Kingdoms and Classification

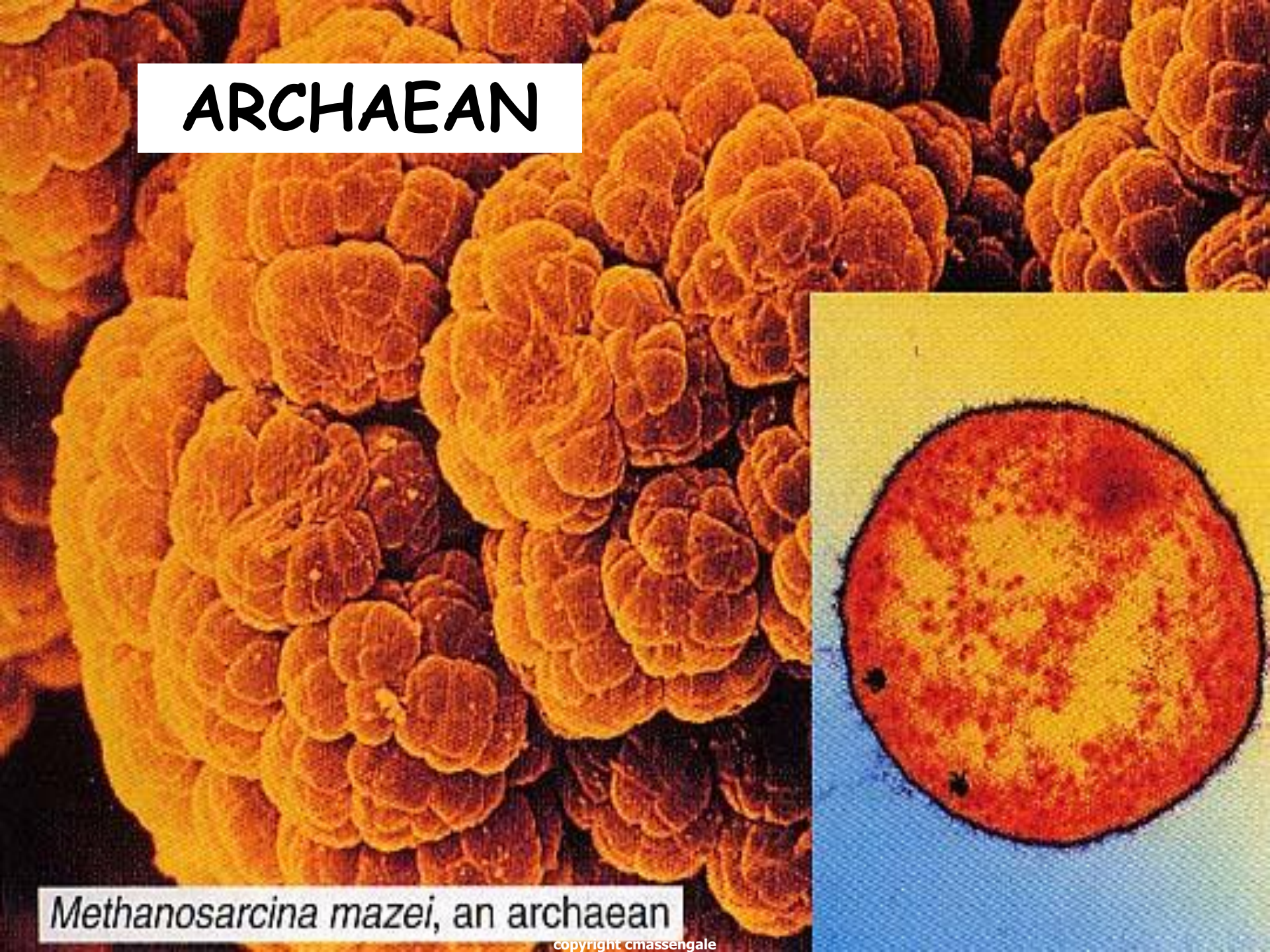
Domains

- Broadest, most inclusive taxon
- Three domains
- Archaea and Eubacteria are unicellular prokaryotes (no nucleus or membrane-bound organelles)
- Eukarya are more complex and have a nucleus and membrane-bound organelles

DOMAIN ARCHAEA

- Probably the 1st cells to evolve
- Live in HARSH environments
- Found in:
  - Sewage Treatment Plants
  - Thermal or Volcanic Vents
  - Hot Springs or Geysers that are acid
  - Very salty water (Dead Sea; Great Salt Lake)

