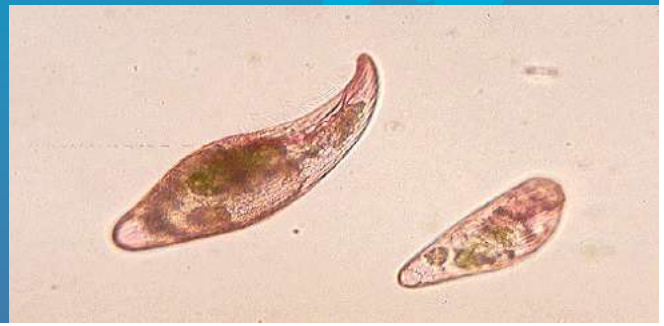
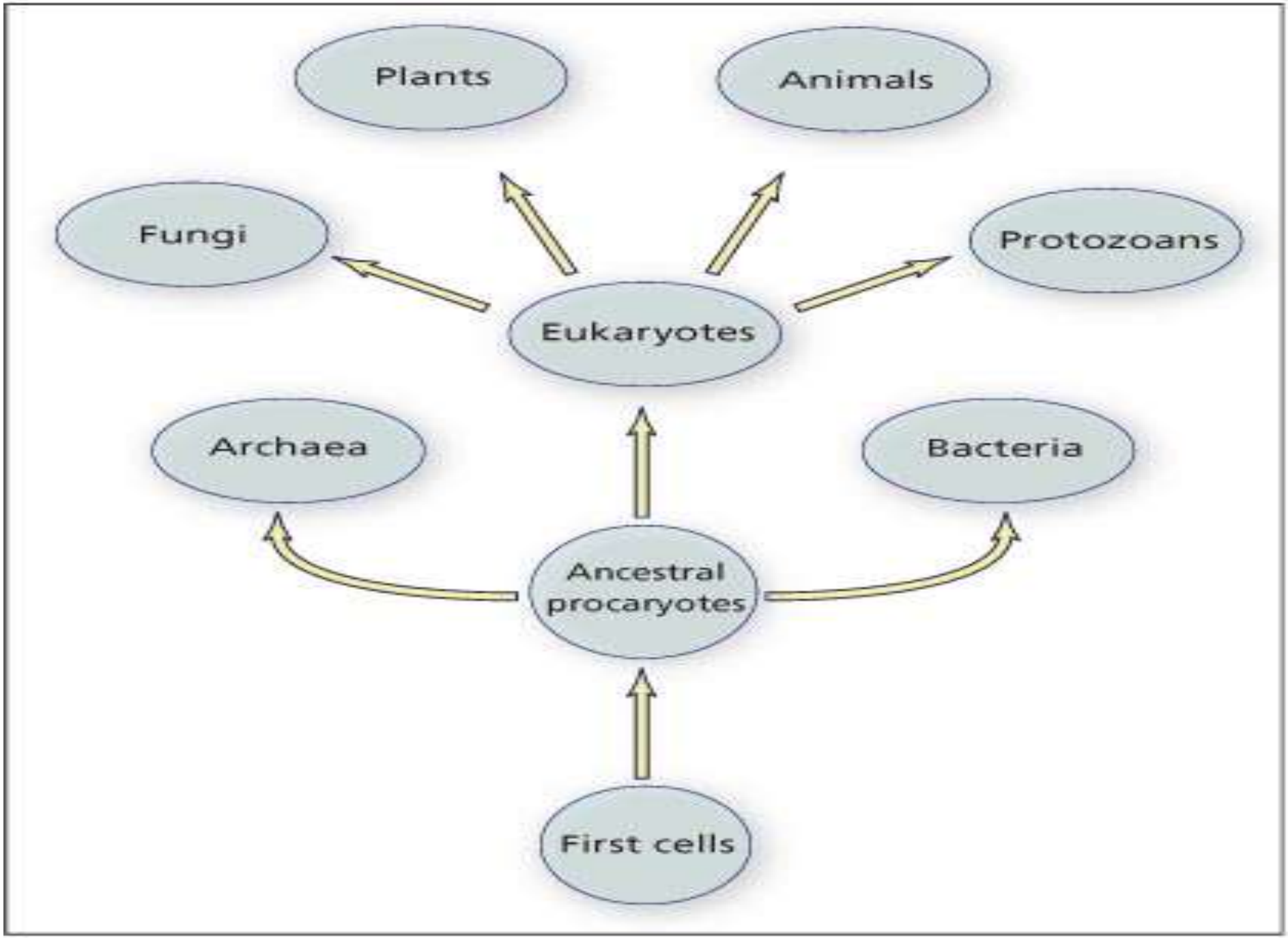
- There is not a Latin Root Word
- Clear your desk
- Protist Quiz
- Grade Quiz
- Malaria Fever Wars

Classification

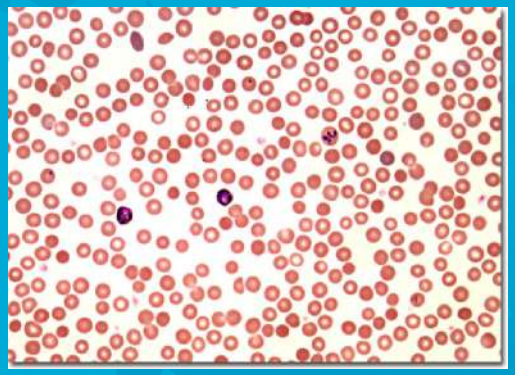
- Kingdom Protista contains THREE main groups of organisms:
  1. Protozoa: "animal-like protists"
  2. Algae: "plant-like protists"
  3. Slime & Water Molds: "fungus-like protists"





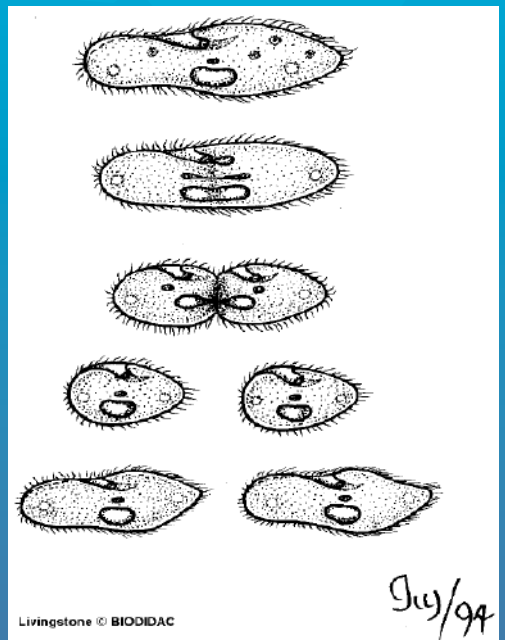
Basics of Protozoa

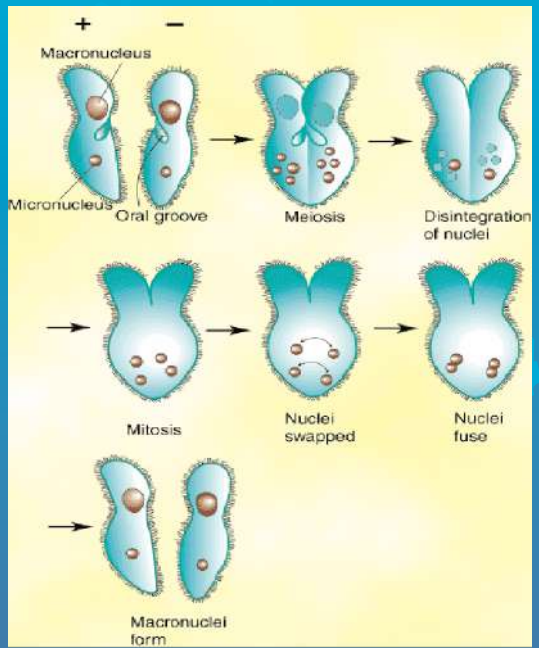
- Unicellular
- Eukaryotic unlike bacteria
- 65, 000 different species
- Heterotrophic
- Free-living (move in aquatic environments) or Parasitic
- Habitats include oceans, rivers, ponds, soil, and other organisms.



Protozoa Reproduction

- ALL protozoa can use asexual reproduction through binary fission or multiple fission
- FEW protozoa reproduce sexually through conjugation.



