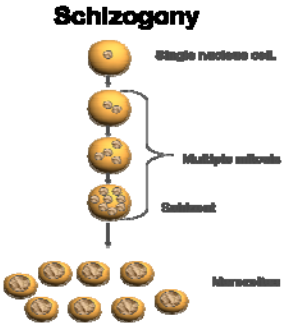
10: Eukaryotic Microbe Classification

Key Microbiology Terms

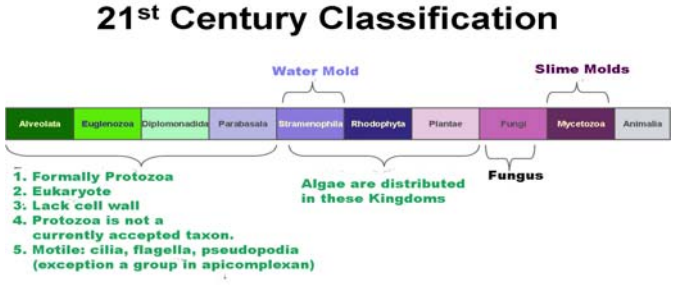
- **Algae:** Usually reproduce by alternating generations in which a haploid thallus alternates with a diploid thallus.
- **Chemoautotroph:** Obtain nutrients by phagocytizing bacteria and organic matter in decay and tissues of hosts.
- **Coenocytes**: Multinucleate cells created by delaying cytokinesis, as can occur in some algae and fungi, following mitosis.
- **Cyst:** Hardy resting stage of protozoa having thick capsule and slow metabolism. Not a reproductive form.
- **Cytokinesis**: Cytoplasmic division usually occurs simultaneously with telophase of mitosis. In some algae and fungi this may be delayed.
- **Gametocytes:** Produced by some sexually reproducing protozoa that fuse to become diploid zygote.
- **Hyphae:** Are either septate (with cross walls) or aseptate depending on the presence of crosswalls.
- **Kinetoplastids:** Are euglenozoans with a large mitochondrion that has a kinetoplast.
- **Meiosis:** A parent diploid nucleus divides and chromosomes cross over, creating four daughter cells.
- **Merozoites:** Uninucleate daughter cells that are released from a schizont.
- **Mitosis:** Is cell division in which nucleus divides and creates an identical copy.
- **Photoautotrophic:** Dinoflagellates and euglenoids are capable of making food products from light energy.
- **Schizogony:** Asexual reproduction (protozoan Plasmodium). Multiple mitoses form a multinucleate schizont. This is followed by cytokinesis.
- **Trophozoite:** Free living aquatic protozoa, motile feeding stage.

Schizogony



- Asexual reproduction a cell undergoes multiple mitoses creating a multinucleate cell (schizont). This multinucleate cell then simultaneously releases many uninucleate daughter cells called merozoites.
- Malaria causing Plasmodium reproduces this way inside red blood cells and liver. The release of merozoites results in the cyclic fever and chills associated with malaria.

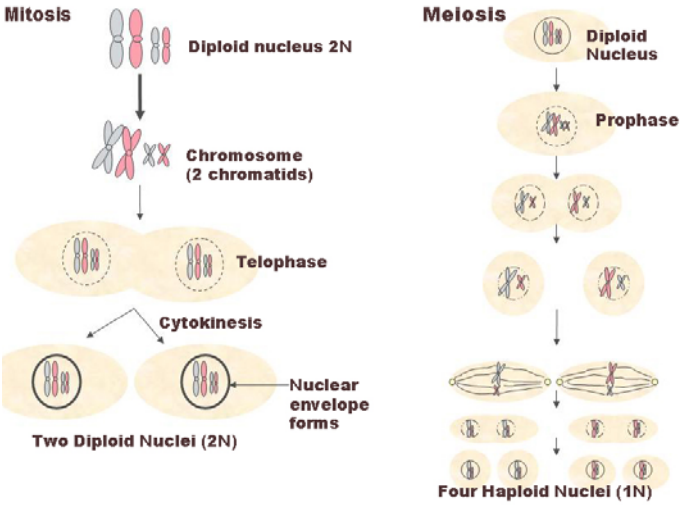
Modern Classification



Fungi, Protozoa, Algae, Water & Slime Molds Major Characteristics

Fungi: chemoheterotrophic eukaryotes that have cell walls typically composed of chitin. Saprophytic and parasitic organisms that lack chlorophyll and include molds, rusts, mildews, smuts, mushrooms and yeast.
Protozoa: Single-celled, eucaryotic microorganisms without cell walls. Most protozoa are free-living although many are parasitic. The majority of protozoa are aerobic or facultatively anaerobic heterotrophs.
Algae: Have cell walls with a diverse type of polysaccharides. Most are unicellular or filamentous. Phototrophic typically contain chlorophyll a and may have accessory pigments. Most algae are aquatic and live in the photic zone. Use sugar and starch as food reserves. 18S rRNA sequences are similar to plants and so are considered progenitors of plants.
Water Mold: Have tubular cristae in their mitochondria. Cell walls of cellulose. Spores have two flagella – one whip like the other like tinsel. True diploid thalli. Example: Phytophthora caused the great Irish potato famine of 1845.
Slime Mold: Feed by phagocytizing organic debris and bacteria. The thallus also called a plasmodium can have millions of diploid nuclei. Cytoplasmic streaming distributes the cells nutrients. When food or water is limiting the plasmodium will divides into cytoplasmic units which make a stalked sporangium. Meiosis occurs in the sporangia to make haploid spores. If water is not limiting myxamoebae make flagella a swim. Myxamoebae of opposite mating type fuse to form a diploid zygote.

Review of Mitosis & Meiosis



Meiosis: nuclear division that results in four nuclei with half the number of chromosomes.
Mitosis involves the nuclear replication that results in an exact copy of the parent cell.
There are typically four phases in mitosis: prophase, metaphase, anaphase and telophase.

Modern Classification

One of the current classification schemes of Kingdoms. This has incorporated the traditional criterion and the new information provided by rRNA, DNA and protein sequencing. The classification schemes are constantly changing based on new information.

How to Use This Cheat Sheet: These are the keys related this topic. Try to read through it carefully twice then rewrite it out on a blank sheet of paper. Review it again before the exams.