

Viruses & Bacteria

What's a VIRUS

- Viruses are non-living
 - They cannot perform all of life functions such as respire, grow or develop
- Extremely small (half the size of a bacterium)
- Viruses CAN replicate
 - Viruses replicate in a host cell (viruses are parasite to the HOST)

Viral Structure

- Contains an inner core of DNA or RNA (nucleic acid)
- Outer core protein called a CAPSID
- Some viruses have an additional outer covering called an envelope
- There are several viral shapes

Viral Shapes



Polyhedral



Helical



Spherical



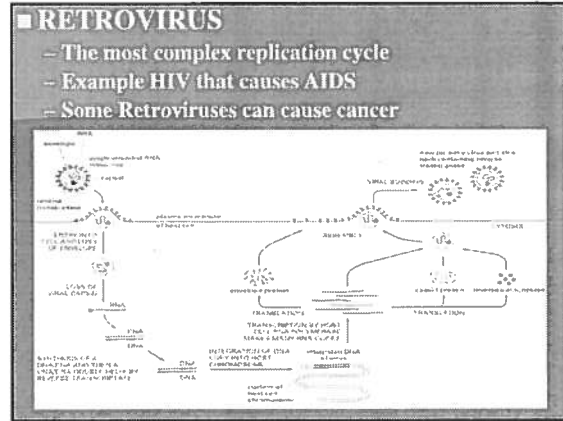
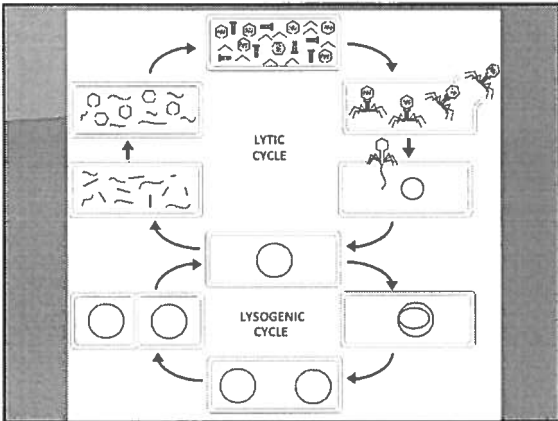
Bacteriophage

Viral Replication

- Lytic Cycle
 - Attachment to host cell
 - Bacteriophage injects its nucleic acid
 - Host cell replicates viral nucleic acid and protein
 - Assemble new viruses
 - Release
 - Host cell breaks (lysis) releasing new virus particles
 - Kills host cell

LYSOGENIC CYCLE

- Bacteriophage invades Bacteria
- Virus specificity varies
- Viral DNA becomes part of HOST DNA & is inactive until stimulated
- Known as a PROVIRUS or PROPHAGE
- The provirus may leave the chromosome and enter into the LYTIC CYCLE
- The Lysogenic cycle does NOT kill the HOST



Diseases Cause by VIRUSES pg 525

- Measles
- Mumps
- Rubella
- Chicken Pox
- Small Pox
- Hepatitis
- Flu
- HIV
- Vaccinations are used to protect against certain slow evolving viruses
- New strains of HIV, FLU & Cold viruses are common

Bacteria

- 2 Kingdoms- EUBACTERIA & ARCHAEBACTERIA
- PROKARYOTES (very small)
- UNICELLULAR
- Some bacteria have flagella/flagellum for movement
- Some have an endospore that protects the bacteria from its environment

Bacteria CONT.

- Most reproduce by BINARY FISSION (asexual)
- Some reproduce by CONJUGATION (sexual)
- CELL WALL
 - If there are 2 cell walls the bacteria is GRAM-
 - Gram- bacteria stain pink & resist many antibiotics
 - If there is only 1 cell wall the bacteria is GRAM+
 - Gram+ stain purple & are more easy to control with antibiotics

Gram Stains

The image shows two types of Gram stains. The top panel shows Gram-positive bacteria, specifically *Streptococcus*, which appear as purple-stained chains. The bottom panel shows Gram-negative bacteria, specifically *E. coli*, which appear as pink-stained individual cells.

3 Bacterial Shapes

Coccus=spherical shape



Bacillus=rod shape



Diplo= bacteria arranged in pairs

Spirillum=spiral shape



Staphylo= bacteria looks like grapes

Strepto= bacteria in chains

Importance of Bacteria

- Fix Nitrogen
- Allow for nutrient recycling/eat oil
- Used in FOOD production
 - Cheese, pickles, yogurt, etc.
- Can be used to produce HORMONES
- ANTIBIOTICS
- Produce OXYGEN=Cyanobacteria like *Abena* are photosynthetic autotrophs

Bacteria & Disease pg 524

- | | |
|--------------------------|------------------|
| ■ <i>M. tuberculosis</i> | ■ Tuberculosis |
| ■ <i>C. tetani</i> | ■ Bubonic Plague |
| ■ <i>T. pallidum</i> | ■ Tetanus |
| ■ <i>C. botulinum</i> | ■ Lyme Disease |
| ■ <i>E. coli</i> | ■ Pneumonia |
| ■ <i>Streptococcus</i> | ■ Some STD's |
| ■ <i>Staphylococcus</i> | ■ Botulism |
| ■ <i>Abena</i> | ■ Strep throat |
| | ■ Salmonella |

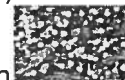
Controlling Bacterial Diseases

- Sanitation
- Good Hygiene
- Sterilization
- Heat/COLD
- Use of Antibiotics
 - Penicillin=breaks down the bacteria's cell wall
 - 1st Antibiotic
 - Tetracycline
 - Streptomycin
 - Always take an antibiotic that is prescribed for the duration of the prescription.

