

# The Anatomy Of A Nerve Impulse Worksheet Answer Key PDF

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## Part 1: Foundational Knowledge

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**What is the primary function of the myelin sheath in a neuron?**

undefined. A) To store neurotransmitters

**undefined. B) To increase the speed of nerve impulse transmission ✓**

undefined. C) To generate action potentials

undefined. D) To maintain the resting potential

The myelin sheath primarily increases the speed of nerve impulse transmission.

**Which of the following are components of a neuron? (Select all that apply)**

**undefined. A) Dendrites ✓**

**undefined. B) Axon ✓**

undefined. C) Synapse

**undefined. D) Cell body ✓**

The components of a neuron include dendrites, axon, and cell body.

**Explain the role of the sodium-potassium pump in maintaining the resting membrane potential of a neuron.**

**The sodium-potassium pump maintains the resting membrane potential by actively transporting sodium out of the neuron and potassium into the neuron.**

**List the three main phases of an action potential.**

1. Phase 1

**Depolarization**

2. Phase 2

## Repolarization

### 3. Phase 3

## Hyperpolarization

The three main phases of an action potential are depolarization, repolarization, and hyperpolarization.

## Part 2: Understanding and Interpretation

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### During which phase of the action potential do sodium ions rush into the neuron?

undefined. A) Restoring potential

undefined. **B) Depolarization ✓**

undefined. C) Repolarization

undefined. D) Hyperpolarization

Sodium ions rush into the neuron during the depolarization phase.

### Which statements are true about the refractory period? (Select all that apply)

undefined. **A) It prevents the backward propagation of action potentials. ✓**

undefined. **B) It occurs after the action potential has reached its peak. ✓**

undefined. C) It allows the neuron to immediately fire another action potential.

undefined. **D) It is divided into absolute and relative periods. ✓**

The refractory period prevents backward propagation of action potentials and is divided into absolute and relative periods.

### Describe how neurotransmitters facilitate synaptic transmission between neurons.

**Neurotransmitters facilitate synaptic transmission by being released from the presynaptic neuron and binding to receptors on the postsynaptic neuron, leading to a response.**

## Part 3: Applying Knowledge and Analyzing Relationships

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**If a neuron is exposed to a toxin that blocks sodium channels, what immediate effect would this have on action potential generation?**

undefined. A) Action potentials would be generated more frequently.

**undefined. B) Action potentials would not be generated. ✓**

undefined. C) The resting potential would become more positive.

undefined. D) The neuron would become hyperpolarized.

If sodium channels are blocked, action potentials would not be generated.

**In a scenario where the myelin sheath is damaged, what consequences might occur? (Select all that apply)**

**undefined. A) Slower nerve impulse transmission ✓**

undefined. B) Increased action potential frequency

**undefined. C) Impaired coordination and movement ✓**

undefined. D) Enhanced synaptic transmission

Damaged myelin sheath can lead to slower nerve impulse transmission, impaired coordination, and movement.

**Apply your understanding of synaptic transmission to explain how a drug that inhibits neurotransmitter reuptake might affect neural communication.**

**A drug that inhibits neurotransmitter reuptake would increase the availability of neurotransmitters in the synaptic cleft, enhancing neural communication.**

## Part 4: Synthesis and Reflection

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**Which of the following best explains why action potentials are unidirectional?**

undefined. A) The presence of the myelin sheath

**undefined. B) The refractory period following an action potential ✓**

undefined. C) The structure of the axon

undefined. D) The release of neurotransmitters

Action potentials are unidirectional due to the refractory period following an action potential.

**Analyze the effects of hyperpolarization on a neuron. Which statements are correct? (Select all that apply)**

**undefined. A) It makes the neuron less likely to fire an action potential. ✓**

**undefined. B) It occurs when potassium channels remain open longer than necessary. ✓**

undefined. C) It results in a more positive membrane potential.

undefined. D) It is a phase that immediately follows depolarization.

Hyperpolarization makes the neuron less likely to fire an action potential and occurs when potassium channels remain open longer than necessary.

**Which strategy would be most effective in treating a neurological disorder characterized by excessive neuronal firing?**

undefined. A) Enhancing sodium channel activity

undefined. B) Inhibiting potassium channel activity

undefined. C) Increasing neurotransmitter release

**undefined. D) Enhancing the function of inhibitory neurotransmitters ✓**

Enhancing the function of inhibitory neurotransmitters would be the most effective strategy.

**Evaluate the potential effects of a novel drug that enhances the reuptake of neurotransmitters. Which outcomes are likely? (Select all that apply)**

**undefined. A) Decreased synaptic transmission ✓**

undefined. B) Increased neurotransmitter availability in the synaptic cleft

**undefined. C) Reduced neuronal excitability ✓**

undefined. D) Enhanced synaptic plasticity

A drug that enhances reuptake would likely decrease synaptic transmission and reduce neuronal excitability.

**Design an experiment to test the effects of a new drug on action potential propagation in neurons. Outline the hypothesis, method, and expected results.**

**The experiment would involve hypothesizing that the drug enhances action potential propagation, using electrophysiological techniques to measure changes in action potential characteristics.**