

HIV

- Human immunodeficiency virus
- Causes AIDS
 - RNA envelope virus
- Uses studs for cell recognition/entry
- Covered with glycoprotein spikes (gp120)
 - gp120 attaches to receptor on host cell
 - 1st attaches to CD4 the CCR5 receptor (needs 2 receptors)
- HIV attacks T-cells (type of white blood cell) which are a critical part of the immune system
 - As T-cells die you become much more susceptible to infections
 - AIDS- stays dormant for 8-10 years
- Enters cell based upon receptor recognition
- Capsid breaks apart, releasing RNA into the cytoplasm
 - RNA + reverse transcriptase
 - **Retrovirus**
 - Reverse transcriptase produces a double-stranded DNA copy of RNA
 - DNA then goes into the nucleus and inserts itself into host cell genome- DNA copy= **provirus**
 - DNA is replicated and hijacks cellular replication synthesis
- Treatments
 - Target stable, important structures/processes
 - 1) Entry Inhibitors
 - a. Block binding of gp120 on receptor
 - b. Block fusion of viral envelope with cell membrane
 - c. Gene therapy- Australian chap with CCR5- changes 32 mutation
 - 2) Reverse Transcriptase inhibitors
 - a. Block DNA/provirus synthesis
 - b. AZT, NRTI
 - c. Protease inhibitors → target virion building stage

Ebola

- Filovirus- filamentous structure
- Helical capsid + RNA
- Surrounded by lipid membrane with glycoprotein studs
- Hemorrhagic fever → multiple organ dysfunction syndrome
 - Central Nervous System, Respiratory System, Digestive System, Circulatory System
- Spread through close contact with blood, feces, or vomit from an infected individual
 - Must be taken in through nose, mouth, eyes, or cuts.
- Likely reservoir species- (3 species)

- o Fruit bats → fruits → chimp/gorilla/duiker → poach animals/hunting → come into contact with blood → human infection

SARS

- Severe Acute Respiratory Syndrome
- RNA envelope virus
- Effects respiratory system
- Reservoir species = civets (like foxes)

Hantavirus

- RNA virus
- In Southwestern United States
- Attacks respiratory and kidney system
- Lots of Rain → lots of food → lots of mice → mice carry hanta → increased human contact → feces and urine that is aerosolized

Poxviruses

- Envelope virus with capsid and DNA
- Lower error rates → lower mutation rates
- Not constantly dealing with new strains