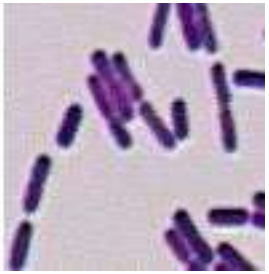
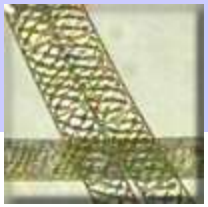


Classification



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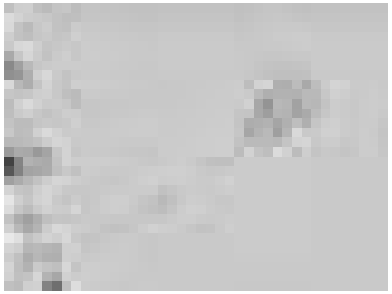
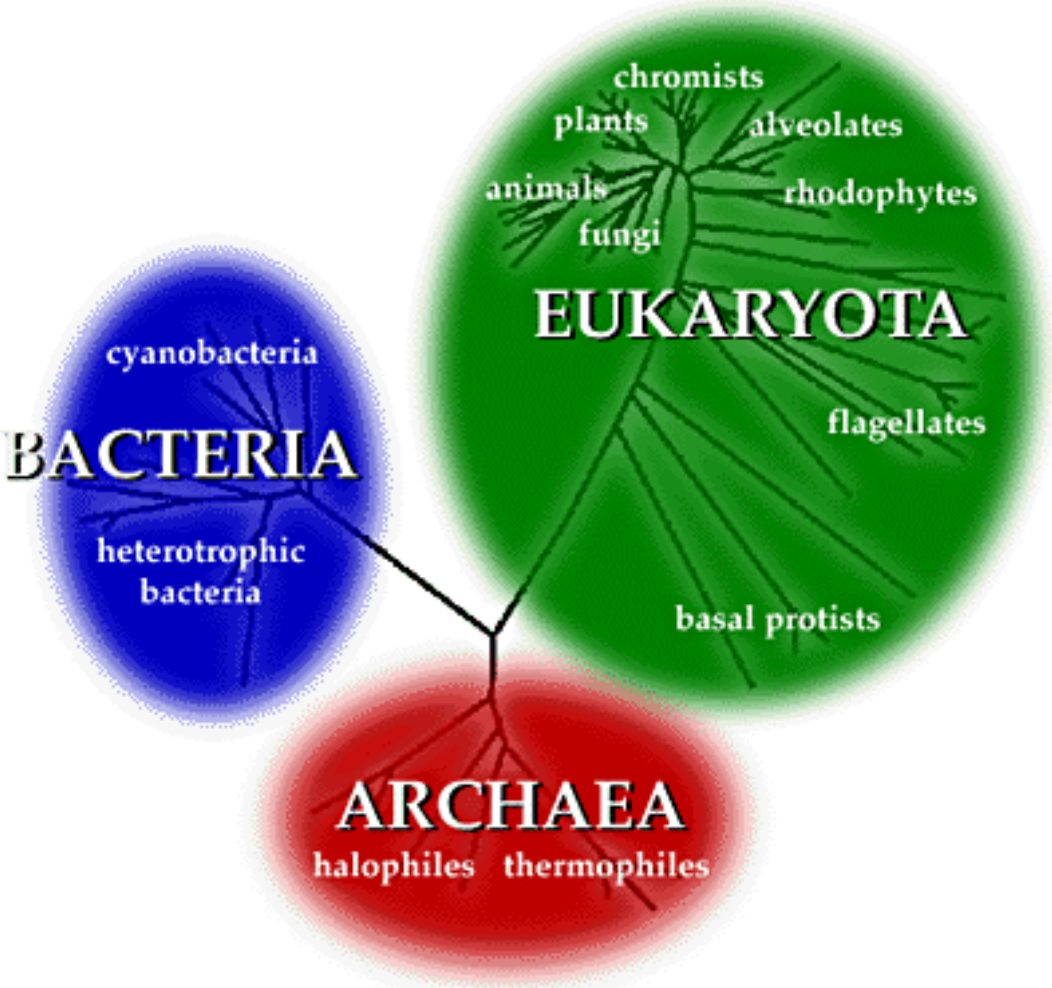


Taxonomy

- The science of naming organisms
- Uses Latin Language = dead language (no slang)
- Carolus Linnaeus: 1750's
- Binomial nomenclature= two name naming system
  - First word = **G**enus. Grouped on major characterisistics. All organisms with the same characteristics are in the same genus
  - Second word = **s**pecies. Describes the organism.
  - *Quercus ruba* or Quercus ruba
- Used the organisms Morphology to classify it. Now phylogeny is included.
- Devised the binomial nomenclature

Three Domain Classification System



- Archaebacteria- oldest kingdom 3.5 bill.yrs

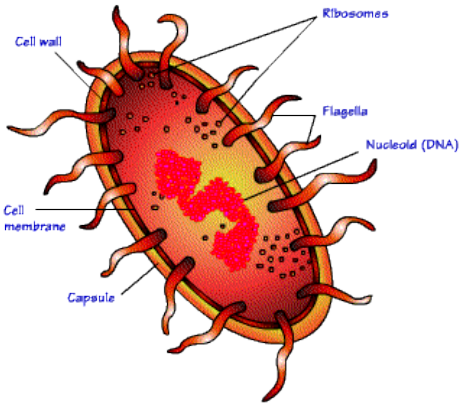
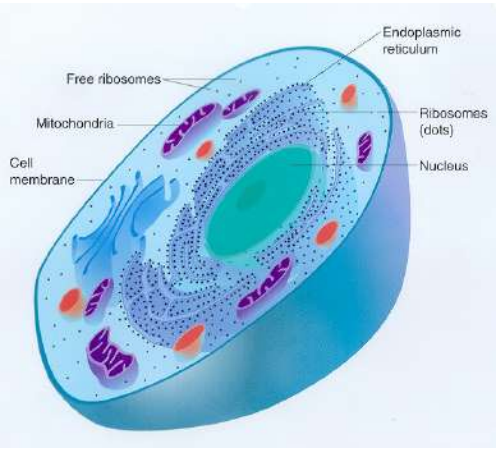


Table 27.2 A Comparison of the Three Domains of Life

CHARACTER	DOMAIN		
	Bacteria	**Archaea**	**Eukarya**
Nuclear envelope	Absent	Absent	Present
Membrane-enclosed organelles	Absent	Absent	Present
Peptidoglycan in cell wall	Present	Absent	Absent
Membrane lipids	Unbranched hydrocarbons	Some branched hydrocarbons	Unbranched hydrocarbons
RNA polymerase	One kind	Several kinds	Several kinds
Initiator amino acid for protein synthesis	Formyl-methionine	Methionine	Methionine
Introns in genes	Very rare	Present in some genes	Present
Response to the antibiotics streptomycin and chloramphenicol	Growth inhibited	Growth not inhibited	Growth not inhibited
Histones associated with DNA	Absent	Present in some species	Present
Circular chromosome	Present	Present	Absent
Growth at temperatures > 100°C	No	Some species	No



System of Classification

K*ing* P*lease* C*lose* O*ur* F*ront* G*ate* S*oon*

- Kingdom- largest grouping; many species
- Phylum
- Class
- Order
- Family
- Genus
- Species- smallest grouping; one species

