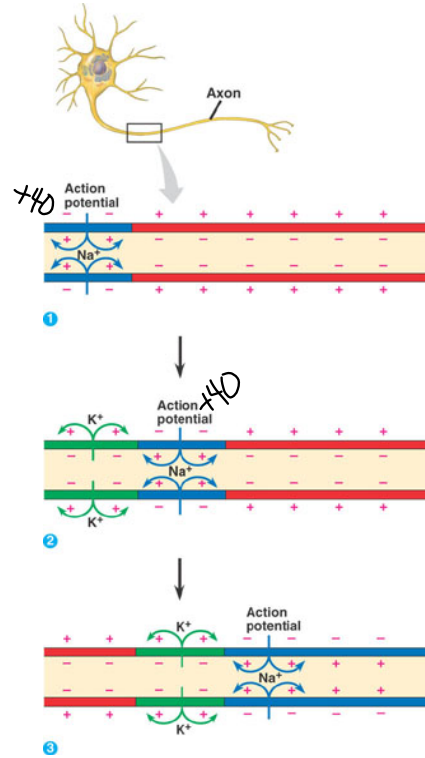
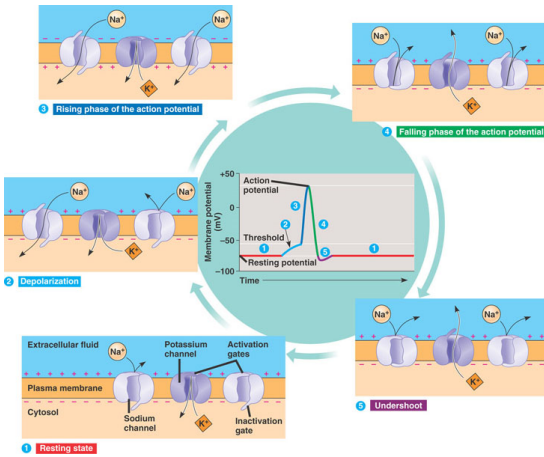
2. Imagine you cut yourself and some nerves are severed. What effect would this have on the transmission of impulses?

3. Imagine an accident victim suffers a spinal cord injury at the neck, resulting in paralysis. Explain the effect this would have on the affected parts of the body.

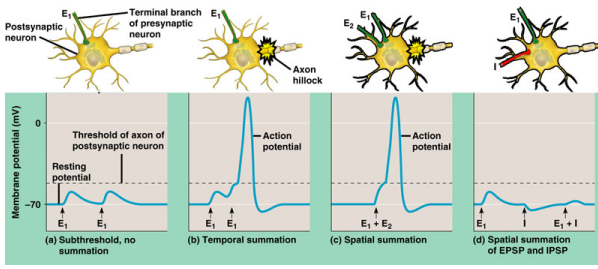


4. Describe the advantage of a reflex response to an organism.
5. You accidentally touch a hot iron. Your hand quickly moves away from the iron.
  - a) What type of reaction is this?
  - b) Do you feel pain before you pull your hand away? Explain.
  - c) Describe what happens in the central nervous system to allow you to react so quickly.
6. Pain receptors are far more abundant in the skin than are cold receptors. Explain why this is adaptive for survival.
7. Suppose that your skin was not sensitive to pressure or pain. What might happen to the muscles and internal organs beneath the skin?
8. Some neurons are wrapped in a coating called the myelin sheath.
  - a) What are the advantages of myelinated nerve axons?
  - b) How does this explain the symptoms of MS?

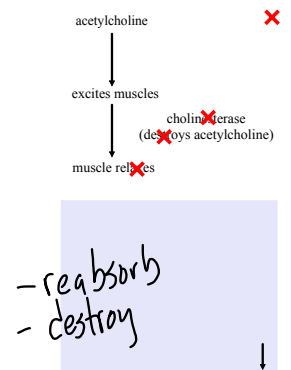
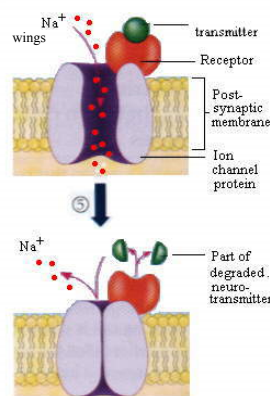
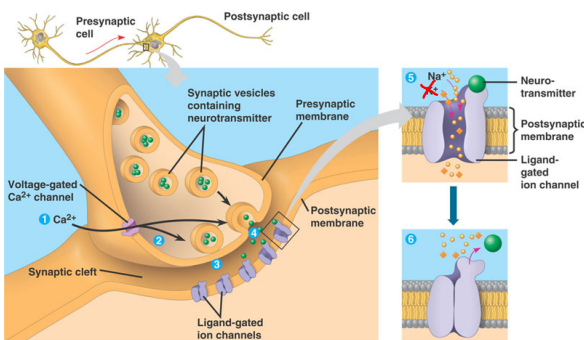
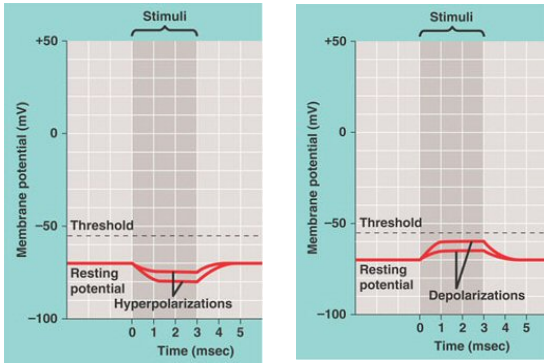




