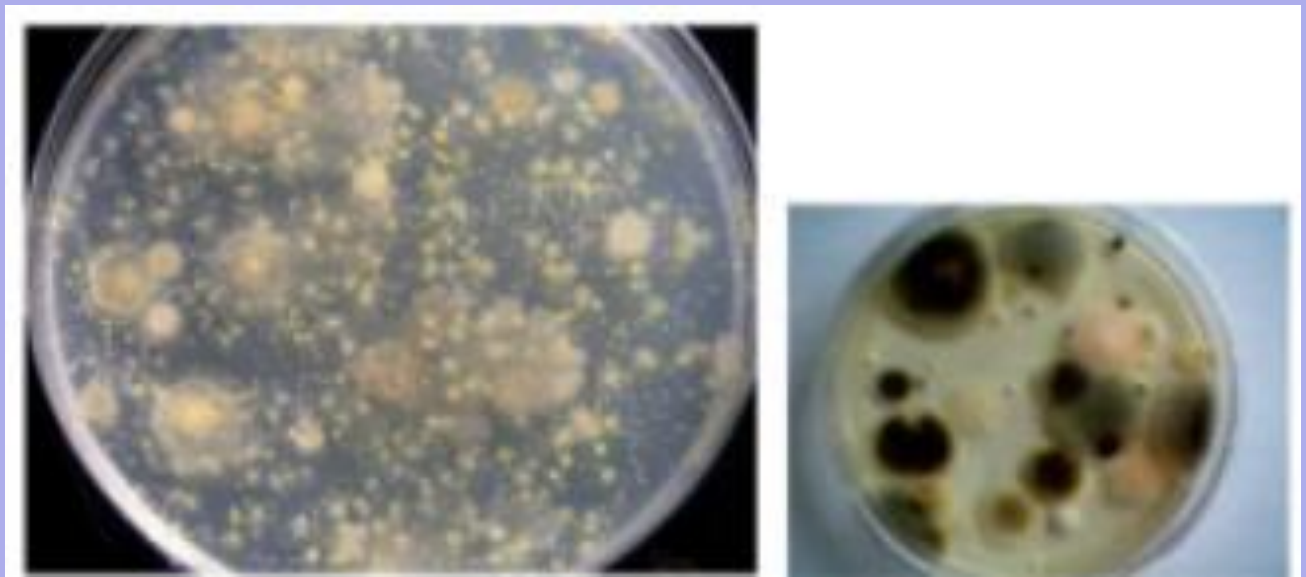
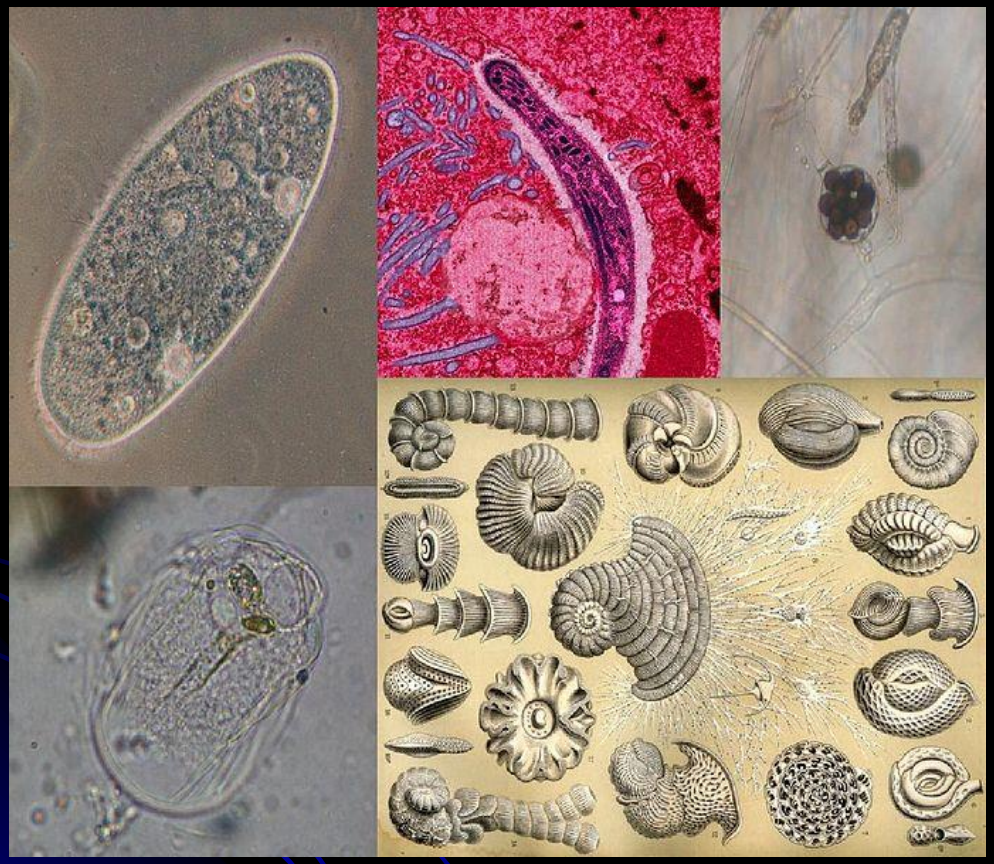
Go to the "Slide Show" shade above