Your Full Human Name

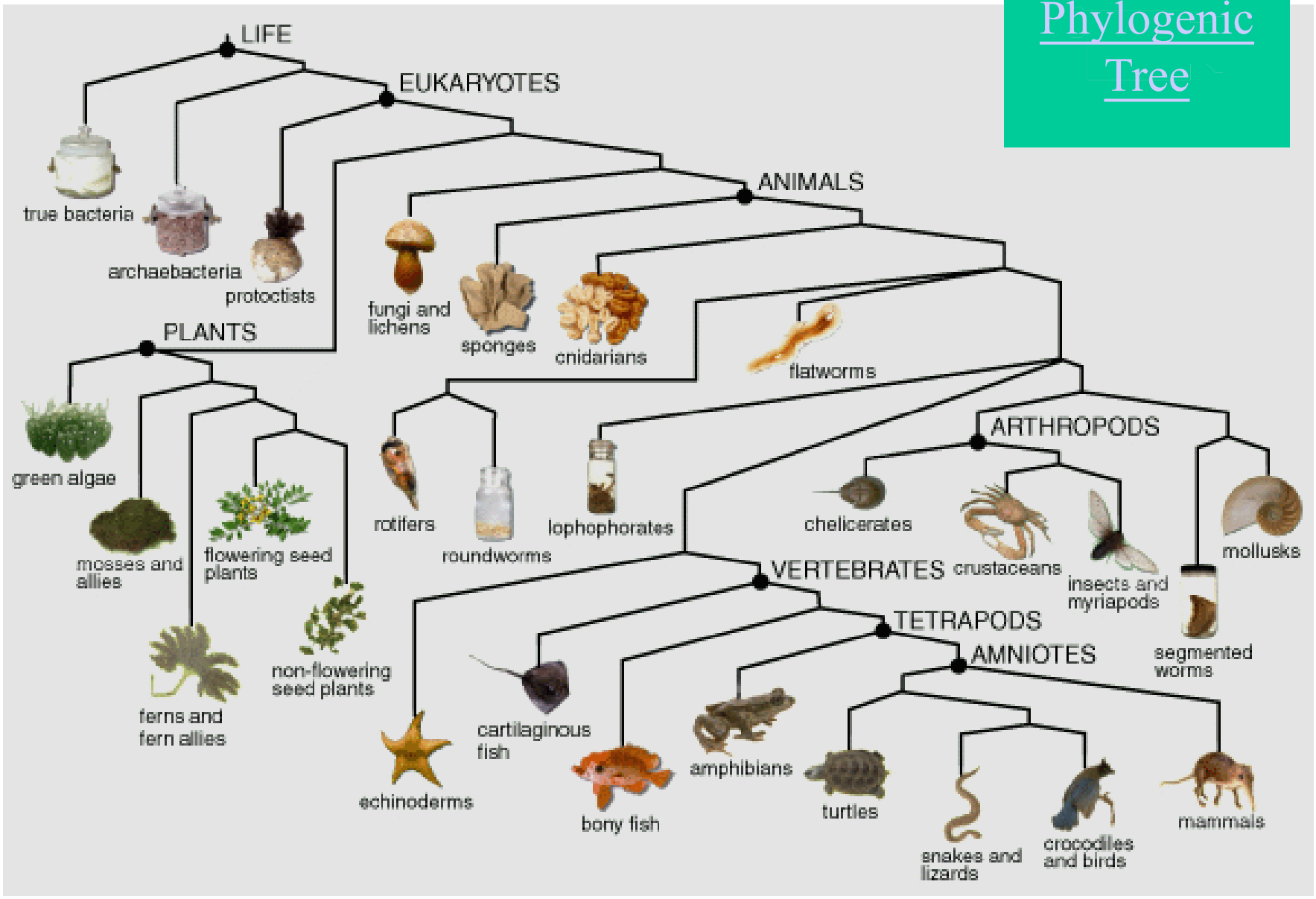
- Domain = Eukarya
- Kingdom = Animalia
- Phylum = Chordata
- Class = Mammalia
- Order = Primates
- **Family = Hominidae**
- Genus = Homo
- Species = sapien

Phylogenic Taxonomy

- Systemic taxonomy: reflects an organisms phylogeny.
  - Phylogenetic tree: family tree that shows evolutionary relationships.
    - Subject to change as new evidence comes to light.

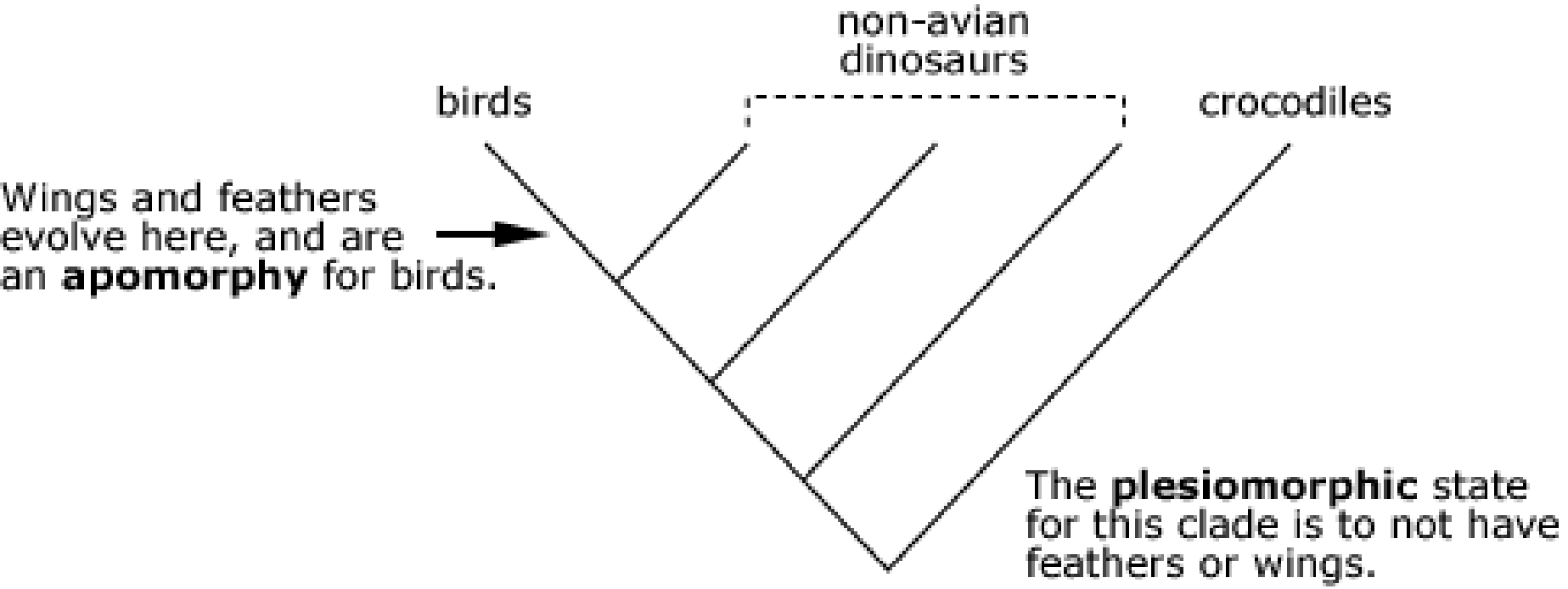
Tutorial For You At Home

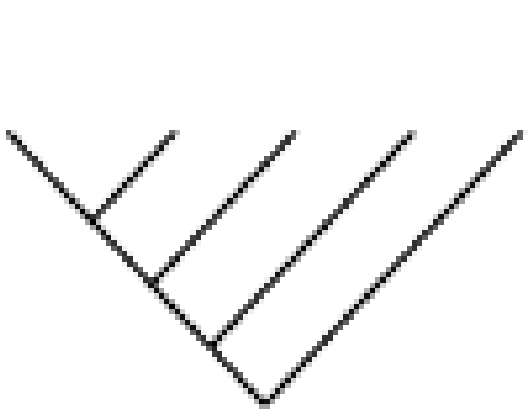
Phylogenic Tree



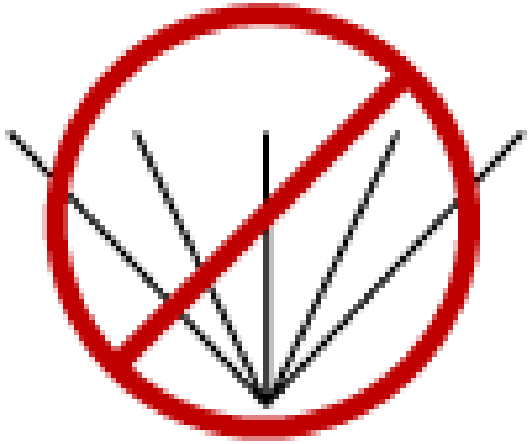
What are Cladistics?

