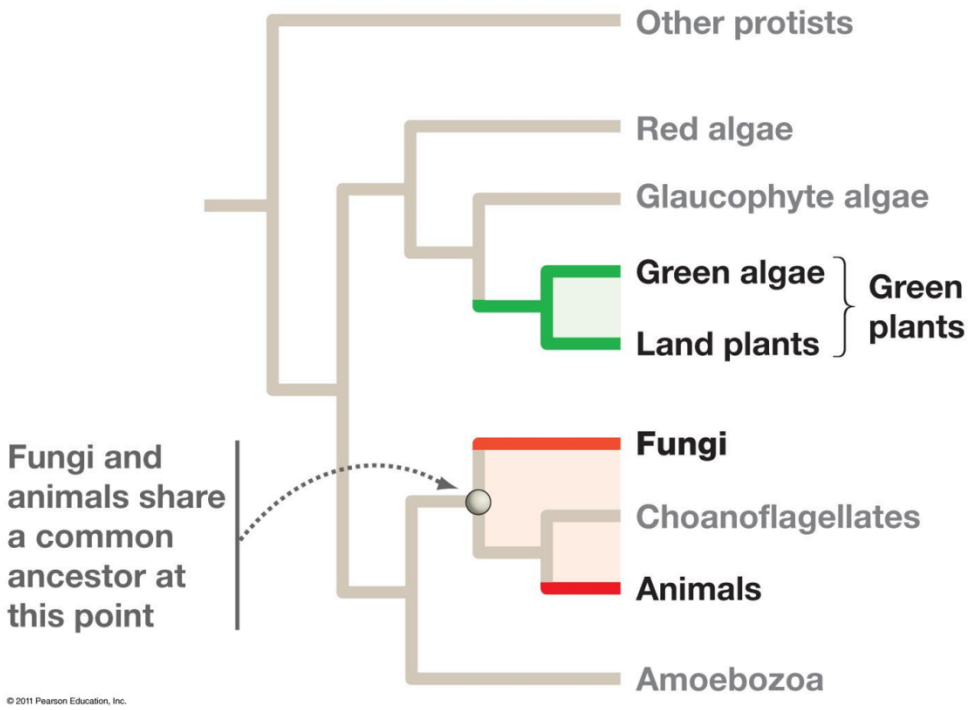
FUNGI

Fungi phylogenetics

- More closely related to animals than plants
  - Fungal infections more difficult to treat
    - Shared ancestry

– Evidence:

- DNA sequence
- Synthesize chitin
- Store glucose as glycogen



Fungi

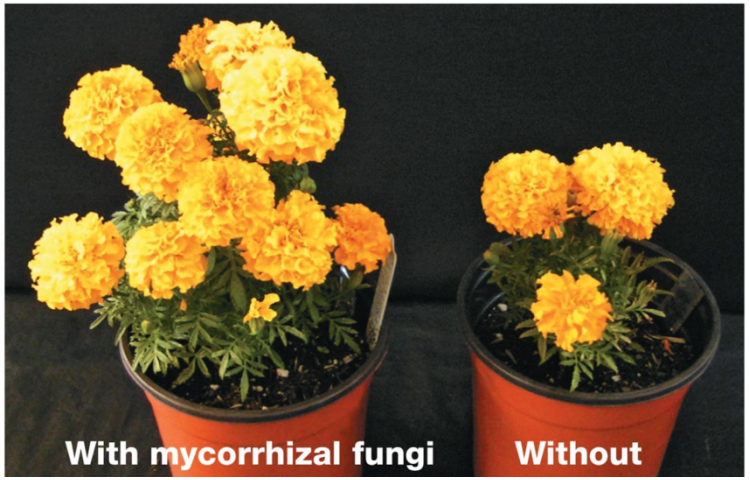
- Diverse group
- Mostly multicellular
- Feed by absorbing nutrients
  - From living or dead organisms
  - World's most important decomposers
- Terrestrial recyclers

