

Viruses

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

Retrovirus-HIV

---> Huge genome section rearranged
----> Changes host range
this is how they think HIV first evolved from monkeys

Infection Cycle

1. HIV enters host cell and releases the capsid and RNA strands

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

Antigenic Drift v. Antigenic Shift

relating to Influenza

Influenza is a -ssRNA Virus

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

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

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 incognito viral RNA enters the nucleus and gets replicated along with the host cell DNA

*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

Antigenic Shift

- a new virus subtype is created because of a *superinfection* which is viral dna reassortment
-DRASTIC CHANGE
most common in flu

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 Acquisition

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 separately, 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

1. Hypha secrete digestive enzyme

2. Break down into organic compounds

3. Reabsorbed back into hypha

4. Water follows by osmosis
- Pressure increases and pushes molecules through structure to relieve pressure

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*

Life Cycle

1. Plasmogamy (fusion of cytoplasm)

2. Heterokaryotic Stage
-- Cytoplasm fuse together but not the nuclei (*not diploid or haploid*)

3. Nuclei fuses only diploid part of the lifecycles (2n)

4. Divide and reproduce by spores get relocated to environment where they thrive

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 mitochondrial remnant
- 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
- Contractile Vacuoles
-- Regulation of water balance

Amoebas

Tubulinids

Slime Molds

