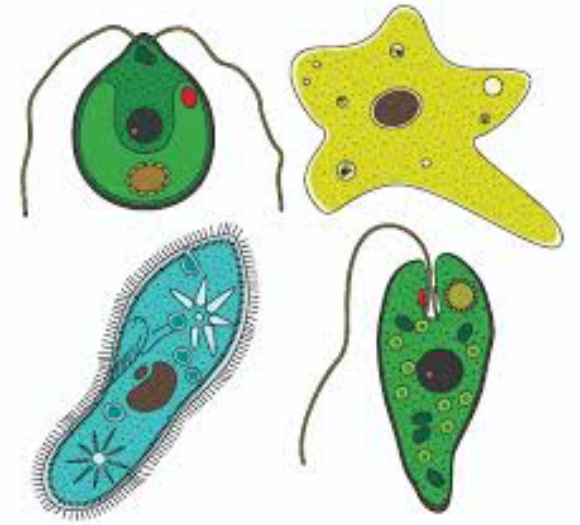


Protistans

18-1: Introduction to Protists

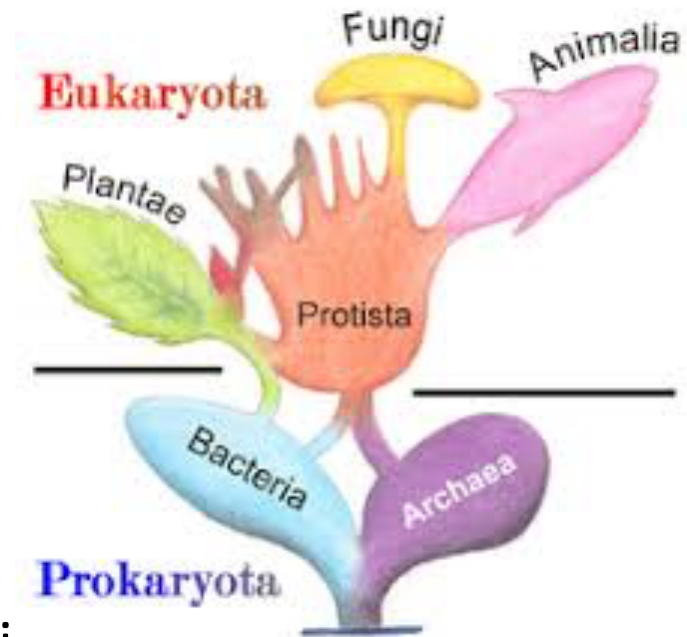


I. Introduction

- A. Protista means first in the Greek language
- B. Protist: Unicellular, or single-celled, eukaryotic organisms
- C. Some are solitary, meaning: that they live as individual cells
- D. Some are colonial, meaning: that they live in groups of individuals of the same species that are attached to one another

II. Classification of Protists:

- A. Kingdom very diverse: over 115,000 species
- B. These species difficult to classify because: they had characteristics in common with more than one of the three kingdoms of multicellular organisms: Animalia, Plantae and Fungi
- C. This Kingdom exists primarily: to solve the problem of classifying these difficult organisms.
- D. Lynn Margulis says Kingdom Protista is defined by: exclusion: its members are neither animals, plants, fungi, nor prokaryotes.



18-2: Animal-like Protists

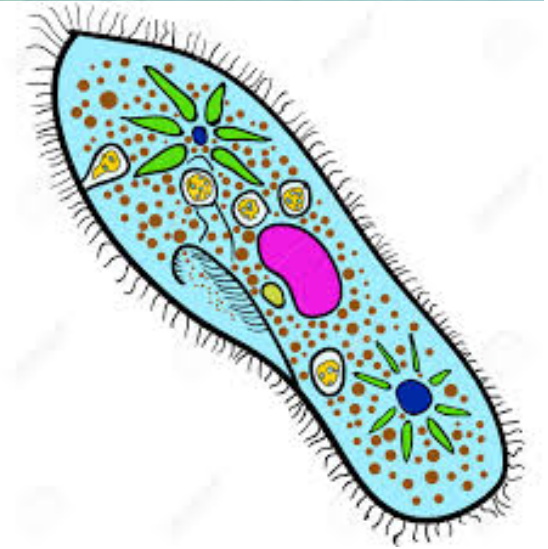
Ciliophora phyla within the kingdom are “animal-like”