Mycorrhizal association

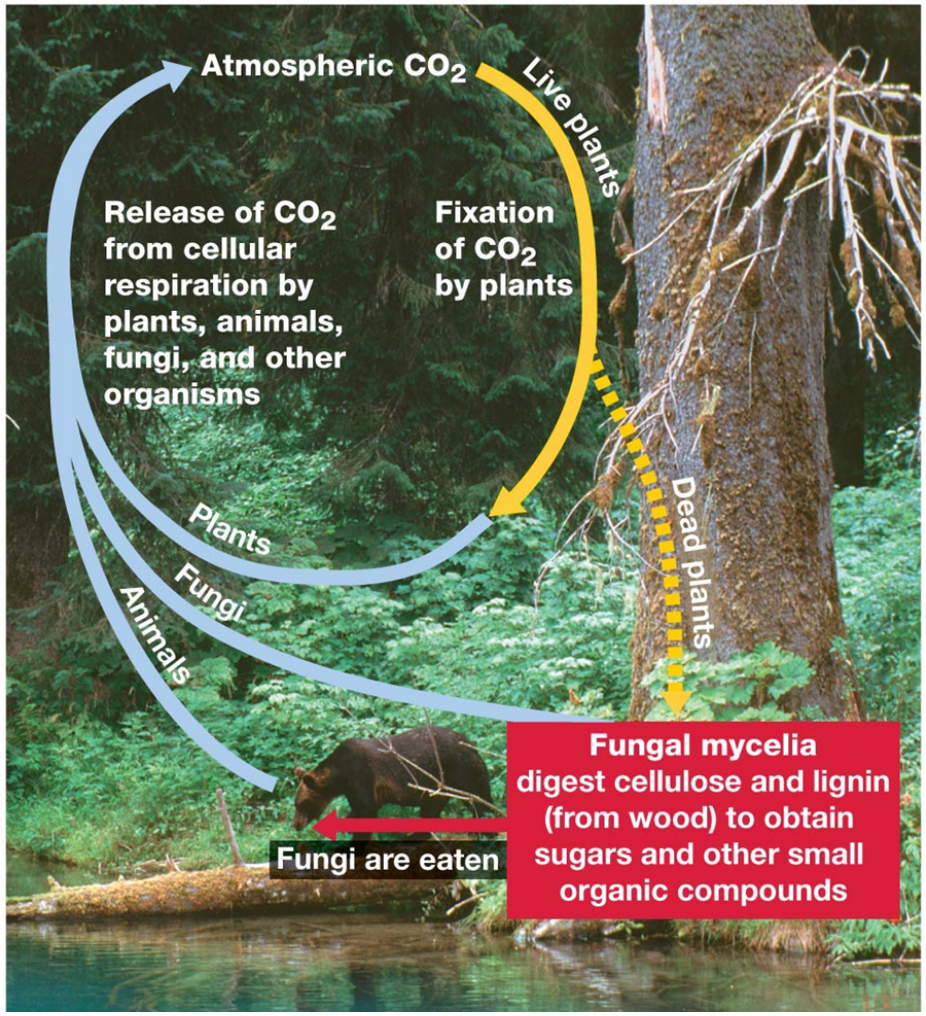
(a) Mycorrhizal fungi form extensive networks in soil.

- Mutualism
  - Nearly all land plants
  - Enhance absorption

(b) Mycorrhizal fungi increase plant growth.



Fungi & the Carbon Cycle



- 2 components
  - Fixation of C by land plants
  - Release of CO_2 from cellular respiration
- Fungi connect 2 components
  - Break down wood into reusable C

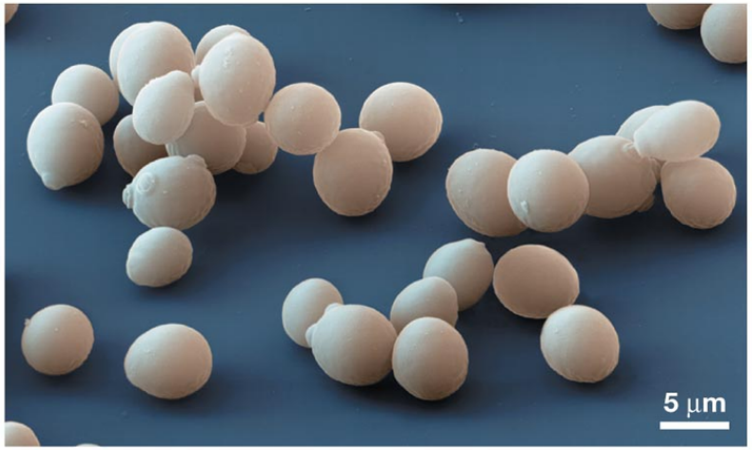
Economic importance

- Antibiotics
  - Penicillin
- Food
  - Mushrooms
- Fermentation
  - Cheese, bread, beer, wine
- Destructive to crops