ARCHAEAN



Methanosarcina mazei, an archaean

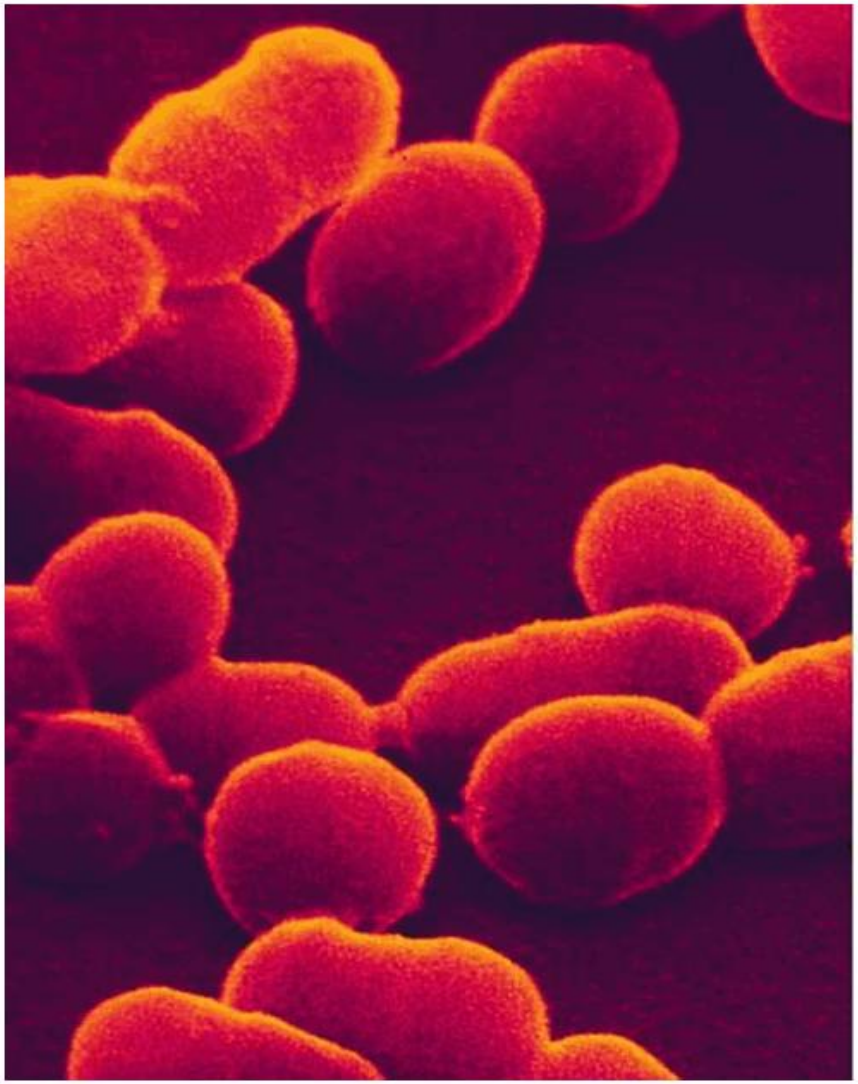
DOMAIN EUBACTERIA

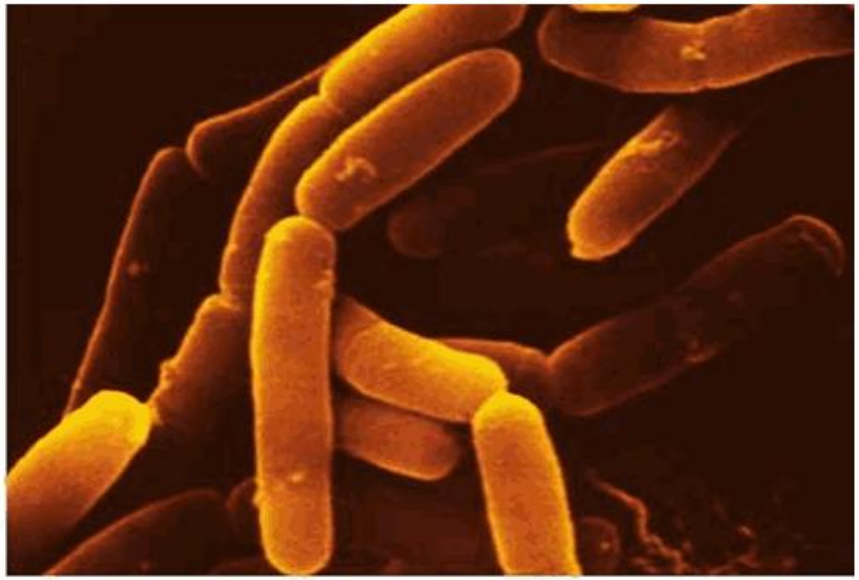
- Some may cause DISEASE
- Found in ALL HABITATS except harsh ones
- Important decomposers for environment
- Commercially important in making cottage cheese, yogurt, buttermilk, etc.