I. Ciliophora: Cilia-Bearing Protists

A. Characteristics: Either solitary or colonial organisms

1. Nickname: ciliates

- a. Cilia are: short hairlike projections
- b. Beating of cilia propels the cell thru water



B. Focus on Paramecium

1. Size: 350 μm in length

2. Details of exterior:

- a. Pellicle (def'n): complex living outer layer made of cell membrane and associated underlying structures
- b. Embedded in pellicle are trichocysts
 - I. Used for defence
 - II. Used to injure nearby cells and cover Paramecium in protective bristles

3. 2 different nuclei:

- a. Large macro nucleus [transcription nucleus]
- b. Small micro nucleus [reproductive nucleus]

Movement

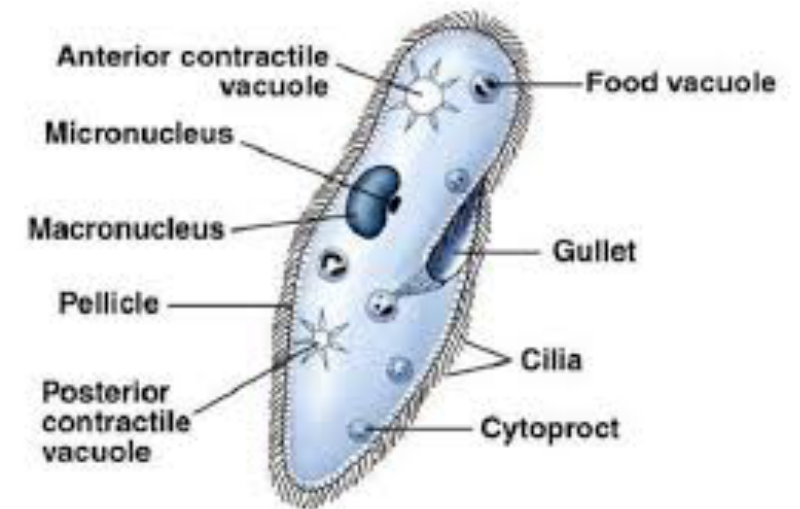


Fig. Paramecium

4. Feeding:

- a. Uses cilia to direct water into gullet
- b. Food (e.g. bacteria) forced into cavities called food vacuoles
- c. Break off into cytoplasm and circulate, eventually fusing with lysosomes

5. Digestion:

- a. Lysosome (def'n): organelles that contain digestive enzymes

6. Waste Removal:

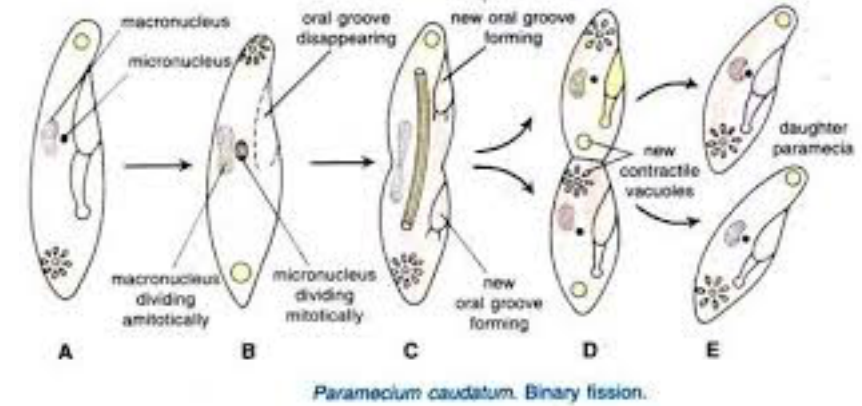
- a. "Used" food vacuoles fuse with region of cell membrane called the anal pore