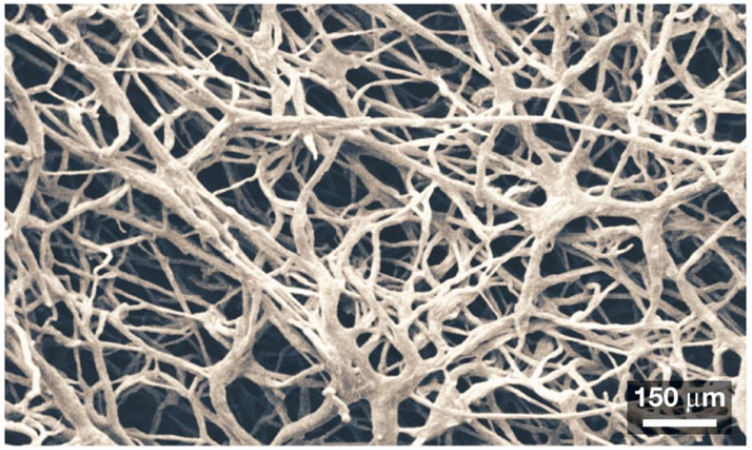
Growth forms

- Yeasts
  - Single-celled
- Mycelia
  - Multicellular
  - Filamentous
- Some adopt both forms

(a) Single-celled fungi are called yeasts.

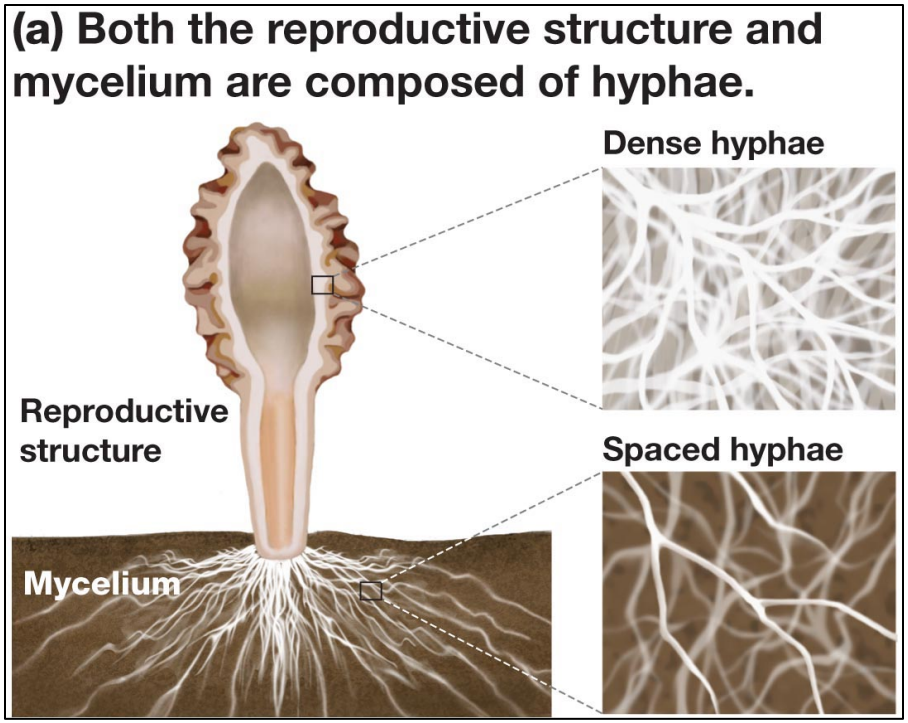


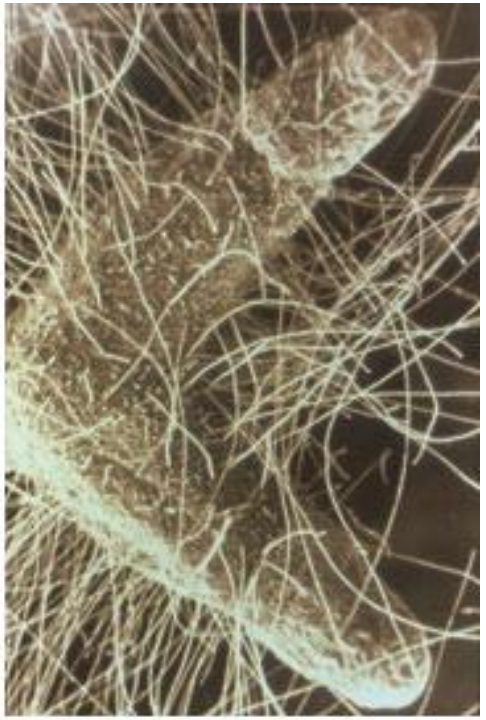
(b) Multicellular fungi have weblike bodies called mycelia.