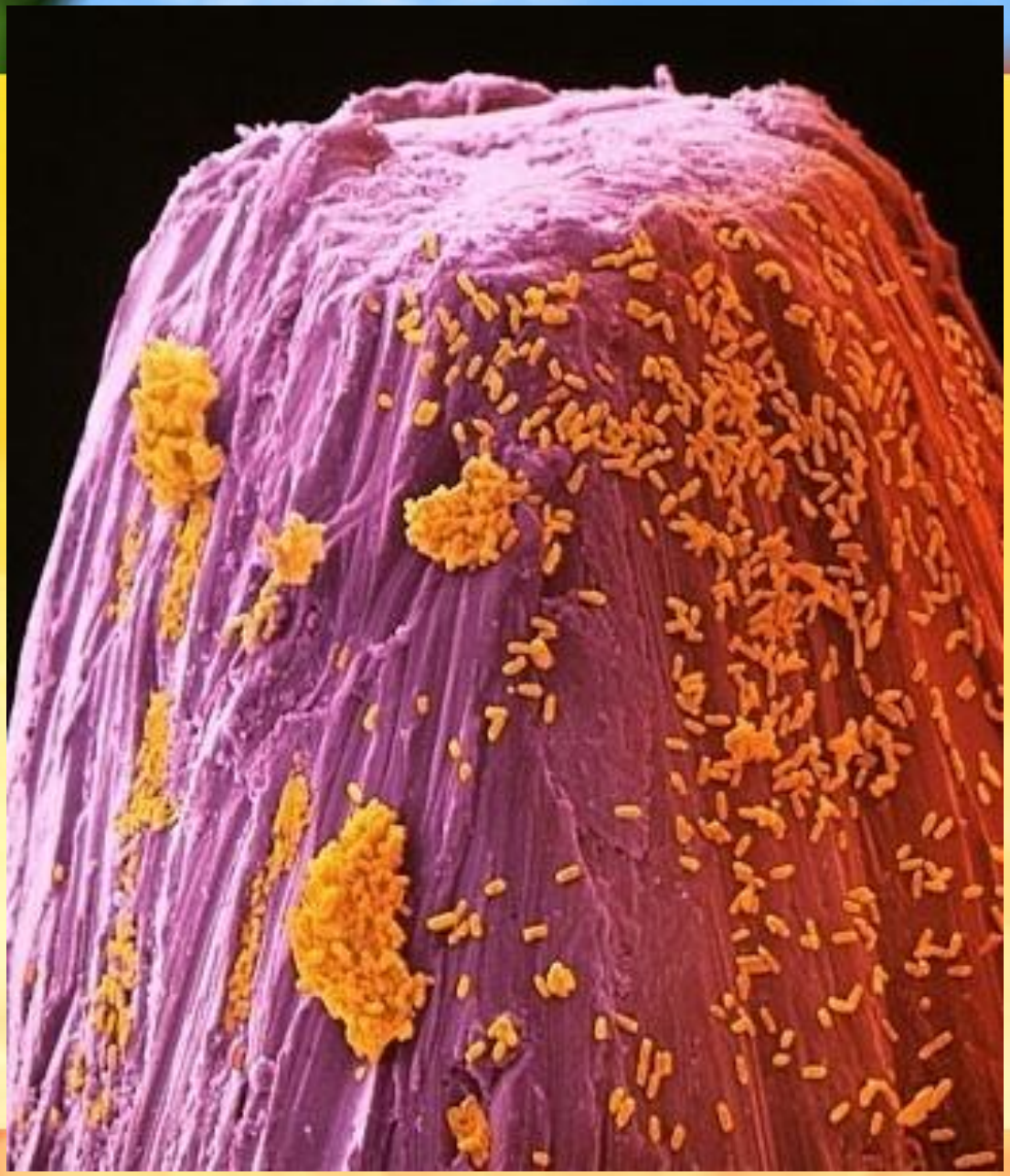
Key Characteristics of Bacteria

- They can be autotrophic, heterotrophic, or chemotrophic.
- They are unicellular.
- Have a cell wall and circular DNA.
- Reproduce asexually.
- Can be found in three basic shapes:
  - -Rods (bacillius)
  - -Spheres (Cocci)
  - - Spirals (spirillium)