- Using derived characteristics of an organism to establish evolutionary relationships.
- Derived characteristics is a feature that only a particular group of organisms possesses.
  - Feathers, hair, roots, etc.



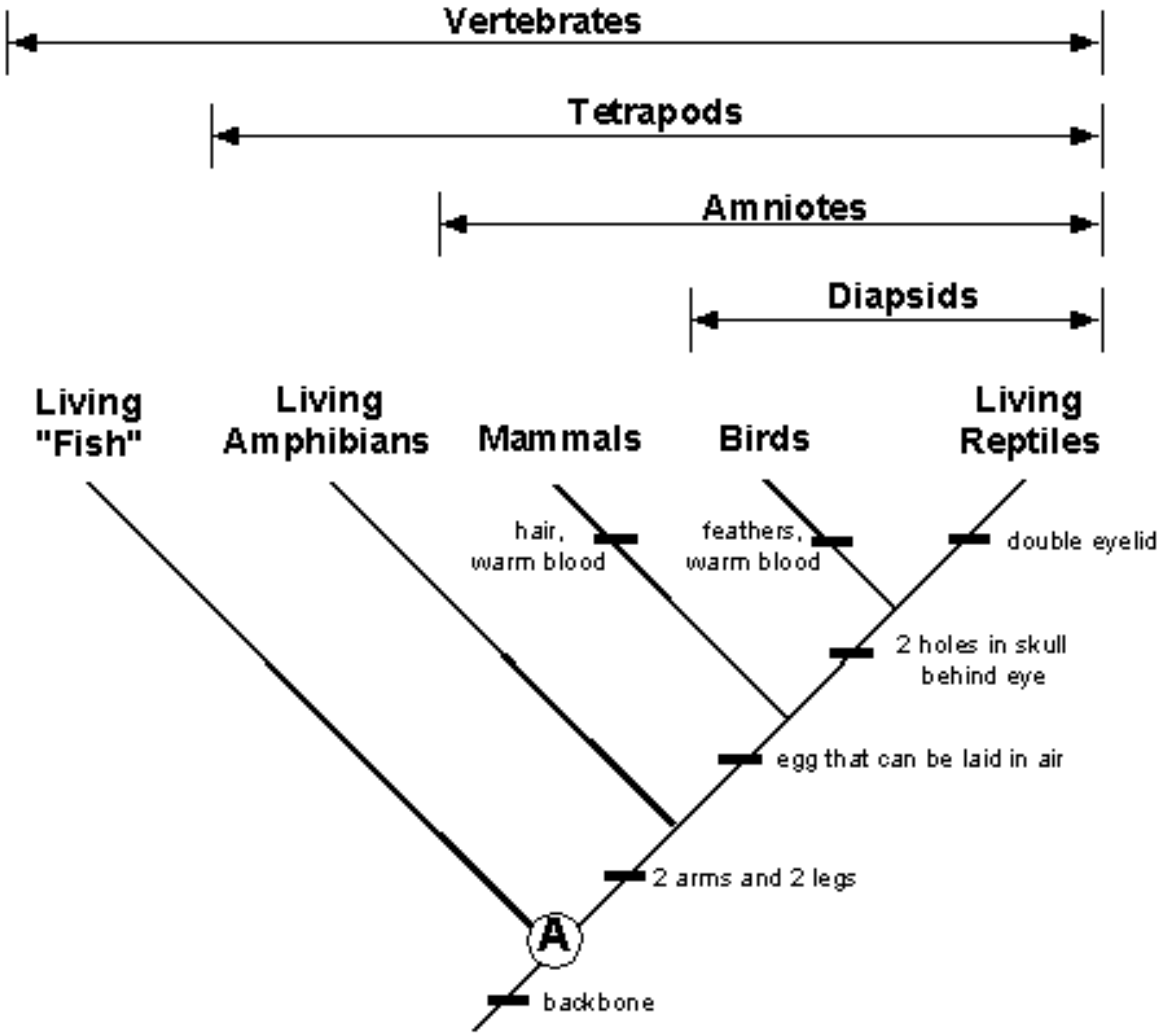


splitting into
two groups



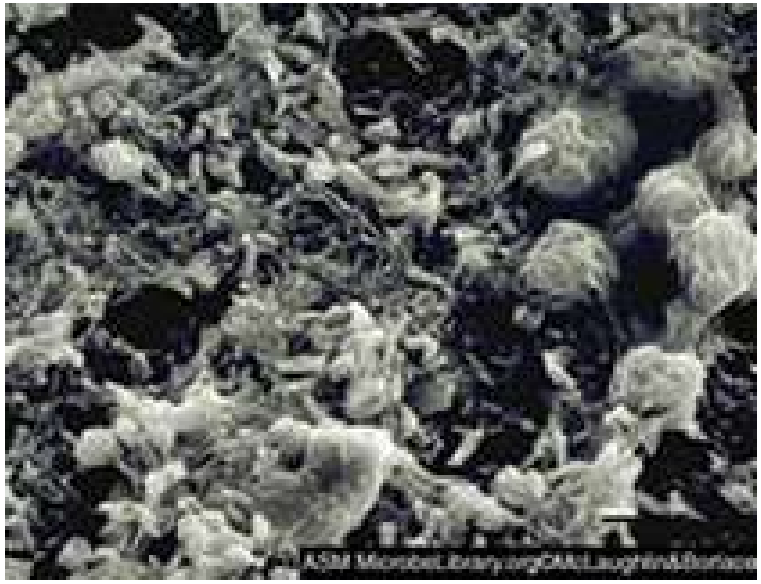
splitting into
many groups

Notice: Evolutionary characteristics, but not relation.



Domain Bacteria:
live in moderate environments.

(On your teeth and contact lenses.)



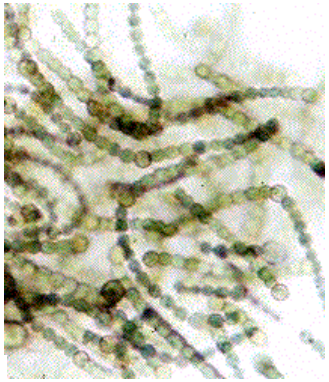
Characteristics of Bacteria

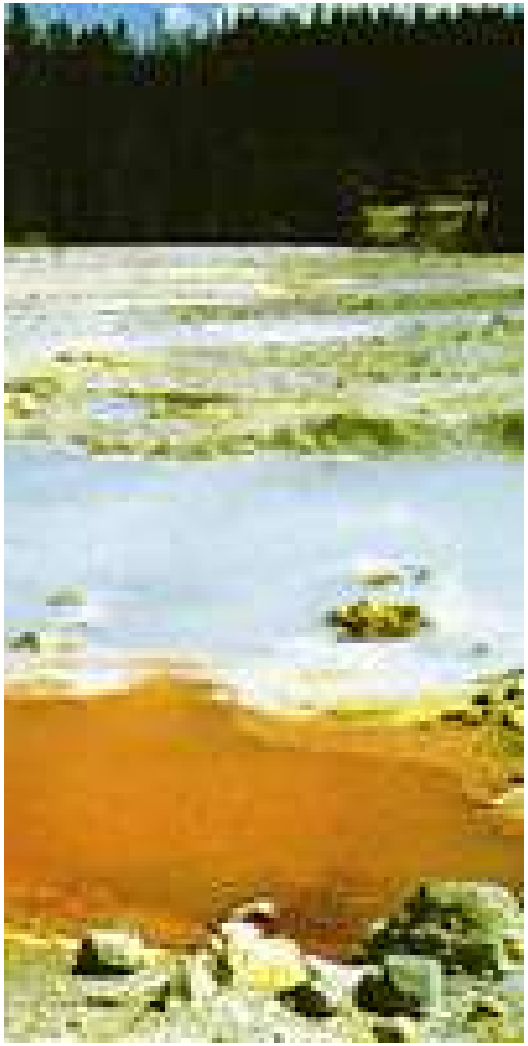
- Unicellular
- Prokaryotes
- No introns
- Thick, rigid, Peptidoglycan cell walls
- Anaerobes or Aerobes
- Some are Decomposers or Pathogens
- Some use conjugation