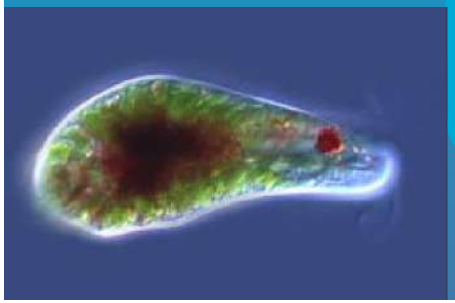


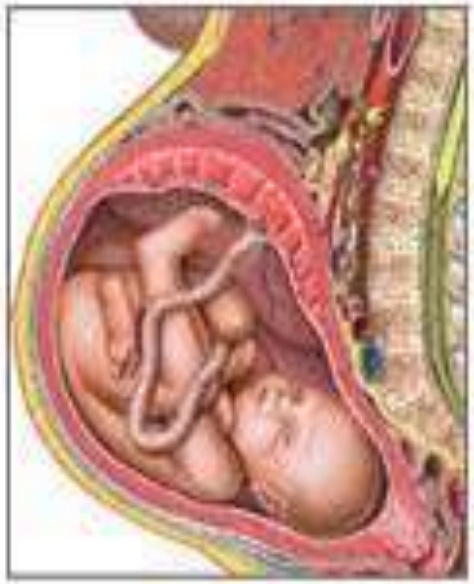
Adaptation

Special Protozoa Adaptations

- Eyespot: detects changes in the quantity/ quality of light, and physical/chemical changes in their environment

- Cyst: hardened external covering that protects protozoa in extreme environments.



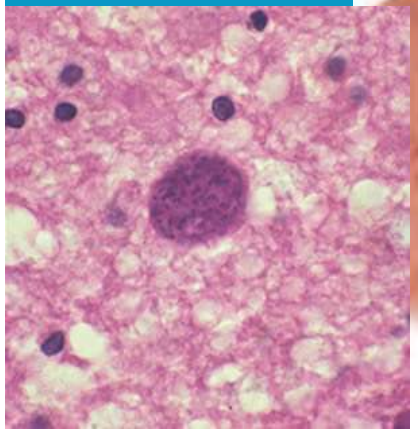


A fetus may contract toxoplasmosis through the placental connection with its infected mother

The mother may be infected by:

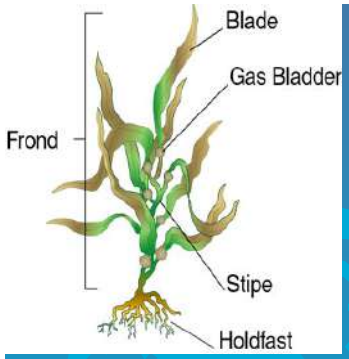
Improper handling of cat litter

Handling or ingesting contaminated meat



Basics of Algae:

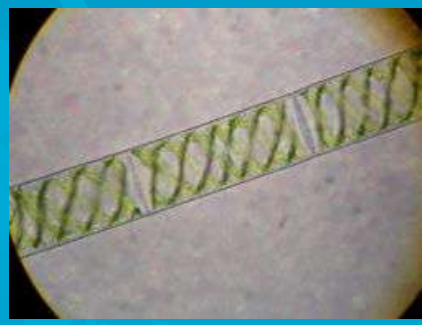
- "Plant-like" protists.
- MOST unicellular; SOME multicellular.
- Make food by photosynthesis ("autotrophic prostists").
- Were classified as plants, BUT…
  - Lack tissue differentiation- NO roots, stems, leaves, etc.
  - Reproduce differently
- Most algal cells have pyrenoids (organelles that make and store starch)
- Can use asexual or sexual reproduction.

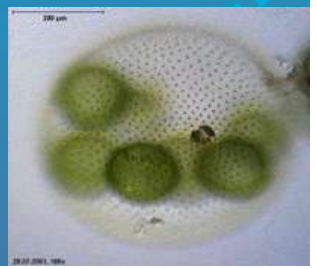


Algae Structure:

- Thallus: body portion; usually haploid
- Body Structure:

1) unicellular: single-celled; aquatic (Ex.phytoplankton, *Chlamydomonas*)
2) colonial: groups of coordinated cells; "division of labor" (Ex. *Volvox*)
3) filamentous: rod-shaped thallus; some anchor to ocean bottom (Ex. *Spyrogyra*)
4) multicellular: large, complex, leaflike thallus (Ex. *Macrocystis*- giant kelp)





Basics of Fungus-like Protists:

Slime Molds:

- Once classified as fungi
- Found in damp soil, rotting logs, and other decaying matter.
- Some white, most yellow and red.
- Two phase life cycle: mobile feeding and stationary reproductive stages.

Water Molds:

- Fungus-like; composed of branching filaments
- Commonly freshwater; some in soil; some parasites.

Slime Molds

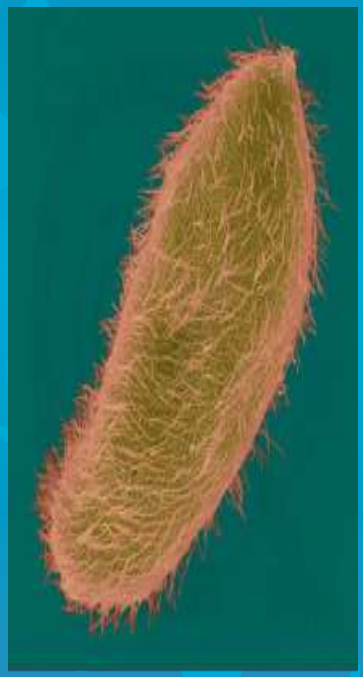
“Chytrids”

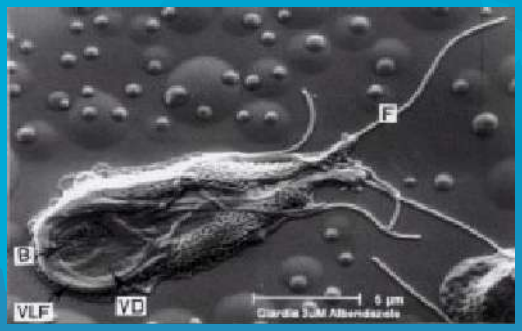
Opening Activity

Latin Root Word: cili-

Protozoa Phyla

- Protozoa are classified into four phyla
  - Sarcodina (pseudopodia)
  - Ciliophora (cilia)
  - Zoomastigina (flagella)
  - Sporozoa (none)

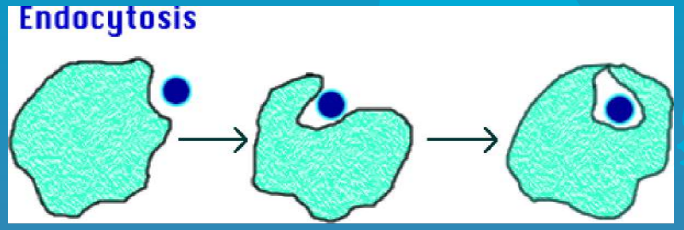




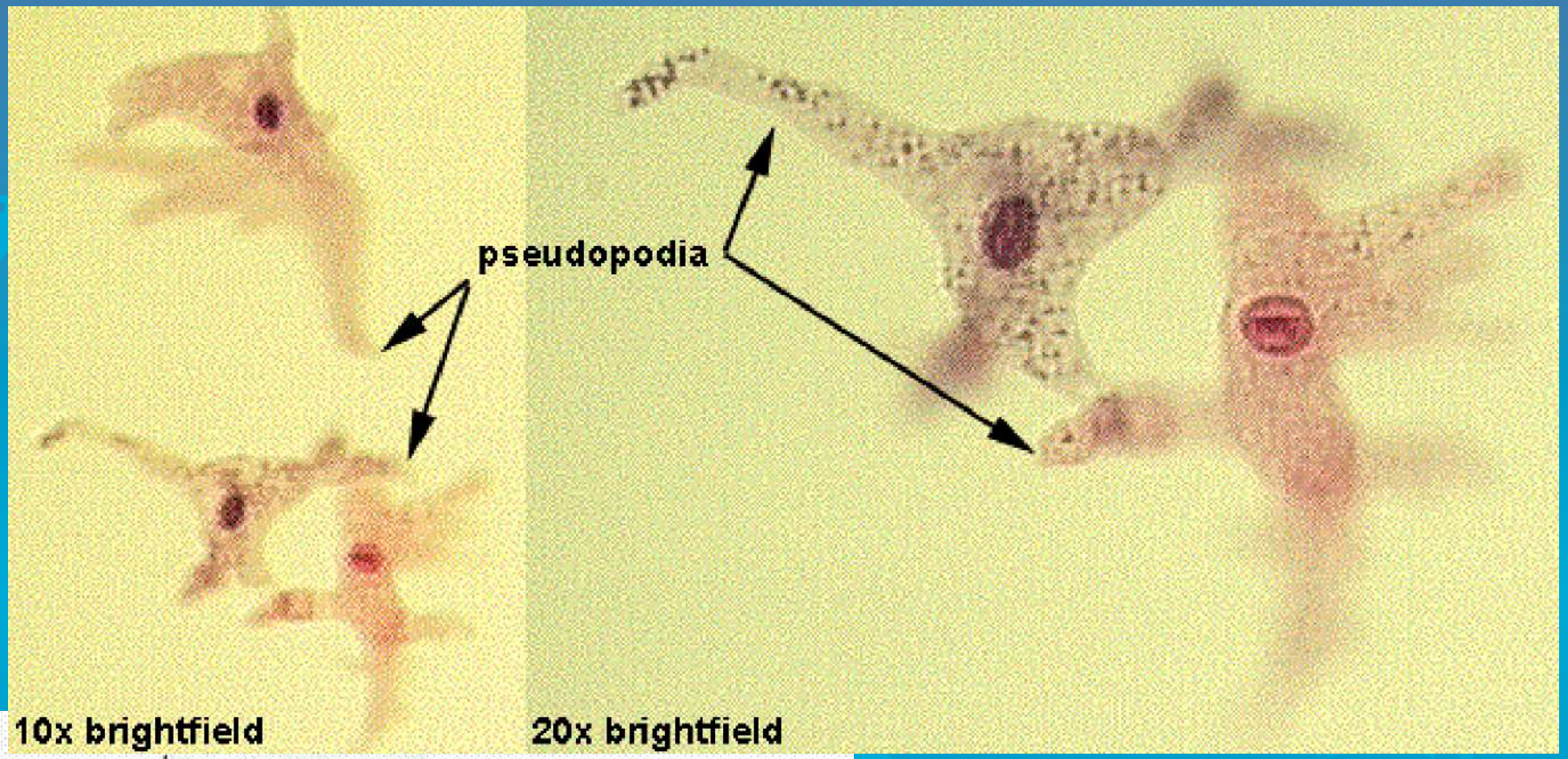
- Four phyla are separated by how the protozoa move