Mycelium

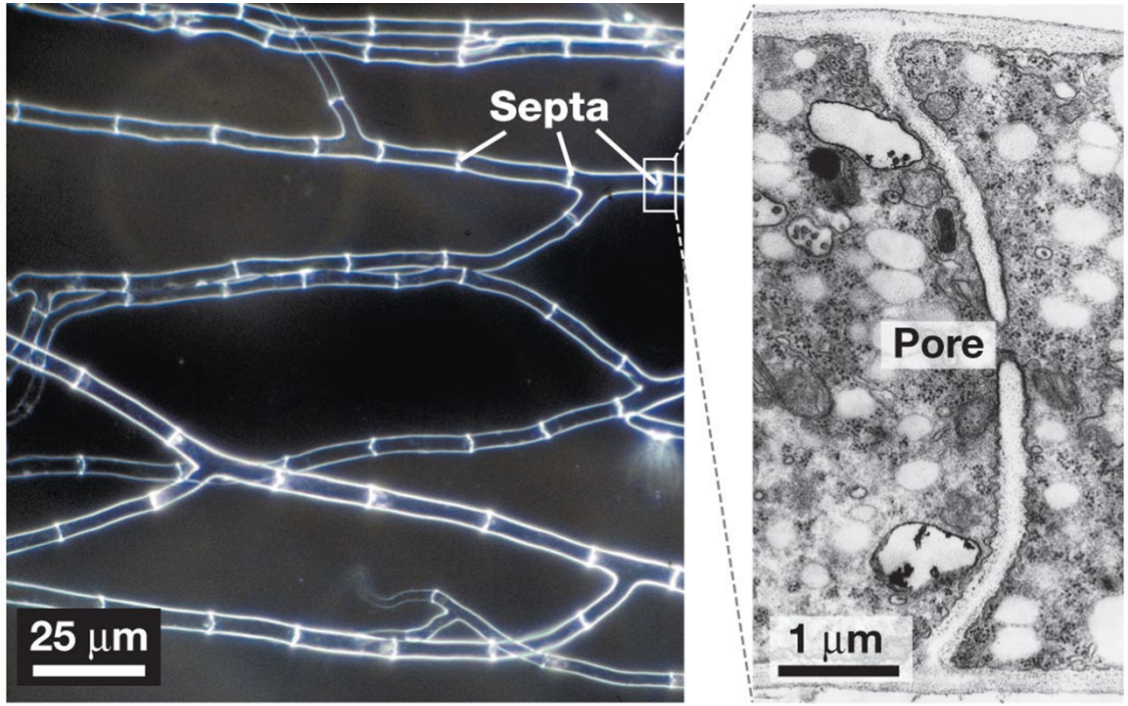
- Hyphae
  - Filaments of mycelia
  - Very thin
- Dynamic
  - Grow towards food
  - Die back when food runs out





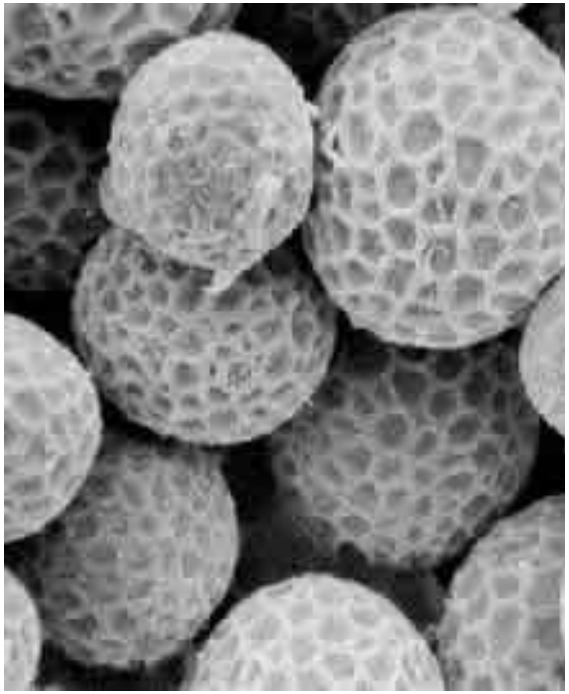
Mycelium

- Filaments (= hyphae) linked by *septa*
- Gaps in septa
  - *Pores*
  - Material flow