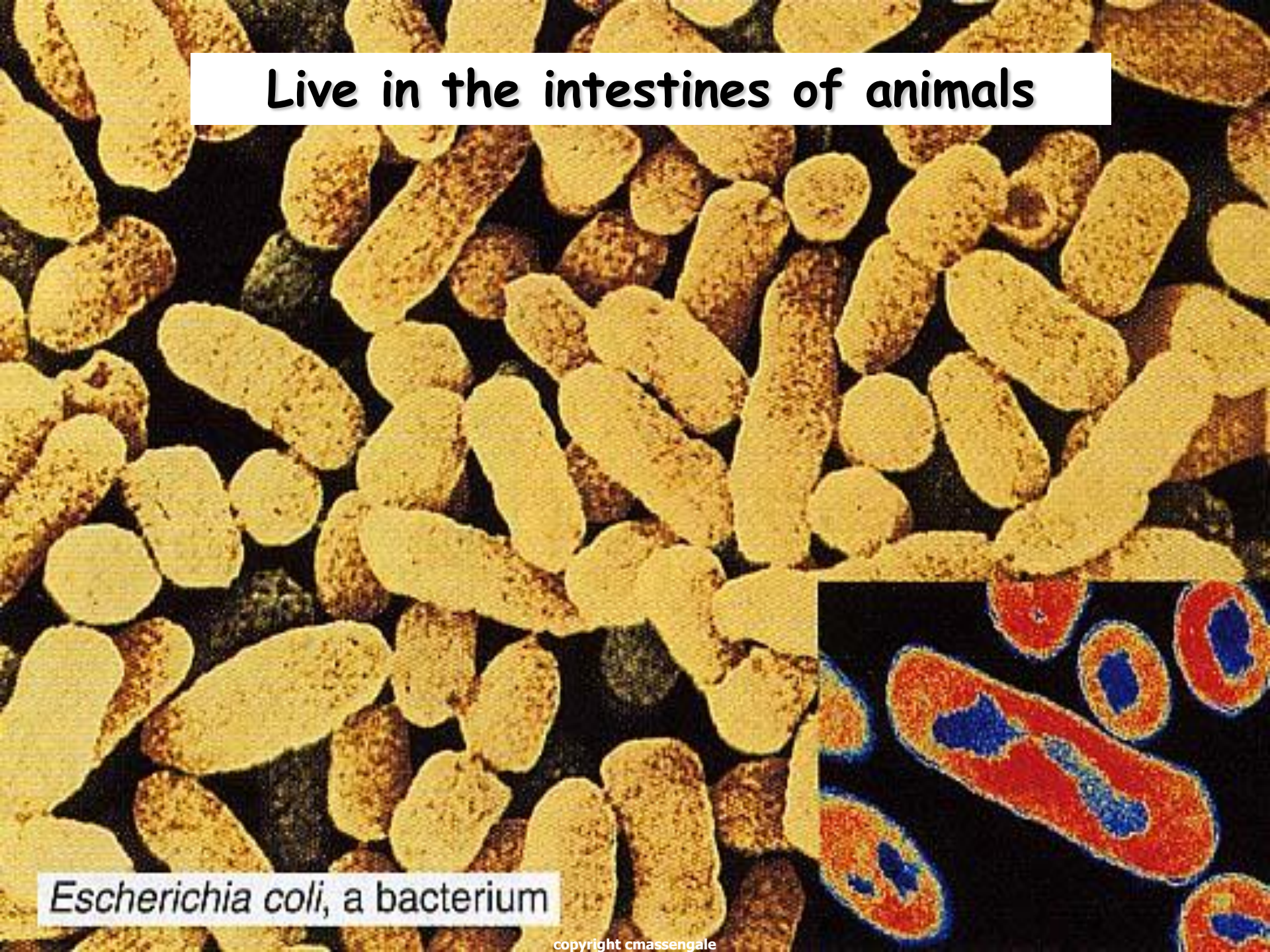
Figure 27.3 The most common shapes of prokaryotes







Live in the intestines of animals



Escherichia coli, a bacterium

Domain Eukarya is Divided into Kingdoms

- Protista (protozoans, algae…)
- Fungi (mushrooms, yeasts …)
- Plantae (multicellular plants)
- Animalia (multicellular animals)

Protista

- Most are unicellular
- Some are multicellular
- Some are autotrophic, while others are heterotrophic
- Usually aquatic.

Protists Categories

Protists can be separated into three categories based on their nutritional needs:

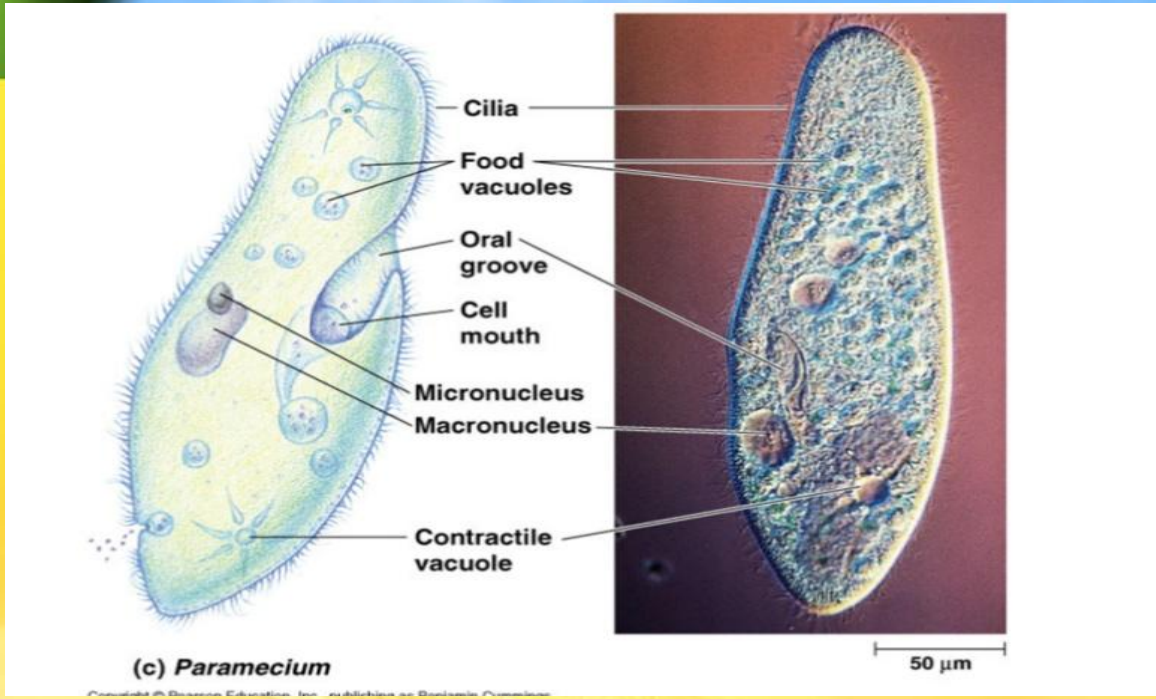
1. Animal like protists (heterotrophs)
2. Plant like protists (autotrophs)
3. Fungus like protists (decomposers)

