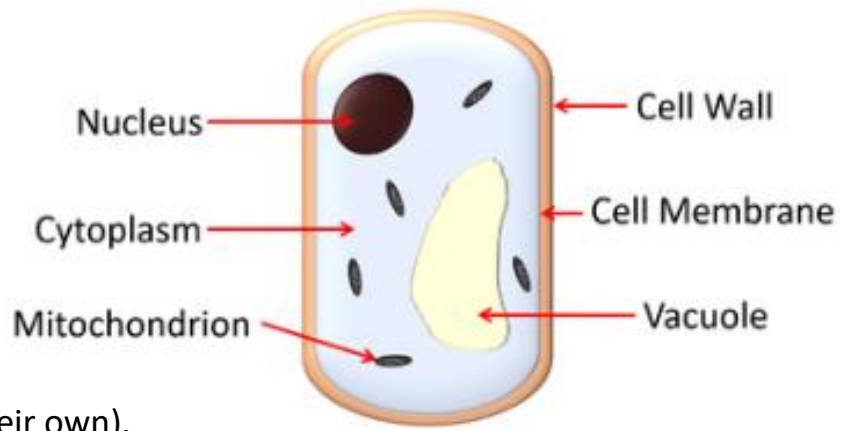
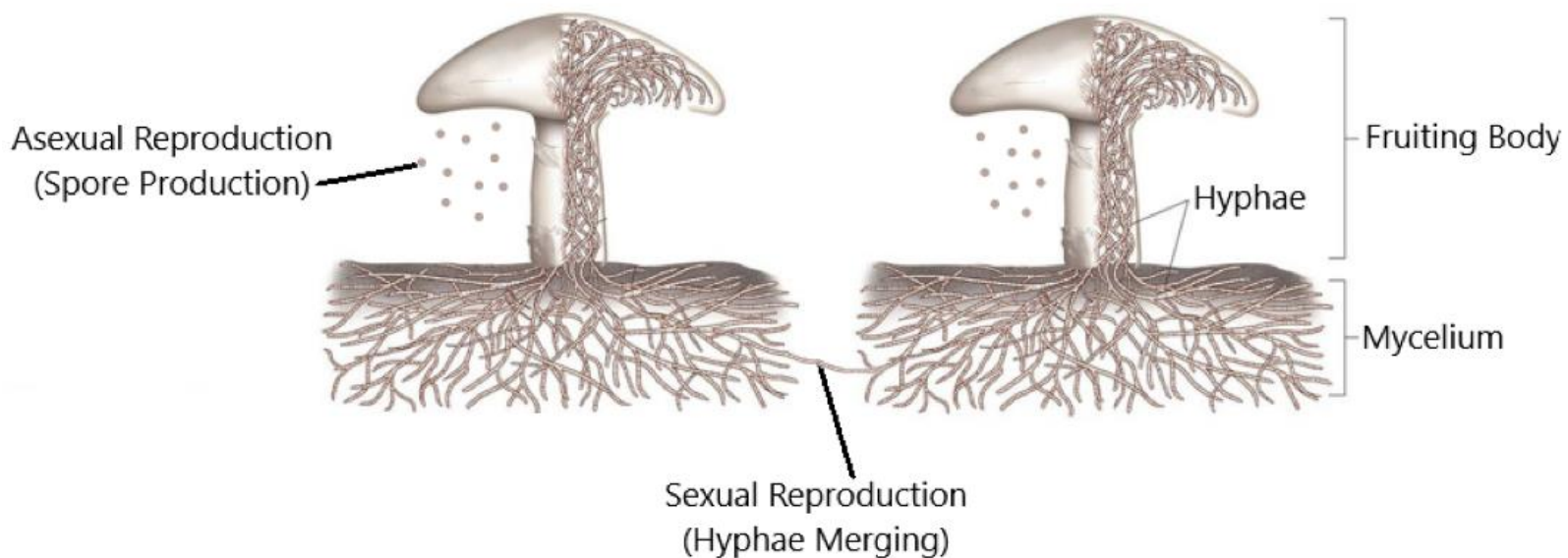