- E.Coli
- Some used to fix nitrogen for the nitrogen cycle

- Viruses placed here for lack of a place to put them.

Domain Archaea: the Extremophiles

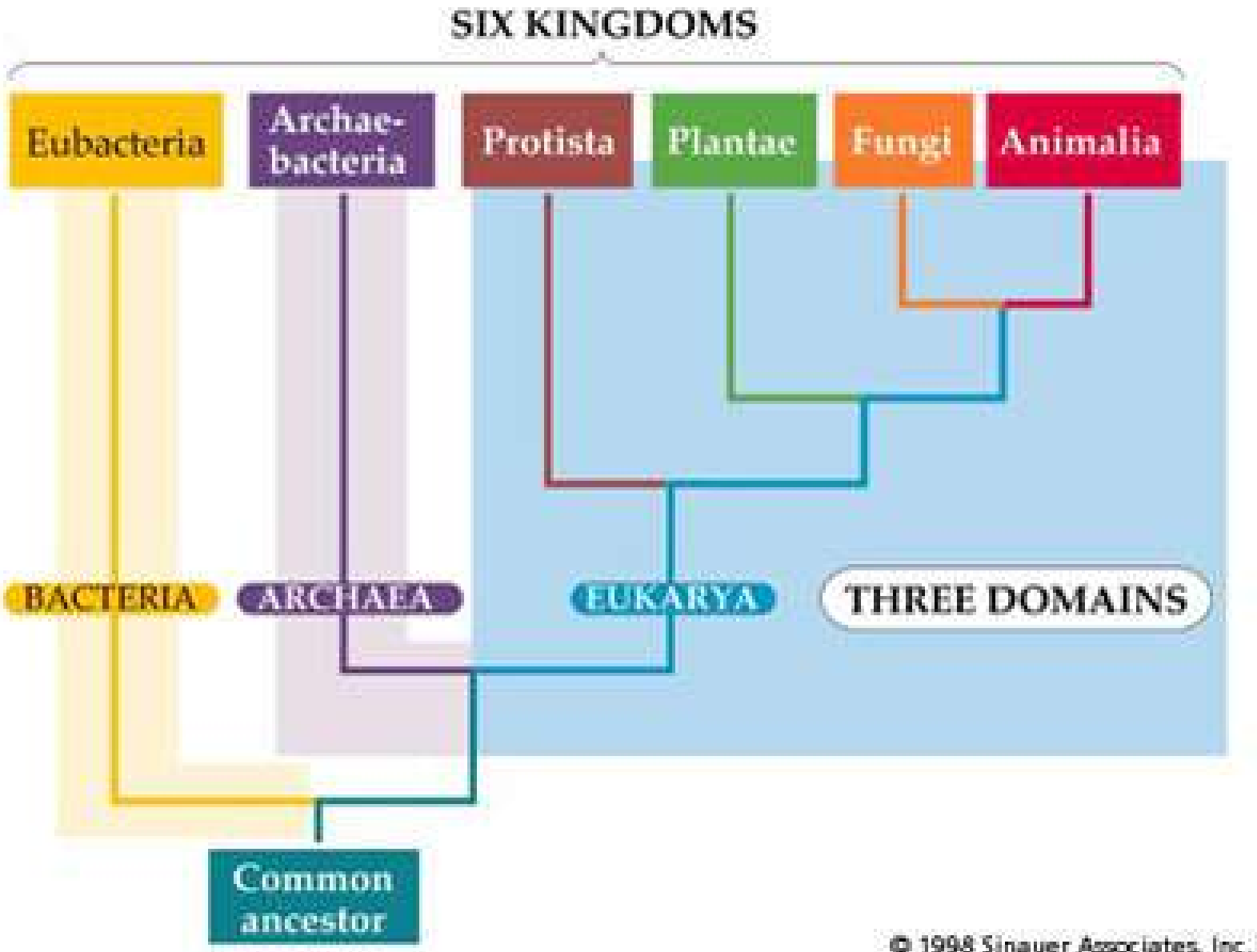




Characteristics of Archaea

- Unicellular
- Prokaryotes
- Some introns
- No peptidoglycan in cell
- Ribosomal RNA more closely related to Eukaryotes than bacteria

- Extremophiles
  - **thermophiles**, which live at high temperatures;
  - **hyperthermophiles**, which live at really high temperatures (present record is 121°C!);
  - **psychrophiles**, which like it cold (one in the Antarctic grows best at 4°C);
  - **halophiles**, which live in very saline environments (like the Dead Sea);
  - **acidophiles**, which live at low pH (as low as pH 1 and who die at pH 7!);
  - **alkaliphiles**, which thrive at a high pH.



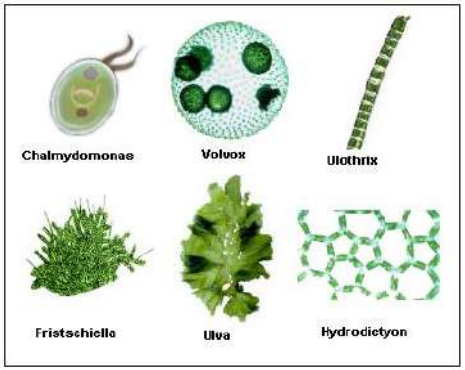
Domain Eukarya: the 4 Kingdoms!!

- Protista- 1.5 billion years ago. Most diverse kingdom plant-like, animal-like, and fungi-like
- Animals- heterotrophs, mobile, no cell wall 700 M
- Plants- autotrophs, immobile,cell wall 400 Mill
- Fungi-heterotrophs, cell wall, immobile 400 Mill.

