Viruses

Obligate intracellular parasites: Required to reproduce within a host
- Always requires ribosomes from host cell

Retrovirus-HIV	**Antigenic Drift v. Antigenic Shift** *relating to Influenza*
--->Huge genome section rearranged ---->Changes host range *this is how they think HIV first evolved from monkeys*	Influenza is a -ssRNA Virus
Infection Cycle	*Does it encode for its own polymerase?* - Minus sense RNA cant be read as RNA - Host cells dont have an RNA dependent polymerase so virus has to bring it in to transform the minus into a plus
1. HIV enters host cell and rleases the capsid and RNA strands	*Does it carry its own polymerase?* -Minus cant be read as mRNA, so we have to switch to a plus....Minus ssRNA has to bring the protein in to make the other RNA - Plus ssRNA can be read as mRNA so it encodes instead of carries
2. The viral RNA gets *Reverse Transcriptase* attached to it so that it can start to be read as RNA-DNA hybrid, which is the same as the host cell DNA	**Antigenetic Drift** - over time the virus genes are going to start to drift and change because it will start to accumulate mutations *NOT DRASTIC*

Viruses (cont)

3. New incognedo viral RNA enters the nucleus and gets replicated along with the host cell DNA	**Antigenic Shift** - a new virus subtype is created because of a *superinfection* which is viral dna reassortment *-DRASTIC CHANGE* most common in flu
*Retro virus is positive but works different because it carries into the cell reverse transcriptase which makes RNA go back to DNA --> Creates undercover spy to get replicated with host DNA	H1N1 and H3N2 both able to penetrate organism. Both at same time so genes will rearrange and mesh/recombine --> Create virus strain of H1N2

A graduate student in a virology lab sends the genome of a novel virus for sequencing. Upon the return of the sequence, the student analyzes the genome and notices there are no polymerase genes. Due to this result, she concludes that it is a: ***dsDNA virus***

Nutrient Aquision

Diverse Group

Energy Source

Phototrophs
(light)

Chemotrophs
(chemicals)

-->1. Organic (chemoorganotrophs)

-->2. Inorganic (chemolithotrophs)

Carbon Source

Autotrophs

Heterotrophs
(only from organic matter)

Bacteria can be any combination of the above

Humans are Chemoorganoheterotrophs

Their metabolic abilities are very different than all other organisms so they can survive in crazy places (bacteria)

Fungi are decomposers. They get everything they need from organic matter.
chemoorganoheterotrophs

Bacteria

Biofilms

- a group of microorganisms that stick together to a surface.

Bacteria (cont)

Biofilms/bacteria are studied in a controlled lab setting seperately, but they mix together in nature

Bacteria live in communities and it is stable

The arrangement of communities are the biofilm. they attach themselves to a place with nutrients and then secrete jelly matrix and then the others start to join

All different kinds of bacteria together!
--> *antibiotics dont function with these structures because they cant penetrate the entire structure.*
- biofilm forms holes and uses the pressure for nutrients and dispersion

? If the mitochondria and chloroplasts in eukaryotic cells resulted from endosymbiosis, what features might we expect these organelles to contain? **?**
a plasma membrane, DNA, and ribosomes

Fungi

Absorptive Feeding	Life Cycle
1. Hypha secrete digestive enzyme	1. Plasmogamy (fusion of cytoplasm)
2. Break down into organicc compounds	2. Heterokaryotic Stage -- Cytoplasms fuse together but not the nuclei *(not diploid or haploid)*
3. Reabsorbed back into hypa	3. Nuclei fuses only diploid part of the lifecycles (2n)
4. Water follows by osmosis - Pressure increases and pushes molecules through structure to relieve pressure	4. Divide and reproduce by spores get relocated to environment where they thrive
*One of the characteristics is that they have hypha that grow very quickly (**function**)* ---> ***form**: thin filaments dont need a lot of energy and have lots of surface area to absorb nutrients*	5. Grow into mycelium a. Can either produce spores on its own and reproducing them (asexual) -Just depending on mutations for gene diversity b. Can fuse with another one and start cycle over to create genetic diversity

Monophyletic: group that contains *all* descendants of a common ancestor

Protists

Diverse evolutionary lineage

Giardia

the Creepy Happy Parasite

Contains two nuclei
Same DNA content
- Same time of replication
- Same transcriptional activity

Lacks mitochondria
- Has mitochonrial remnanr
- Relies primarily on glucose as energy source

Two forms
- Motile flagellated
- Non-motile cyst

Giardia infection is the most frequently diagnosed intestinal parasitic disease in the United States

The Ciliates

Have two types of vacuoles
-Food Vacuoles
-- Digestion of food{{nl-Contractive Vacuoles
--Regulation of water balance

Amoebas

Tubulinids

Slime Molds