Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Project ID: \_\_\_\_\_\_\_\_\_\_

Period: \_\_\_\_\_\_\_\_\_\_

Teacher: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date: \_\_\_\_\_\_\_\_\_\_\_

**Lesson 7: “Does Genetic Resistance to HIV Exist?”**

Before seeing any evidence, which model do you think is the right one? Circle your selection.

Model 1: Genetic resistance to HIV does not exist.

Model 2: Genetic resistance to HIV does exist.

1. Write your reasons for the model you picked.

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**Do Now**

1. Explain the difference between HIV and AIDS.

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**Evidence 1 – FIV Video**

**Video Summary:** The following is a summary of the video about FIV in cats.

**Introduction:** FIV stands for Feline Immunodeficiency Virus. FIV is a virus that attacks the immune system in house cats in a way that is similar to how HIV attacks the immune system in humans.

FIV was first observed in house cats, also called domestic cats. Dr. Stephen O’ Brien noticed that house cats could get FIV very easily, and he was worried that FIV would spread from house cats to the large wild cats like cheetahs, lions, and pumas. Many of these species of large wild cats are endangered and could become extinct. Dr. O’Brien was afraid that many of these endangered species could die out if they were exposed to FIV.

**Method:** Dr. O’Brien gathered blood samples from thousands of large wild cats from around the world. He analyzed these samples. He used well known, reliable techniques for analyzing the blood for the presence of the virus.

**Results:** Most large wild cats like cheetahs, lions, and pumas already had FIV in their blood. However, they were not negatively affected by it because they possessed a genetic mutation that makes them resistant to the disease. Even though large wild cats get the virus, they do not become sick. Unlike wild cats, house cats do not have this genetic mutation and are not resistant to the disease. When house cats get infected with FIV, they often become very sick and can die.

**Conclusion:** From the blood samples of thousands of wild cats and house cats, Dr. O’Brien concluded that wild cats are genetically resistant to FIV, and house cats are not genetically resistant to FIV.

3A. Most wild cats who get FIV become sick and can die. True False

3B. House cats do not get the FIV resistant gene. True False

4. Geeta and Jose are arguing about this evidence. Circle the one you agree with the most.

A. Geeta thinks cats are mammals like humans and research on cats is useful for understanding HIV.

B.Jose thinks cats are different from humans and research on cats is not useful for understanding HIV.

C. I don’t agree with either of them.

Explain your choice for your answer to question 4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Evidence 2 – Greater Area Health Clinic**

**Interview Report:**

It is common for people with HIV to be treated in health clinics. A journalist interested in whether some people are genetically resistant to HIV interviewed the nurses and doctors at the Greater Area Health Clinic.

The journalist interviewed fifteen different nurses and doctors at this health clinic. Here are a few things the interviewees said:

Dr. Gutierrez: “It used to be, back in the 1980s, people would come in with HIV and there was very little that we could do to help. In the 1990s we developed medicine that attacked HIV in the blood stream. This reduced the infection but it didn’t cure it. People taking the medicine people live longer than people who don’t take the medicine.”

Nurse Singh: “I have worked in the labor and delivery ward for twenty-seven years. It used to be that if a pregnant woman came in and she had HIV, the baby would usually get the disease too. Now we can give mothers some medicine that reduces the chance the baby will get it. If the mothers don’t get the medicine, the babies will still usually get the disease.”

Dr. Morse: “With my patients I try to stress the point that everyone can get HIV. You can get it from injecting drugs with contaminated needles or having sex with someone who has the disease.”

Lab Assistant Feld: “I have worked in the blood lab for about five years. We check patients’ blood for HIV. The test is about 99% accurate. I have never met anyone who is resistant to HIV. We have had some patients who thought they were resistant because they injected drugs for a long time and didn’t get it. But within a few years they eventually got HIV.”

5. How do you rate the quality of this piece of evidence (0, 1, or 2)?

Give reasons for your rating.

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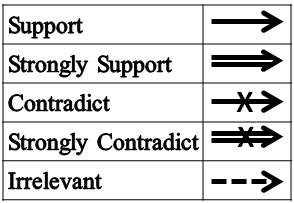
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**Arrows Diagram**

|  |  |  |
| --- | --- | --- |
| **Evidence Goodness Rating** | **Model 1: Genetic resistance to HIV does not exist.** | **Model 2: Genetic resistance to HIV does exist.** |
| **1. FIV Video**  lions |  |  |
| **2. Greater Area Health Clinic: Interview Report** |  |  |



6. For evidence 1 and evidence 2 rate the evidence (0, 1, or 2) and then draw an arrow for how the evidence relates to each model. Make sure to put ratings and arrows for **both** pieces of evidence.