Click on "Play from Beginning"

Bacteria, Protists, Fungi
Chapters 21-23



Kingdom Protista



Chapter 22

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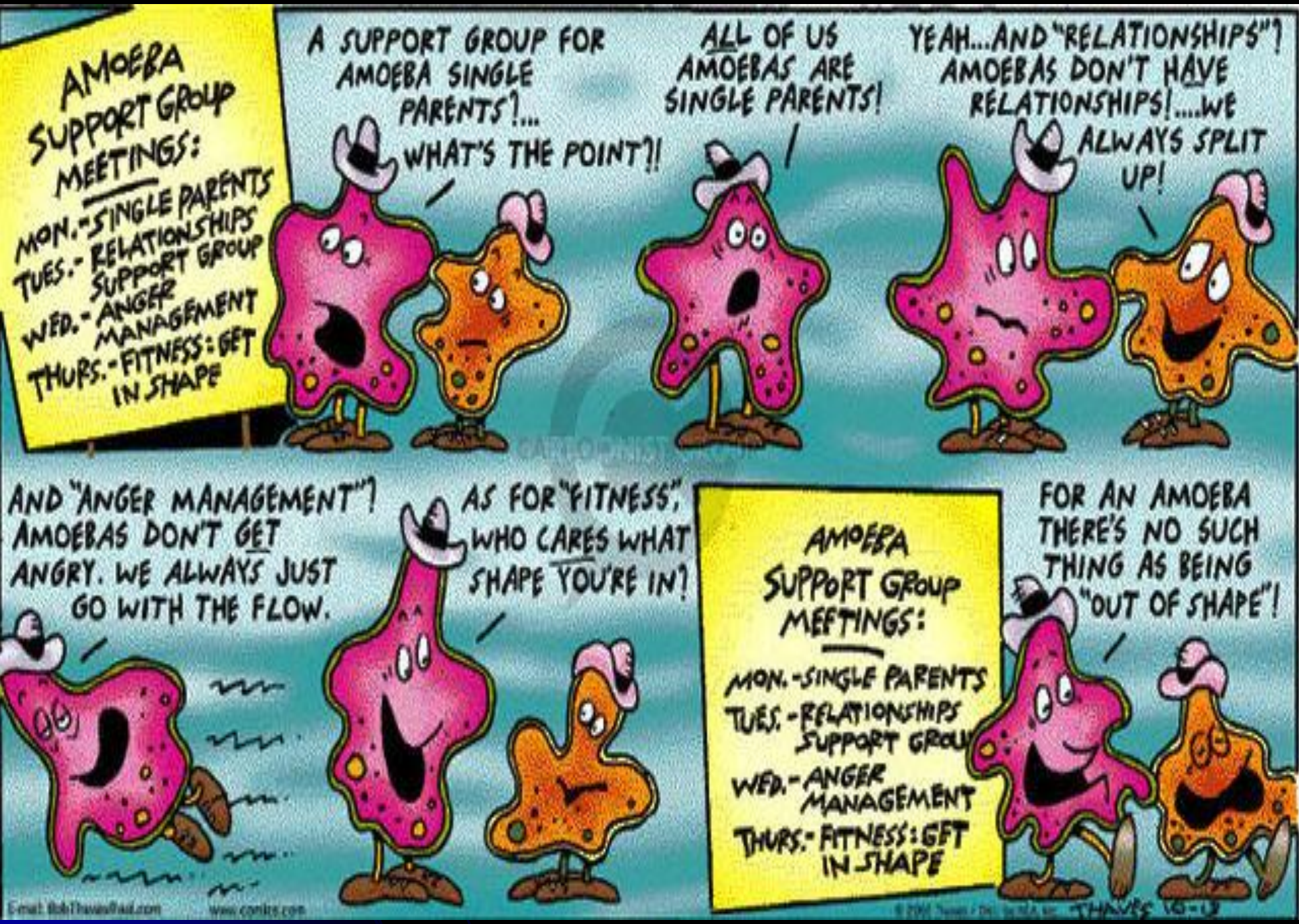
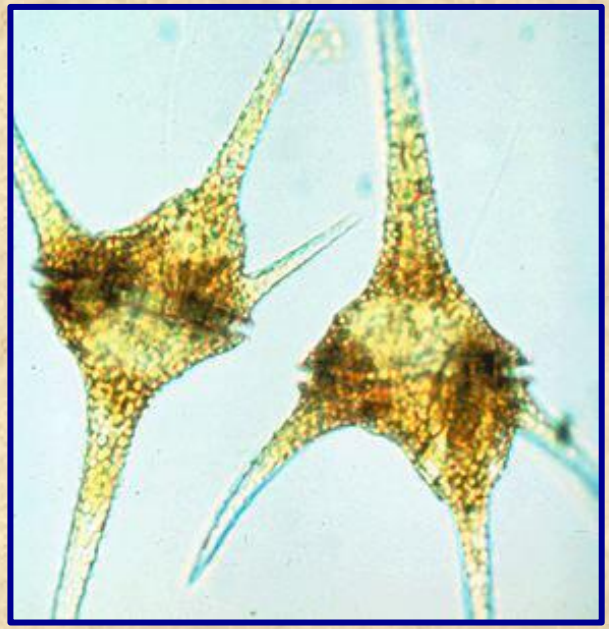
Bacteria Protists Fungi Lab (14:44)


