High School Science Virtual Learning

Applied Biological Science
Viruses & Cancer

April 27, 2020

High School Applied Biological Science
Lesson: April 27, 2020

Objective/Learning Target:

Recognize that viruses can insert their DNA or RNA into a host cell, causing the host cell's genes to mutate which can sometimes cause the cell to become cancerous.

Let's Get Started:

Begin by watching this video and answer the following questions:

1. What is a virus and how does it reproduce?
2. What is the difference between the lytic and lysogenic viral reproduction cycles?
3. How might this lead to cancer?

Let's Get Started: Answer

Begin by watching this video and answer the following questions:

1. What is a virus and how does it reproduce?
    a. A small infectious particle that inserts DNA/RNA into host cells to make more viruses
2. What is the difference between the lytic and lysogenic viral reproduction cycles?
    a. Lytic cycle- active cycle of virus that makes copies of virus, lysogenic- inactive cycle that incorporates genetic material in host cell DNA
3. How might this lead to cancer?
    a. Can insert into host DNA causing mutations leading to cancer

Lesson Activity:

After reading the information found on this website, fill in the table below as to how each virus can lead to cancer.

Virus	Cancer Potential/Prevention
Human Papillomavirus (HPV)	
Epstein-Barr Virus (EBV)	
Hepatitis B Virus (HBV) and Hepatitis C Virus (HCV)	

Lesson Activity: Answers

Virus	Cancer Potential/Prevention
Human Papillomavirus (HPV)	• STI which is main cause of cervical cancer • Causes abnormal cells to start growing/eventually turn into cancer cells • Linked to mouth/throat cancer • Vaccine available to protect against 4 types
Epstein-Barr Virus (EBV)	• Type of herpes virus known for causing infectious mononucleosis (mono) • infects/stays in B lymphocytes • Infection increases risk of developing nasopharyngeal cancer and Burkitt lymphoma • Also linked to Hodgkin's disease and stomach cancer • No vaccine/medications available
Hepatitis B Virus (HBV) and Hepatitis C Virus (HCV)	• Both known to cause liver infections • Long-term infection increases risk of developing liver cancer • Vaccine to prevent HBV • Few medications effective at treating HBV and HCV

Practice Questions

For each statement, indicate which virus(es) is associated using the information from your activity.

1. These viruses are mostly associated with liver cancers.
2. This virus currently has no vaccine.
3. If you have had mononucleosis, you have been infected with this virus.
4. This virus is mostly associated with cervical cancer.

Practice Questions - Answers

1. HBV/HCV
2. EBV
3. EBV
4. HPV

Additional Practice

1. Check your understanding by taking this online quiz of the viral life cycle.
2. Test your knowledge by completing this viral worksheet.

Additional Practice

1. View this article to learn how scientists are using viruses to fight cancer using Oncolytic Viral Therapy.
2. Watch this lecture from Dr. John Bell summarizing everything from this lesson and current applications in medicine.