Fungi

- Eukaryotic cells.
- Heterotrophs.
- Mainly multicellular but some are unicellular (yeast).
- 140,000 known species (3-5 million unidentified species).
- Non-motile (don't move around on their own).
- Cell walls made of chitin (same material found in insect and crustacean exoskeletons).
- Mainly Saprophytes (feed on the deceased) therefore are considered decomposers.
- They do not ingest food like animals do, instead they burrow into and invade the substrate in which they are feeding while secreting digestive enzymes which break the food down allowing the nutrients to then be absorbed into their hyphae cells.
- Most reproduce **asexually** producing **spores** (see diagram below).
- Some reproduce **sexually** (see diagram below) and mate by merging hyphae underground, combining and exchanging genetic information. During this mating 2 hyphae cells merge while their individual nuclei remain separate for some time. Eventually the 2 nuclei fuse and exchange information, later separating and producing genetically unique spores.



Structure of a Typical Fungus

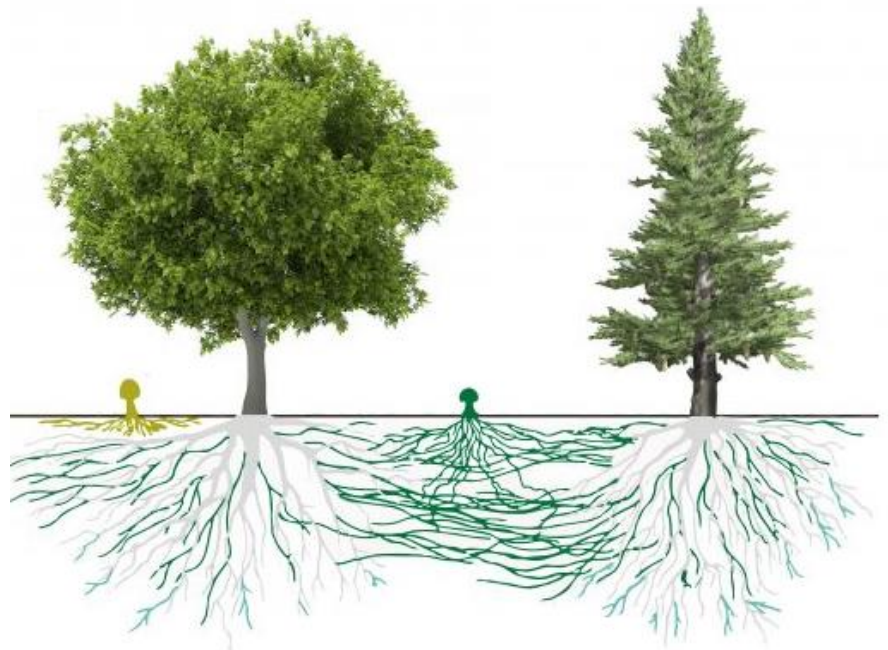
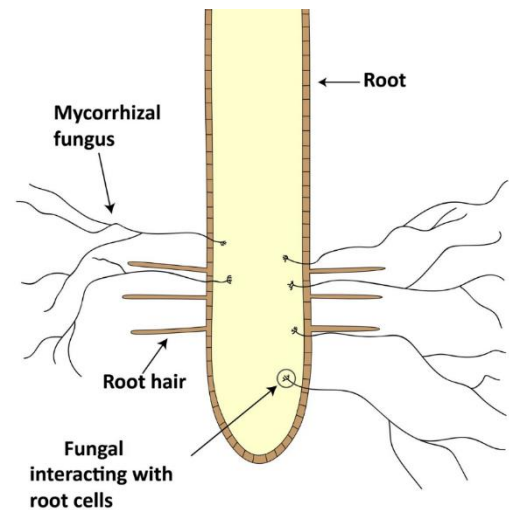
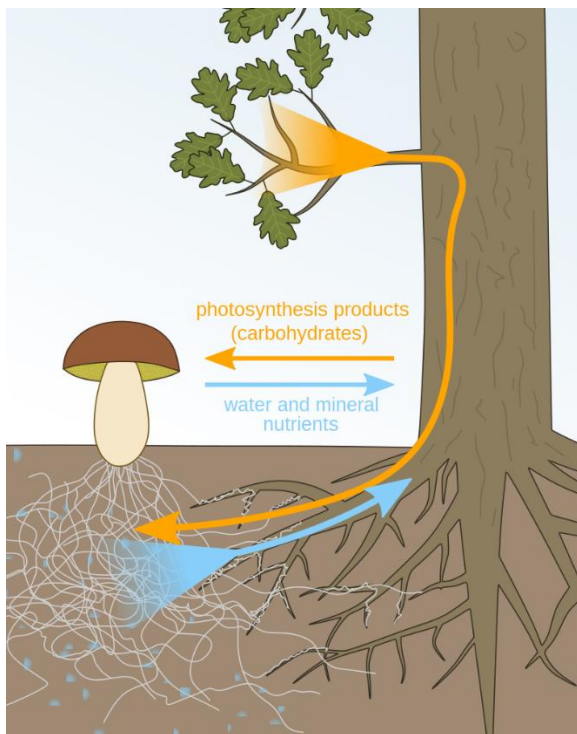


