Outline on viruses essay

A. Is a Virus Alive? 1. Viruses are segments of nucleic acids contained in a protein coat.

2. Pathogens are agents that cause disease. 3. Viruses do not grow, do not have homeostasis, and do not metabolize, therefore scientists don’t consider them to be living. 4. Discovery of Viruses i. Scientists filtered bacteria from the sap of infected plants, and were surprised to find that the filtered sap could still cause uninfected plants to become infected.

ii. In 1935, Wendell Stanley of the Rockefeller Institute purified tobacco mosaic virus. The crystallized the purified virus, and concluded that TMV is a chemical rather than an organism. B. Viral Structure 1. The virus protein coat, or capsid, may contain either RNA or DNA, but not both. 2. Many viruses, such as the influenza virus, have a membrane, or envelope, surrounding the capsid.

3. The envelope consists of proteins, lipids, and glycoproteins, which are proteins with attached carbohydrate molecules. 4. Viruses exist in a variety of shapes, from rods, spheres, polyhedral figures, etc. 5. Viruses that infect bacteria are called bacteriophages. C. Viral Reproduction 1.

Lytic Cycle i. In bacterial viruses, the cycle of viral infection, replication, and cell destruction is called the lytic cycle. .

Lysogenic Cycle i. In the lysogenic cycle, the viral genome replicates without destroying the host cell. ii. During an infection, some viruses stay inside the cells but do not make new viruses. Instead of producing virus particles, the viral gene is inserted into the host chromosomes and is called a provirus. 3.

Host Cell Specificity i. Viruses are often restricted to certain kinds of cells. For example, TMV can infect tobacco and related plants, but not animals. Scientists hypothesize this specificity may be due to the viruses' origin. 4.

Structure of HIV-an Enveloped Virus i. Many viruses that infect only animals, such as influenza, have an exterior viral envelope. ii. In many cases, the viral envelope is composed of a lipid bilayer derived from the membrane of the host cell. D.

How HIV Infects Cells 1. Entry into Macrophages i. HIV cannot enter a cell merely by docking onto a CD4 receptor. Rather; the HIV glycoprotein must also bind to a co-receptor called CCR5. This binding allows the viral capsid to enter the cell. ii.

Human macrophages possess both CD4 and CCR5 receptors, therefore HIV can enter macrophages. 2. Replication i.

Once inside a cell, the HIV capsid comes apart and releases its contents, which include the viral RNA. ii. Accompanying the RNA is an enzyme called reverse transcriptase. iii. Reverse transcriptase uses the viral RNA as a template for making a DAN version of the viral genome. 3. AIDS i. For years after the initial infection, HIV continues to replicate (and mutate).

Eventually and by chance, HIV's surface glycoproteins change such that they now recognize a new co-receptor. ii. This co-receptor is found on the subset of lymphocytes called T cells.

iii. Usually, HIV-infected people do not develop AIDS symptoms until years after infection. As a result, an HIV-infected individual can feel healthy and

still spread the virus to others. E. Viral Diseases 1. Emerging Viruses i. Newly recognized viruses or viruses that have reappeared or spread to new areas are called emerging viruses.

2. Prions and Viroids i. In 1982, the American scientist Stanley Prusiner, of Stanford University, described a new class of pathogens that he called prions. ii. Prions are composed of proteins but have no nucleic acid. iii.

A viroid is a single strand of RNA that has no capsid.