

## General Characteristics of the Domains and Kingdoms

### Domain Bacteria

- Organisms with a prokaryotic cell structure
  - Cell walls contain peptidoglycan
  - No internal membrane bounded structures (no organelles)
  - Genetic material not found within a nucleus

#### Candidate Kingdoms

##### **Proteobacteria**

##### **Firmicutes**

High-GC Gram-Positive

Low-GC Gram Positive

##### **Cyanobacteria**

##### **Spirochetes**

##### **Chlamydia**

### Domain Archaea

- Organisms with a prokaryotic cell structure
  - Typically found in extreme environments
    - (Halophiles, Thermophiles, Methanogens)
  - Cell membranes comprised of branching hydrocarbons
  - No internal membrane bounded structures (no organelles)

#### Candidate Kingdoms

##### **Euryarchaeota**

##### **Crenarchaeota**

##### **Korarchaeota**

##### **Nanoarchaeota**

### Domain Eukarya

#### **Protista Alliance** (All Candidate Kingdoms)

- Eukaryotic Organisms lacking tissue organization
- Unicellular or Cell aggregates
- Includes (using the Campbell Scheme of Kingdoms in the Protista)

#### **Excavates**

**Diplomonadida** (Archaezoa) Diplomonada

**Parabasala** (Archaezoa) Trichomonada

**Euglenophyta** (Euglenoids)

**Kinetoplastida** (Trypanosomes)

**Heteroloboseans**

#### **Alveolata**

Dinoflagellata (Pyrrophyta) (Dinoflagellates)

Apicomplexa (Sporozoans) (Non-motile)

Ciliophora (Ciliates)

## **Stramenopila**

Phaeophyta (Brown algae – the kelps)

Chrysophyta (Chrysophytes)

Oomycota (water molds)

Bacillariophyta (Diatoms)

Photosynthetic Protists allied to the Stramenopila

Cryptophyta (Cryptomonads)

Haptophyta (Haptophytes)

## **Ameobozoa**

Myxogastriada (Plasmodial Slime Molds)

Dictyostelida (Cellular Slime Molds)

Gymnamoeba (Gymnamoebas)

Entamoeba (Entamoebas)

## **Rhizaria**

### **Cercozoa**

Radiolaria and Heliozoans

Foraminifera (Forams)

## **Choanoflagellida**

## **Protists or Plants**

**Rhodophyta (Red algae)**

**Chlorophyta (Green algae) Many Alliances)**

## **Kingdom Fungi**

Multicellular eukaryotic organisms

Cellular organization of hyphae and mycelium

Non-photosynthetic

Assimilate by absorbing digested nutrients using enzymes secreted into medium

Important Ecosystem Decomposers

Includes

Molds and Mildews

Smuts and Rusts

Yeasts

Mushrooms

Phyla

**Microsporidia**

**Chytridiomycota**

**Zygomycota**

**Glomeromycota**

**Ascomycota**

**Basidiomycota**

Plus:

Yeasts (any unicellular fungus)

Deuteromycota (Fungi with no known sexual cycle)

Lichens (Associates of Fungi and Cyanobacteria or Chlorophyta algae)

## Kingdom Plantae

### Characteristics

#### Characteristics

Eukaryotic

Photosynthetic

Multicellular

Sexually reproducing

Life History involves an alternation of a haploid phase (**Gametophyte**) with a diploid phase (**Sporophyte**)

#### Includes

#### **Bryophytes** (Mosses, Liverworts and Hornworts)

Three Phyla of Bryophytes

**Bryophyta** - Mosses

**Hepatophyta** - Liverworts

**Anthoceroophyta** - Hornworts

#### **Spore-dispersing Vascular Plants**

**Lycophyta (Lycopodiophyta)** - Club Mosses

Three Classes

Lycopodiae

Selaginellae

Isoetae

#### **Monilophyta or Pteridophyta**

Three Groups

Ferns (Pterophyta),

Whisk Ferns (Psilophyta)

Horsetails (Sphenophyta)

#### **Seed Plants** (Disperse by seeds) (All Vascular)

#### **Fossil Seed Plants (Progymnospermophyta)**

**Gymnosperms:** -- Seed not protected by a fruit

Four Phyla

**Cycadophyta** - Cycads

**Coniferophyta** - Conifers (e.g., Pine, Spruce, Fir, Hemlock, Yew)

**Ginkgophyta** - *Ginkgo*

**Gnetophyta** - *Gnetum*, *Ephedra*, *Welwitschia*

**Angiosperms** (Flowering plants) -- Seed protected by a fruit (the ovary)

One Phylum

#### **Anthophyta**

Classes

Eudicotyledones (Dicots)

Monocotyledones (Monocots)

Magnoliides and alliances (Ancestral to both other classes)

## Kingdom Animalia (Discussed in Biology 212)

Multicellular eukaryotic organisms

Non- Photosynthetic

Traditionally Grouped on Anatomical Complexity

### 1. Cell and Tissue Organization

### 2. Symmetry

Radial vs Bilateral

### 3. Body Cavity and Spaces

#### A. Coelom

Fluid-filled cavity between organs and body wall

Permits

Hydrostatic skeleton

Medium for circulation (Insects)

Space for organs

Space for gamete maturation

#### B. Acoelomate (Solid Body)

Cnidaria

Platyhelminthes (Flatworms)

#### C. Pseudocoelomates (Blastocoel retained for cavity)

Nematoda

Rotifera

### 4. Developmental Patterns

#### A. Protostome vs Deuterostome (Blastopore destination)

#### B. Cleavage patterns

#### C. Larval patterns

#### D. Complete vs Incomplete Digestive tract