Helpful Examples

- Some, like mushrooms, are a food source.
- Yeast used to make breads, wine, beer, and other alcoholic beverages and some cheeses.
- Some help produce various antibiotics (penicillin).

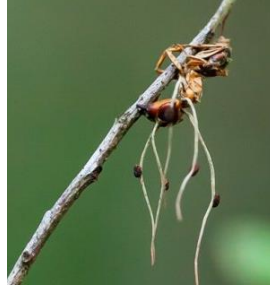
Fungi play a massively important role on earth in both returning nutrients to the soil and aiding plants in the absorption of those nutrients.

- They return nutrients to the soil by decomposing dead organic material.
- Mycorrhiza (fungal roots) are found in over 90% of plants. Work with plants to increase water and nutrient absorption by drastically increasing the absorptive surface area of roots (instrumental in helping aquatic algae migrate to land 450 million years ago).
- Some mycelium form relationships with multiple plants forming an underground network that connects plants. In some cases, this networking allows the plants to share resources such as water and other nutrients (some orchids don't even produce their own carbohydrates). This networking even allows some plants, when under attack from herbivores, to share signaling molecules to other plants allowing them to begin preparing chemical defenses in the event they are attacked.



Harmful Examples

- Some are parasitic and live on and off their hosts.
- Some cause diseases in humans (skin infections such as athletes' foot).
- On average 1 million people die annually due to fungal infections.
- Cordyceps are a genus of fungi infamous for the species that attacks ants (and various other insects) filling their body with a hyphae network eventually taking control of the ants turning them into “zombi ants”.
Many other species of cordyceps have medicinal uses.



- Fungi are the largest single cause of disease in plants. This, of course, includes important agricultural crops such as wheat, rice, corn, as well as various fruits and vegetables.
- Between 10-20 percent of crops are lost each year and another 20% lost in storage.
- Dutch elm disease is another example of the destruction fungi can cause in plants.