Characteristics of Domain Eukarya

- Nucleus and Organelles
- No peptidoglycan in cells
- 4 kingdoms

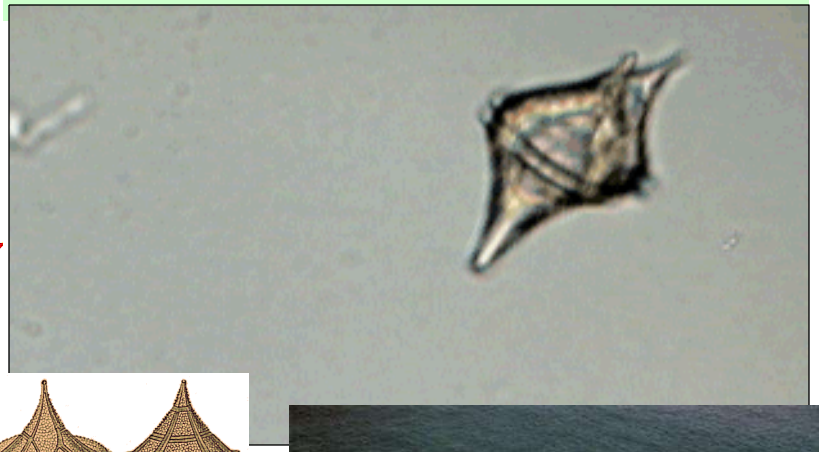
Kingdom Protista

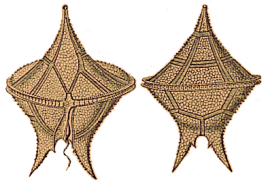


- Widest variety of organisms
- They are in this kingdom because of what they are not. Not animals, Fungi, or Plants
- Single and multicelled
- Heterotrophs and Autotrophs
- Some use conjugation (yes, like bacteria)

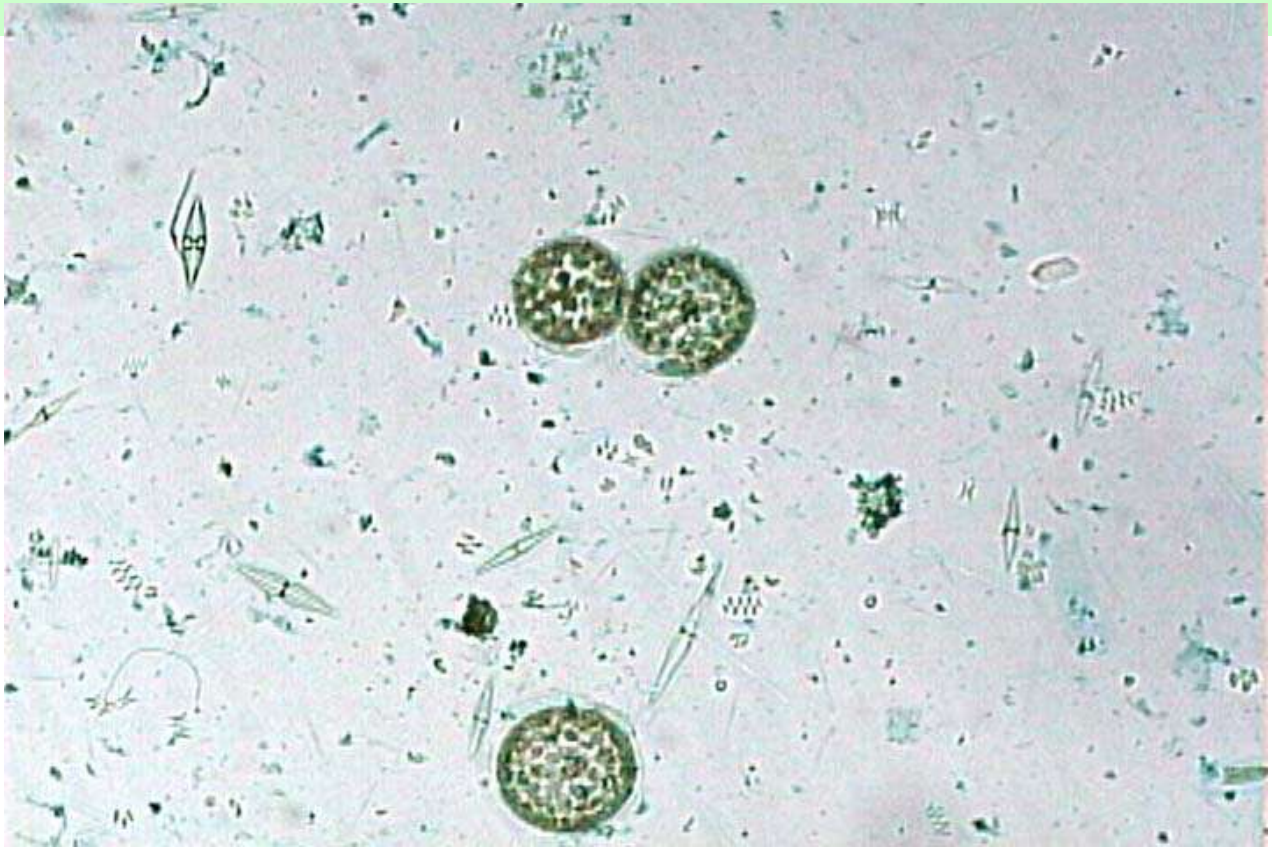
Protists: Plant-like varieties

- Multicellular, Photosynthetic = **Algae**
- Dinoflagellates- cause red tides
- Diatoms- reflective paint, toothpaste
- Kelp