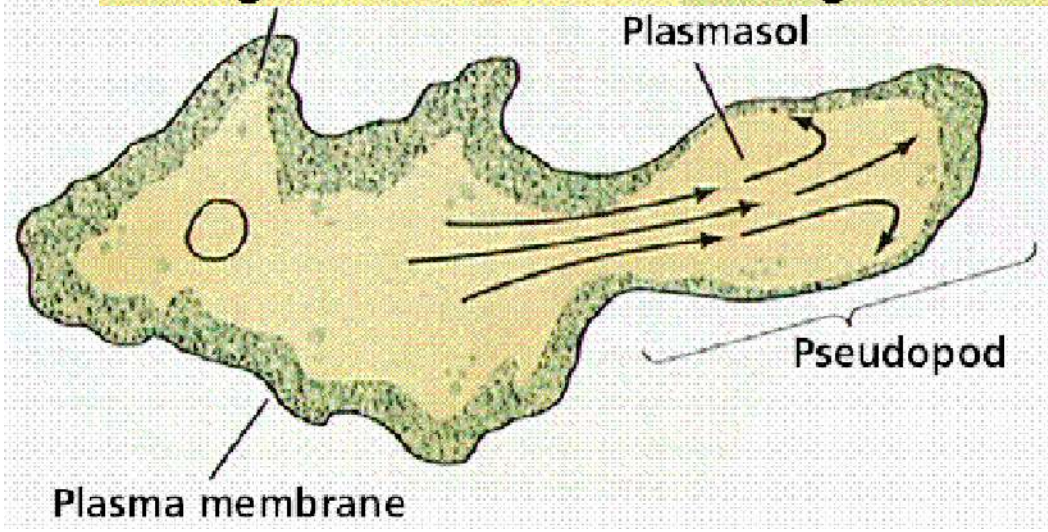
Phylum Sarcodina

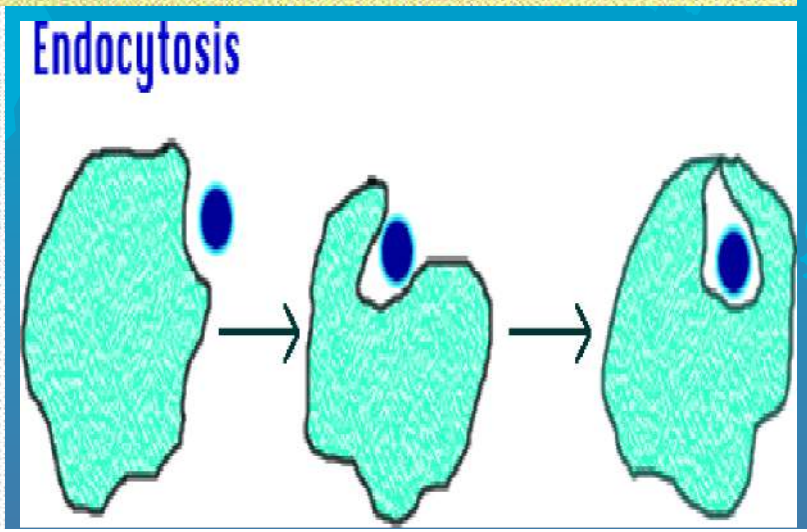
- 40,000 species that live in fresh and salt water, and soil
- Movement uses pseudopodia (Pseudo= false, pod= feet) by the process of cytoplasmic streaming.
- Feed through Phagocytosis where pseudopodia surround food to form a food vacuole



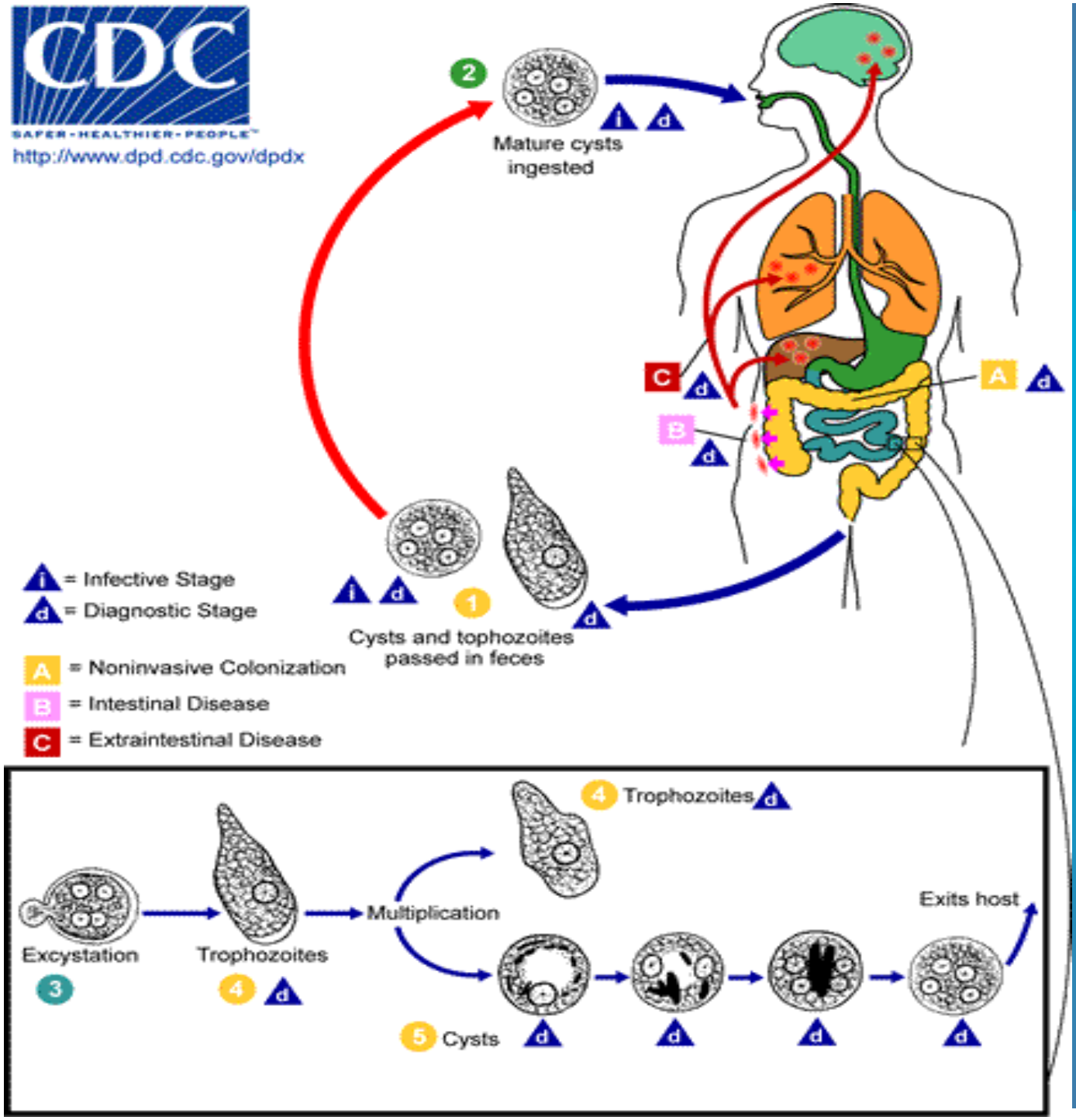
- Ex: Amoebas (some parasitic)
  - Entamoeba histolytica (causes ulcers and amebic dysentery)