7. Excretion

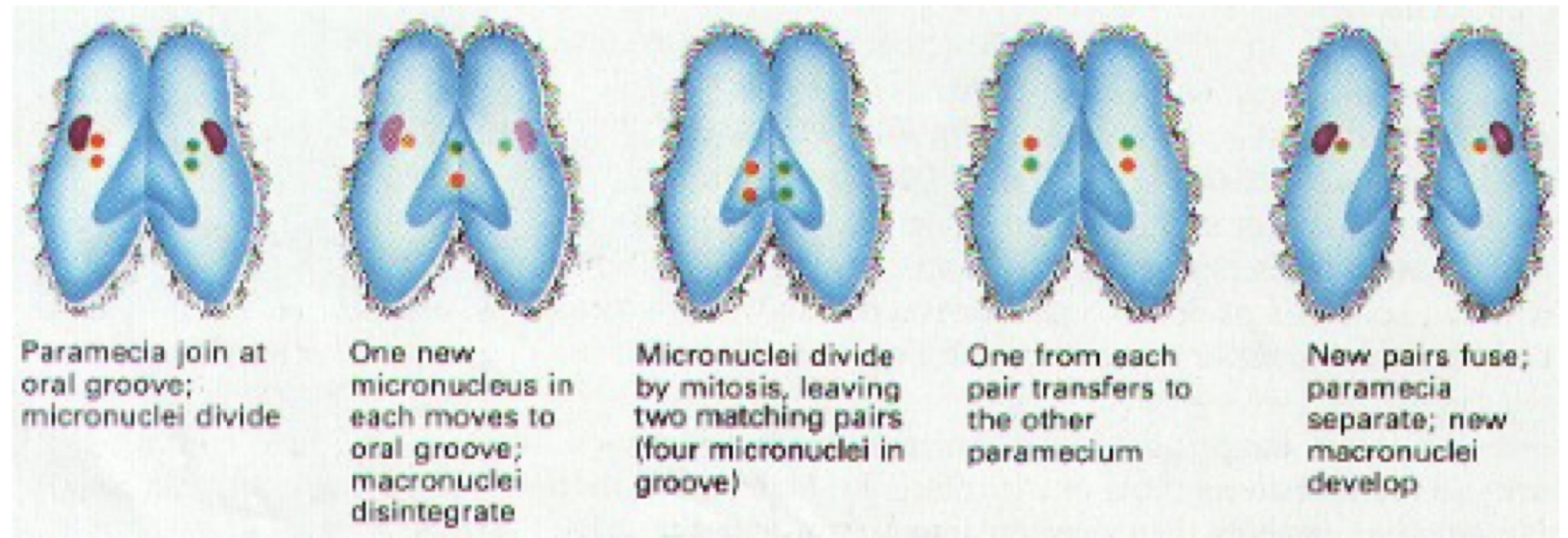
- a. Water flows into Paramecium due to osmosis
- b. Expelled by process:
 - i. Excess water collects in other vacuoles
 - ii. Vacuoles fuse with canals located around the contractile vacuoles
 - iii. When filled, this organelle contracts quickly and pumps water out

8. Reproduction

- Mostly asexual by binary fission (mitosis) results in 2 cells that are genetically identical
- Under stresses such as starvation or temperature, Paramecium will engage in sex by process of conjugation



- Conjugation is not REPRODUCTION, because no additional cells are produced but it is a SEXUAL process because new combinations of genetic material result