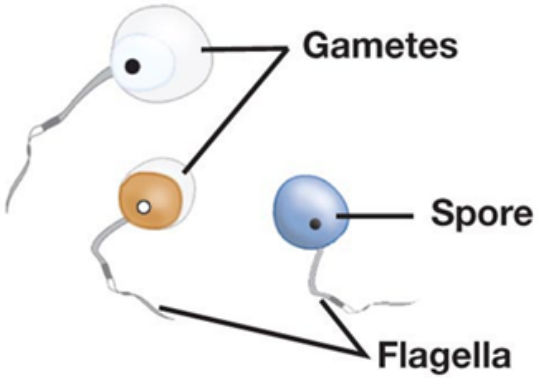


Mycelium

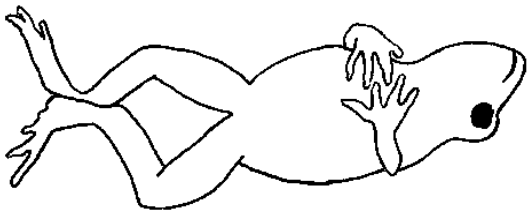
- Highest SA:V ratio of any multicellular organism
- Absorption very efficient
- Prone to drying out
  - Exception:
    - Spores
    - Thick fleshy structures (mushrooms)

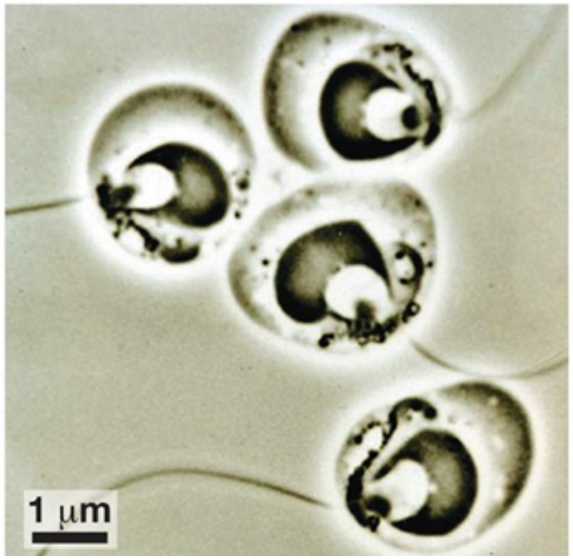


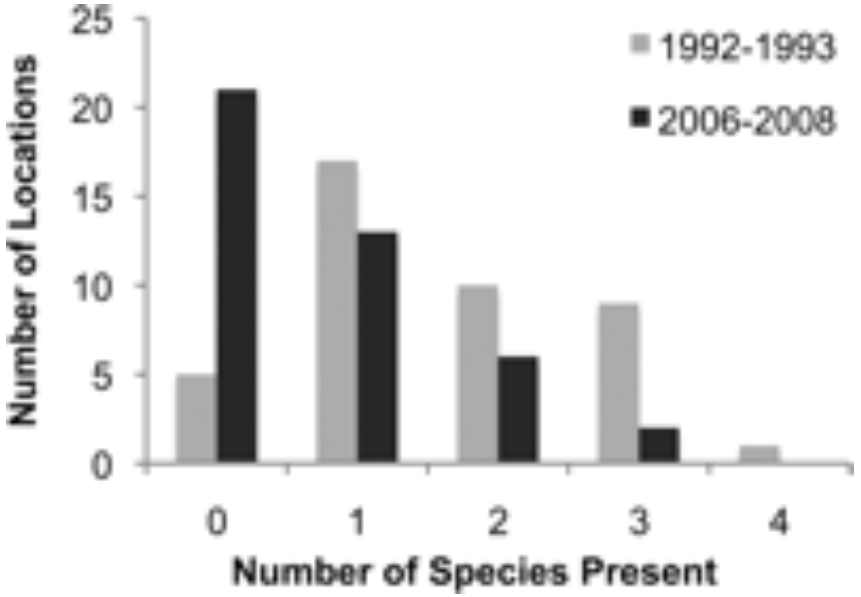
Reproductive structures



- Chytrids
  - Only motile fungal cells
  - "Swimming" spores
  - Amphibian decline

