

Investigation 11.A: Move Fast! Reflex Responses Answer Key

Answers to Analysis Questions

1. Your answer should be similar to Figure 11.8 on page 370 of the student textbook (shown below). Make sure that you label the stimulus, sensory neuron, cell body of the sensory neuron, interneuron in the spinal cord, cell body of the motor neuron in the grey matter of the spinal cord, the motor neuron, and the effector (muscle).

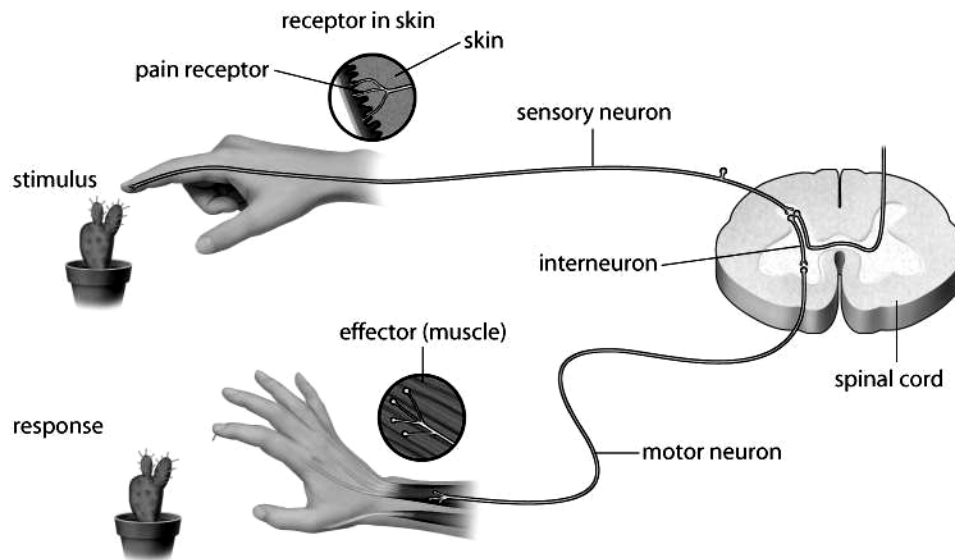


Figure 11.8 A withdrawal reflex. Receptors in the skin perceive the stimulus. Sensory information is conducted from the senses into the spinal cord. Motor information is then conducted away from the spinal cord to the muscles and glands.

2. Because reflex arcs use very few neurons to transmit messages, reflexes can be rapid and a response can happen before there is an awareness that a reaction is necessary. This means that contact with a dangerous stimulus is minimized.

Answer to Conclusion Question

3. The pupillary reflex will protect the retina from bright light. The blink reflex will protect the cornea and other structures of the eyeball from contact with objects. The knee-jerk reflex can be used by doctors to diagnose certain neurological disorders or an injury to the muscles in the thigh (i.e., a pulled hamstring muscle).

Answers to Extension Questions

4. When a student moves her hand upon touching a hot glass, it is an example of the withdrawal reflex. Receptors in the skin sense the heat and initiate an impulse in the sensory neurons. The impulse carried by the sensory neuron then activates the interneuron in the spinal cord. The interneuron signals the motor neuron to instruct the muscle to contract and withdraw the hand. A reflex arc initiates a reaction before the brain has had a chance to process the sensory information. However, once the brain has interpreted the sensory information, the student will feel pain.

CHAPTER 11	Investigation 11.A: Move Fast! Reflex Responses Answer Key (cont'd)	BLM 11.1.5A
ANSWER KEY		

5. You can now build on your previous experiences and learn more about reflex arcs. You can quantify your data by measuring the distance the foot moved during the knee reaction by marking the starting and ending points on a piece of cardboard. Alternatively, you could use a protractor to measure the angle of change in the knee. Eye pupil data may be scored as a plus or minus to indicate whether the reaction occurred in a number of students.

Make sure that you are conducting investigations that do not cause harm to sense organs. For example, if you are going to “pop” a balloon near an unsuspecting student, make sure that you do not pop the balloon close to the other person’s ear.