

Neuronal Anatomy

1. Describe role of the soma in a neuron.
2. Role of the axon hillock.
3. Role of dendrites.
4. Role of myelin sheath.
5. Role of Nodes of Ranvier.
6. Compare an IPSP to an EPSP (and state what they stand for).
7. Define saltatory conduction.
8. What ion is concentrated outside of the cell? What ion is concentrated inside the cell?
9. Which ion rushes in? Which ion leaves?
10. Describe WHY an action potential moves faster along a myelinated axon.
11. Compare generation and propagation of an action potential.
12. Where does the electrical signal cause exocytosis of synaptic vesicles?

Answers:

Neuronal Anatomy

1. Describe role of the soma in a neuron.
Makes neurotransmitters and all the other proteins the cell needs.
2. Role of the axon hillock.
"Sums" up the input from all the dendrites. If the total sum is high enough (threshold) then an action potential is fired.
3. Role of dendrites.
Receive signals from neighboring neurons.
4. Role of myelin sheath.
To insulate and increase the speed of an action potential.
5. What is a Node of Ranvier and what is its function?
Gap in the myelin sheath at which the action potential can be propagated.
6. Compare an IPSP to an EPSP (and state what they stand for).
Inhibitory post synaptic potential: decreases the likelihood of an action potential at the axon hillock.
Excitatory post synaptic potential: increases the likelihood of an action potential at the axon hillock.
7. Define saltatory conduction and what its Latin root means.
"Saltar" = to jump. Saltatory conduction is when an action potential is propagated in jumps down a myelinated axon.
8. What ion is concentrated outside of the cell? What ion is concentrated inside the cell?
Na⁺ concentrated outside/K⁺ concentrated inside
9. Which ion rushes in? Which ion leaves?
Na⁺ rushes in/K⁺ leaves
10. Describe WHY an action potential moves faster along a myelinated axon.
It only has to be propagated at each Node of Ranvier, rather than each patch of membrane along the axon.
11. Compare generation and propagation of an action potential.
Generation is when the action potential starts at the axon hillock. It only starts if the summed input from the dendrites reaches threshold. Propagation is the passing of the action potential along the axon.
12. Where does the electrical signal cause exocytosis of synaptic vesicles?
axon terminal