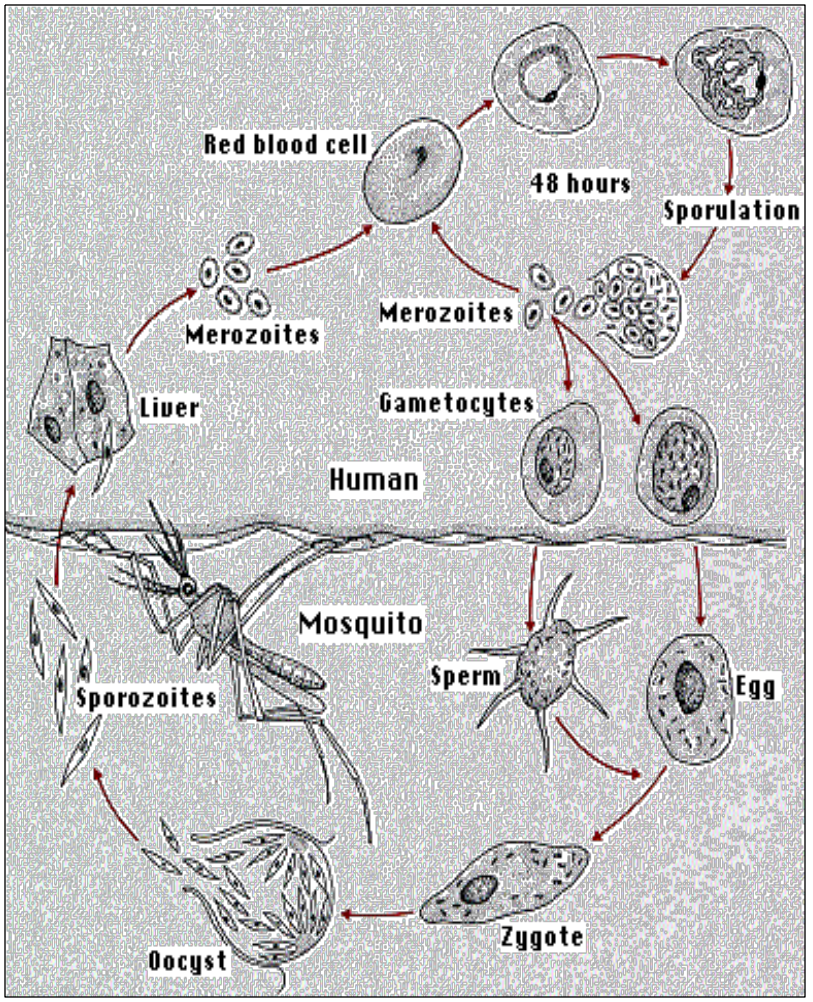
Diatoms



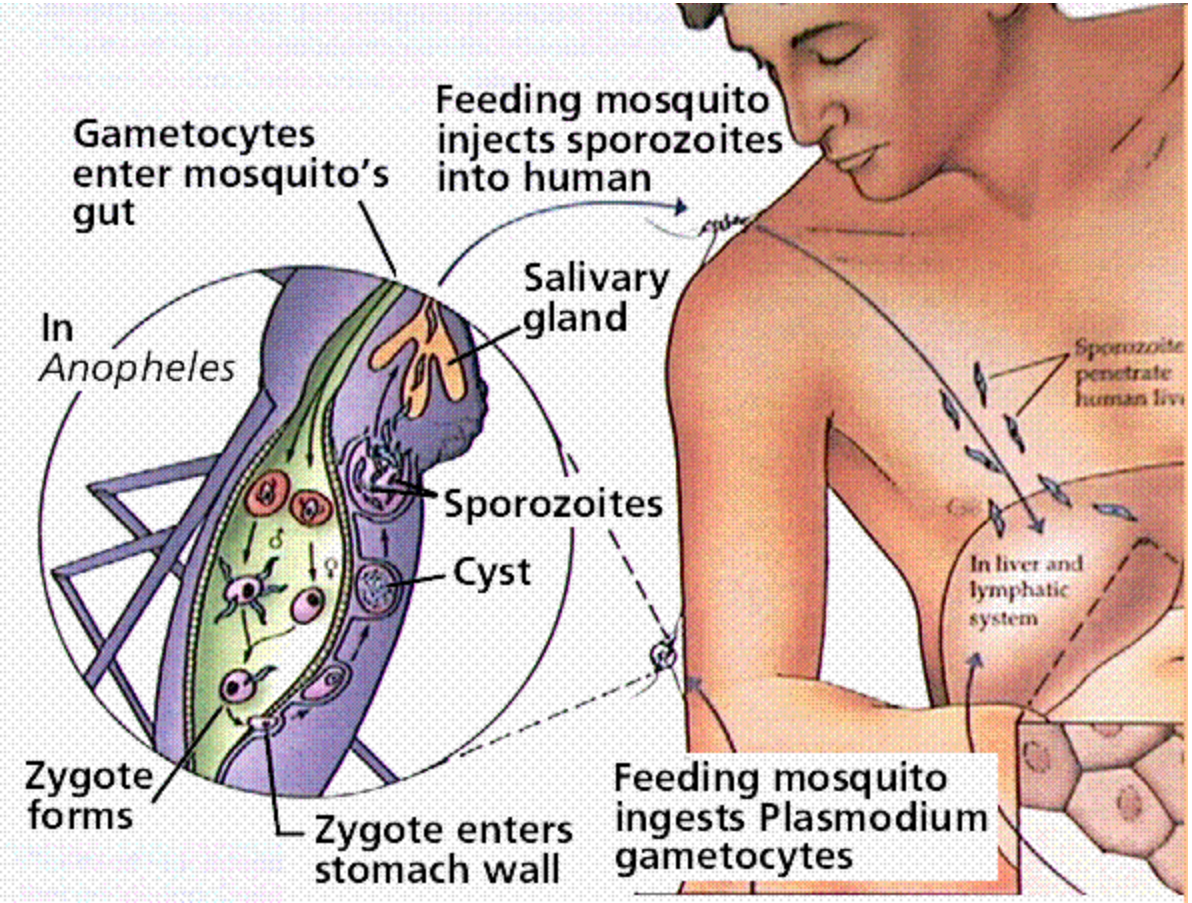
Kelp

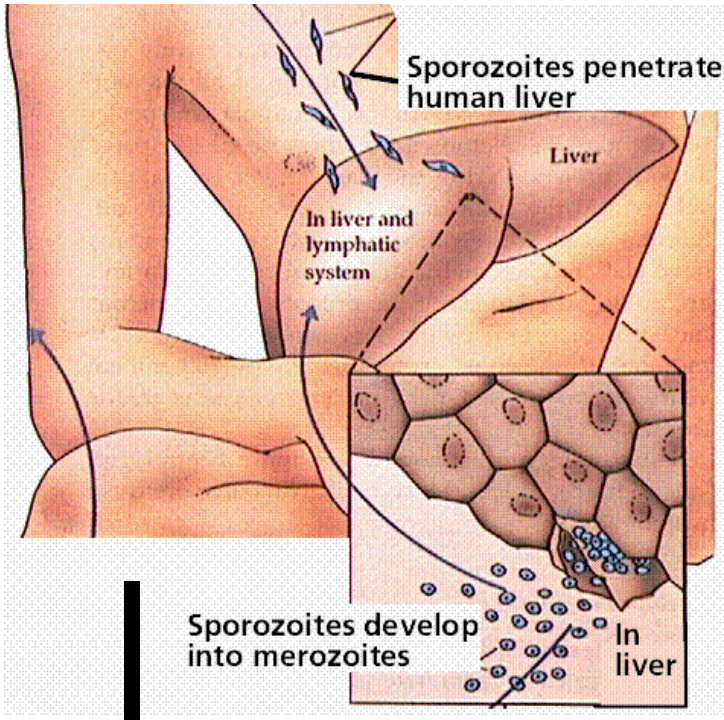
Animal-like Protists

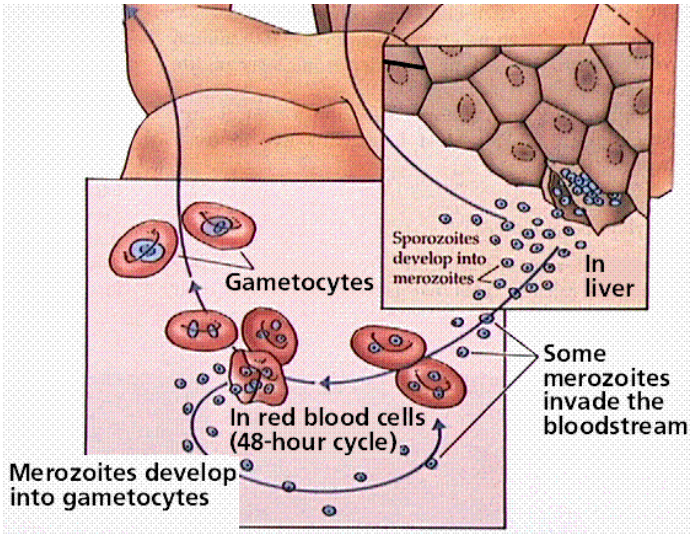
- Unicellular, heterotrophs some can photosynthesize =**Protozoans**
- African sleeping sickness and Giardias
- **Sporozoans**= malaria
- **Flagellate**= termites digestive friend, have flagella
- **Amoebas**= dysentery, move by pseudopodia