9. What causes the resting neuron to be polarized?
10. Describe the distribution of ions across the cell membrane as it changes from a resting potential to an action potential and then into refractory period?
11. How is the membrane potential of the resting cell restored after a nerve impulse has passed?
12. Tetrodotoxin is a toxin present in the spines of the puffer fish. It has the capability of blocking the function of voltage-regulated sodium channels. What effect do you suppose this substance would have on the contractions of muscles?
13. Draw a fully-labelled graph showing the potential of the neural membrane as it fires.



- 14. a) What is meant by the all-or-none response?
- b) If a stimulus causes an all-or-none response, how can the level of pain you feel vary?
- 15. Use the idea of threshold levels to explain why some individuals can tolerate more pain than others.



**Acetylcholine** is one of the most common neurotransmitters

- it has an excitatory effect on skeletal muscle cells
- in the CNS, it can be inhibitory or excitatory, depending on the type of receptor (implicated in concentration and learning)
- it tends to help us filter out weak stimuli while amplifying stronger ones

**Dopamine** is associated with the reward system

- active mostly in the anticipation of reward (seeking versus liking)
- some evidence suggests it might be associated with all motivators, positive and negative
- might be involved in learning to associate new behavior with a reward
- normally released when a need is filled, causing a feeling of pleasure or satisfaction

**Serotonin**

- regulation of mood (feeling of happiness), appetite, sleep
- cognitive functions include memory and learning

**GABA** is the main inhibitory neurotransmitter in the CNS

**Norepinephrine** is involved in the fight-or-flight response

**Endorphins** are natural analgesics (pain killers)

- block the release of GABA and increase the release of dopamine
- block pain signals.

**Stimulants** (amphetamines like meth and ecstasy, cocaine)

- block the removal of dopamine, serotonin and norepinephrine from the synaptic cleft
- increase the effect of norepinephrine
- adenosine inhibits the release of stimulating neurotransmitters
- caffeine occupies adenosine receptors, blocking its effect

**Depressants** (barbiturates, tranquilizers)

- mimic GABA
- heroin is a pain-relieving sedative
- antidepressants block the breakdown of serotonin
  - SSRI drugs (*e.g.*, Prozac) inhibit the uptake of serotonin
- Alcohol is a depressant that slows down the function of the CNS
- binds to acetylcholine, GABA, serotonin, and NMDA receptors
- blocking NMDA receptors results in:
  - hallucinations
  - paranoid delusions
  - confusion
  - difficulty concentrating
  - agitation
  - alterations in mood
  - catatonia
  - ataxia
  - anaesthesia
  - learning and memory deficits

**Nicotine**

- at low doses (quick puffs) - enhances norepinephrine and dopamine, having a stimulant effect
- at high doses (deep puffs) - enhances serotonin - having a calming effect
- inhibits the enzymes that breakdown dopamine and serotonin
- binds to the same receptors as acetylcholine
- increases alertness and arousal by binding to acetylcholine and norepinephrine receptors

**Opiates** (morphine, codeine)

- mimic the effects of endorphins

**Marijuana**

- THC makes the presynaptic neurons think they have sent a message even if they haven't
- THC can thus exert both excitatory and inhibitory effects

- How does the nerve impulse cross the space between two nerve cells?
- Use the idea of a synapse to explain why a nerve impulse can move from neuron A to neuron B but not *vice versa*.
- Explain the functions of acetylcholine and cholinesterase in the transmission of nerve impulses.
- Use the idea of a synapse and neurotransmitters to explain the concept of summation.
- How can drugs act as stimulants or depressants?
- What is an endorphin? How does it work?

Can someone read your thoughts?

How well do you read people?

Are fortune tellers seeing the future?

Do you really pay attention?

How well do you pay attention?

Can you pay attention when there's lots of action?

How easily are we distracted?

Is the brain easily influenced?

How about what you see?

Can they take something from you?

What if it's personal?

What if someone wants you to forget?

What if you don't even know it's happening?

## Attachments

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Derren Brown Car Salesmen.flv



Lilac-Chaser.gif

Lilac-Chaser.gif



Derren Brown - Cold Reading a Psychologist.flv

Derren Brown - Winning ticket.flv



Eye - Optical illusion.flv



Myelin and impulse conduction.flv



Synapse.flv