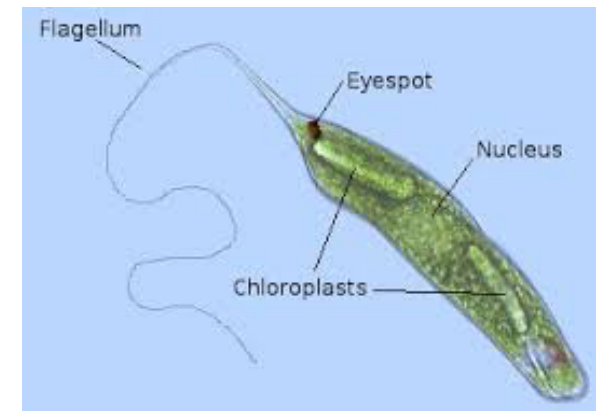
II. Zoomastigina: Animal-like Protists with Flagella

A. Characteristics:

1. Move through water by means of flagella (def'n): long, whiplike projection that aids in movement in some cells

B. Feeding:

1. Absorb food through cell membranes
2. Some live within the bodies of other organisms and live as parasites
 - a. Giardia: lives in small intestine of humans
 - b. Trichomonas: causes intestinal and venereal disease in humans



III. Sporozoa: Spore-Producing Parasitic Protists

A. Characteristics:

1. Are non-motile and parasites on other organisms
2. Hosts can be worms, insects, fish, birds and humans

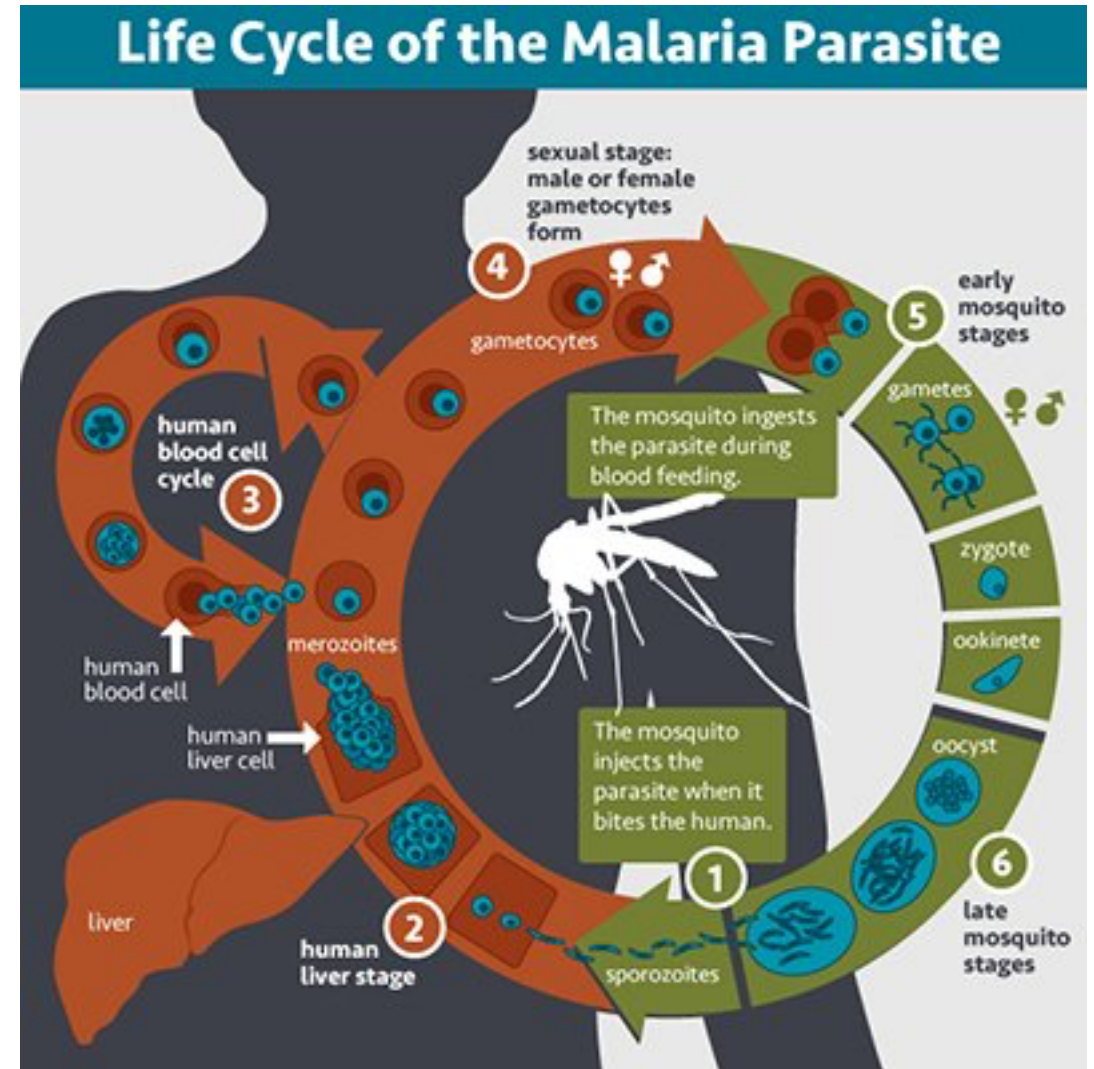
B. Life Cycle:

