**STUDENT NAME:**

The Parasite Predicament

Diagnosing and Investigating the Transmission of an Infectious Disease



A 36 year old woman has been rushed to the hospital. Her symptoms are similar to those of the flu, but she has not responded to antiviral influenza medicine. The patient’s family history is recorded, as well as a recent travel record. The travel record from the last two years includes a camping trip in the northwestern United States, and a cruise around the Mediterranean.

The patient’s family history reveals that the patient’s maternal aunt and paternal grandfather had Sickle Cell Disease, a heritable disease. The patient is being tested for Sickle Cell Disease, but these results have not been received yet. Sickle Cell trait (the state of being a carrier for sickle disease) may reduce the severity of malaria because it changes the shape of the red blood cell where the malaria parasite lives. The malaria parasite does not fit into a sickle shaped red blood cell.

Since the patient does not know if she is a carrier for Sickle Cell trait, and based on the patient’s recent travel, the patient will be tested for malaria. Malaria is a parasite-borne infectious disease. The mosquito’s bite introduces the parasite from the mosquito’s saliva into the person’s blood. The parasite then travels to the liver where it matures and reproduces. The parasite ruptures from the liver and infects red blood cells and multiplies further. This cycle causes fevers, headache, shivering, joint pain, vomiting, yellowing of the skin (jaundice), retinal damage and convulsions. A hallmark of malaria is the cyclical occurrence of sudden coldness followed by shivering, fever and sweating every 36-48 hours.

To test your patient for malaria, you will use an enzyme-linked immunosorbent assay (ELISA), which will demonstrate the presence of malarial antibodies with color change. An ELISA tests for the presence of a specific antigen for a particular antibody. Antigens serve as the target for the receptors of an immune response. Antibodies are large Y-shaped proteins that identify and neutralize pathogens.

**PART I - Introduction**

1. What is malaria and how will we test for it?
2. What are antigens?
3. What are antibodies?

**PART II - Antibody Antigen Relationship**

1. Label the antibody and the receptor site. Then select the antigen that matches with this antibody.

 

**PART III - ELISA Assay**

**ADDING OUR SAMPLES**

 

1. What does the positive control contain that the negative control does not?

**ANTIBODY ADDITION**

1. What is the antigen-antibody relationship?

1. What is the importance of washing the wells (specifically with Tween)?

1. Why is it important to wash the wells in between the addition of the primary and secondary antibodies?

**PART IV - Results and Analysis**

1. Answer the following question using the Claim, Evidence, Reasoning chart below.
	1. Does the patient test positive for the malaria parasite?

|  |  |
| --- | --- |
| **CLAIM** | **EVIDENCE** |
| Use the above question to formulate a complete answer. Your answer to the question is your claim. It is like a thesis statement, or something you’re trying to prove. The patient tested ...  | **Evidence:** List 2-3 pieces of information that support your claim. Each should be specific observations or calculations taken directly from the activities in this lab.1.2.3. Now that we have our three pieces of information. We need to make an evidence statement.*From the assay, I know…* |
| **REASONING** |
| **Reasoning:** Describe and show how your pieces of evidence support your claim. You also want to describe any connections you can make between your claim/evidence and other scientific principles you already know. Use relevant facts and general concepts from your scientific knowledge in this section to expand on your evidence and support your claim. *The evidence shows…**I know that…* *Therefore, I can conclude that…* |

1. If your patient has malaria, what conclusions can you make about the patient’s pending test results for Sickle Cell trait? If no, what next step recommendations would you make?