

Virus Paper

- I. Information on viruses, in general (as it applies to almost any virus)
- a. Non-cellular organisms
 - b. Some scientists consider viruses “living” Dr. H does not
 - i. Metabolize substances
 - ii. Reproduce (on their own) (viruses hijack the host cell machinery)
 - iii. Divide/Grow
 - iv. Viruses can exist outside a host cell, but not “live.”
 - c. Grouped based upon
 - i. Genetic material (DNA or RNA; “mix”)
 - ii. Capsid shape (general size)
 - iii. Enveloped or non-enveloped
 - iv. Host cells that they infect
- HIV is a RETROVIRUS
Genetic material: RNA
Material to make: reverse transcriptase
Capsid:
Enveloped:
- II. Information on YOUR virus
- a. Family to which this virus belongs (*Retroviridae*)
 - b. Retrovirus (important because of reverse transcriptase)
 - c. Polyhedral capsid (shape of the “container” that holds the genetic material of the virus)
 - d. Envelope with spikes
 - i. gp: glycoprotein – use these to attach to host cells
 - ii. gp120 and gp41 are used to attach to CD4 on a helper Tcell
 - iii. CD4 is a protein on the surface of helper Tcells
 - e. Host cell it infects (above)
 - i. Mode of infection
 - ii. Mode exit (bud form host cells—takes part of the plasma with it when leaving)
 - f. Transmission
 - i. Direct contact: blood and body fluids, sexual contact/sharing IV needles
 - ii. Blood transfusions with HIV+ blood
 - iii. Placental transmission
 - iv. Latent period? Yep
 - g. Diseases
 - i. Knocks out human immune system – AIDS
 - ii. Kaposi’s sarcoma
 - iii. *Cryptococcus neoformans*; *Cryptococcus pneumoniae*; *Pneumocystis pneumoniae* – pneumonia caused by these organisms
 - iv. Aspergillosis – fungal infections (*Aspergillus fumigatus*)
 - v. *Mycobacterium tuberculosis*—especially, if you have had tuberculosis. HIV will bring the tuberculosis out of latency.
 - vi. Parasites: cryptosporidium, *Ascaris lumbricoides*
 - vii. Become susceptible to normal flora that become opportunistic pathogens
 1. *Candida albicans* – yeast infections; thrush
 2. *Staphylococcus aureus*
 3. HSV I/II (Herpes); HPV (Human Papilloma Virus); VZV – Chicken pox
 4. More viruses, more bacteria, more fungi
 - h. Treatment for HIV
 - i. Protease inhibitors (block viral replication)
 - ii. Block gp120 and gp41 with antibodies (Entry inhibitors)
 - iii. Vaccines are in development
 - iv. Interferon
 - v. Anti-retrovirals (ARVs) – inhibit or block the activity of reverse transcriptase