7. How does evidence 2 relate to Model 2? Give reasons for the arrow you chose.

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8. Which model is better? Circle your selection.

Model 1: Genetic resistance to HIV does not exist.

Model 2: Genetic resistance to HIV does exist.

9. Which model do you think is best and why? Be sure to give reasons for your answer.

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**Evidence 3 – SIV**

**Introduction:** Monkeys can be infected by SIV (Simian Immunodeficiency Virus). SIV is similar to HIV, the virus found in humans. Some monkeys seem to be resistant to SIV even when exposed to the virus. Resistant monkeys have SIV in their blood, but they do not develop AIDS. Monkeys that are not resistant to SIV develop AIDS and get sick.

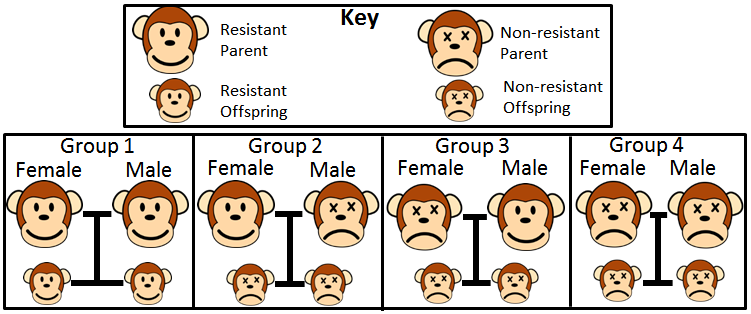
**Method and Results:** Scientists did four breeding experiments with eight parent monkeys. The groups were completely separated so that they did not have contact with monkeys outside of their group. All monkeys were tested for SIV resistance using high-quality blood tests.

**Group 1:** A resistant mother and resistant father have resistant offspring

**Group 2:** A resistant mother and non-resistant father have non-resistant offspring

**Group 3:** A non-resistant mother and resistant father have non-resistant offspring

**Group 4:** A non-resistant mother and non-resistant father have non-resistant offspring



10a. Is SIV resistance in monkeys genetic? Circle your answer.

1. No it is not genetic.
2. Yes it is genetic and resistance is a dominant trait.
3. Yes it is genetic and resistance is a recessive trait.

10b. Explain why it is or is not genetic based on the results of this study. Give reasons for your answer.

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**Evidence 4 – Dr. Paxton’s Study**

**Introduction:** During the 1990s Dr. Paxton heard that there were some people who had been exposed to HIV, but didn’t develop AIDS. He wanted to see if their immune system cells would be resistant to HIV if they were exposed to it again. People who have unprotected sex or inject illegal drugs are more likely to get HIV, so they decided to study these people.

**Method:** Dr. Paxton and his team of researchers studied a group of 25 people who had been exposed to HIV many times. Despite many exposures, the people in the study were HIV negative, which means that there was no HIV in their blood.

The researchers used white blood cells taken from these 25 people. The white blood cells were exposed to different levels of HIV in a test tube.

**Results:** All 25 peoples’ white blood cells showed some resistance. Some people had immune system cells that were resistant to very high levels of HIV in the test tube.

11. What conclusion do you draw from this study? Explain your answer.

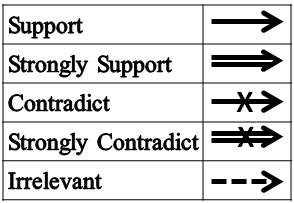
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**Arrows Diagram**

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| --- | --- | --- |
| **Evidence Goodness Rating** | **Model 1**  **Genetic resistance to HIV does not exist.** | **Model 2**  **Genetic resistance to HIV in does exist.** |
| **1. FIV Video**  lions |  |  |
| **2. Greater Area Health Clinic: Interview Report** |  |  |
| **3. SIV Study** |  |  |
| **4. Paxton Study** |  |  |



12. For **all** the pieces of evidence make sure to rate them (0, 1, or 2) and draw an arrow for how the evidence relates to each model.

13. Which model is better? Circle your selection.

Model 1: Genetic resistance to HIV does not exist.

Model 2: Genetic resistance to HIV does exist.

14. Which evidence is most useful for helping you decide between the models? Explain why.

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15. Write an argument to support your model. Write to someone who may not agree with you. Give detailed reasons for your answer.

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16. In pairs discuss the following four questions.

Which evidence is the best evidence?

Which evidence helps you the most to decide which model is better?

What is the best argument for Model 1?

What is the best argument for Model 2?

17. As a class discuss which model is best. Give lots of reasons for your answers.