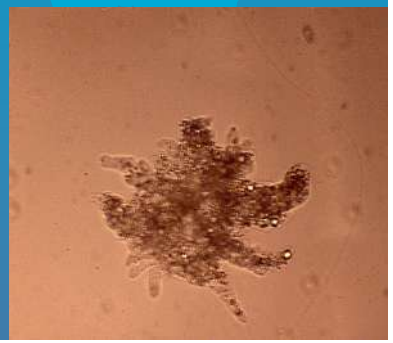

pseudopodia
10x brightfield
20x brightfield


Plasmasol
Pseudopod
Plasma membrane


Endocytosis

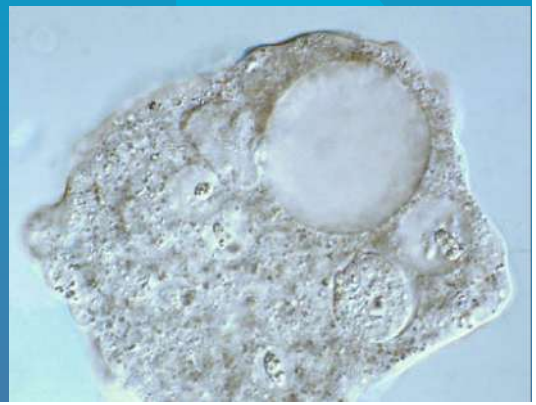
Amebic Dysentery



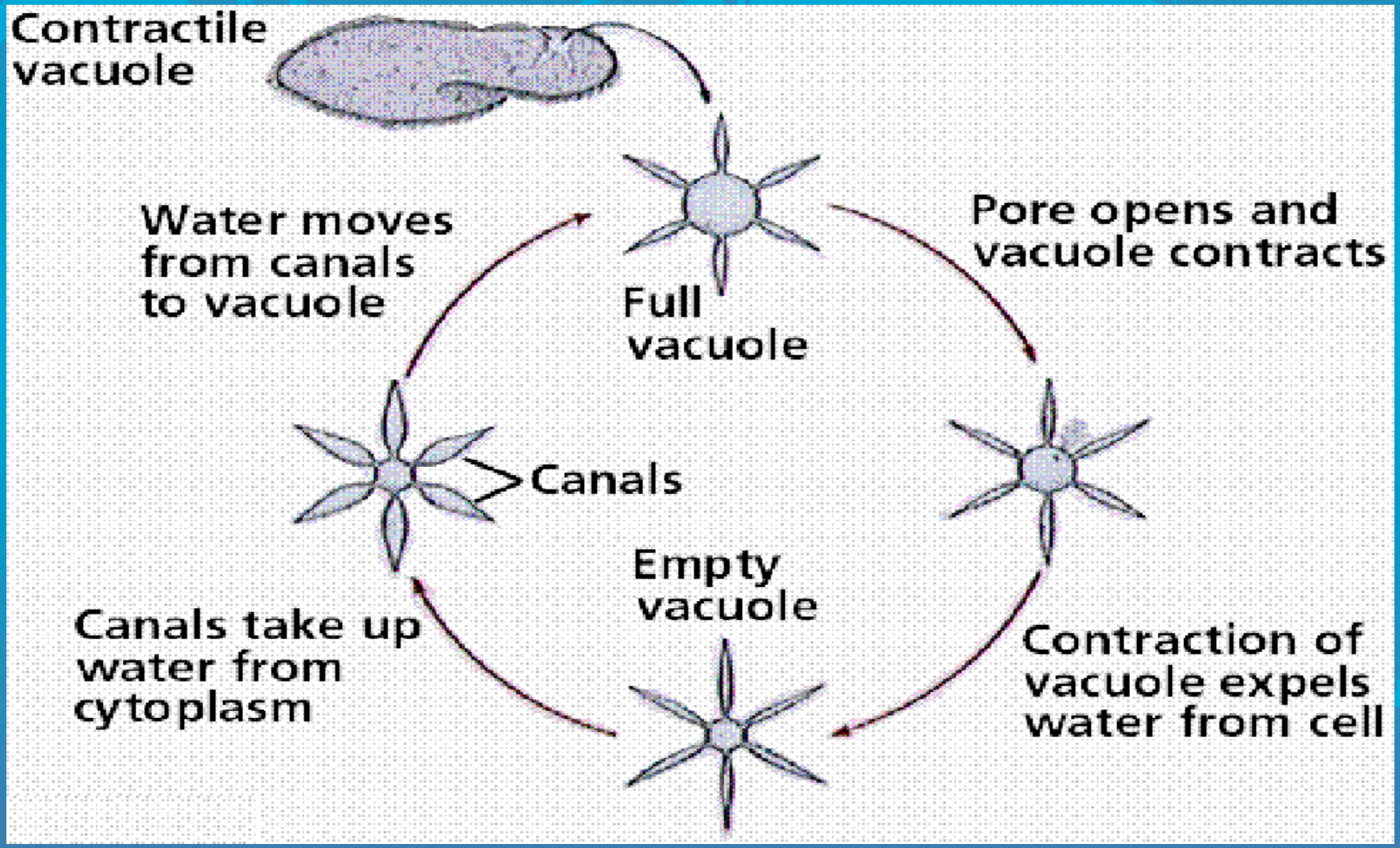


The Contractile Vacuole

- Helps rid protozoa of excess water AND maintain homeostasis by expelling fluid from the cell

