

Kingdom Monera & Protista Notes

Taxonomy = a way of grouping organisms based on similar characteristics ex) all vertebrates have a similar skeletal system.

Prokaryote = organisms which lack a true nucleus.

Eukaryote = organisms that have a true, membrane bound nucleus.

Autotroph = organisms that can make their own food. They can obtain food from their surrounding environment.

Heterotroph = organisms that cannot make their own food. They use autotrophs as a food source.

TAXONOMY

Kingdom
 Phylum
 Class
 Order
 Family
 Genus
 Species

Memory trick:

“Kitchen people can only feed good soup” OR

“King Philip Came Over From Great Spain”

Kingdom is the most general category

Species is the most specific category

Binomial nomenclature: We write the Genus name with a capital letter and the species name with a lower case letter. Both Genus and species names are either underlined or italicized.

Ex) Homo sapien or *Homo sapien*

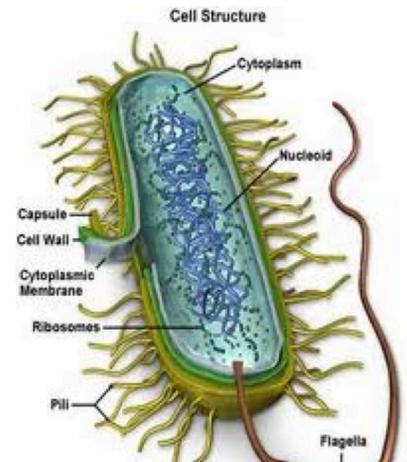
KINGDOM MONERA

5 main characteristics of bacteria:

1. Prokaryotes - *This is the only prokaryotic kingdom*
2. Unicellular
3. No membrane bound organelles in cytoplasm
4. Single circular chromosome
5. Reproduces by binary fission “splitting in two” – all bacteria undergo this form of asexual reproduction.

Diagram of a Typical Bacteria Cell

- **Pili** = for movement
- **Cell wall** = structure, support, & protection of bacteria
- **Cytoplasm** = fluid part around organelles
- **Ribosome** = make proteins
- **Flagellum** = some have these for movement
- **Chromosomes** = circular DNA – genetic information



Classification of Kingdom Monera

Two subkingdoms:

- **Subkingdom Archaeobacteria:**
 - Resemble 1st life forms on earth – primitive
 - Able to live in extreme conditions = extremophiles
 - Thermophiles – extreme temperature
 - Halophiles – very salty
 - Acidophiles – very acidic
 - Alkaliphiles – very basic
 - Methanogens – methane gas
- **Subkingdom Eubacteria:**
 - Largest group of Monerans
 - Majority of bacteria
 - Most are decomposers / heterotrophs / saprophytes
 - Some photosynthesize like *cyanobacteria* or chemosynthesize

KINGDOM PROTISTA

Characteristics:

- All eukaryotic
- Complex organelles – mitochondria, lysosomes...
- Most are unicellular
- Autotrophs, heterotrophs, or **both!!**
- All reproduce asexually, some sexually
- Found in water environments ex) pond, ocean, lake, puddle, or damp soil.
- 3 groups: plant-like, animal-like & fungi-like
 - **Plant-like protists** = called **phytoplankton**, autotrophs, supply oxygen, have cell walls
 - **Animal-like protists** = called **zooplankton**, heterotrophs, move, respond to stimuli
 - **Fungi-like protists** = slime molds, prefer shady, cool, damp areas, heterotrophs.

See table for classification of protists

Ecological roles of Protists

Plant-like Protists

Harmful:

1. **Euglenophytes** thrive where sewage is discharged because they can absorb nutrients.
 - Large masses of cells can result and are known as **blooms**.
 - When they run out of nutrients, they die and add to the waste matter. This can decrease the oxygen of lakes, which will affect fish & other creatures.
2. **Red Tide:** - blooms of dinoflagellates (Pyrrophyta) occur
 - they produce a toxin that can become concentrated in the tissues of shellfish (clams, mussels)
 - the toxin affects the nervous system causing illness, paralysis, or death of humans, fish and other marine animals

Beneficial:

1. Coral can contain dinoflagellates which photosynthesize. Coral can live off of the products of photosynthesis and therefore, can live where there are not many nutrients in the water.
2. Phytoplankton is an important part of the food chain for many organisms (whales, shrimp, & squid)
3. Phytoplankton produces oxygen for the Earth

Animal-like Protists

Harmful:

1. *Plasmodium* (Sporozoa) causes Malaria – passed on by a mosquito (vector = method of transfer)
2. *Trypanosomiasis* (Mastigophora/Zoomastigina) – causes African sleeping sickness – passed on by tsetse fly.
3. *Entamoeba* (Sarcodina) – amoeba that lives in the digestive tract and causes dysentery. Spread through contaminated water sources.

Beneficial:

1. *Trichonympha* (Mastigophora/ Zoomastigina) lives in the intestines of termites to digest wood (Termites cannot digest wood without them!= symbiotic)
2. Zooplankton are an important part of the food chain

Controlling Pathogenic Protists

By knowing how the protist reproduces, you can control their spread. This shows where the organism is vulnerable in their life cycle.

Ex. To control Malaria, they spray mosquitoes – same with Tsetse fly for African Sleeping sickness

Life Cycle of Plasmodium (Malaria)

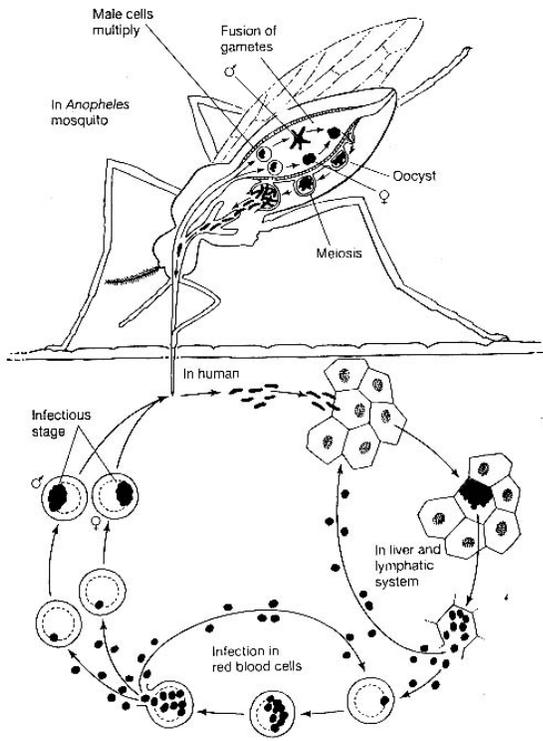


Figure 5.26 Life cycle of the malaria parasite *Plasmodium falciparum*

- Mosquito bites infected human & picks up *Plasmodium*
- *Plasmodium* develops inside the mosquito
- Mosquito bites human, injecting the *Plasmodium* in its saliva
- Infects the liver cells and bursts them open (lysis)
- Infects the red blood cells
- Red blood cells burst releasing *Plasmodium*. Some can now infect other red blood cells and others can infect mosquitoes.
- Cycle repeats

Slime Molds = Fungi-like Protists

- 2 parts to their life cycle:
 - a) Produces spores from **fruiting bodies** (reproductive structure).
 - These spores help spread the slime mold to new areas.
 - b) It is able to move to new areas by cytoplasmic streaming – like an amoeba.