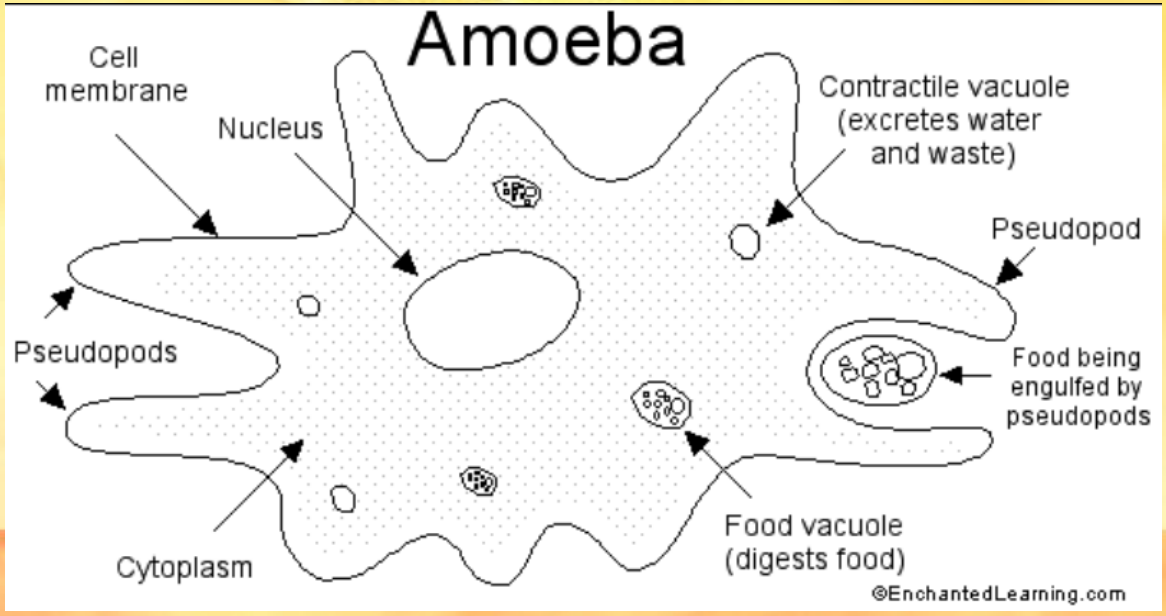
Animal Like Protists:

Animal like protists are also protozoans.

Locomotion takes place by either cilia, flagella, or pseudopods.

They are heterotrophs and reproduce asexually.


Cilia
Food vacuoles
Oral groove
Cell mouth
Micronucleus
Macronucleus
Contractile vacuole
(c) Paramecium
50 µm

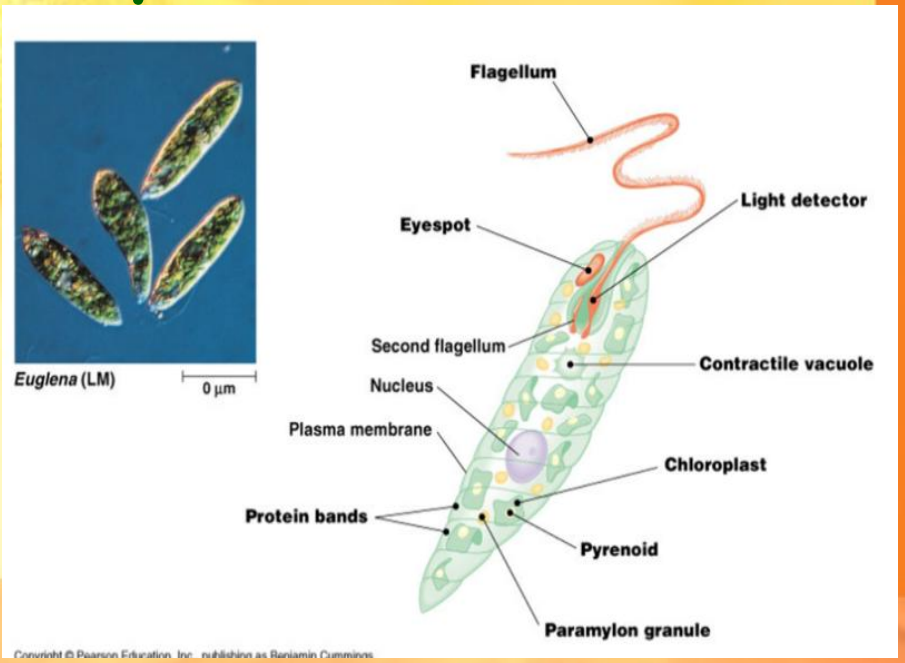

Amoeba
Cell membrane
Nucleus
Contractile vacuole (excretes water and waste)
Pseudopod
Pseudopods
Food being engulfed by pseudopods
Cytoplasm
Food vacuole (digests food)
©EnchantedLearning.com

Plant Like Protists

Plant like protists include the euglena, algae, and seaweed.