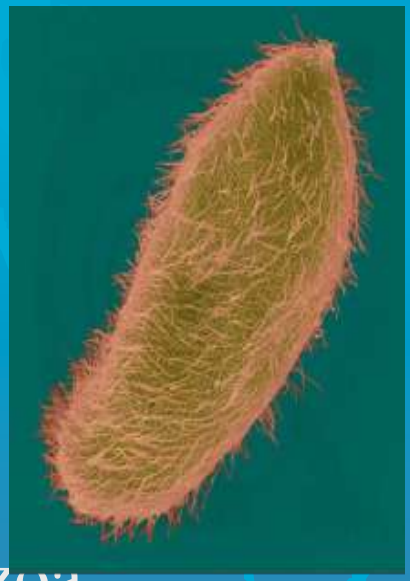


Contractile Vacuole

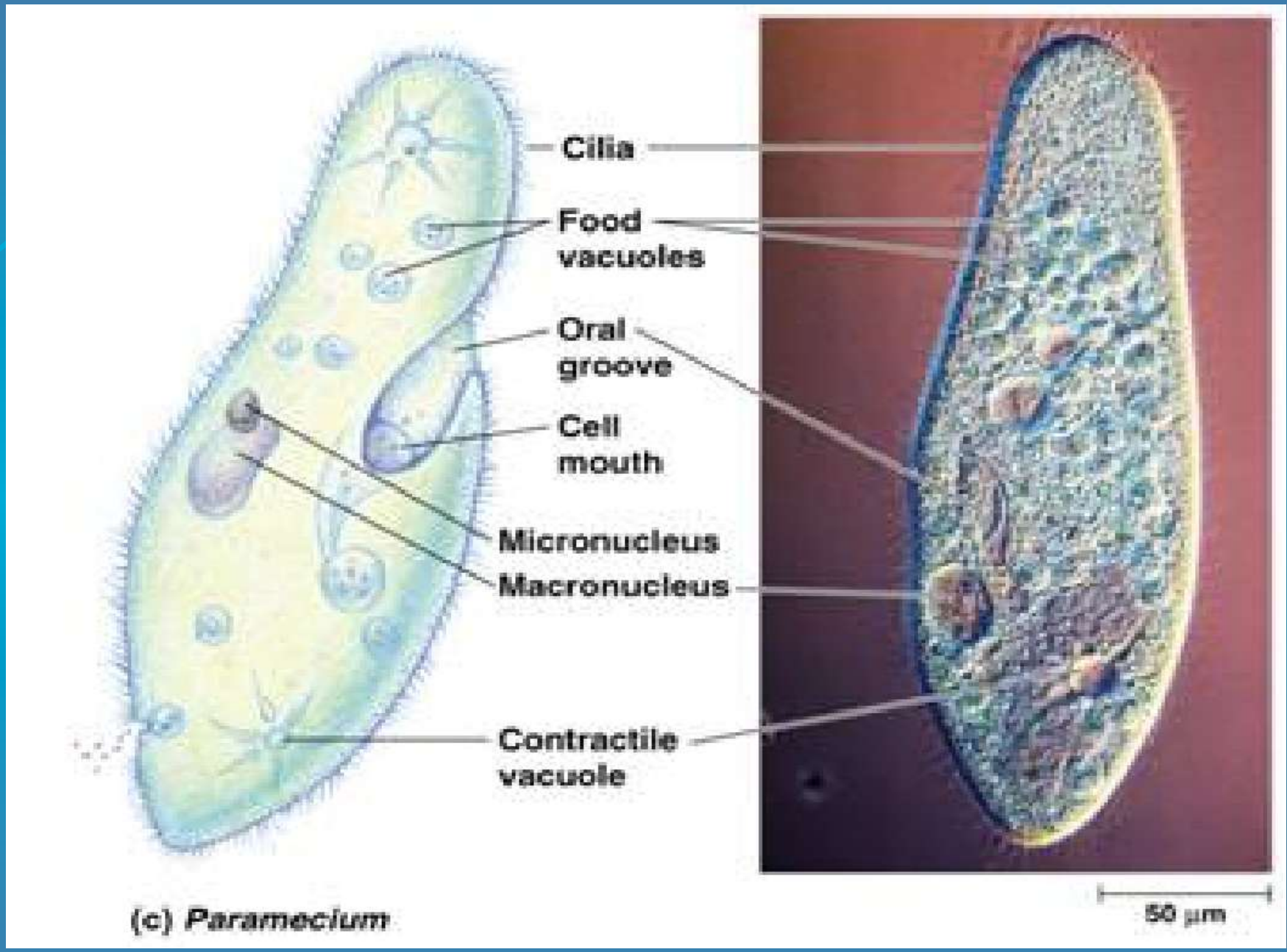


Phylum Ciliophora

- Members of genus Paramecium are among the most studied ciliates
- Movement through cilia: hair like projections that line cell membrane
- Heterotophic
- Found in freshwater and saltwater
- Have the most complex anatomy of protozoa



Internal structure	Function
Pellicle	Clear elastic protein that surrounds cell membrane
Oral Groove	Funnel depression leads into mouth pore
Mouth Pore	Cilia sweep food from oral groove into the mouth pore
Gullet	Forms food vacuoles that circulate through cytoplasm
Anal pore	Molecules not digested are expelled
Macronucleus	Contains DNA, necessary for asexual reproduction
Micronucleus	Used to exchange genetic material necessary for sexual reproduction

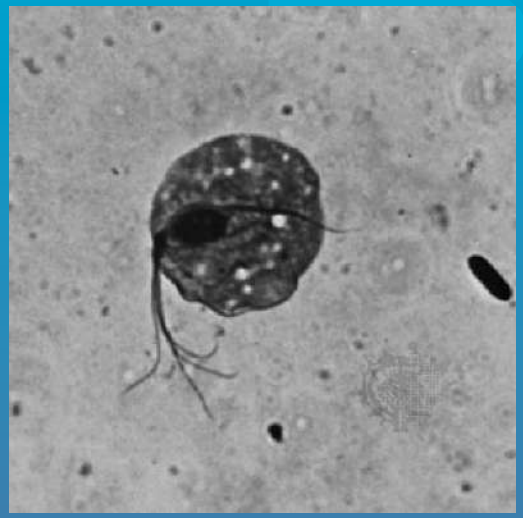

Cilia
Food vacuoles
Oral groove
Cell mouth
Micronucleus
Macronucleus
Contractile vacuole
50 µm
(c) Paramecium

Sexual Reproduction = conjugation

Phylum Zoomastigina

- Characterized by the presence of one or more flagella

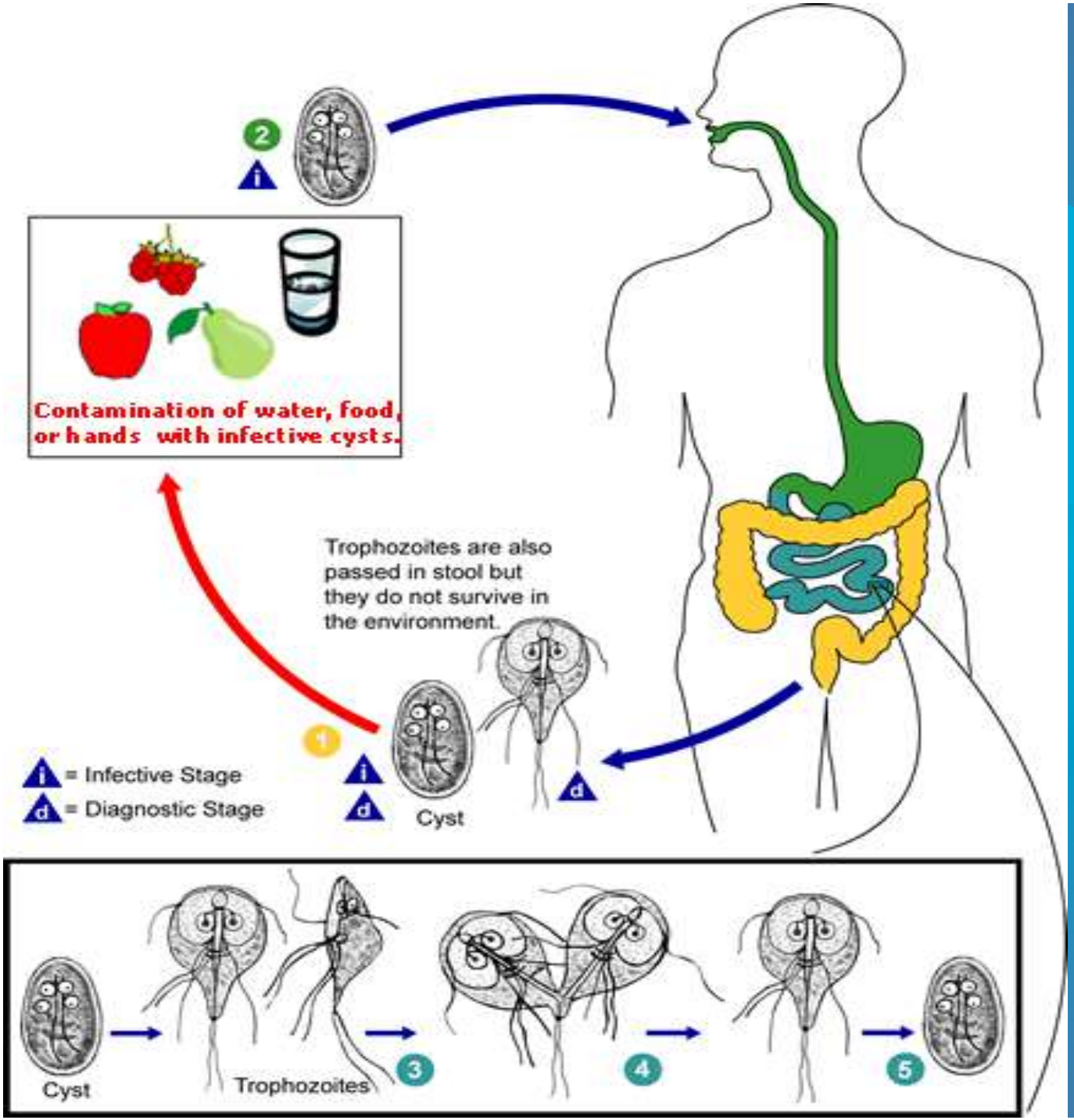
- Found in lakes and ponds



Parasitic Flagellates (Genera Trypasosoma)

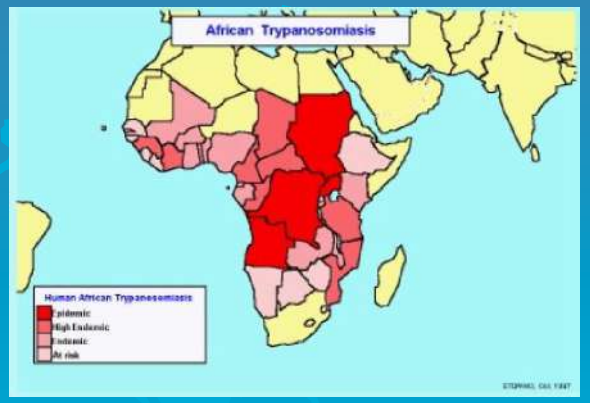
Name of Disease	Vector	Symptoms
Trypanosomiasis (sleeping sickness)	Tsetse fly (Africa)	Fever, lethargy, mental deterioration
Chagas Disease	Kissing bug	Fever, severe heart damage
Leishmaniasis	Sand flies	Disfiguring sores
Giardiasis	Contaminated water	Severe diarrhea, intestinal cramps