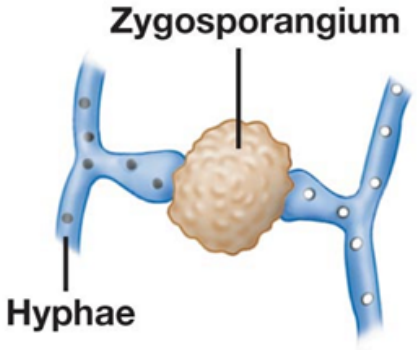






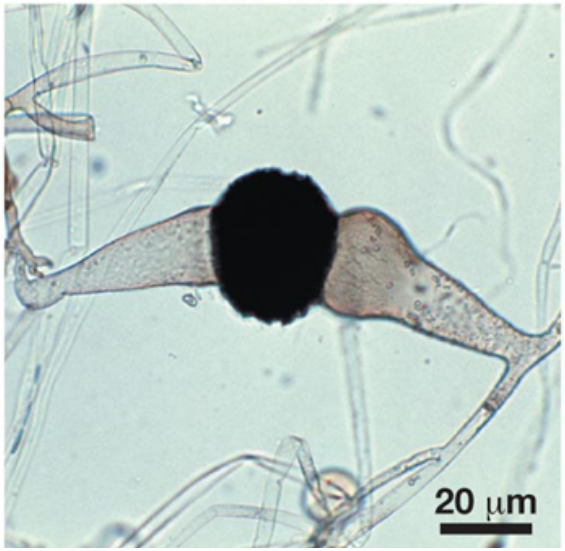
Reproductive structures

- Zygomycetes
  - Have zygosporangia
    - Asexual form:
    - Sexual form:
      - when 2 haploid hyphae cells fuse together

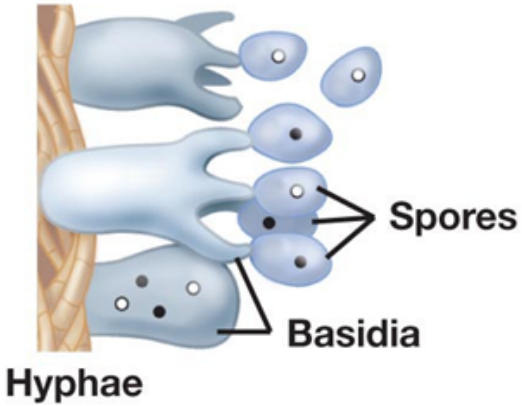


  - Bread mold

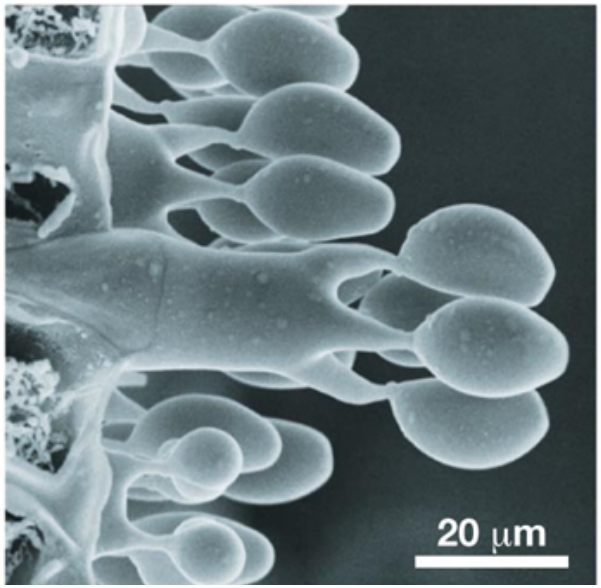
Rhizopus -black bread mold



Reproductive structures

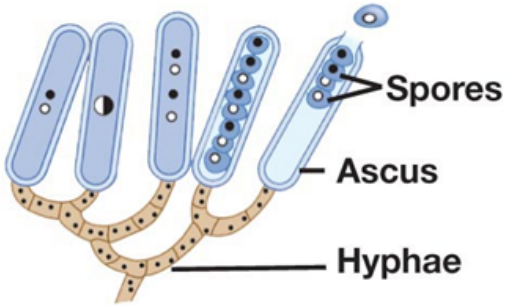


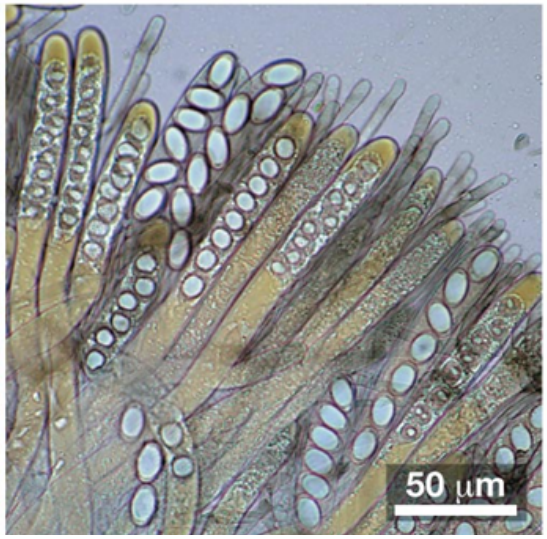
- Basidiomycetes
  - Basidia
    - "little pedestals"
    - Specialized spore-producing cells
      - Meiosis produces spores
    - Form at end of hyphae
  - Mushrooms and puffballs