AMOEBA SUPPORT GROUP MEETINGS:
MON.-SINGLE PARENTS
TUES.-RELATIONSHIPS SUPPORT GROUP
WED.-ANGER MANAGEMENT
THURS.-FITNESS: GET IN SHAPE
A SUPPORT GROUP FOR AMOEBA SINGLE PARENTS?... WHAT'S THE POINT?!
ALL OF US AMOEBAS ARE SINGLE PARENTS!
YEAH...AND "RELATIONSHIPS"? AMOEBAS DON'T HAVE RELATIONSHIPS!....WE ALWAYS SPLIT UP!
AND "ANGER MANAGEMENT"? AMOEBAS DON'T GET ANGRY. WE ALWAYS JUST GO WITH THE FLOW.
AS FOR "FITNESS", WHO CARES WHAT SHAPE YOU'RE IN?
AMOEBA SUPPORT GROUP MEETINGS:
MON.-SINGLE PARENTS
TUES.-RELATIONSHIPS SUPPORT GROU
WED.-ANGER MANAGEMENT
THURS.-FITNESS: GET IN SHAPE
FOR AN AMOEBA THERE'S NO SUCH THING AS BEING "OUT OF SHAPE"!
THAVES '10

What is a Protist?



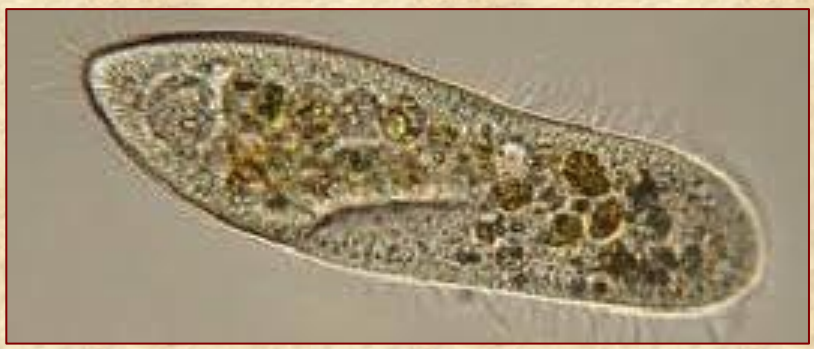
There is much debate about this very diverse group of organisms.

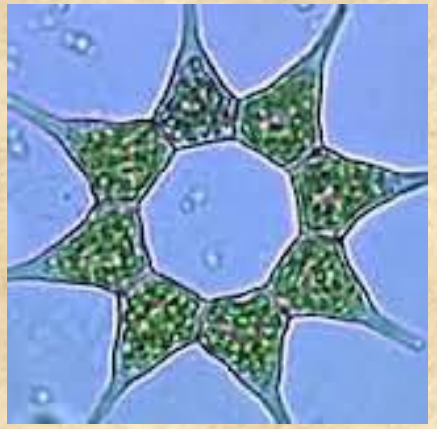
Scientists have been arguing for years over how best to classify these organisms.