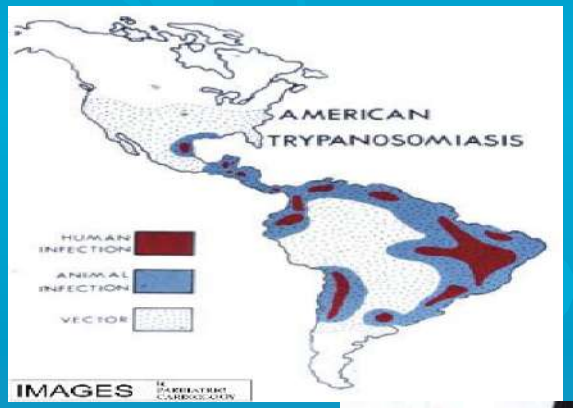
Giardiasis

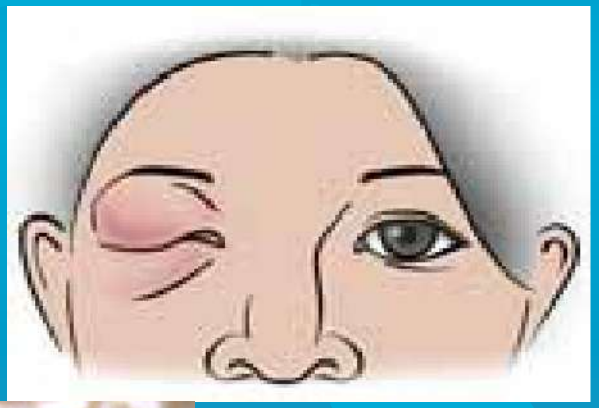

2
i
Contamination of water, food, or hands with infective cysts.
Trophozoites are also passed in stool but they do not survive in the environment.
1
i
d
Cyst
d
i = Infective Stage
d = Diagnostic Stage
Cyst
Trophozoites
3
4
5

African Sleeping Sickness

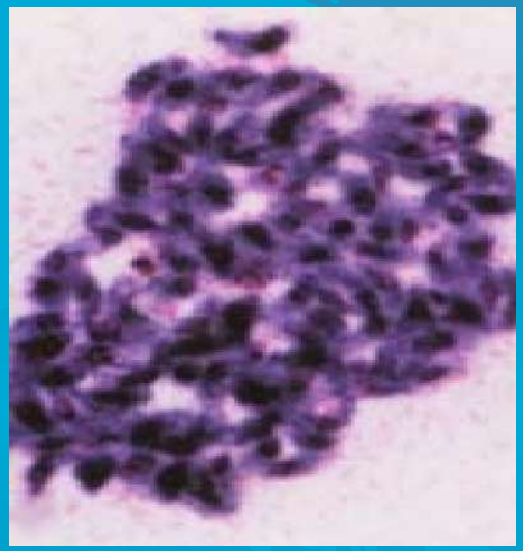
Zooflagellate Diseases





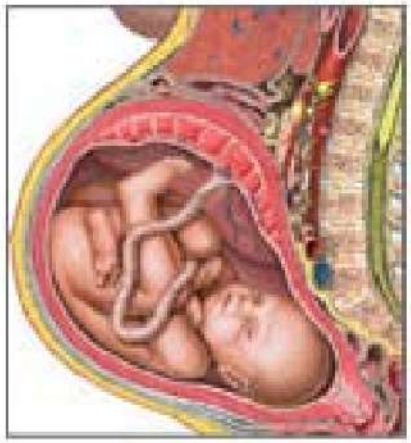


Phylum Sporozoa



- Most species are parasitic
- No movement
- Complex Life cycle: produce infective form of parasite called a spore
  - *Toxoplasma gondii* (toxoplasmosis)
  - *Plasmodium* (malaria)

Toxoplasma gondii (toxoplasmosis)



A fetus may contract toxoplasmosis through the placental connection with its infected mother

The mother may be infected by:

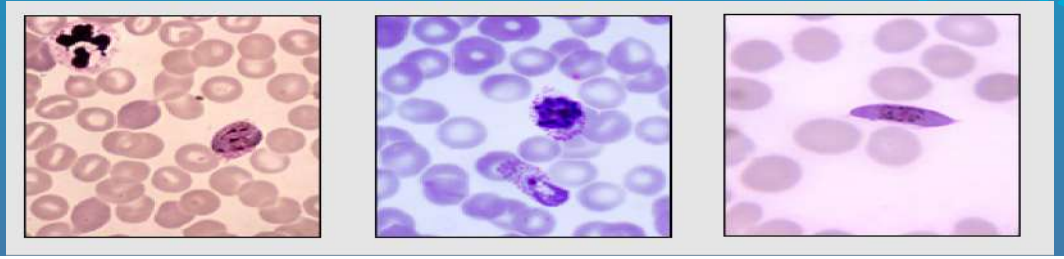
Improper handling of cat litter

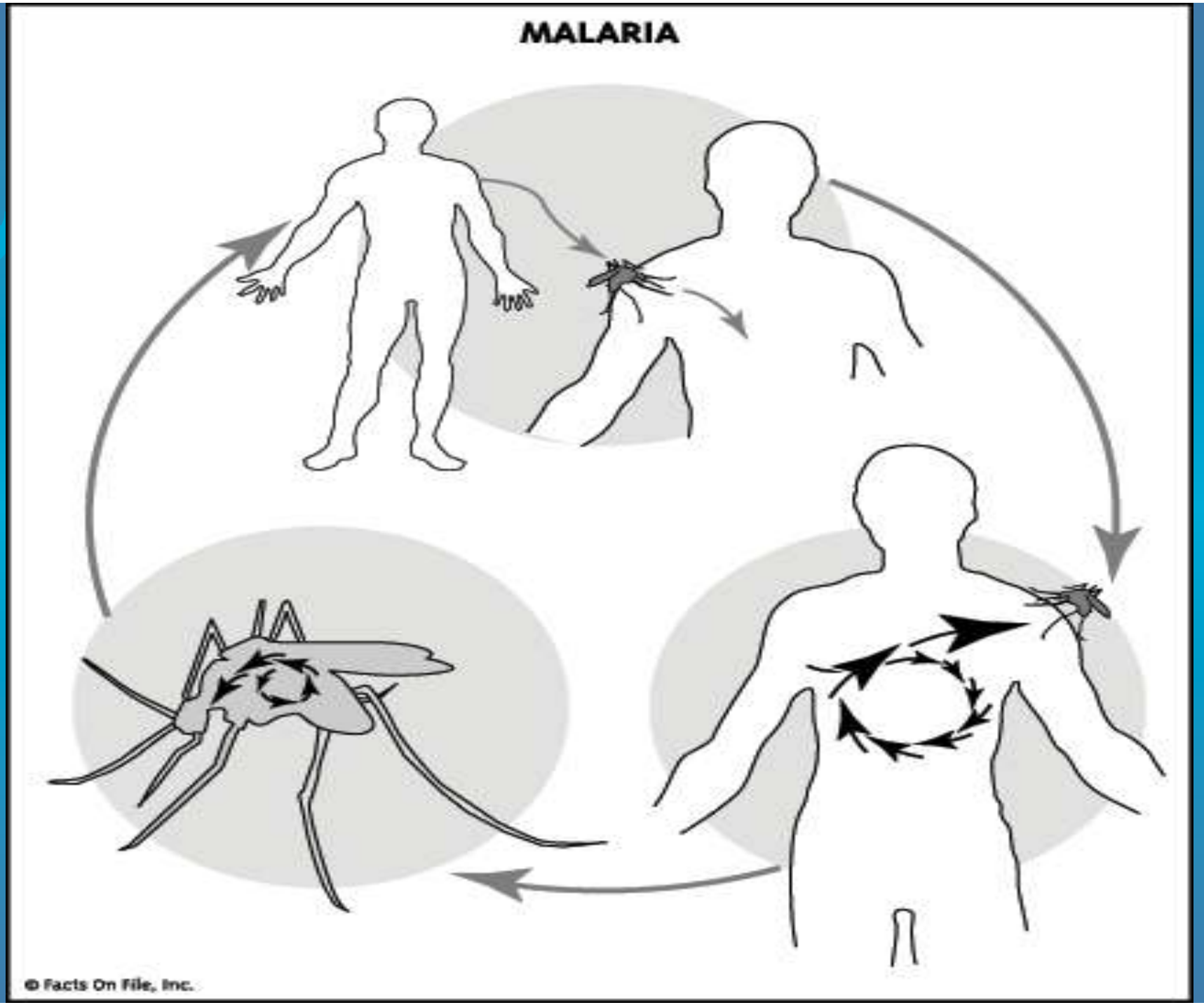
Handling or ingesting contaminated meat

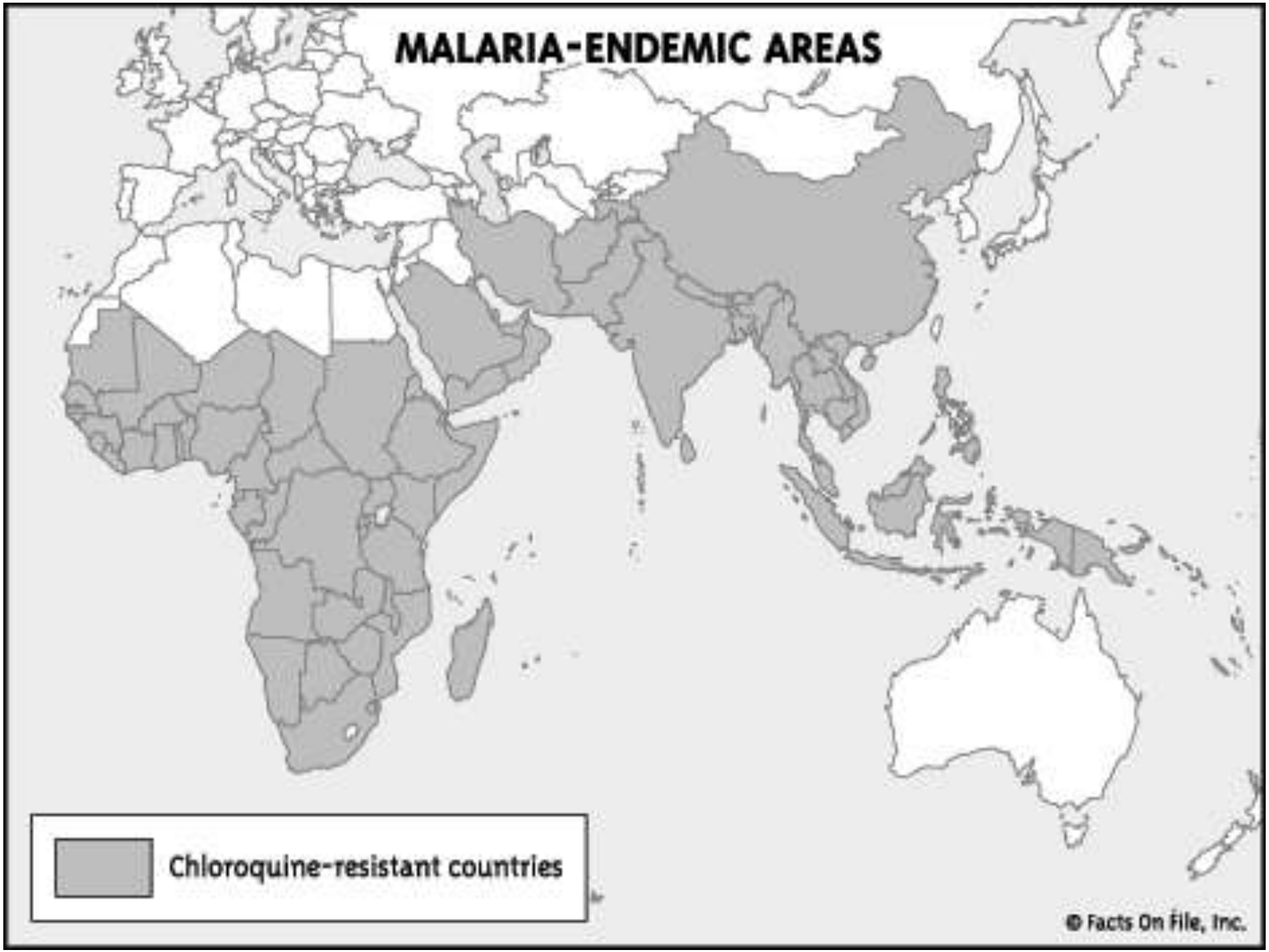
Malaria

- Largest worldwide epidemic in history
- *Plasmodium sp.* : causes malaria
- Malaria: infects between 300 and 500 million people every year
- Control through mosquito nets, oils, insecticides, and through anti-malarial drugs
- Progression of Symptoms:

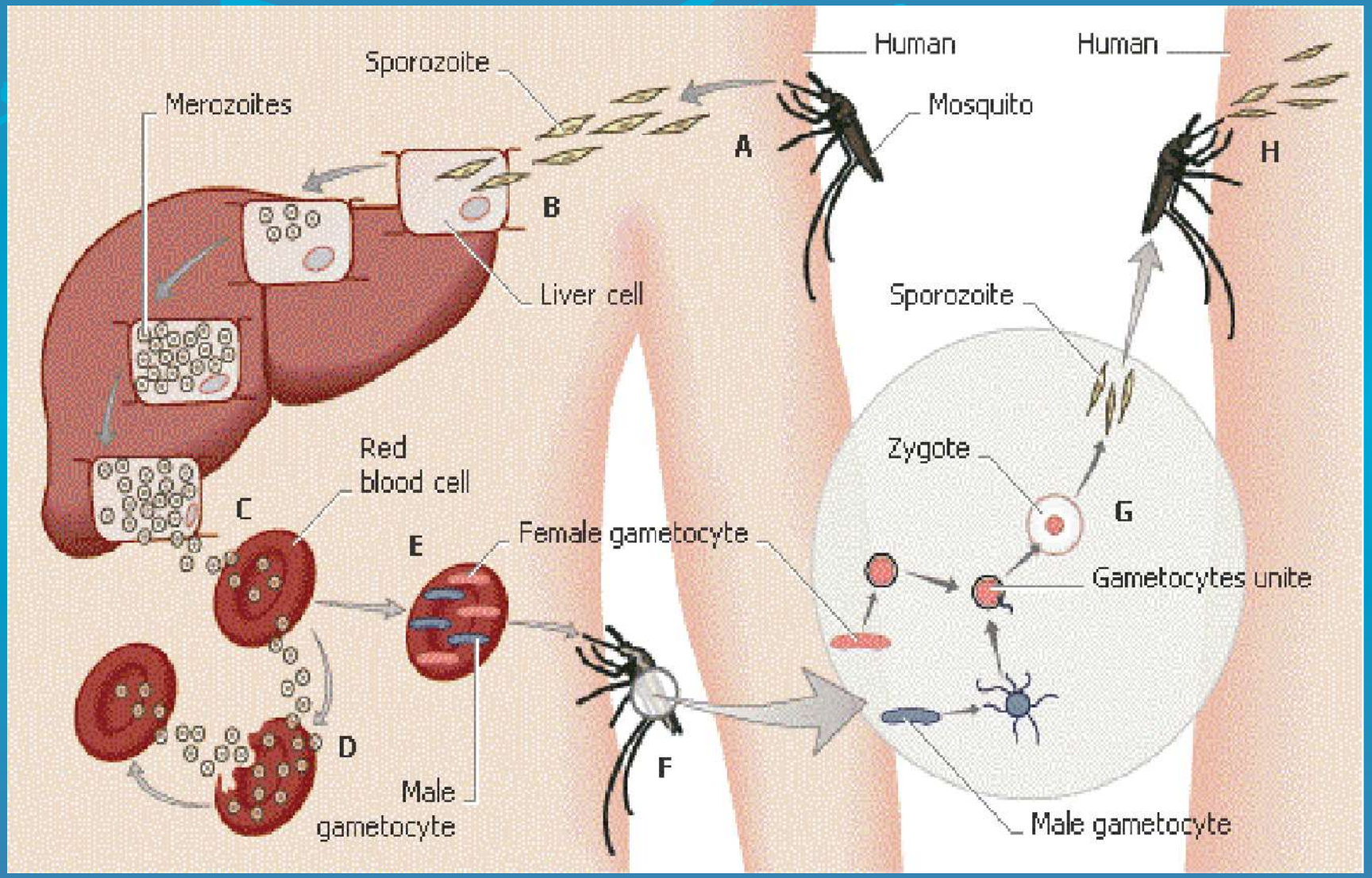
1. Anemia, light headedness, shortness of breath, fever, chills, flu-like symptoms, coma, death
2. Die of kidney failure, anemia, or brain damage




MALARIA
© Facts On File, Inc.


MALARIA-ENDEMIC AREAS
Chloroquine-resistant countries
© Facts On File, Inc.