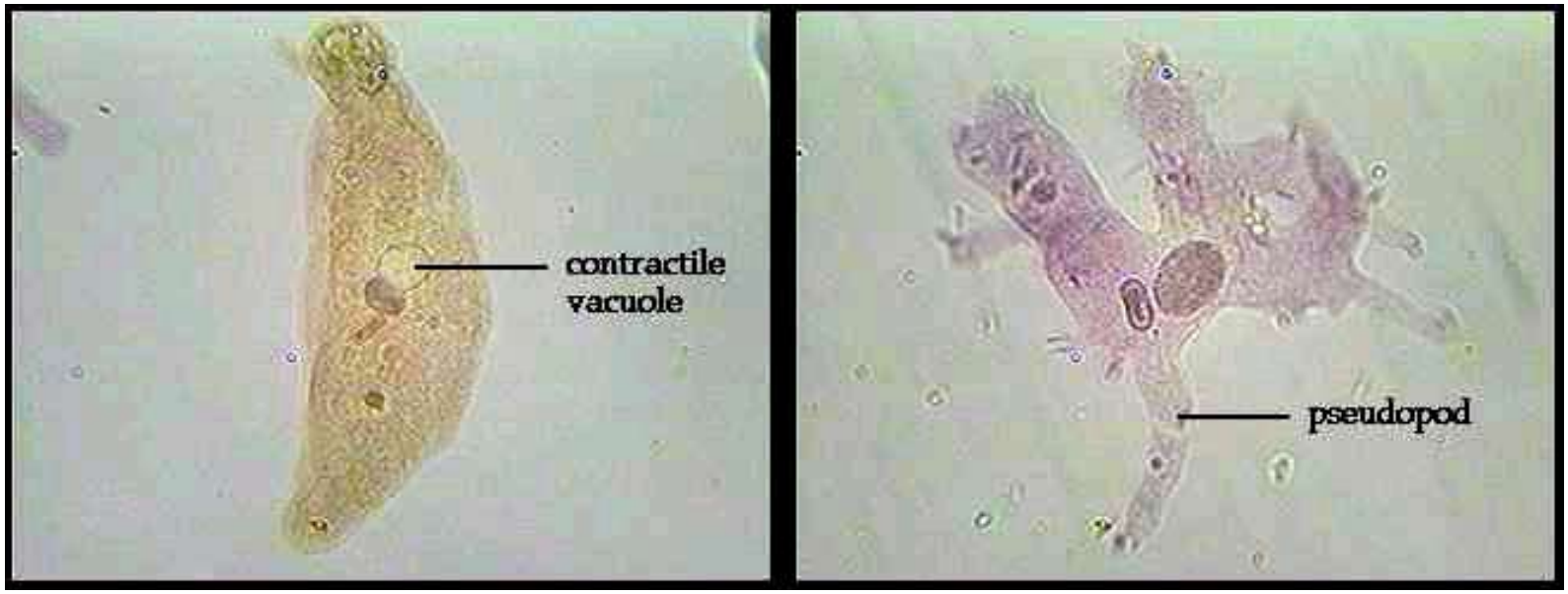
Malaria: The life Cycle

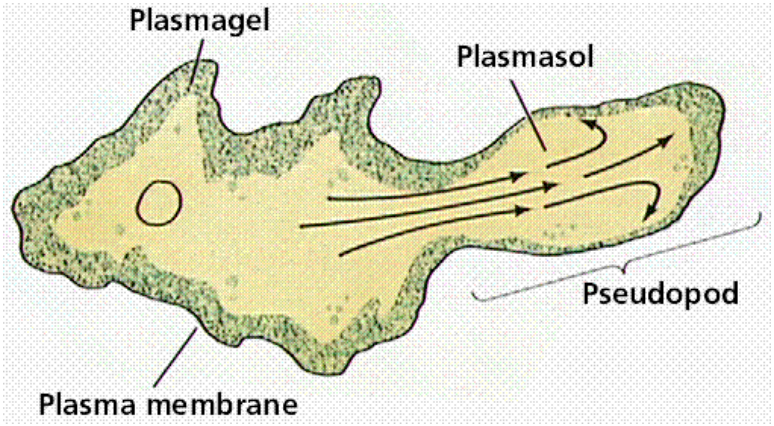






Amoebas

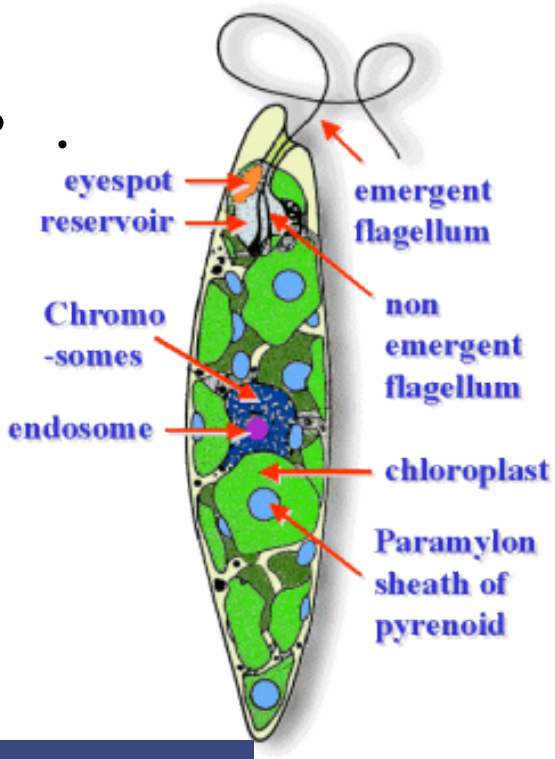

contractile vacuole
pseudopod

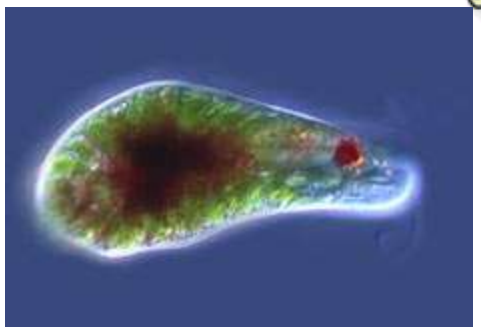

Plasmagel
Plasmasol
Pseudopod
Plasma membrane

Protista: Animal-like Euglenids

- Unicellular
- Many *Euglenoids* feed by phagocytosis. 1/3d of the species of *Euglenids* are photosynthetic but can become heterotrophic when sunlight is unavailable.
- *Euglena* use flagella for moving. The outer covering called a pellicle, is flexible and assists in moving.
- Some have an eyespot with a photoreceptor is capable of detecting the presence of light.
- Reproduction is asexual.

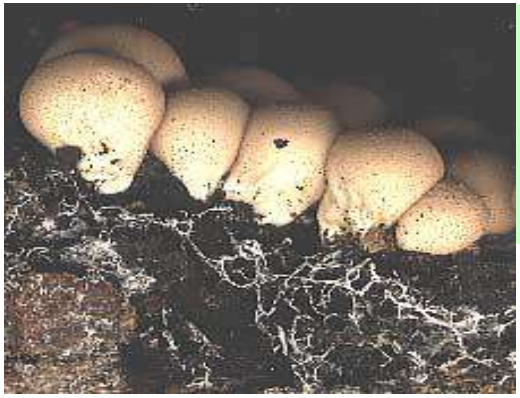
- .



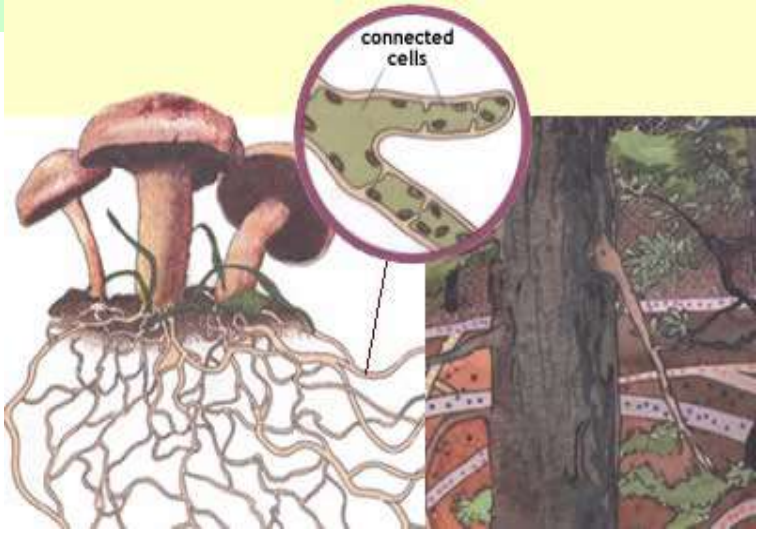


Fungi-like Protists

- Decomposes organic materials
- Slime molds
- Water molds (includes mildew)