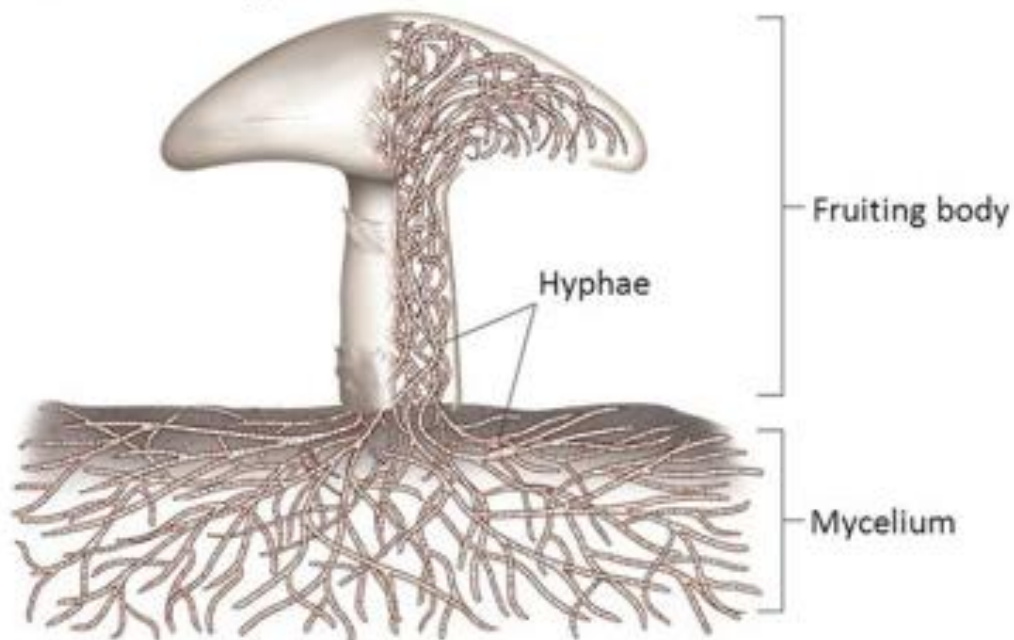
Fungus Structure

Fruiting Body - most fungi have a portion of the fungus that is typically above ground and visible which contains the spore producing structures.

Hyphae – thin thread-like structures that form the “body” of the fungus and secrete digestive enzymes which break down food to later be absorbed.

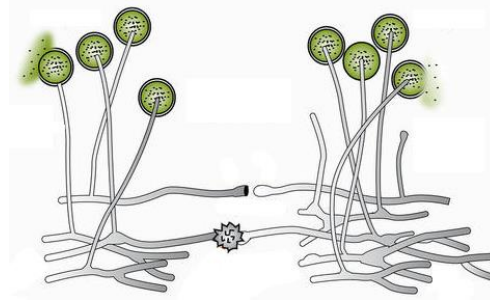
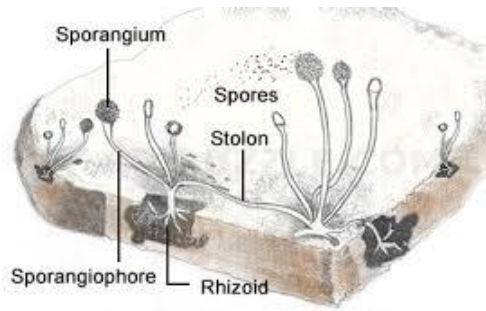
Mycelium – a “root-like” mass of hyphae typically found hidden in the soil that grow and branch out within the food source.

Structure of a Typical Fungus

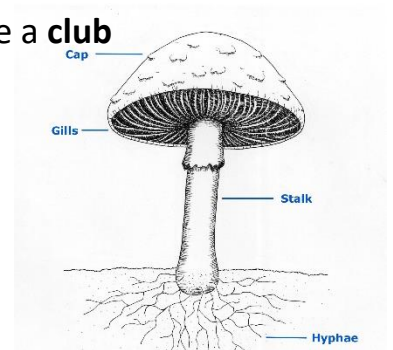


Five Main Types Of Fungi

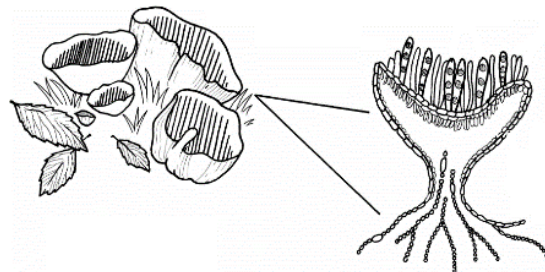
1. **Zygomycota** - Contain sporangium which are structures on long stalks of hyphae that produce spores. Example: bread mold



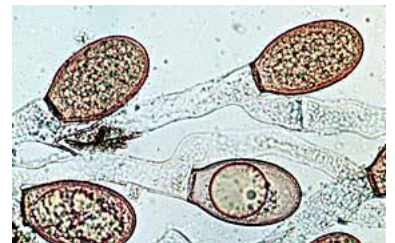
2. **Basidiomycota** - Referred to as the **club** fungi, these typically have a **club** shaped fruiting body that produces spores. Example: mushrooms



3. **Ascomycota** - Referred to as the **sac** fungi, these typically have a **sac** or **cup** shaped fruiting body that produces spores. Examples: cups fungi, mildews, and yeast



4. **Chytridiomycota** - Often live in the intestines of cows and other ruminants where they release digestive enzymes aiding in the breakdown of cellulose. Example: fungi living in cow intestines



5. **Deuteromycota** - Referred to as the **imperfect** fungi, these typically only reproduce asexually. Examples: athletes' foot and thrush