1. Usually complex, involving more than one host
2. Reproduce by means of spores
3. Spores attach and penetrate host cells



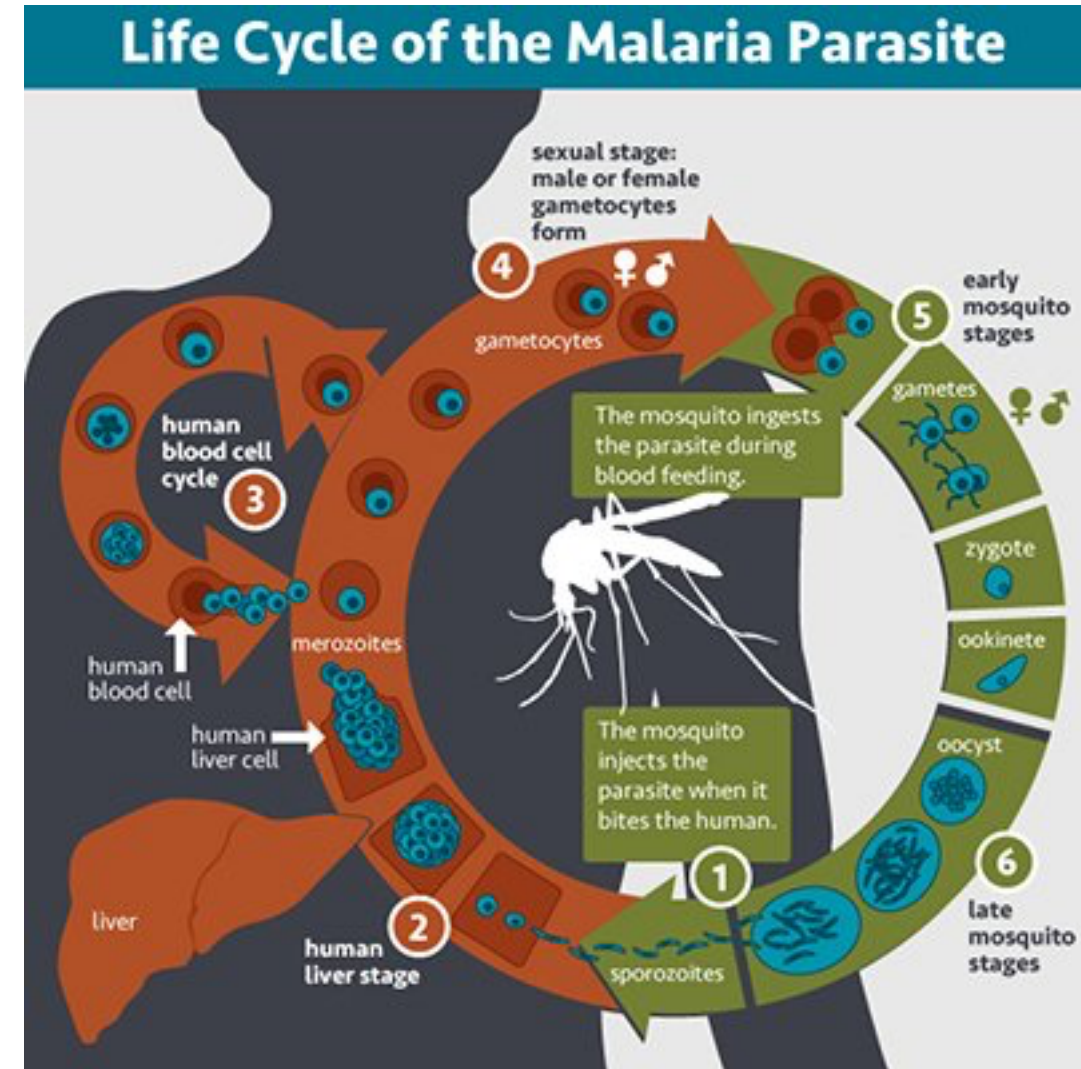
C. Focus on Plasmodium

1. Carrier (vector): the Anopheles mosquito
2. Infection process – human host
 - a. Mosquito saliva contains spores, which are injected into the bloodstream
 - b. First infects liver cells, then red blood cells (RBCs)
 - c. Grows rapidly, and lyse cells at regular intervals: 48 or 72 hours
 - d. Millions of bursting RBCs dump large amounts of toxins into bloodstream
 - e. Toxins produce symptoms: chills and fever



3. Infection process – mosquito host:
