**Chapter 12**

**Eukaryotic Organisms**

**General Characteristics of Eukaryotic Organisms**

* Five major groups
  + Protozoa
  + Fungi
  + Algae
  + Water molds
  + Slime molds
* Include both human pathogens and organisms vital for human life

**Protozoa**

* Diverse group defined by three characteristics
  + Eukaryotic
  + Unicellular
  + Lack a cell wall
* Motile by means of cilia, flagella, and/or pseudopodia (except subgroup, apicomplexans)
  + Require moist environments
  + Most live worldwide in ponds, streams, lakes, and oceans; critical members of plankton
  + Others live in moist soil, beach sand, and decaying organic matter
  + Very few are pathogens
* **Nutrition of Protozoa**
  + Most are chemoheterotrophic
  + Obtain nutrients by phagocytizing bacteria, decaying organic matter, other protozoa, or the tissues of host
  + Few absorb nutrients from surrounding water
  + Dinoflagellates and euglenoids are photoautrophic
* **Reproduction in Protozoa**
  + Most reproduce asexually only (binary fission or schizogony)
  + Few also have sexual reproduction

**Protists**

* Plasmodium causes malaria-look for ring form INSIDE RBC
* Trypanosoma-causes African Sleeping Sickness.. NO form inside RBC
* Entamoeba – cause amoebic dysentery—look for “fried egg”

**Fungi**

* Chemoheterotrophic
* Have cell walls typically composed of chitin
* Lack chlorophyll; do not perform photosynthesis
* Related to animals
* **The Significance of Fungi**
  + Decompose dead organisms and recycle their nutrients
  + Form associations with roots of vascular plants, which help plants absorb water and minerals
  + Used for food, in religious ceremonies, and in manufacture of foods and beverages
  + Produce antibiotics
  + Serve as important research tools
  + 30% cause diseases of plants, animals, and humans
  + Can spoil fruit, pickles, jams, and jellies
* **Nutrition of Fungi**
  + Acquire nutrients by absorption
  + Most are saprobes
  + Some trap and kill microscopic soil-dwelling nematodes
  + Most are aerobic; some are anaerobic; many yeasts are facultative anaerobes
* **Reproduction in Fungi**
  + All have some means of asexual reproduction involving mitosis and cytokinesis
  + Most also reproduce sexually
  + Budding and asexual spore formation
* **Classification of Fungi**
  + **Division based on sexual spores formed**
  + Division Zygomycota
    - *Rhizopus* (black bread mold)
  + Division Ascomycota (cup fungi)
    - *Penicillium* (look like hand and fingers)
    - *Aspergillus* (casuses aspergillosis)
    - *Peziza* 
      * spores along cup—8 ascospores in an ascus—look like pease in a pod
  + Division Basidiomycota
    - *Coprinus* (mushrooms)
      * look for spores on gill slits
  + Deuteromycetes
    - Heterogeneous collection of fungi whose sexual stages are unknown
    - rRNA analysis revealed that most deuteromycetes belong in the division Ascomycota
* **Lichens**
  + Partnerships between fungi and photosynthetic microbes (green algae or cyanobacteria)
  + Abundant throughout the world, particularly in pristine habitats
  + Grow on soil, rocks, leaves, tree bark, other lichens, and even on backs of tortoises, in almost every habitat
  + Occur in three basic shapes – fruticose, crusts, foliose

**Parasitic Helminths and Vectors**

* Parasitic worms have microscopic infective and diagnostic stages – usually eggs or larvae
* Arthropod vectors are animals that carry pathogens
  + Mechanical vectors
  + Biological vectors
* Disease vectors belong to two classes of arthropod
  + *Arachnida*
  + *Insecta*
* 2 basic phylum—Nematoda and Platyhelminthes
  + Plathyhelminthes (flat worms)
    - Taenia (tapeworm)—look for the 3-4 cross sections
      * know scolex, proglottids and gravid proglottids
    - Fasciola (sheep’s liver fluke)-looks like large leaf
    - Clinorchis (Chinese liver fluke)-looks like Fasciola except MUCH smaller
  + Nematodes (round worms)
    - Enterobius (pinworm)
    - Ascaris (look for mounts)
    - Necator (new world hookworm)—look for hooks in mouth
    - Trichinella (causes trichinosis)—look for spirals in muscle