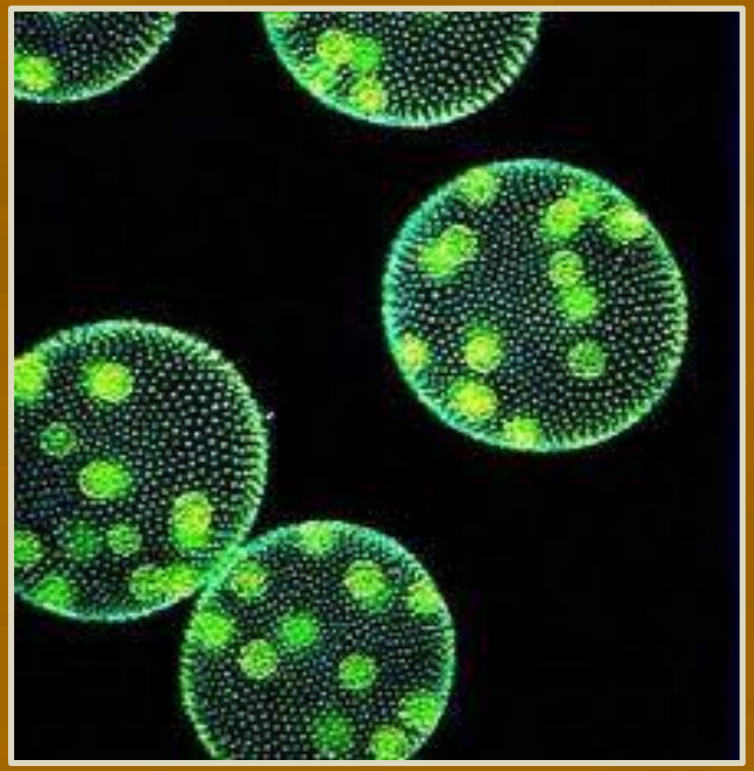
Eventually the protists may be divided into many separate kingdoms.

For now, we will consider the protists as a single kingdom.

A protist is any organism that is not a plant, an animal, a fungus or a prokaryote.







Protists are eukaryotes that are not members of the kingdoms: Plantae, Animalia, or Fungi.

The range and variety of organisms in this kingdom is huge. It is thought that this group may contain over 200,000 different species.

Most protists are unicellular, but a few are colonial and a few are multicellular.

Because most protists are unicellular they are considered the simplest eukaryotic organisms, but their cells are extremely complex.

They must carry out within a single cell all the basic functions performed by specialized cells, such as:

digestion, gas exchange, circulation & excretion.

In multicellular organisms, essential biological functions are carried out by organs.

Unicellular protists carry out the same essential functions, but they do so using subcellular organelles, rather than with multicellular organs.

Protists

Protists make up a significant part of **PLANKTON**

- Starting point in food chains
- Produces majority of oxygen in atmosphere
- Phytoplankton: Algae
- Zooplankton: Protozoa

Protists can be divided into three categories:

Protozoa:

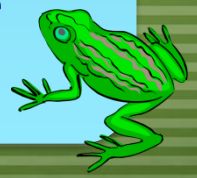
Ingestive (Heterotrophs) Animal-like protists

Algae:

Photosynthetic (Autotrophs) Plant-like protists

Slime Molds:

Absorptive (External Digestion), Fungus-like protists.



Algae

Plant-like Protists

Algae are a very diverse group of protists. They range in size from microscopic single-celled organisms to large multicellular seaweeds.

All of the algae are autotrophs. They are eukaryotic, have chloroplasts, and make their own food by photosynthesis.

The unicellular algae are found floating near the surface of the oceans and inland waters. Together with small invertebrates, they form the Plankton of the oceans.

They are classified by color. They all contain chlorophyll, but the green chlorophyll may be masked by other pigments.

There are green algae, red algae, brown algae, golden brown, and yellow algae.

Algae are producers in the food chain.

They are responsible for much of the atmospheric oxygen.

In the past, the algae were classified as plants and placed in the Kingdom Plantae.

PLANT KINGDOM

They are now classified as Protists and are no longer a part of the plant kingdom for the following reasons:

Algae LACK the specialized tissues that are found in the true plants.

Algae LACK vascular tissue (xylem and phloem) that is found in the true plants.

Algae LACK true roots, stems & leaves.

Algae form gametes in **single-celled gametangia**. True plants produced gametes in **multicellular gametangia**. (Gametangia are "**gamete chambers**" where **sex cells** are produced.)

Algae are divided and classified into 7 phyla, based on the Pigment Color:

RED

BROWN

GOLDEN

GREEN

All algae contain chlorophyll, which is required for photosynthesis.

