Anti-cancer genes are prolific in pachyderms

By Associated Press, adapted by Newsela staff on 10.20.15

CHICAGO, Ill. — Cancer is one of the most frightening and terrible diseases humans face. It causes the uncontrolled growth of cells within human bodies. The cells invade tissue, often in the form of lumps called tumors. When those tumors are too numerous and large, they can choke off life. If they are inside lungs, for example, they can eventually make breathing impossible.

Because cancer involves out-of-control cells, it seems logical that large animals would be more likely than small animals to develop the disease. After all, they have many more cells. Surprisingly, that is not the case. Cancer is much rarer in elephants than in humans, even though elephants’ huge bodies have many more cells.

Scientists now think they may have found a reason for that puzzling fact. Their discovery might someday lead to new ways to protect people from cancer.
More Genes – But Scientists Didn't Know Why

Two teams of scientists have discovered that elephants' cells contain 20 copies of a major cancer-blocking gene known as p53. By comparison, human cells have just one copy of that gene. The p53 gene helps damaged cells repair themselves or self-destruct when exposed to cancer-causing substances.

The new studies do not prove the extra p53 genes make elephants cancer-resistant. Further study will be needed before scientists can be absolutely sure what is going on.

If proof is found, scientists could try to develop new kinds of medicines for humans. Such medicines would attempt to copy the way p53 genes behave.

Cancer expert Dr. Joshua Schiffman led one of the scientific teams. He began his research after hearing a lecture a few years ago. The speaker said large animals, including elephants and whales, have lower cancer rates than smaller species do, even though they have many more cells. Scientists had no idea why.

The speaker added that elephants seem to have extra copies of a gene known as p53.

Looking For Clues In Elephant Blood

Schiffman was already familiar with p53 genes. His patients include children whose p53 genes are incomplete because of a condition called Li-Fraumeni syndrome. The condition greatly increases their chances of developing cancer.

Schiffman decided to see if elephants do indeed have extra p53 genes, and if so, how many. He set out to look for clues in blood samples taken from eight elephants.

His team — along with a second group of scientists — eventually determined that elephant cells have 20 copies of the p53 gene. The second team found that many other species have only one copy per cell, just like humans.

Schiffman and his team also looked at how elephant cells react to radiation, which is known to cause cancer. They compared the elephant cells with a set of human cells, which were also exposed to radiation. The human cells came from 10 healthy humans and 10 patients with Li-Fraumeni syndrome.

Elephant Deaths From Cancer Are Rare

When cells become cancerous, the body has two ways of protecting itself. Damaged cells can repair themselves, or they can destroy themselves. If neither happens, the cells start to grow uncontrollably and the cancer spreads.

When exposed to radiation, the elephant and human cells Schiffman tested behaved very differently. The elephant cells self-destructed at twice the rate of healthy human cells and more than five times the rate of cells from patients with Li-Fraumeni syndrome.
Schiffman's team also found that only about 1 in 20 elephants dies of cancer, compared with about 1 in 4 humans. This is true even though elephants can live as long as humans.

**Tests On Humans Are Years Away**

The second group of scientists looked at more than 60 other species besides elephants. They found that only elephants and wooly mammoths, an ancient, long-dead relative of today's elephant, have extra copies of p53.

The second team also inserted elephants' p53 genes into mouse cells. They found that those cells then behaved just like elephant cells and self-destructed when exposed to damaging substances.

Schiffman's team hopes to look into possible treatments based on the elephant research. Studies on humans are at least several years away, but "we certainly think we've found something very intriguing," Schiffman said.
Quiz

1. Select the paragraph from the section "Looking For Clues In Elephant Blood" that would be MOST important to include in a summary of the article.

2. Which of the following two sentences from the article include the CENTRAL ideas of the article?

   1. The new studies do not prove the extra p53 genes make elephants cancer-resistant.
   2. Schiffman’s team also found that only about 1 in 20 elephants dies of cancer, compared with about 1 in 4 humans.
   3. Schiffman’s team hopes to look into possible treatments based on the elephant research.
   4. They found that only elephants and wooly mammoths, an ancient, long-dead relative of today’s elephant, have extra copies of p53.

   (A) 1 and 2
   (B) 2 and 3
   (C) 1 and 3
   (D) 3 and 4

3. Which sentences from the article BEST explains why the scientists studied elephants?

   (A) Cancer is one of the most frightening and terrible diseases that humans face.
   (B) Schiffman and his team also looked at how elephant cells react to radiation, which is known to cause cancer.
   (C) Cancer is much rarer in elephants than in humans, even though elephants’ huge bodies have many more cells.
   (D) The second group of scientists looked at more than 60 other species besides elephants.
Select the sentence from the section "Elephant Deaths From Cancer Are Rare" that BEST explains why elephants rarely die from cancer.

(A) When exposed to radiation, the elephant and human cells Schiffman tested behaved very differently.

(B) Schiffman's team also found that only about 1 in 20 elephants dies of cancer, compared with about 1 in 4 humans.

(C) Damaged cells can repair themselves, or they can destroy themselves.

(D) The elephant cells self-destructed at twice the rate of healthy human cells and more than five times the rate of cells from patients with Li-Fraumeni syndrome.