

Infection Storyboard Lesson Plans

A curriculum activity to complement “Outwitting Bacteria’s Wily Ways” by B. Brett Finlay for the December 1999 HHMI Holiday Lecture “2000 and Beyond: Confronting the Microbe Menace”

This activity was developed by the 2002 South Dakota Gene Explorers Summer Teachers’ Workshop

Lesson Plan for Advanced Biology Grades 11-12

Objectives

Students will be able to:

- Define the term pathogen.
- Be able to describe the process by which a bacterium invades a cell.
- Be able to draw the process by which a type 3 secretion system is used by bacteria to invade a mammalian cell.

Activities

1. Ask the students how a bacterium invades a mammalian cell?
2. Follow up by showing the students the animation of an E.coli infection. The animation is available on the December 1999 HHMI Holiday Lecture “2000 and Beyond: confronting the microbe menace” DVD. Select DVD Extras on the main DVD menu. On the DVD Extras menu select Animations & Video Clips. The select E. coli infection.
3. Ask students:
 - a. To describe the process of E. coli infecting a mammalian cell?
 - b. To name the system that allows E.coli to invade a cell?
 - c. To describe what happens inside the cell when the Type 3 secretion system is working.

Assignment

Have your students make a storyboard about the process of bacteria invading a cell.

Grading Rubric (30 pts)

Include 6 panels

- Drawing of mammalian cell
- Bacteria attaching to cell
- Bacteria and Type 3 secretion system
- Bacteria anchoring to cell
- Happenings inside the cell
- Throne

Each panel

- Illustrated (2 pts @)
- Labeled (1 pt @)
- Explained correctly (2 pts @)

Reference

2000 and Beyond: Confronting the Microbe Menace. Howard Hughes Medical Institute Holiday Lectures. December 1999.

Lesson Plan for General Biology Grade 10

Objectives

Students will be able to:

- Differentiate a virus from a mammalian cell.
- Describe the process by which a virus infects a cell.
- Describe the process of viral replication.
- Describe how a disease spreads throughout a culture.

Activities

1. Ask students how a virus replicates itself?
2. Follow up by showing the students the animation of the viral infection. The animation is available on the December 1999 HHMI Holiday Lecture “2000 and Beyond: confronting the microbe menace” DVD. Select DVD Extras on the main DVD menu. On the DVD Extras menu select Animations & Video Clips. The select Viral Infection
3. Ask students:
 - How does a virus get into a mammalian cell?
 - Where do viruses replicate their DNA? RNA?
 - How do viruses replicate themselves?
 - How does a virus produce a systemic infection?

Assessment

Have students make a storyboard describing the process of a virus infecting a host cell and subsequent systemic infection.

Grading Rubric

- Have 7 panels
 - Host cells
 - Virus attaching to host cell
 - Virus losing protective shell
 - Where virus replicates
 - Replacing protective shell
 - Leaving cell
 - Infecting other cells
- Each panel
 - Illustrated (2 pts @)
 - Labeled (1 pt @)
 - Correctly described (2 pts @)

Reference

2000 and Beyond: Confronting the Microbe Menace. Howard Hughes Medical Institute Holiday Lectures. December 1999.