Chapter 25: Fungi

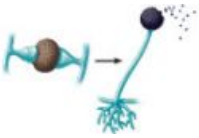
- Digest cellulose
    - Example: Symbiotic relationship with *leaf cutter ant*
- Evolution granted breakdown from **living → dead**

Characteristic of Fungi

- Two groups based on how obtain carbon
    1. Saprotroph
    2. Symbiont
        a. Parasitism
        b. Mutualism
- Feed on absorptive nutrition
    - Cannot be stationary, or else food is depleted
    - Reproduce **asecually,** via budding → hyphae → mycelium
- Arose from single cell-flagella protist, similar to **choanoflagellates**
    - Earliest fossil Kingdom Fungi = late **Proterozoic**

Tube of cytoplasm surrounding by cell wall (chitin)

Fungi Radiated to Several Lineages

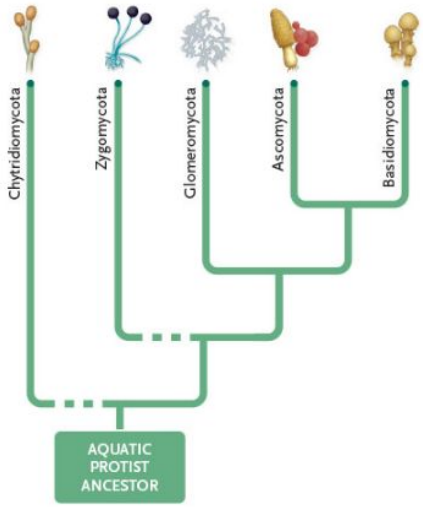
Phylum	Body Type	Key Features	Photo
chytrids	Several cells	• Motile cell • Propelled via flagella	
zygomycetes	hyphal	• Resistant zygospore • Forms later germination	
glomeromycetes	hyphal	• Associated via plant roots • Arbuscular mycorrhizas	
ascomycetes	hyphal	• Sexual spores • Produced by asci	

- Classify fungi by complexity of its reproduction

5 phyla of Fungi

1. Chytridiomycota
2. Zygomycota
3. Glomeromycota
4. Ascomycota
5. Basidiomycota

(red = not **monophyletic**)



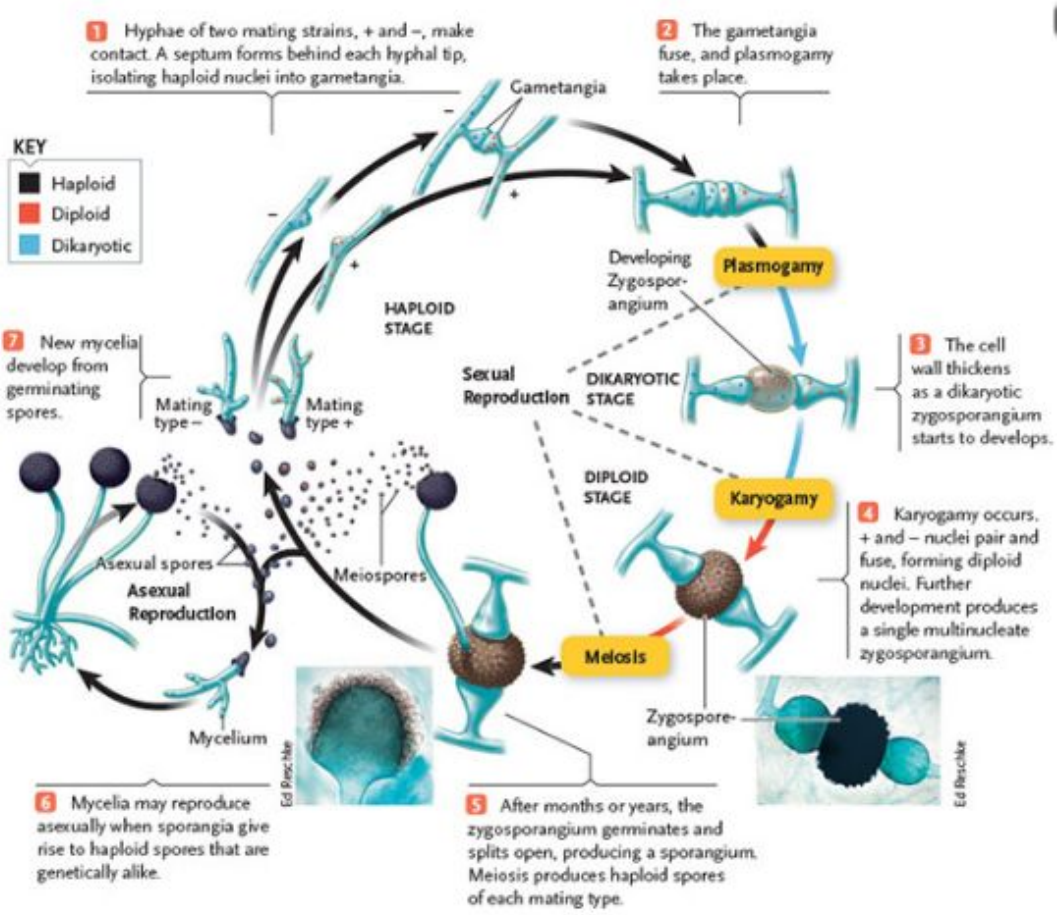
Chytridiomycota

- Chytrids
  - **Only** fungi produce flagellated motile spores (**chemotaxis**)
- Saprotrophs
- Symbiotic relation with **cattle**
  - Break down cellulose in gut
- Disease chytridiomycosis
  - Decline in amphibian population due to increase in temperature
    - Colonizing in skin, mess with electrolyte balance and function of organs
- unicellular , some chains of cells, anchor fungus to substrate
- Vegetative stage = **haploid**
  - Formation of sporangium — May form mycelium, give rise to **sporangia**