 - a. Mosquito feeds on an infected human: blood contains Plasmodium
 - b. In digestive system, rapidly spreads everywhere, including salivary glands
4. Combating malaria:
 - a. Drugs (e.g. chloroquine) work on some forms, but some are resistant
 - b. Disrupt Plasmodium life cycle by destroying breeding areas for mosquito

Ethical Question: Do we Destroy the Mosquito?



IV. Sarcodina: Protists with False Feet

A. Characteristics:

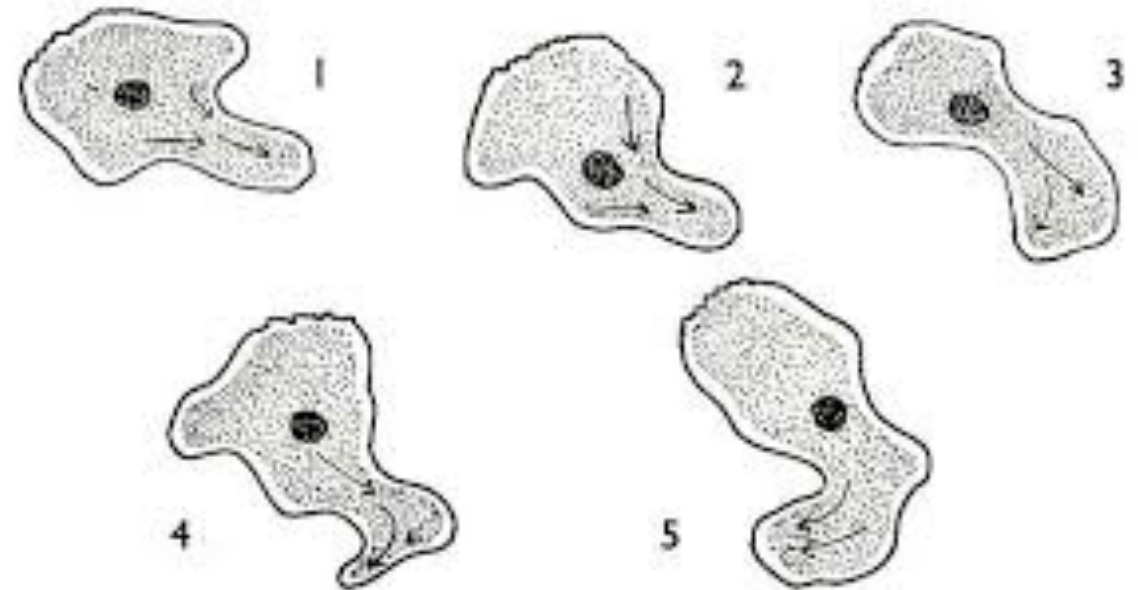
1. Use temporary projections of cytoplasm to move and feed
2. Pseudopod means: false foot.
3. Shapes:
 - a. Rounded and broad
 - b. Thin, strand-like
 - c. Web-like
4. Phylum name comes from: sarcode which meant "jelly"

