PROTISTS AND FUNGI
Commonalities / Differences in the Protist Kingdom

• All are eukaryotes (cells with nuclei).
• Live in moist surroundings.
• Unicellular or multicellular.
• Autotrophs, heterotrophs, or both.
• Some can move - others cannot.
3 categories of Protists

• Animal-like
• Fungus-like
• Plant-like
Animal-like Protists (Protozoans)

* Unicellular

* Heterotrophs

* 4 groups based on movement: those with flagella, cilia, pseudopods and the ‘others’.
Protozoans with pseudopods

• Pseudopods also called ‘false feet’

• Cell membrane pushes in one direction & the cytoplasm flows into the bulge. This allows the protozoan to move, dragging the rest of the cell behind it.
Pseudopods, cont.

EXAMPLE OF HOW PSEUDOPODS MOVE

FLOW

PUSH

DRAG
It can form 2 pseudopods to surround & trap food. Then form a food vacuole to break down food in the cytoplasm.
Pseudopods, cont.

- Reproduce by binary fission like bacteria.
- Contractile vacuole - it collects extra H2O & expels it from cell.
- Thin cell membrane - no definite shape.
- Example of a pseudopod - Amoeba.
Protozoans with cilia

• Cilia - hairlike structures - help organisms move, get food and sense environment.

• Multicellular with 2 nuclei.
  • 1 nuclei controls everyday functions
  • 1 nuclei is for reproduction.
• Reproduce by binary fission (asexual) or conjugation (sexual).
Cilia, cont.

- Oral groove lined with cilia - moves H2O containing food into food vacuole at end of oral groove.
- Food vacuole breaks down food and sends through cell.
- Anal pore sends out waste.
- Example of protozoan w/ cilia: paramecium.
Protozoans with flagella

- Organisms called zooflagellates
- Use long whiplike part called flagella to move.
- These usually live inside other organisms.
Other Protozoans

• Called **sporozoans** - parasites
• Feed on cells & body fluids of hosts

Sporozoans like *Plasmodium* (causes malaria) have more than 1 host: mosquitoes and then humans
Funguslike Protists

• Like animals - they are heterotrophs
• Like plants - they have cell walls
• Reproduce by spores (tiny cells that can grow into a new organism)
• Not in fungi kingdom because they can move at one point in their lives.
• An example is mildew.
Plantlike Protists

• Better known as algae
• Autotrophs
• Size: unicellular to very large
• Contain different pigments so they come in different colors.
• Euglena: special type of algae - when there is no sunlight they become heterotrophic.
Fungi Kingdom

- Eukaryotes.
- Use spores to reproduce.
- Heterotrophs feed by extracellular digestion, secreting enzymes and absorbing digested material.
- Need warm, moist places to grow.
- Examples: yeast, molds and mushrooms.
Fungi - Obtaining food

• use a structure called **hyphae** to get their food.

• **Except for yeast which are unicellular.**

• **Hyphae:** threadlike tubes. Shape of fungi depends on how hyphae used.

AND...
The fungus grows hyphae into food then hyphae secrete digestive chemicals into food. After food is broken down, hyphae absorb it.
Reproduction in Fungi

• produce thousands of spores with a protective covering: carried by water and air.

• spores land in a warm, moist place where they grow.
Reproduction in Fungi, cont.

When plenty of moisture, fungi reproduce *asexually* by releasing the spores. When conditions are not good, they reproduce *sexually*, making new spores that are different from both parents.
• Since yeast is unicellular, they reproduce by budding (asexual). A well fed cell grows from the body of the mother cell and breaks off from the original cell.
Four classifications of Fungi

• **Threadlike** - produce spores in their threadlike hyphae (ex. Bread mold)
• **Sac** - produce spores in structures that look like sacs (ex. Yeast)
Club - produce spores in structures that look like clubs (ex. Mushrooms)

Imperfect - those that cannot reproduce sexually (ex. Penicillin)
Negatives:

• spoiled food, diseases, poisonous mushrooms
Plant Diseases:

- Fungi can cause diseases such as **corn smut** which destroys corn kernels. Also can cause **wheat rust** which affects wheat fields.
Human Diseases

• Athletes foot
  – A fungal infection common on feet
• Candidiasis (Thrush) – yeast infection
Animal Diseases

- **Cordyceps**
  - A fungus that attacks certain species of ants and other arthropods in the rain forests of Costa Rica
Positives:

– Saprophytes - Decompose large quantities of Earth’s wastes- without fungi there would be large quantities of waste sitting around.
  
  • Break down complex organic substances into raw materials which living organisms need
Lichens

• A mutual symbiotic relationship between a **fungus** and a photosynthetic plant such as algae or cyanobacteria.
  – In a lichen, the fungus provides water for the plant to photosynthesize and the plant provides nutrients for the fungus to survive.
Mycorrhizae

- A mutualistic relationship between a fungus and roots of plants.
  - In mycorrhizae, the roots provide nutrients for the fungus and fungus provides water for the roots.