

The Fungi

The yeasts, molds and mushrooms:

- Eukaryotic
- Unicellular – multicellular detritivores
- Major decomposers
- Saprophytic heterotrophs
- Generally sessile (nonmotile)
- Single and multinucleated forms
- Often symbiotic, some parasitic, some cause disease
- Nutrient recyclers

Ecologically and economically important because?

1. Nosocomial infections
2. Plant pathogens
3. Food chain/decomposers
4. Digestion
5. Medicine
6. Food and produce food
7. Plant symbiots = the *mycorrhizae*

Mycorrhizae = fungi/plant root mutualistic symbiotic relationship

Mycology = the study of fungi

Fungal Body Structure: Vegetative Structures (colonies)

A. Molds and fleshy fungi

1. thallus = the main vegetative body of fungus, consists of long filaments of cells called **hyphae**

2. hyphae = (hypha) hair-like filaments of many cells joined together, derived from a single cell, branched
 - a. uninucleate, septate hyphae and septa
 - b. multinucleate (*coenocytic*), nonseptate hyphae
 - c. vegetative hypha – aerial hypha
 3. mycelium = a visible netlike mass of hyphae
- B. Yeasts
1. fission yeasts
 2. budding yeasts
- C. Dimorphic fungi

Fungal Body Structure: Fruiting Bodies

Mushrooms and Toadstools

“mushroom” = temporary above ground reproductive structure

1. Pilus (stalk)
2. Cap
3. Gills

Fungi vs. Plants:

Similarities: grow in ground, sessile, have a cell wall

Differences: cell wall made of *chitin*, lack *chloroplasts*

Life Cycle

Fragmentation, sexual and asexual reproduction

Sexual and asexual by spores

Diploid and Haploid phases

A. Asexual Spores

1. formed by one individual at end of aerial hypha
2. made by mitosis
3. types:

- a. conidiospore = spores not enclosed in a sac (conidiophore)
- b. sporangiospore = found within a sporangium (or sac)(sporangiophore)

B. Sexual Spores

1. normal state of parent is **haploid**
2. donor cell nucleus joins recipient cell nucleus
3. nuclei fuse to make a **diploid** zygote
4. zygote undergoes meiosis to create haploid sexual spores

Life Cycle of a Fungus

I. Haploid Phase

- Start with haploid spores formed by meiosis
- Spores released by fruiting body
- Spores germinate and grow into haploid mycelia
- Cells haploid, undergo mitosis to form fungal body
- Mating types?

II. The Dikaryotic (binucleate) Phase

- Fusion of two mating types, exchange of nuclei
- Result in binucleated mycelia
- Binucleated mycelia form fruiting body
- Terminal cells of hyphae become sporangia (pair of haploid nuclei)
- Two haploid nuclei fuse to finally become zygote
- No sperm or egg cells

III. The Diploid Phase

- Only diploid stage is zygote

- Zygotes form in specialized cells on underside of cap called *sporangia* (sporangium)
- Sporangia on long stalks called *sporangiophores*
- Zygotes undergo meiosis in sporangia to produce haploid spores

Medically Important Divisions of Fungi

Fungi are classified into 3 basic groups based on reproduction:

- A. Zygomycota (ex. *Rhizopus*)
- B. Ascomycota (ex. Puffball)
- C. Basidiomycota (ex. *Coprinus*)

D. Deuteromycota = the false fungi, most pathogenic

Fungal Diseases

Mycosis

- Systemic mycoses
- Subcutaneous mycoses
- Cutaneous mycoses and dermatophytes
- Superficial mycoses

Lichens

- Fungal/algae symbiot
- Primary colonizers
- Three types:
 1. Foliose
 2. Fruticose
 3. Crustose