Reproductive structures

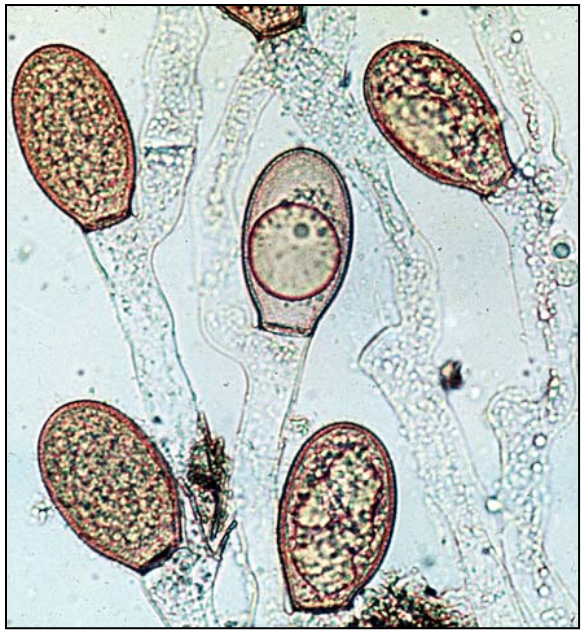
- Ascomycetes
  - Asci
    - Sacs where meiosis occurs
    - Spores form
  - Morel





Chytridiomycota & Zygomycota

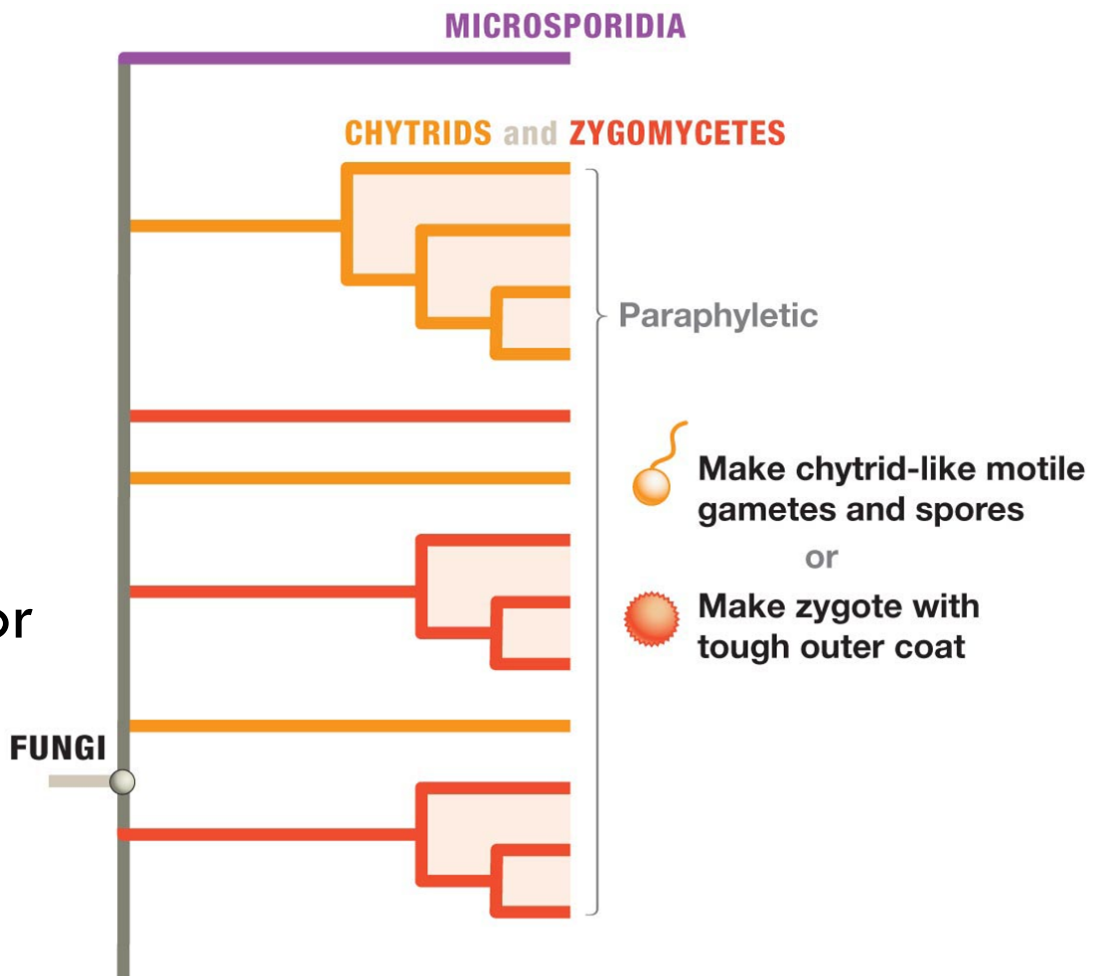
- Chytrids
  - Motile spores
  - Motile gametes