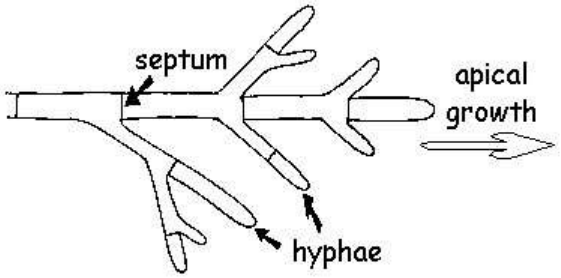


Kingdom Fungi



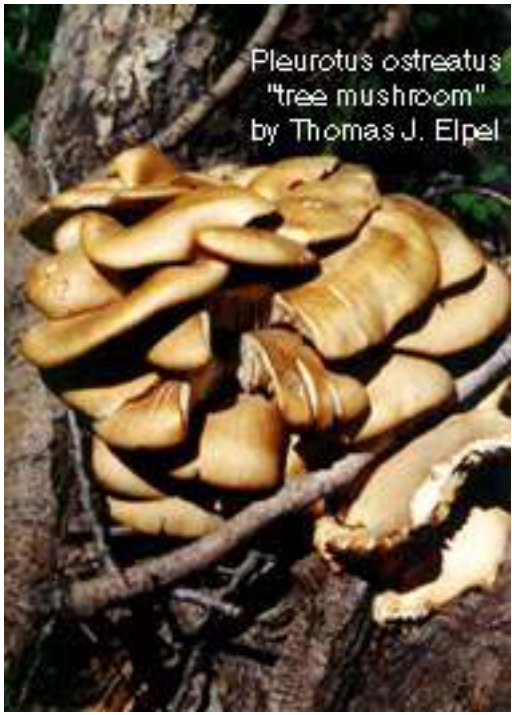
- Heterotrophic
- Cell walls made of chitin

- Hyphae and mycelium. Most of the Fungi cannot be seen.
- Extracellular digestion through hydrolytic enzymes
- Decomposers



Edible and Non edible Forms

- Yeast makes beer and bread
- Blue cheese- penicillin
- Morels and others



Fungi can Infect you

- Oral Thrush and Athletes Foot

Kingdom Plantae

- Photosynthetic autotrophs with a cell wall
- Bryophytes: no vascular tissue
  - Nonvasuclar land plants: Moss Liverwarts

More Plants

- Plants with stems: Whisk fern
- Plants with leaves and stems: Equesetum
- Ferns

More Plants

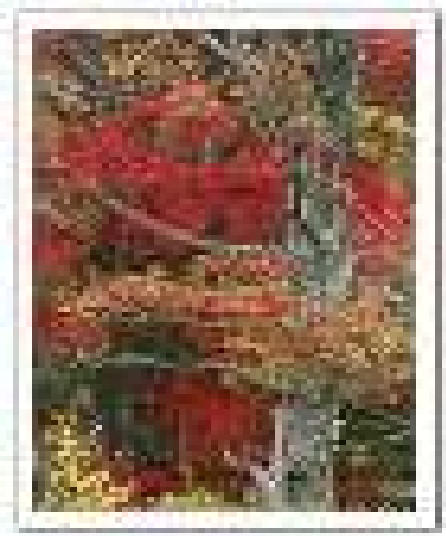
- Gymnosperms
- Cycads and Ginkgo

- Junipers , Cypress , and Pine

Modern Plants

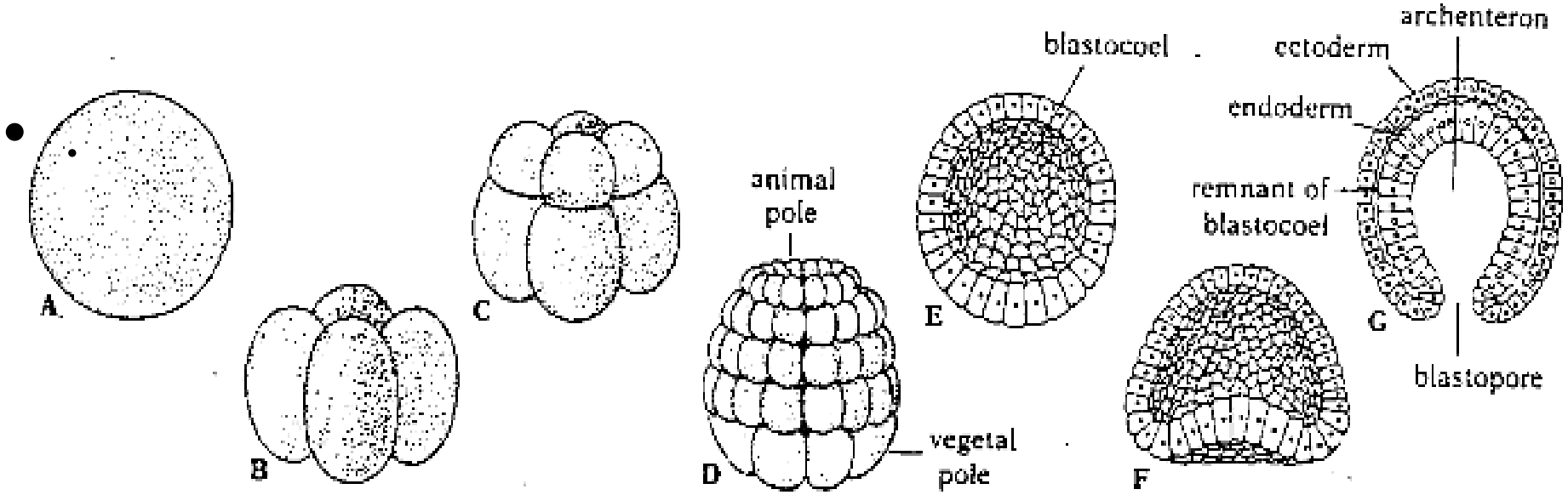
- Angiosperms- flowering plants

- Deciduous Trees



Patterns of Embryological Development

- **Zygote**: fertilized egg
- **Blastula**: hollow ball of cells
- **Gastrula**: caved in ball of cells , the opening becomes the mouth or anus of an organism.
  - Insects: Mouth- Protosome
  - Echinoderms: Anus-Deuterosome
  - Which one are you?

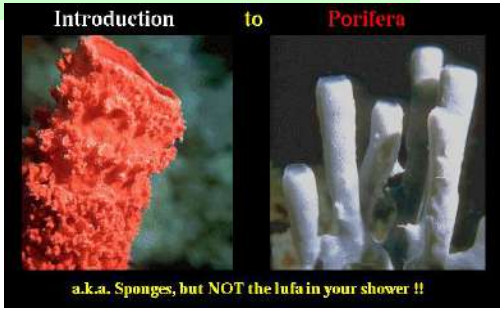


Development in Gastrulating Animal

(A) Zygote. (B-D) Early cleavage stages forming a morula (C) an dthen blastula (D). (E) Longitudinal section through blastula, showing blastocoel. (F-G) Longitudinal sections through an early and late gastrula.

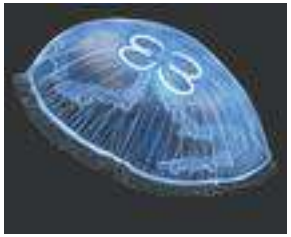
(From Keeton, 1976, p. 700.)

Kingdom Animalia



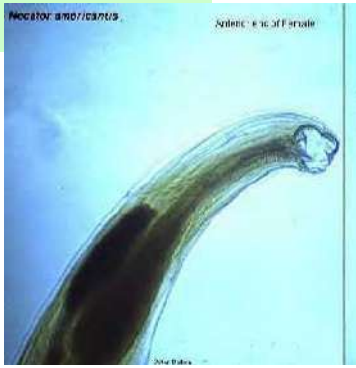
- Most ancient animals = sponge

- Cnidarians or jellyfish, coral, sea anemones



What came next in the Animal Kingdom?

- Flatworms and round worms



- Mollusks Snails and Octopus

- Annelids earthworms and leeches

More Animals

- Arthropods- Jointed appendages

- Chordates- internal skeleton

There are so many living things how can we find them quickly?

- Dichotomous Key. By comparing two opposing traits at one time a quick identification can be made.
- Lab time