AoW 11 Directions:

1. Annotate (write your thoughts, questions, etc.) the text (10 points)
2. Identify (circle, underline, highlight, etc.) key words in 1-4. (5 points each question)
3. Circle the BEST answers for 1-4. (10 points each question)
4. On a separate sheet of paper, write a 3-5 sentence rationale justifying your chosen answer for 1-4. (5 points for each rationale)
5. Write a well-written paragraph summary of this text. Your summary must be 5-7 sentences. (10 points)

DNA from Neanderthal ancestors gives us immunity, allergies, studies find

By Los Angeles Times, adapted by Newsela staff
01.19.16

Some people sneeze and rub their itchy eyes when flowers bloom and pets come too near. Scientists say they may fall victim to allergies because of their Neanderthal DNA.

Research shows that tens of thousands of years ago, ancient humans and Neanderthals interbred. Neanderthals were a type of early Stone Age, primitive man who lived in what is now Europe and Asia. Today, about 2 percent of the DNA in most people can be traced to those unions. DNA controls how every part of the human body develops and works. Scientists are trying to determine what part Neanderthal genetics, inherited characteristics and physical traits, play in people today.

Scientists believe that 50,000 years ago, humans who left Africa encountered Neanderthals during their travels. The meetings happened somewhere in the Middle East and sometimes led to interbreeding. Evidence of this is apparent in the genomes, or inheritable traits, of people with ancestors from Europe and Asia.

In the scientific magazine American Journal of Human Genetics, two groups of scientists published work with similar conclusions. They say that genes, or units of DNA, that protect against pathogens were probably inherited from Neanderthals. Pathogens are bacteria, viruses or fungi that cause disease.

Spreading The Immunity

The scientists say that the same genes also seem to affect allergies. Janet Kelso is a researcher at the Max Planck Institute for Evolutionary Anthropology in Germany. She was one of the authors of one of the new studies. Kelso says, “Perhaps this is some kind of trade-off. Increased resistance to bacterial infection was advantageous, but may have resulted in some increased sensitivity to non-pathogenic allergens."

Not everyone with Neanderthal DNA inherited the same genes. Immunity genes seem to be more popular than others. In some Asian and European groups, researchers found that Neanderthal immunity genes are present in half of the population. “That’s huge. It came as a big surprise to us,” says Lluis Quintana-Murci, a geneticist at the Pasteur Institute in France, who was an author of the other study.

Peter Parham is a professor at Stanford School of Medicine in Stanford, California. He says that research shows that Neanderthal genes served human ancestors well because they are still so plentiful today. Parham says that if the DNA were not valuable, it would have been flushed out of the human gene pool.

Both of the research groups note a cluster of three specific genes. These genes make up part of the body’s innate immune response to bacteria and viruses. Innate immunity is when people are born already protected from certain diseases.

Acquired Vs. Innate Responses

The innate immune response is different from the acquired immune response. The second type is gained through vaccines or simply getting sick. Innate immunity kicks in first and can destroy a pathogen in a few hours, before a person even knows that he or she is sick. Quintana-Murci says that innate immune response has been a strong player in positive selection. Positive selection is when helpful traits increase in frequency in a population over time.

Both groups of researchers came to the same conclusion: Neanderthal DNA plays an important role in immunity. However, the teams asked different questions when they began their studies.

Quintana-Murci’s group is trying to understand how microscopic pathogens influence the human genome. The spread of disease has killed many people throughout history. Therefore, immunity genes must spread through natural selection. Only those who adapt to their environment survive and pass their genes to succeeding generations, and those less adapted are eliminated.

Survive And Thrive Thanks To Neanderthals

In their research, Quintana-Murci and his team examined 1,500 innate immunity genes in people. Then they matched them up with a map of Neanderthal DNA in the human genome. The team figured out how much Neanderthal DNA was in innate immunity genes and other genes. When they compared the amounts, they found that innate immunity genes had more Neanderthal.

Kelso's group is interested in ancient genomes like those of Neanderthals. It wants to find the results of the interbreeding between ancient humans and Neanderthals. The scientists studied the genomes of thousands of present-day people from all over the world, looking for similarity to Neanderthal DNA. Then they checked how often they found the similarities. Kelso says, "What emerged was this region containing three genes involved in the innate immune system."

Scientists say that they still need to figure out exactly how Neanderthal DNA helped humans survive. However, they are already certain that interbreeding with Neanderthals helped early humans when they left Africa. "The things we have inherited from Neanderthals are largely things that have allowed us to adapt to our environment," Kelso says.

**from newsela.com

1. Based on the section "Acquired Vs. Innate Responses," which sentence BEST explains the function of innate immunity in a person?
    a. Innate immunity results after a person has become sick, and it helps the person heal.
    b. Innate immunity appears as a result of acquired immunity, and it helps a person heal.
    c. Innate immunity exists in the DNA of a person, and it protects the person from becoming sick.
    d. Innate immunity spreads into the genes of a person during an illness, and it destroys harmful DNA.

2. Which is a conclusion of scientific studies about Neanderthal DNA?
    a. It is present in small amounts in modern humans.
    b. It is the cause of many inherited pathogens.
    c. It helps protect against common allergies.
    d. It contributes to how modern humans think.

3. Read the quote from the section "Spreading The Immunity." Kelso says, "Perhaps this is some kind of trade-off. Increased resistance to bacterial infection was advantageous, but may have resulted in some increased sensitivity to non-pathogenic allergens." Which answer choice means the same as "advantageous" as it is used in the quote?
    a. ambitious
    b. beneficial
    c. lucky
    d. superficial

4. Read the sentence from the second paragraph of the article. Scientists are trying to determine what part Neanderthal genetics, inherited characteristics and physical traits, play in people today. Which of these meanings of the word "play" is used in the sentence?
    a. to act the part of
    b. to engage in for enjoyment instead of practical reasons
    c. to be involved in something in a specific way
    d. to act carelessly with something

SUMMARY: