What is a Synapse and Neurotransmitter?

Worksheet

A synapse is the gap between neurons filled by neurotransmitters-chemical molecules released by the presynaptic neuron that bind to receptors on the postsynaptic neuron, transmitting the signal.

Questions

1. Where is neurotransmitter stored in the presynaptic neuron?

A) In the cell nucleus
B) In synaptic vesicles
C) In the axon terminal membrane
D) In the mitochondria

2. What causes the postsynaptic neuron to depolarize after an excitatory signal?

A) K efflux
B) Cl efflux
C) Na influx
D) Ca efflux

3. Which ion's influx into the presynaptic terminal triggers neurotransmitter release?

A) Na
B) K
C) Ca
D) Cl

4. What does GABA do at its synapse?

A) Speeds up firing
B) Slows down or prevents firing
C) Releases more neurotransmitters
D) Destroys the synapse

5. Acetylcholine is released at the neuromuscular junction. How does it cause muscle contraction?

6. Serotonin levels are low. What mood changes might occur?

7. GABA is released at a synapse. What type of signal does it produce?

8. Define: What is a synapse?

9. Define: What are neurotransmitters?

10. Define: Name three common neurotransmitters.

Answer Key

1. B) In synaptic vesicles - Synaptic vesicles are membrane-bound organelles that store and release neurotransmitters.

2. C) Na influx - Excitatory neurotransmitters open Na channels, allowing Na to flow in and depolarize the membrane.

3. C) Ca - Voltage-gated Ca channels open during depolarization, and Ca influx triggers vesicle fusion.

4. B) Slows down or prevents firing - GABA is an inhibitory neurotransmitter that hyperpolarizes the membrane and reduces firing likelihood.

5. Acetylcholine binds to nicotinic receptors on muscle cell membrane Na ions flow in membrane depolarizes Action potential triggers muscle contraction

6. Low serotonin fewer receptors activated in mood-regulating brain regions reduced signaling in limbic system depression, anxiety, poor sleep

7. GABA binds to inhibitory receptors Cl ions flow in or K flows out Hyperpolarization occurs Postsynaptic neuron is less likely to fire (inhibitory)

8. The junction between two neurons where communication occurs via neurotransmitters.

9. Chemical molecules released by the presynaptic neuron that carry signals across the synapse.

10. Acetylcholine, dopamine, serotonin, GABA, glutamate (any three).