They can be unicellular or multicellular.

They are photosynthetic (autotrophs) and reproduce asexually.



Fungus Like Protists

Similar to fungus. They are decomposers (heterotrophs).

Reproduce by spores (asexually).

Includes slime molds and water molds.

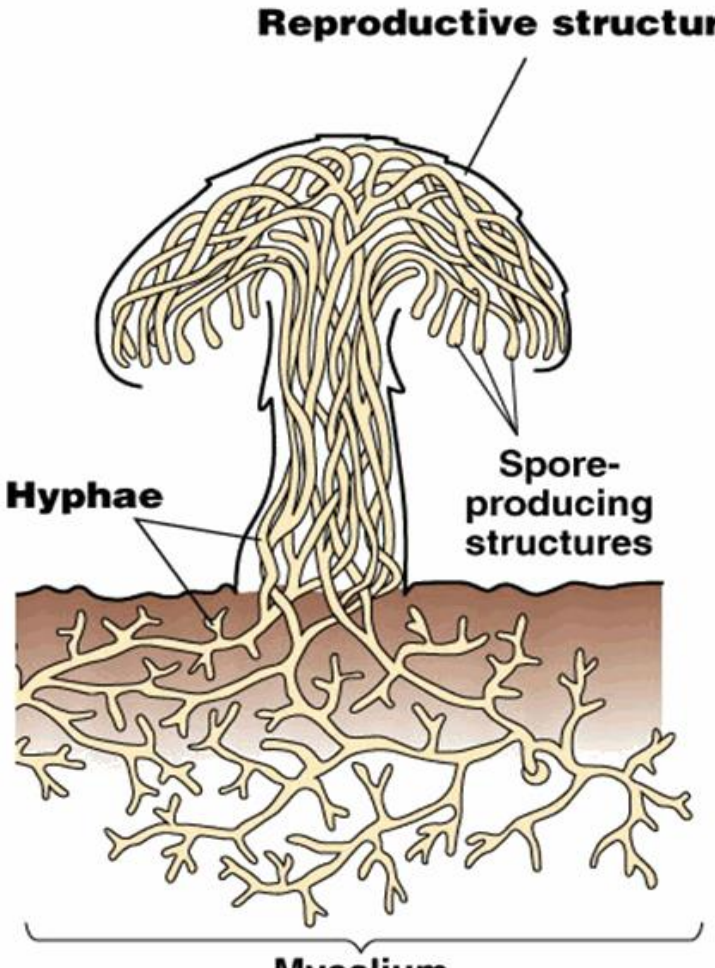
Fungi

- Multicellular, except yeast
- Absorptive heterotrophs (digest food outside their body & then absorb it)
- Cell walls made of chitin
- Reproduce sexaully and asexually.
- Includes mold, yeast, mushrooms, and even some parasites (athlete's foot or ringworm).

Structure of Fungi:

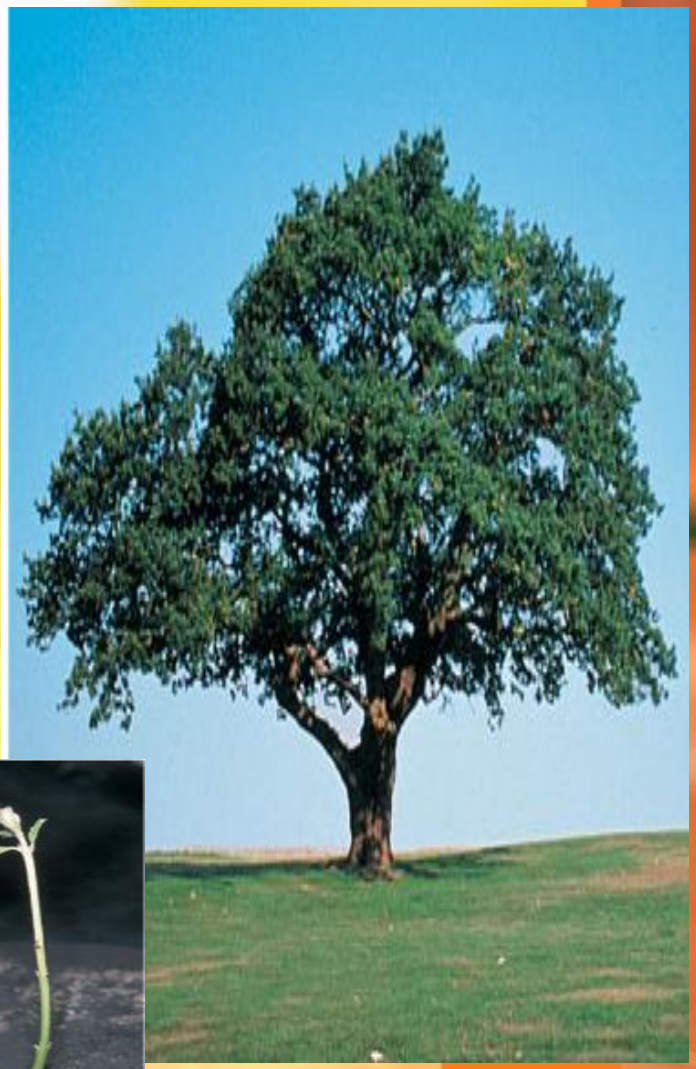
Fungi are composed of hyphae. These are thin filaments of single cells. The hyphae join together to make a net like structure called the mycelium. This helps increase the rate of absorption.

