A4 · Crossing the synapse · Worked examples and practice

Name: _____ Date: _____

Worked examples

Read these first. There is one for each kind of question in this lesson.

Example 1 · Follow a message across a synapse

An action potential reaches an axon terminal. What happens next?

1. Vesicles release the neurotransmitter into the synaptic cleft.
2. The neurotransmitter diffuses across.
3. It binds to receptors on the postsynaptic neuron.
4. Sodium channels open, and sodium ions enter.

Answer: The postsynaptic neuron is depolarized.

Example 2 · Predict what a drug does at a synapse

A drug blocks the acetylcholine receptors on a skeletal muscle. Predict the effect.

1. Step 1: it changes the receptors. Acetylcholine cannot bind.
2. Step 2: less neurotransmitter reaches the receptors.
3. Step 3: acetylcholine is excitatory at a skeletal muscle.
4. Step 4: the sodium channels do not open.

Answer: The muscle cannot contract.

Practice

Questions 1 to 4 are easy. Questions 5 to 8 are medium. Questions 9 and 10 are harder.

EASY

1. Name the gap between a neuron and the next cell.

EASY

2. Name the chemical that carries a message across a synapse.

EASY

3. Name the enzyme that breaks down acetylcholine.

EASY

4. Name the neuron that has receptors for the neurotransmitter.

MEDIUM

5. Name the two neurons at a synapse. State which one carries the action potential to the synapse.

MEDIUM

6. Explain how an inhibitory neurotransmitter makes a neuron less likely to fire.

MEDIUM

7. Explain why acetylcholine must be broken down after it has acted.

MEDIUM

8. Explain what summation is.

HARDER

9. A drug stops norepinephrine from being taken back into the presynaptic neuron. Use the four steps to predict the effect at an excitatory synapse.

HARDER

10. Three neurons meet neuron Z. X and Y are excitatory. W is inhibitory. X and Y together just reach the threshold level. Predict what happens when all three fire. Explain.