Kingdom FUNGI:

- Traditionally associated with Plant Kingdom
  - general appearance (looks like a plant!)
  - lack of mobility (appear rooted)
- But fungi are NOT plants
  - fungi are chemoheterotrophs not photoautotrophs
  - fungi have filamentous bodies
  - fungi have cell walls made of chitin and polysaccharides (not cellulose)
  - fungi have nuclear mitosis

Kingdom FUNGI: Body Structure

- Body composed primarily of hyphae separated into cells by septa
- The mycelium is a mat of hyphae
- The hyphae may also be interwoven to form specialized reproductive structures (mushrooms)
Kingdom Fungi: Nutrition

- Fungi are heterotrophic and characterized by absorptive nutrition (external digestion)
  - saprophytic
  - parasitic
  - mutualistic
  - predatory!
- Thin hyphae provide huge surface area for absorption
- Many fungi are capable of breaking down cellulose
Kingdom Fungi: Reproduction

• Hyphae are haploid (1N) structures

• All fungi capable of asexual reproduction
  – Sporangia & Conidia

• Sexual reproduction involves unique “dikaryon” stage (N+N)

• Development of dikaryon stage serves to classify fungi into 3 divisions
Kingdom Fungi: Division Zygomycota

- Smallest of divisions with only about 665 named species
- Black bread mold is best known example
- Members of this division are coenocytic
- Reproduce asexually via sporangia
- Dikaryon stage is absent or reduced to single cell
- Dormant structure called a zygosporangium
Kingdom Fungi: Division Ascomycota

- Largest division with some 30,000 sps.
- Huge economic importance
  - foods... truffles, morels, and many yeasts
  - disease... Dutch Elm disease, Chestnut blight
- Asexual reproduction via conidia
- Dikaryton stage well developed
  - dikaryon develops into ascocarp
  - 2 nuclei fuse to form a zygote (2N)
  - zygote divides via meiosis to form spores
Kingdom Fungi: Division Basidiomycota

- Most common (mushrooms, toadstools, shelf fungi, puffballs)
- Economic importance
  - primary wood decomposers
  - many species form mycorrhizae w/ plants
  - most edible fungi (also deadly ones!)
- Dikaryon often dominates life cycle
- Sexual reproduction involves formation of a “basidium” (club-shaped structure) within the dikaryon
Kingdom Fungi

- Fungi Imperfecta... fungi with no known sexual stage
- Yeasts- unicellular fungi
  - “baker’s yeast” (release CO$_2$ to make bread “rise”)
  - “brewer’s yeast” (ferment to make ethanol)
- Lichens
  - mutualistic association between fungi and algae
  - 3 forms: crustose, foliose, fruticose
- Mycorrhizae
**Figure 21.15**

Cross section of a lichen thallus. Lichens consist of algae and fungi growing symbiotically.

**Figure 21.16**

Growth forms of lichens. (a) Crustose lichen. (b) Fruticose lichen. (c) Foliose lichen.
Figure 25-12 Western red cedar (Thuja plicata) seedlings respond to mycorrhizae. (a) Control plants grown in low phosphorus in the absence of the fungus. (b) These seedlings were grown under conditions identical to the control, except that their roots have formed mycorrhizal associations. (a, b, Courtesy of Randy Moxon, U.S. Forest Service)