Movement



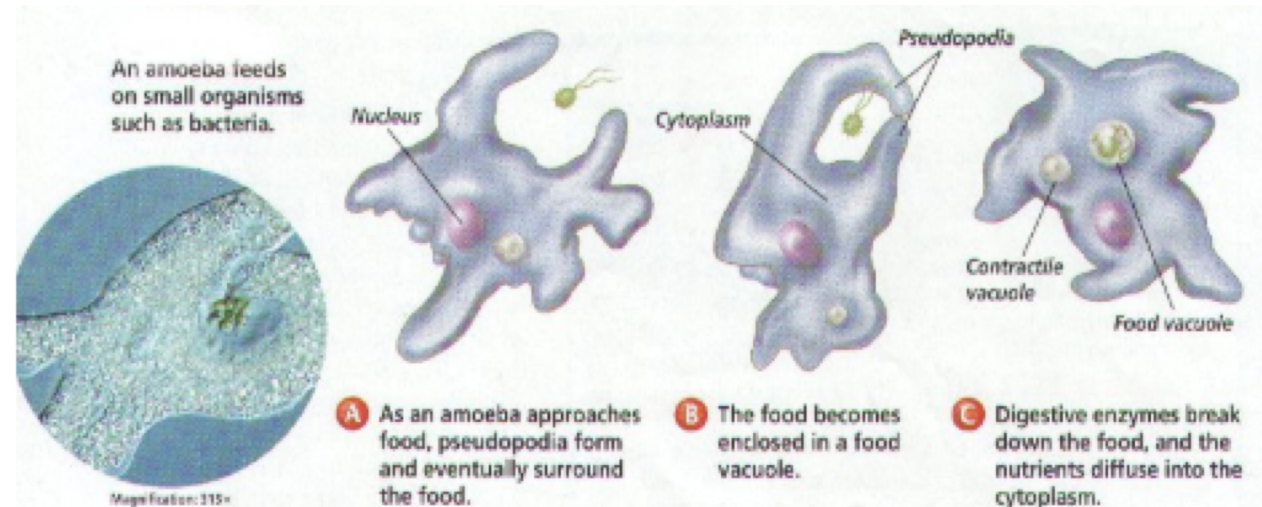
B. Focus on: Amoeba

1. Description: flexible, active cells without cell walls, flagella, cilia, and even a definite shape.
2. Move by "[amoeboid movement](#)"
 - a. Amebas move by means of thick pseudopods, which they extend out of the central mass of the cell
 - b. The cytoplasm of the cell streams into the pseudopod
 - c. The rest of the cell follows



3. Feeding

- a. Prey capture (process): It feeds by first surrounding its meal with streaming cytoplasm and then taking it inside the cell to form a food vacuole
- b. Digestion (process): The material is digested rapidly and the nutrients are passed along to the rest of the cell



4. Reproduction

- a. Binary fission – one large amoeba divides by mitosis to produce two smaller, but genetically identical amoebas

C. Classification: Families of Sarcodina

1. Amoeba
2. Heliozoans
3. Radiolarians
4. Foraminifers
5. These last three groups' characteristics:
 - a. Produce external shells
 - b. Shells made of:
 - i. Heliozoans/radiolarians: silica
 - ii. Foraminifers: calcium carbonate