KINGDOM PROTISTA

3 Groups

- Animal-like Protists
 - Called PROTOZOANS classified by how they move.
- Plant-like Protists
 - Called ALGAE classified by their photosynthetic pigments (color)
- Fungus-like Protists
 - Classified by their reproduction



METHODS OF MOVEMENT for Protozoa (Animal Like Protists)

- Flagella
 - long, whiplike structure
- Cilia
 - short hairlike structures
- Pseudopods
 - False feet
 - Flowing extensions of cell body

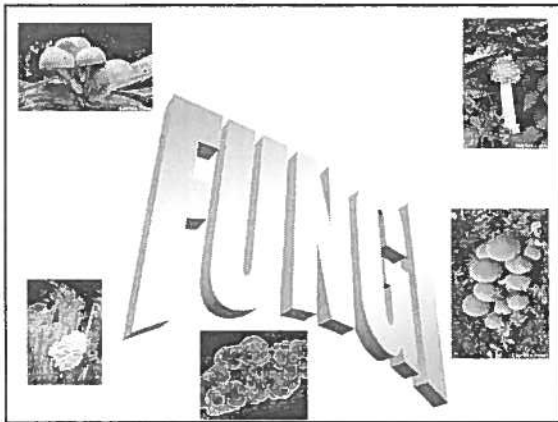


METHODS OF REPRODUCTION

- Mitosis (Asexual)
 - Simple division into two identical cells (binary fission)
- Meiosis (Sexual)
 - Nucleus divides by meiosis then two paramecia exchange nuclear material (conjugation)

DISEASES CAUSED BY PROTISTS

- Malaria is caused by Plasmodium
- Potato Famine caused by water mold

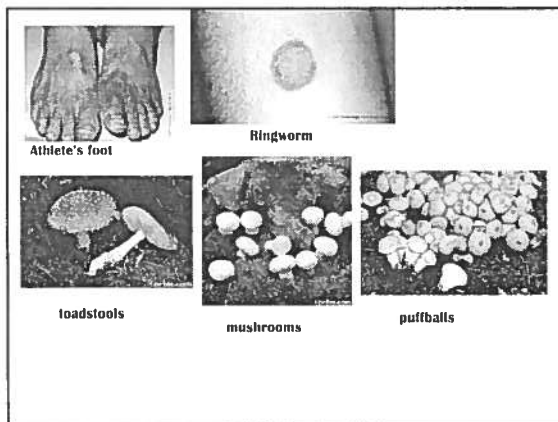
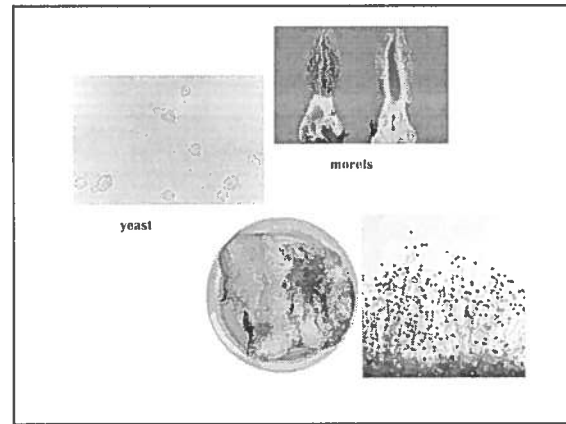


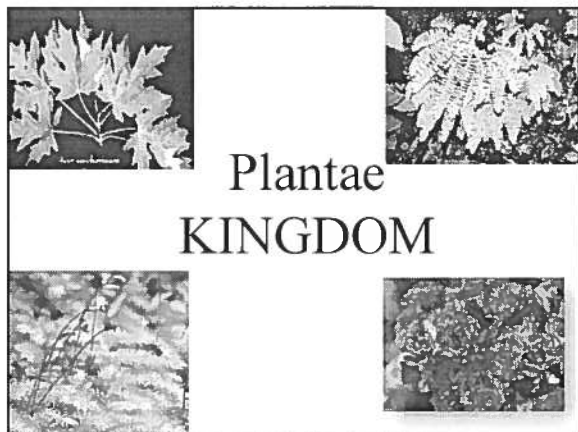
General Characteristics

- Eukaryotic
- Most multicellular
- Heterotrophic decomposers
- Classified by how they reproduce
 - Create spores (asexual and sexual stages)
 - Budding and Fragmentation (asexual)

Structures/Adaptations

- Hyphae
- Rhizoids
- Mycelium
- Cap
- Cell wall of chitin





General Characteristics

- Multicellular & Eukaryotic
- Reproduce by spores (Alt. of Generations) some by seeds
- Chlorophyll
- Autotrophic (Photosynthesis)
- Thick CELL WALL made of CELLULOSE



Classification of Plants

- Based on their reproduction & their presents of vascular tissues
- Three Main Groups
 - NonVascular NonSeed
 - Vascular NonSeed
 - Vascular Seed

Animals

- Eukaryotic
- Multicellular
- Heterotrophs
 - Herbivores
 - Omnivores
 - Carnivores
- LACK Cell Wall
- Body Systems
- Most Reproduce Sexually
- Classified by Vertebrates & Invertebrates (no backbone)

