

Name: _____

HOW EXERCISE CHANGES YOUR BODY

In “DNA Blasts Off!” (p. 14), you learned that living in space can cause changes to astronauts’ DNA. In this passage, you’ll learn how exercise can cause similar changes. Read the passage, and then answer the questions that follow.

WORKING OUT ALTERS YOUR DNA

You’ve probably heard many times that exercise is good for you. Studies show that people who exercise regularly have a lower risk of many diseases. Scientists believe one reason for this is that exercise changes your DNA.

Epigenetic changes are small, reversible modifications to DNA molecules. These changes can alter the way the *genes* in your DNA behave. Genes contain the instructions that tell the cells in your body how to function.

To try to pin down the epigenetic effect of exercise, researchers at the Karolinska Institutet in Sweden recently had volunteers exercise on a stationary bike using only one leg. They did this for 45 minutes four times a week for three months. Then the scientists analyzed DNA in muscle cells from the legs that were exercised and compared it with DNA from the legs that weren’t.

The scientists found epigenetic changes in more than 5,000 different DNA sites in the exercised leg that weren’t seen in the unexercised one. Many changes they saw were related to genes that play a role in important processes for health. These included genes involved in *metabolism* (how energy is processed in the body) and *inflammation* (the process by which the body’s immune system fights infections).

QUESTIONS

1. What was the *control*—or standard used to compare results from the experimental treatment—in the scientists’ experiment?

- (A) the unexercised leg
- (B) the exercised leg
- (C) the amount of time that the volunteers exercised
- (D) the type of exercise done

2. What evidence did scientists find that indicated that exercise can cause epigenetic changes?

- (A) There was more DNA in the cells of the exercised leg than in the unexercised one.
- (B) DNA in the exercised leg showed chemical changes that weren’t seen in the unexercised leg.
- (C) DNA from the unexercised leg was damaged.
- (D) All genes in the exercised leg were more active than those in the unexercised leg.

3. Which of the following statements BEST represents the central idea of the passage?

- (A) Exercise lowers your risk of many diseases.
- (B) Epigenetic changes can affect your health.
- (C) Exercise can cause changes to your DNA.
- (D) Epigenetic changes can alter how genes behave.

4. Which of the following facts from “DNA Blasts Off!” is also supported by evidence in the passage above?

- (A) Epigenetic changes alter genes related to height.
- (B) Epigenetic changes can affect many biological processes in the body.
- (C) Exposure to radiation in space causes epigenetic changes.
- (D) Being in space can affect a person’s health.

5. Consider what you learned in the passage above and in “DNA Blasts Off!” about the factors that can cause epigenetic changes. What are three factors that may have caused epigenetic changes in the DNA of Scott Kelly that did not occur in the DNA of his twin brother, Mark, who remained on Earth?

On a separate sheet of paper, Write a 250-300 word essay about how this relates to abilities and traits that these brothers will pass on to their children.