Life cycle of malaria



Algae Classification:

- Seven phyla
- Based on…
  1. Color
  2. Type of chlorophyll
  3. Food-storage substance
  4. Cell wall composition

Phylum Chlorophyta

- "green" algae
- 7,000 species
- Unicellular, colonial, or multicellular
- Aquatic AND terrestrial
- Believed they gave rise to land plants.

Phylum Phaeophyta:

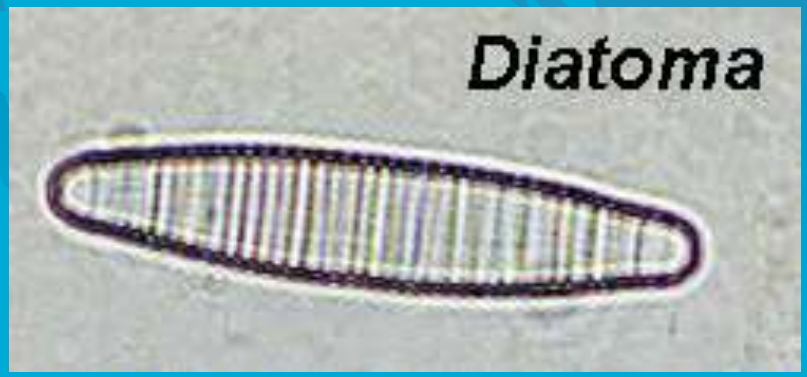
- "brown" algae
- 1,500 species
- Mostly marine- seaweeds and kelps
- Large, multicellular (Ex. *Macrocystis*)
- Fucoxanthin- gives it brown color

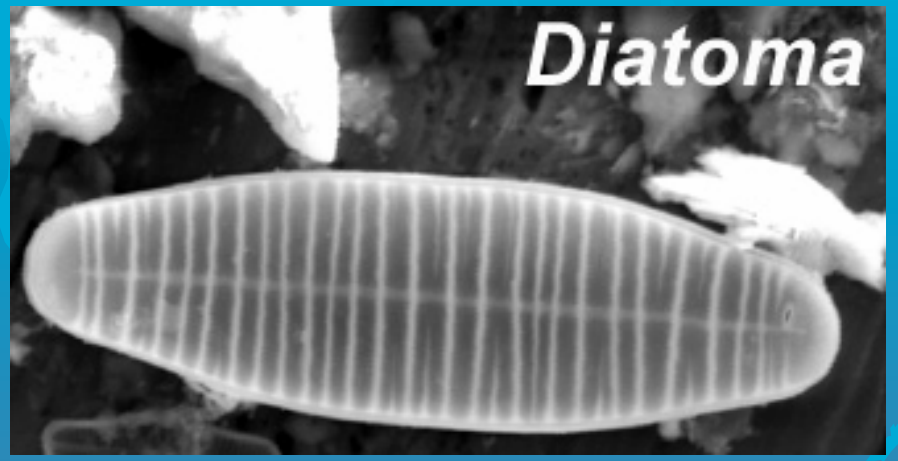
Phylum Rhodophyta:

- "red" algae
- 4,000 species
- Mostly marine seaweeds; smaller than brown algae
- Colors vary b/c of different depths
- Carageenan- inside cell walls; used in cosmetics, gel capsules, some cheese, and agar

Phylum Bacillariophyta

- "Diatoms"
- Bivalve shells for cell walls
- 11,500 species
- Freshwater and marine
- Important producers in food webs
- Diatomaceous earth- from diatom shells; used in detergents, paint removers, fertilizers, and some toothpaste





Phylum Dinoflagellata:

- "dinoflagellates"
- 1,100 species
- Usually unicellular; mostly photosynthetic
- Most have two flagella of unequal length
- Can produce bioluminescence and red tide.

Red Tide

Phylum Chrysophyta:

- "golden" algae; color from "carotenoids"
- 850 species
- Most fresh water
- Form "cysts" to survive in harsh environments
- 2 flagella; unequal length
- Important in formation of petroleum deposits

Phylum Euglenophyta:

- Unicellular algae called “euglenoids”
- 1,000 species
- Live in fresh water, soil, and animal digestive tracts
- Photosynthetic; highly motile
- Lack cell wall

- Which of the following is not a habitat of protozoa
  - Ocean
  - Fresh Water
  - The earth's mantle
  - Other organisms
-

- Protozoa reproduce asexually through a process known as
  - Binary fission
  - Multiple Fission
  - Conjugation
  - Both A and B
  - Both A an C

- Protozoa have the ability to monitor light in their surrounding environment because of
  - Their ability to cluster together
  - Their ability to form a cyst
  - Their ability to form a second membrane
  - Because of their eyespots

  Latin Root Word: Pent - Five

- How do algae differ from plants?
  - Algae have starch in their cell walls
  - Algae do not have tissue differentiation
  - Algae are autotrophic
  - Algae are found on land

Write on 5.3

- Which of the four is not a body structure for algae
  - Colonial
  - Unicellular
  - Tricellular
  - Filamentous

  Latin Root Word: pod - foot

PROTISTS

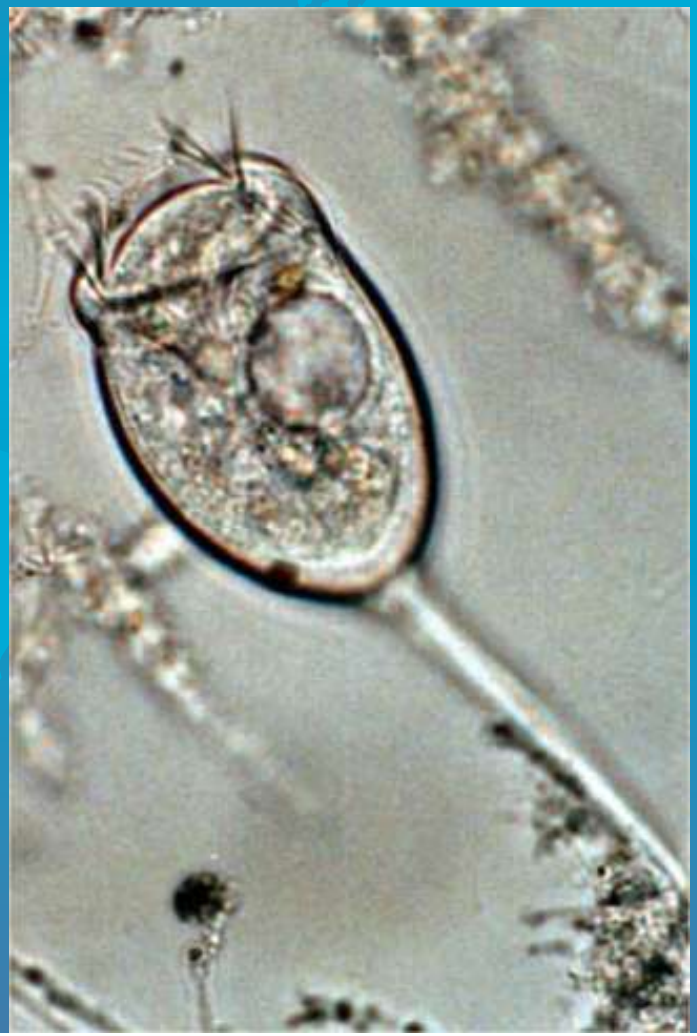
EUGLENA, AMOEBA, PARAMECIUM, VOLVOX, Stentor, Spyrogyra

VOLVOX

- Found in ponds ditches and puddles.
- Composed of a colony of tiny flagellate cells. (more than 50,000 cells)
- Often times called algae.

Spirogyra

Vorticella



3.6 Opening Activity

- Which of the following is a characteristic of most protists?
  - They can be seen with the unaided eye
  - They lack a nucleus and many other cell structures
  - They are unicellular

- Which structure helps a freshwater protist get rid of excess water?
  - Food vacuole
  - Contractile vacuole
  - macronucleus

- Malaria is caused by a type of…
  - Sporozoan
  - Sacrodine
  - Dinoflagette

- Which of the following uses cilia to move?
  - Euglena
  - Ameoba
  - Paramecium

- Which of the following is considered an animal like protist?
  - Slime mold
  - Protozoa
  - Algae

- Euglena is considered a plant like protist.
  - True
  - False

- Paramecium swim using flagella.
  - True
  - False

- All algae are similar in that they
  - Obtain food from the environment
  - Produce their own food
  - Have flagella and cilia
  - Do not have membrane-bound organelles

- Plant like protists are collectively called
  - Protozoans
  - Algae
  - Diatoms

- Which of the following moves using pseudopodia
  - Paramecium
  - Euglena
  - Diatoms

- The paramecium belongs to the Kingdom_____ and the Phylum _____
  - Ciliophora, protista
  - Protista ciliophora
  - Protozoa, protista
  - Animalia, protista