Figure 31.1 Fungal mycelia



Plantae

- Multicellular
- Autotrophic
- Absorb sunlight to make glucose – Photosynthesis
- Cell walls made of cellulose



Plantae

Plants can be divided into 2 categories:

1) Vascular Plants-have xylem and phloem.
2) Nonvascular Plants- do not have xylem and phloem.

Non Vascular Plants

Includes: liverworts, mosses, and bryophytes.

Since non vascular plants do not have xylem, they require moist environments in order to get water.

Vascular Plants

Vascular plants have xylem and phloem and can be divided into 2 groups:

1) Angiosperms-flower producing plants.
   Ex: Apple trees
2) Gymnosperms-cone bearing plants.
   Ex: Pine trees

Angiosperm Reproduction

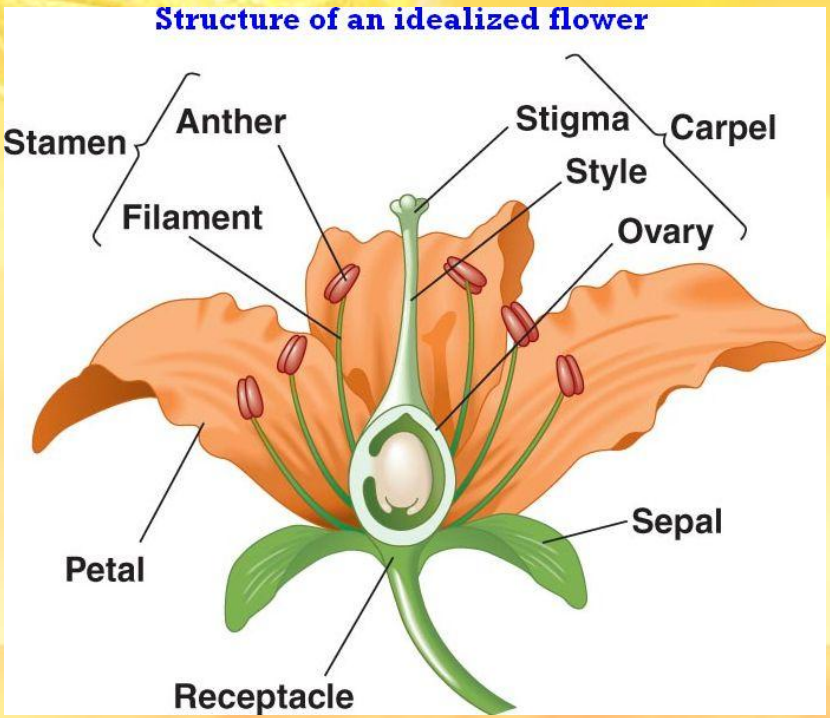
Cross pollination occurs when pollen from one flower fertilizes an egg from another flower. Animals, wind, and water help with cross pollination.