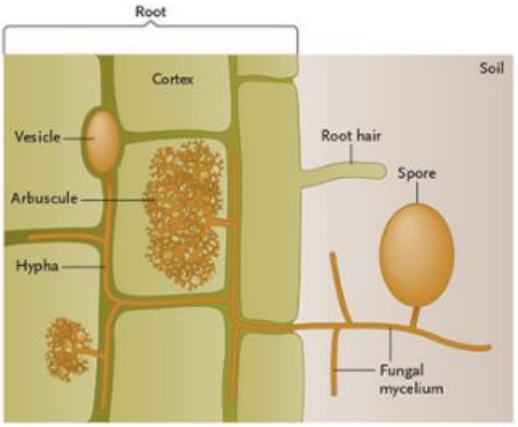
Zygomycota

- Moulds in fruit/bread
- Sexual reproduction, zygospore
- Saprotroph
- Some **parasitic** to insects/destroy food supply)
  - Also used via production of pharmaceuticals (**steroids**)
- Consist of **haploid**, some have **septa**
  - Sexual reproduction of mycelium, mating type [+ or -] → gametangia → zygosporangium → meiosporangium → Haploid ← **sporangia** ← branching mycelium ← **germination** ← haploid
  - Reproduce **asexually**

Note: meiosis results in formation of **haploid pores**



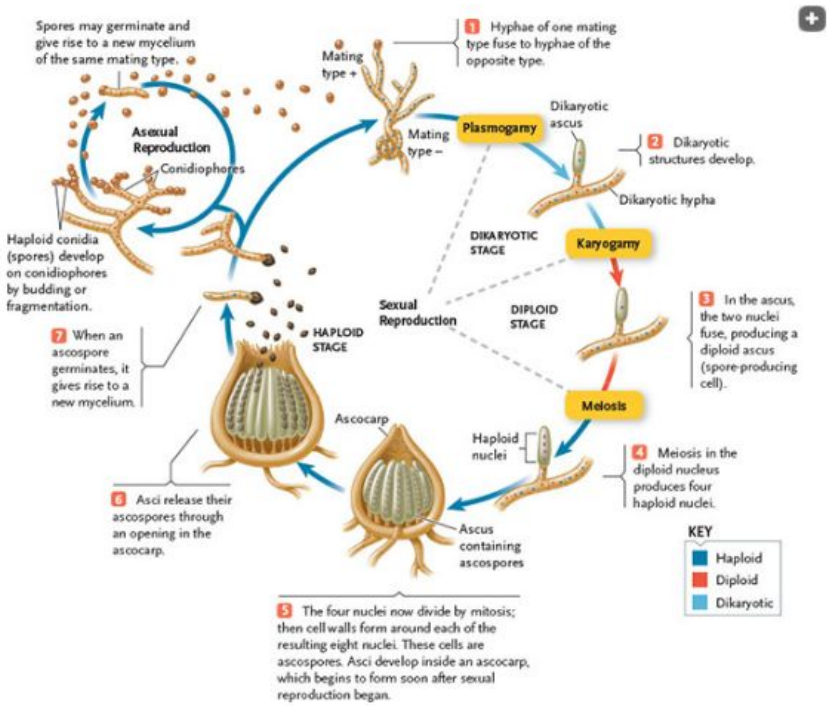
Glomeromycota (used to be under zygomycetes)



- Sexual reproduction is unknown…
  - Spores forming asexually via "walling off" section of hypha
- Mycorrhizas
  - Mycelia of these, colonize in **roots**
  - **Hypha** penetrates arbuscules → folds in plasma membrane → nutrient exchange between plant and fungi
- Obtains sugar from plants, provides plants with steady supply of dissolved minerals

Ascomycota

- Named after sac-structure, asci → enclosed in ascocarp
- *Neurospora* used for research
- **Saprotroph**
    - Common in symbiotic association
    - Prey on agriculture insect pest → **biological pesticide**
- Grow **haploid** with regular septa, allow organelles more through cytoplasm via **mycelium**
    - Fusion of mycelium (+) and (-), fusion of nuclei is **delayed** → dikaryotic hyphae
- 2 separate nuclei (n+n) → diploid zygote → ascospores
- DO NOT produce asecual spores in sporengia
    - Asexual spores (conidia)



Basidiomycota

- Produce enzymes, digestive cellulose, decomposer of wood-plant debris
- trap/consume small animals by secreting toxins that immobilized
- Most are **mycelial**
    - Two different nuclei due to 2 different haploid → dikaryon
- Formation of fruiting bodies basidiocarps → 2 nuclei = 4 basidiospores
- Reproduction
    - Formation of **conidia/budding**
    - Harmful to humans, ie: *C.gattii*