- Zygotes
  - Tough coat
  - Terrestrial

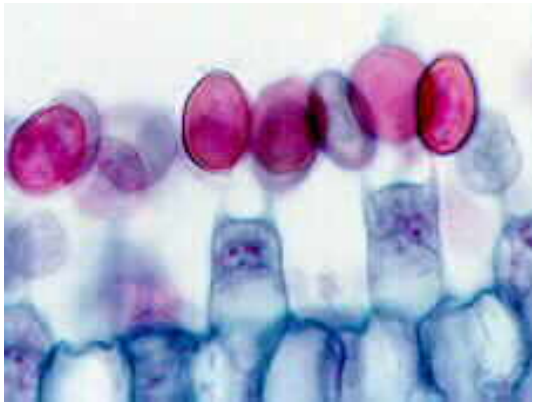
Chytridiomycota & Zygomycota

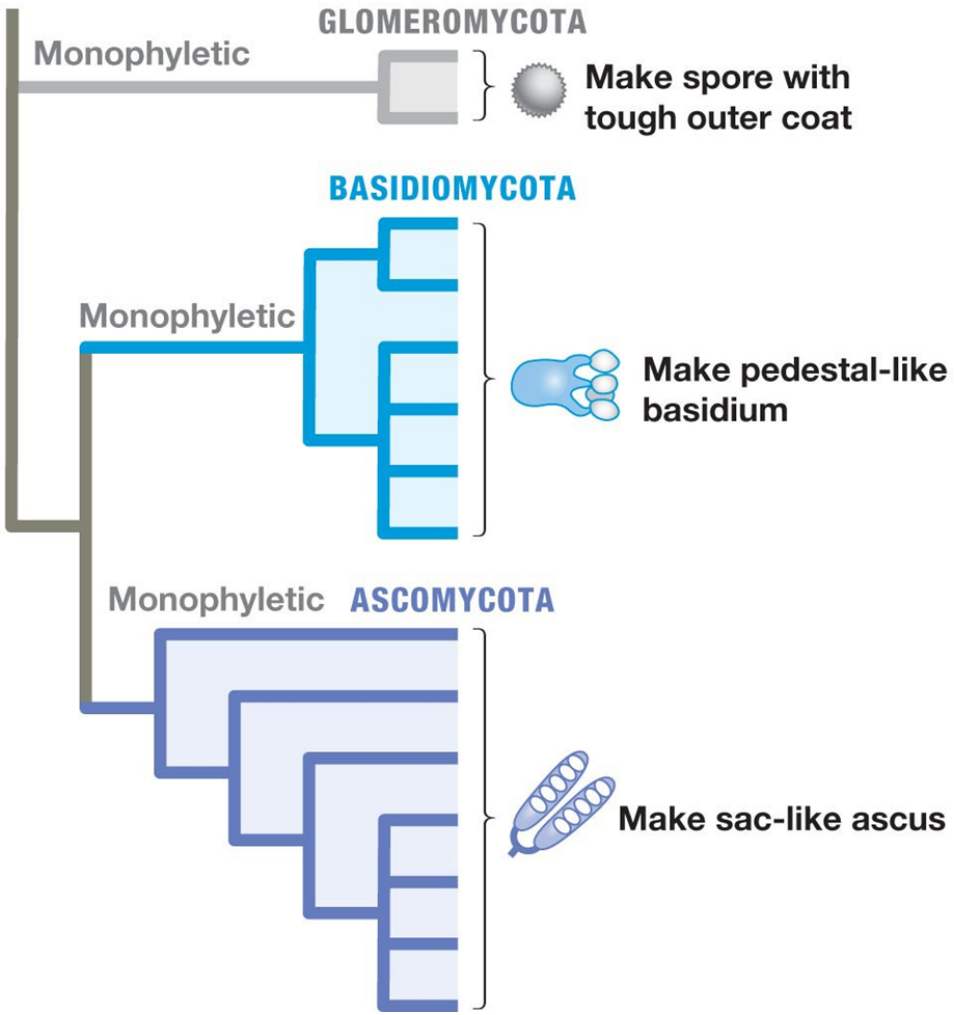
- Chytrids
  - Motile spores
  - Motile gametes
- Zygotes
  - Tough coat
- Paraphyletic
  - No common ancestor



Basidiomycota

- "Club fungi"
- Monophyletic
- Have basidia
- Dikaryotic
  - 2 nuclei





Ascomycota

- "Sac fungi"
- Monophyletic
- Dikaryotic