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6.08 Immune System Mystery

Introduction: Although your body has several lines of defense to fight off infections, it is especially important to do what you can to avoid the pathogens entering your system in the first place. In this assignment, you will be given a scenario about a pathogen. Use what you learned in Lesson 6.08 to solve this immune system mystery.



Scenario



In a small area of Connecticut, a group of children and adults were suffering from some puzzling health issues. Their symptom included swollen knees, paralysis, skin rashes, headaches, and severe chronic fatigue. These families were left undiagnosed and untreated during the 1960s and 1970s. Scientists noticed all patients lived in small towns and rural areas. Their symptoms started around the same time of year. In the 1980s, a scientist named Willy Burgdorfer found a connection between a deer tick and the disease. A bacterial pathogen called a spirochete, carried by ticks, was causing the symptoms now called Lyme. Doctors began to use several antibiotics to treat the disease, being successful, especially with patients who get treated early on.

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Questions: Using what you have learned in the lesson and the scenario, answer the following questions in complete sentences. **Do not copy and paste from any source! Your answers should be in your own words to avoid being flagged for Academic Integrity.** Remember that the purpose of these questions is to assess your understanding of the scenario AND what learned in Lesson 6.08 about specific and nonspecific immune system defenses.

Imagine a person infected with Lyme disease has very few functioning T-cells. How would this affect the body's ability to respond to the infection? Use evidence from the lesson to support your answer. Be sure to include the role of T-cells in your answer.

Hint: Refer to pages 3 and 4 of Lesson 6.08.

Why do you think it is beneficial for a pathogen to make its host sick without killing the host? **Hint:** In Lesson 4.03 of Biology A, you learned about distinct types of symbiotic relationships. Include in your answer which type of relationship is represented by a pathogen and its host (mutualism, parasitism, commensalism, competition, or predation.) If you need a refresher, click here: [mutualism, parasitism, commensalism, competition, or predation](#)

Doctors noticed that patients improved after taking antibiotics. What does this observation suggest about the type of pathogen causing the disease? Explain your reasoning. **Hint:** Refer to page 6 of Lesson 6.08.

A person recovers from a disease and is exposed to the same pathogen several years later. Predict how the immune system will respond and explain why. **Hint:** Refer to pages 4 and 5 of Lesson 6.08.

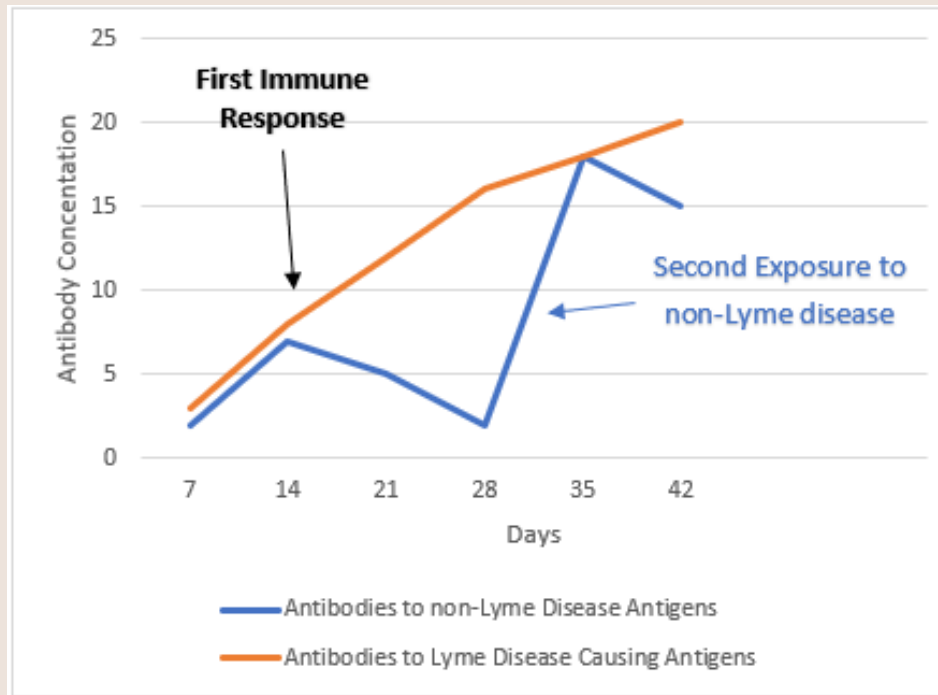
Using your knowledge of external nonspecific defenses how could someone prevent Lyme disease in the first place? **Refer to page 3 of Lesson 6.08 to review external nonspecific defenses.**

Analyzing Data: Analyze the data in the graph below by answering the following questions. Be sure to use complete sentences. **Do not copy and paste**

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Examine the Lyme disease antibody response shown in the graph. Approximately how long does it take for the body to produce detectable antibodies after the first exposure to Lyme disease bacteria? Support your answer with data from the graph.

Hint: When is the antibody level above 0 on the graph?

What does the rapid increase in antibodies to non-Lyme disease antigens after Day 28 (blue line) suggest about the immune system's previous exposure to that antigen?

Hint: Non-Lyme disease is a different type of pathogen. Think about why antibodies are formed and use clues on the graph to determine why they would increase.

Doctors often recommend treating Lyme disease as soon as possible. Based on what you know about bacterial infections, explain why early treatment is important.

What evidence from the graph suggests that the immune system is still responding to Lyme disease antigens after Day 28?

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Although antibiotic resistance has not been observed for *B. burgdorferi*, create an argument defending the control of antibiotic use to the public. **Hint: Refer to page 6 of Lesson 6.08.**