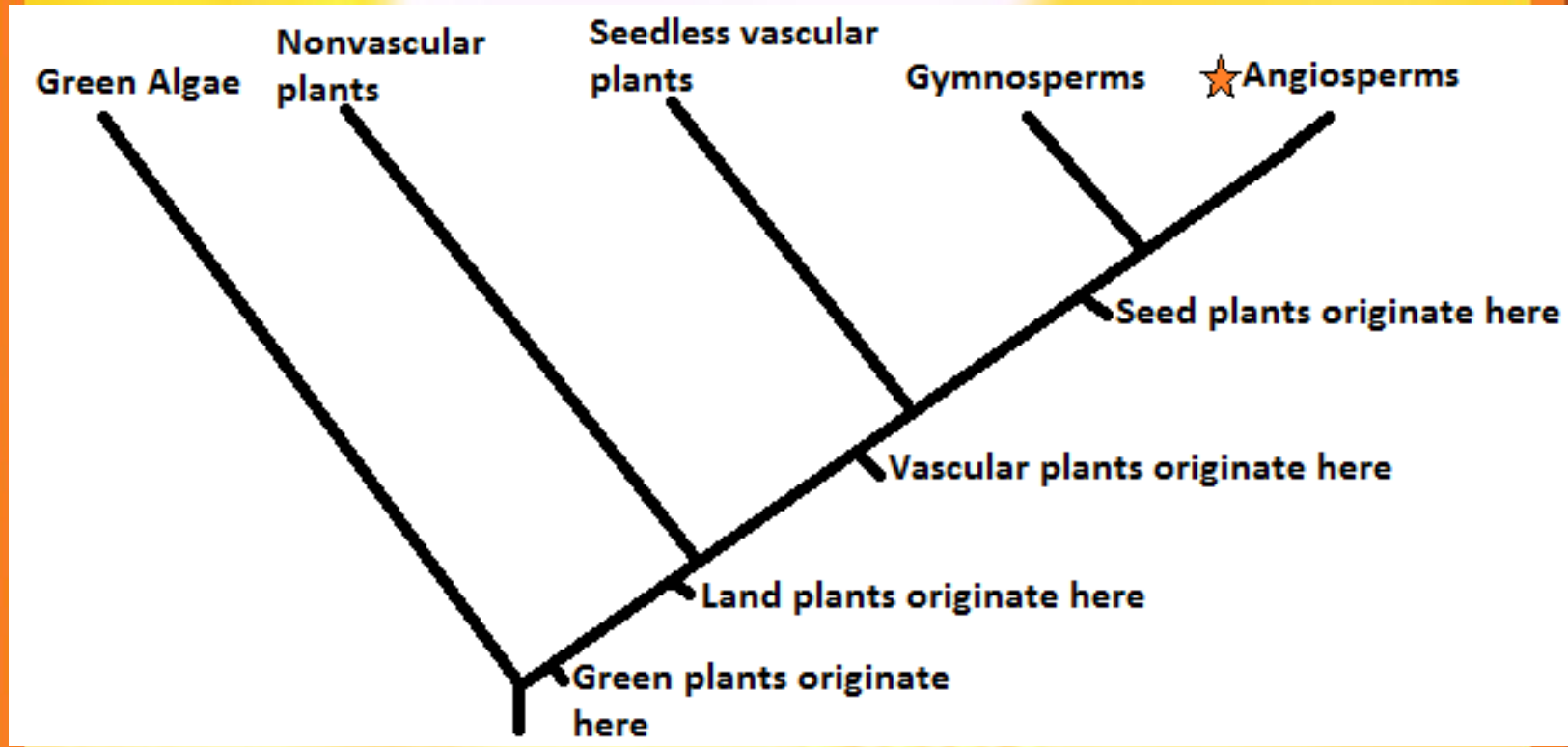
Self pollination occurs when pollen from one flower pollinates its own egg.

Angiosperm Reproduction

Stamen contains the male parts of the plant. Anther produces pollen (sperm).

Carpel contains the female parts. Ovary contains the ovule (egg).





Types of Plants

Bryophytes

- Non-vascular
  - No xylem or phloem
- Examples are mosses
- They are small
- Have to be near water
- No pollen, seeds, flowers, or fruits

Gymnosperms

- Vascular
  - Xylem to move water
  - Phloem to move food
- Examples are conifers
- Have pollen (sperm)
- Have seeds on cones
- No fruits or flowers

Angiosperms

- Vascular
  - Xylem to move water
  - Phloem to move food
- Examples are flowering plants like oak trees, corn, and roses
- Have pollen (sperm)
- Have seeds in fruits
- Have flowers

Animalia

- Multicellular
- Ingestive heterotrophs (consume food & digest it inside their bodies)
- Feed on plants or animals
- Specialized organs.

TYPES OF ANIMALS

Annelids

- Segmented worms
- No backbone
- "breathe" through skin
- Closed circulatory system
- External fertilization
- External development

Insects

- No backbome
- Three body segments
- Six legs
- Wings
- Open circulatory system
- External fertilization
  - Females may store sperm
- External development
- metamorphosis

Amphibians

- Have backbone
- Moist skin
- Gills when young, lungs when adult
- Three chambered heart
- Cold-blooded
- External fertilization
- External development
- Metamorphosils
- Jelly like egg

Mammals

- Backbone
- Hair
- Milk glands
- Lungs
- Four chambered heart
- Warm-blooded
- Internal fertilization
- Internal development
- Amniote egg

Kingdom	Organization	Type of Nutrition	Representative Organisms	
Protista	Complex single cell, some multicellular	Absorb, photo-synthesize, or ingest food	 paramecium  euglenoid  slime mold  dino-flagellate	Protozoans, algae, water molds, and slime mold
Fungi	Some unicellular, most multicellular filamentous forms with specialized complex cells	Absorb food	 black bread mold  yeast  mushroom  bracket fungus	Molds, yeast, and mushrooms
Plantae	Multi-cellular form with specialized complex cells	Photo-synthesize food	 moss  fern  pine tree  nonwoody flowering plant	Mosses, ferns, nonwoody and woody flowering plants
Animalia	Multi-cellular form with specialized complex cells	Ingest food	 coral  earthworm  blue jay  squirrel	Invertebr-ates, fishes, reptiles, amphibians, birds, and mammals

c. Domain Eukarya
Eukaryotes, structurally diverse and organized into the four kingdoms depicted here.