

Parasitic Fungi
(Dr. Juan Mata, Ph.D.; Guest Lecture October 30, 2009)

XVII. Kingdom Fungi

A. Characteristics

1. Heterotrophs
2. Secrete hydrolytic enzymes that digest the external substrate and absorb small molecules across the cell walls
3. Cell walls are composed of CHITIN, not cellulose
4. Produce filaments called HYPHAE

Slide: Most fungal hyphae are NOT divided into separate cells; Purves *et al.*, 2001, *Life, The Science of Biology*, 6th ed., Fig. 30.3

5. DNA sequence data indicates that fungi are more closely related to animals than to plants

Slide: Eukaryote Phylogeny; Roberts & Janovy, 2009, Fig. 4-11, p. 55

B. Parasites of humans

1. Approximately 50 species described from humans
2. MYCOSIS: general term for fungal infection (pl = mycoses)
3. Ringworm or “athletes foot”
 - a. Can form red circular areas anywhere on skin
 - b. Treatable
4. *Candida albicans*
 - a. “Yeast infections”
 - b. Member of the community of microscopic organisms that are normally found on moist epithelial tissues
 - c. Circumstances that lead to pathogenicity
 - (1) Antibiotic therapy kills surface bacteria competitors
 - (2) Clothing that retains moisture = “diaper rash”
 - (3) Increased glycogen content of vaginal secretions during pregnancy favors fungal growth
 - (4) Compromised immune system of AIDS patients
5. Coccidioidomycosis
 - a. Infective spores carried by wind
 - b. Virtually all people living in southwestern US have had the disease
 - c. Pathogenicity
 - (1) Usually asymptomatic in lungs
 - (2) Occasionally causes symptoms similar to pneumonia and/or tuberculosis
 - (3) In rare cases it spreads to body organs
 - (a) Can be fatal
 - (b) Potential biological warfare

C. *Arthrobotrys* spp. prey upon soil nematode worms

1. Possess trapping mechanisms
2. Hyphae form a network of interconnected loops

3. Once a nematode enters a loop, a “sticky” adhesive secretion enabling the fungus to trap relatively large nematodes
 4. Nematode’s cuticle is perforated and hyphae grow throughout the victim’s body cavity
- D. *Entomophthora* spp. parasitize arthropods
1. Spore on host produces a germ tube that penetrates soft exoskeleton between segments
 2. Hyphae invade and consume almost all host tissues within a week
 3. SUMMIT DISEASE
 - a. During late afternoon and early evening, hosts seek elevated positions on branches or stems
 - b. Following death, root-like structures emerge and anchor host to substrate
 - c. During the night, sporangia grow from host and release infective spores in moist morning breezes
 4. Flies killed by *E. muscae* are frequently encountered attached to windows