

How Do Antiretroviral Drugs Work?

HIV is a retrovirus. Retroviruses are a group of viruses that cause AIDS and some types of cancer. They carry their genetic information in the form of RNA and then copy it into DNA that is integrated into the cell's nucleus. Unfortunately, there is no cure for HIV at this time. There are only ways to control HIV and attempts to keep it from progressing into AIDS. In this activity, you will address the question below through a series of tasks.

HIV/AIDS is not curable at this point in time. Why is this the case based on currently available drugs?

Part of your assignment will be to discover – the same way scientists do – how to treat HIV/AIDS. You will present your findings to the class through diagrams and descriptions and then have a chance to compare your deductions to those of actual scientists.

PBS Video: HIV Immunity Questions

Watch the PBS video, *Surviving AIDS: HIV Immunity*, and respond to the questions below.

1. What is the benefit of studying the extreme situations in a viral infection?
2. How does HIV infect a cell?
3. What are some possible ways people can be resistant to HIV?
4. What potential benefit does this knowledge of how people can become immune to HIV offer?

Mystery of the Black Death: Clues and Evidence Questions

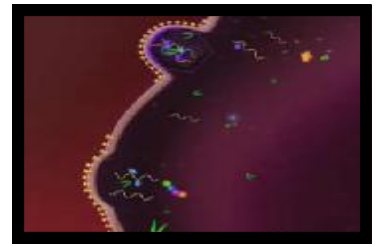
Read the *Clues and Evidence* article and respond to the following questions.

(http://www.pbs.org/wnet/secrets/case_plague/clues.html)

1. How is studying a virus different from studying a bacteria?
2. What evidence indicates that there is a relationship between individuals with ancestors who survived the plague and those resistant to HIV?
3. What is a type of drug mentioned in the article that is used to inhibit HIV from affecting a cell? How does it work?



Studying the Life Cycle of HIV



Using only the attached HIV lifecycle, determine at least three more stages in the lifecycle, in addition to the one identified in the article, where a drug can be developed to prevent HIV from spreading in the body. Draw and explain your group's response below by using a scientific approach – develop a hypothesis and discuss how you could test your hypothesis about how this “drug” would prevent the spread of HIV in an individual's body. In other words, what would you look for to indicate that the drug was effective in blocking the HIV lifecycle? You will share your findings with the class, so be sure to explain in a clear and well-supported manner.



How do Antiretroviral Drugs Work Video

Watch the *How do Antiretroviral Drugs Work* video from the Koshland Science Museum Website

(http://koshlandscience.org/exhib_infectious/hiv_antivirals_movie1.jsp). In your group compare your findings about how antiretroviral drugs can interrupt the life cycle of HIV to that of the video, then respond to the questions below.

1. How do your findings compare to those of scientists? How close were you in identifying stages in the infection pathway current drugs target?
2. Currently, what is the standard way to treat an HIV infection with medicine? Why is this the case?
3. You have seen how people develop a natural immunity to certain infectious diseases through vaccines. As of yet, we do not have a vaccine for HIV. Why is this the case? Think about the why HIV is effective at spreading so quickly throughout the body.