

Action Potential

NOTES

The transmission of an impulse along a single neuron occurs because of ion movement across the **axomembrane**. This ion movement causes a small temporary shift in the electrical nature of the fibre. The voltage is measured as a difference in the inside of the axon (in the **axoplasm**) and the outside of the axon.

Resting Potential

When an axon is not conducting an impulse, the inside of an axon is _____ compared to the outside. This is called the _____. The existence of the **polarity** (charge difference) correlates with a difference in ion distribution on either side of the axonal membrane.

Draw a portion of an axon under resting potential. Indicate the relative concentrations of Na^+ and K^+ ions.

The unequal distribution of these ions is due to the action of the _____, a _____ that actively transports Na^+ _____ and K^+ _____ the axon.

Action Potential

The action potential is a _____ in polarity across an _____. As the nerve impulse occurs, an action potential is an _____. If a stimulus causes the axonal membrane to depolarize to a certain level, called _____, an action potential occurs. The action potential requires _____ types of gated channel proteins in the membrane. One gated channel protein opens to allow _____ to pass through the membrane to inside the cell, and the second channel opens to allow _____ to pass through the membrane to outside the cell.

Sodium Gates Open

When an action potential begins, the gates of _____ channels open first, and _____ flows down its concentration gradient into the axon. This is called _____ because the charge inside the axon changes from _____ to _____.

Draw a portion of an axon under action potential with sodium gates open.

Potassium Gates Open

Second, the gates of _____ channels open, and _____ flows down its concentration gradient to outside the axon. This is called _____ because the inside of the axon resumes a _____ charge.

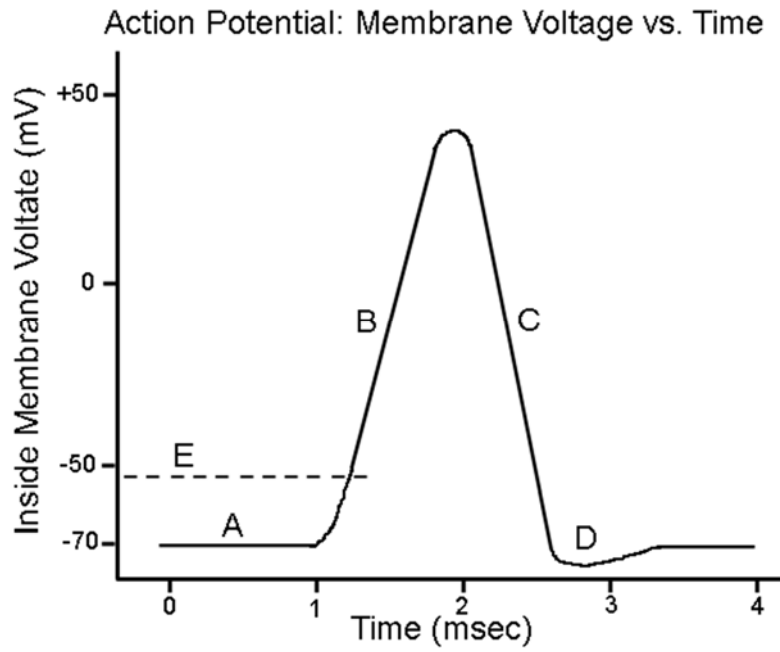
Draw a portion of an axon under action potential with potassium gates open.

Conduction of an Action Potential

In _____ axons, the action potential travels down an axon one small section at a time. As soon as action potential has moved on, the previous section undergoes a _____, during which the _____ gates are unable to open. Therefore, the action potential cannot move _____ and always moves towards its _____.

In _____ axons, the gated ion channels that produce an action potential are concentrated at the _____. Since ion exchange occurs only at the nodes, the action potential travels _____ than nonmyelinated axons. This is called _____, meaning that the action potential “_____” from node to node.

Complete the graph below with the terms: depolarization, hyperpolarization, repolarization, resting state, threshold



Summary of the steps of an action potential

1. _____
 2. _____
 3. _____
 4. _____
 5. _____
 6. _____
-