

Unit 2

Nervous Tissue // Homework Assignment 1

Action Potentials (Harvard Extension School)

1. What are the four parts of a neuron? Function of each?
2. What is a nerve?
3. What must occur before an action potential?
4. When a neuron is at rest, what is the location of the sodium and potassium ions?
5. What is the charge across the plasma membrane? Where is it positive and negative?
6. What is the electrical gradient across the neuron's plasma membrane?
7. What is required for an ion to cross the neuron's plasma membrane?
8. What is true about voltage regulated most ion channels? Significance?
9. What is a graded potential?
10. After a local potential, what will a neuron use to return to the resting potential?
11. What occurs when the sodium potassium ATP pump completes one cycle?
12. What occurs when local potential reaches negative 55 millivolts? Where does this occur?
13. What occurs during depolarization? Which voltage gate is open? Which voltage gate is closed?
14. What occurs during repolarization? Which voltage gate is open? Which voltage gate is closed?
15. What causes the neuron to be hyperpolarized? How is it corrected?
16. When will the neuron be in its absolute refractory period? Why? Prevents what?
17. What is the difference between absolute and relative refractory periods?
18. Will the action potential get bigger with a stronger stimulus? How is the action potential described?
19. What can change? Significance?
20. What may increase speed of action potential along the axon? Why? Called?
21. What glial cells make the myelin sheath? Locations?
22. What does a small stimulus make? What occurs if stimulus is above threshold?

Transmission Across Synaptic Cleft (2 min)

1. In this video, what is the location of the synapse?
2. What is the space called?
3. How wide? Compared to human hair?
4. What causes the neurotransmitter to be released into the synaptic cleft?
5. What is located on the post synaptic membrane surface?
6. How is the neurotransmitter removed from the synaptic cleft? (three ways)

Postsynaptic Potentials (2.35 min)

1. What may happen after a neurotransmitter binds to the postsynaptic membrane?
2. What do we call it when the neurotransmitter hyperpolarizes the postsynaptic membrane?
3. What do we call it when the neurotransmitter depolarizes the postsynaptic membrane?
4. What type of response are the IPSP and EPSP?
5. What happens to the IPSP or EPSP as they travel across the neuron's soma? Called?

Receptors (3.30 min)

1. What are the five types of proteins in plasma membrane?
2. Where are intracellular receptors located?
3. What type of molecule uses intracellular receptors?

cAMP Second Messenger (4.16 min)

1. Who are the “players” in the second messenger system?
2. What does the protein kinase A do?
3. In this system, what is the characteristic of the ligand?
4. How do you turn off the cyclic AMP system?

Sodium Potassium Pump (56 seconds)

1. Why do we sometimes refer transmembrane proteins as pumps?
2. How are sodium and potassium ions actively moved across the membrane?
3. How many binding sites are on the sodium potassium pump?
4. What happens when a phosphate binds to the pump and after the phosphate is released from the pump?
5. What does the “unequal movement of ions” cause across the membrane? Significance?

Conversations in Science with Dan Rather and Eric Kandel: Neuroplasticity

1. When did Eric Kandel win the Nobel Prize in Medicine?
2. What did Broca show in 1860?
3. What is the function of the Wernicke area?
4. What is neuroplasticity?
5. Why do we all have “different brains”?
6. Did Kandel start out in college to be a medical doctor?
7. How does Kandel describe working in a lab and doing research?
8. What are the two types of memory? Which one is conscious? The other?
9. What brain structure is required to make new long term memories?