Some phyla have accessory pigments that give them a characteristic color.

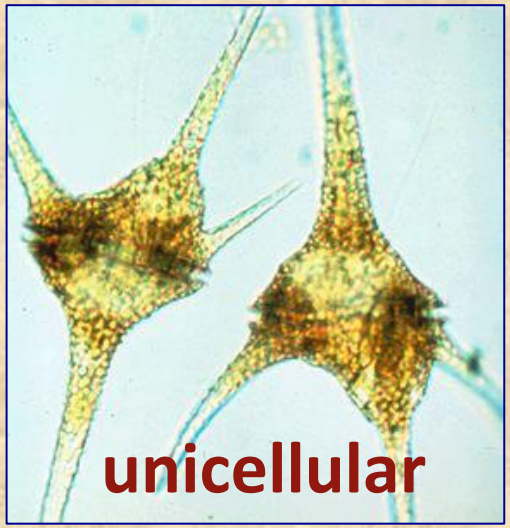
multicellular

Structure of Algae

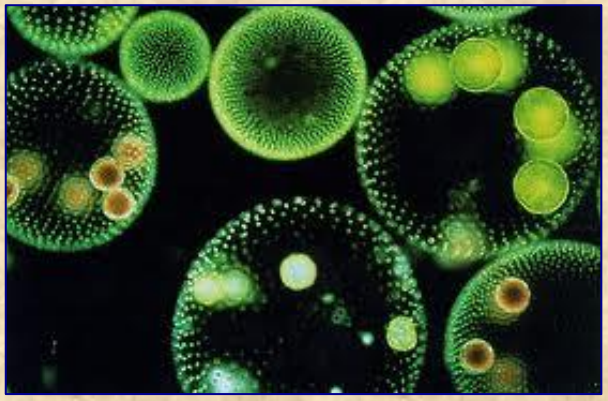
The body of an alga is called a "**Thallus**".

Based on the plant thallus, four types of algae are recognized: Unicellular, Colonial, Filamentous, and Multicellular.

filamentous



unicellular

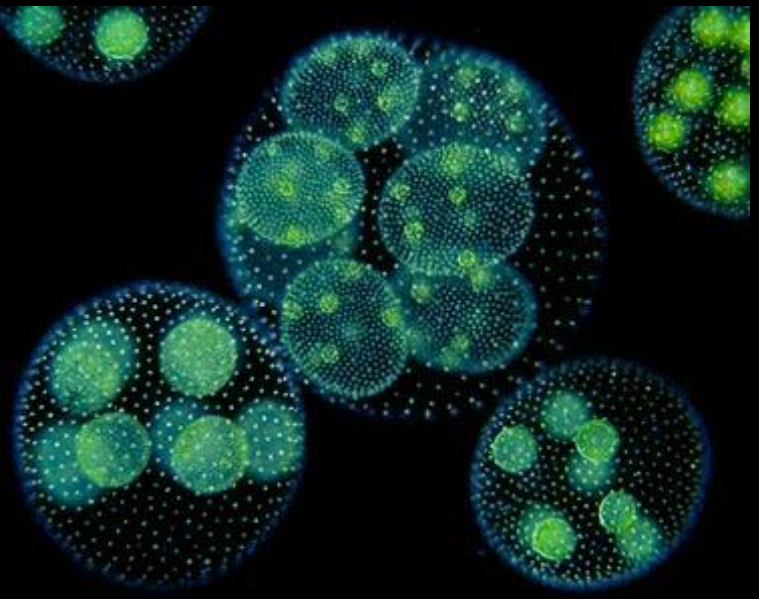


colonial

Types of Algae

- **Unicellular:** mostly Phytoplankton

- **Colonial:** Groups of individual algal cells that function together in a coordinated way
  - *Volvox*



Types of Algae

- **Filamentous:** Body made of rows of algal cells linked together end to end
  - *Spyrogyra*

- **Multicellular:** Large, complex thallus
  - *Ulva* (sea lettuce)

Phyla of Algae

GREEN algae:

- Exhibit all 4 types of algae
- "Closest relative to land plants"

BROWN algae:

- Seaweed or Kelp
- Many are edible
- Used to thicken processed foods: Pudding, ice cream, salad dressing, etc.

RED algae:

- Seaweed or Kelp
- Source of Agar, used for culturing bacteria and other microbes

Phyla of Algae

Diatoms:

- Most abundant algae
- Cell walls made of Silica, which is the primary component of glass

Dinoflagellates:

- Some emit their own light (Bioluminescence)
- Severe bloom causes Red Tide

Golden Algae

Euglenoids:

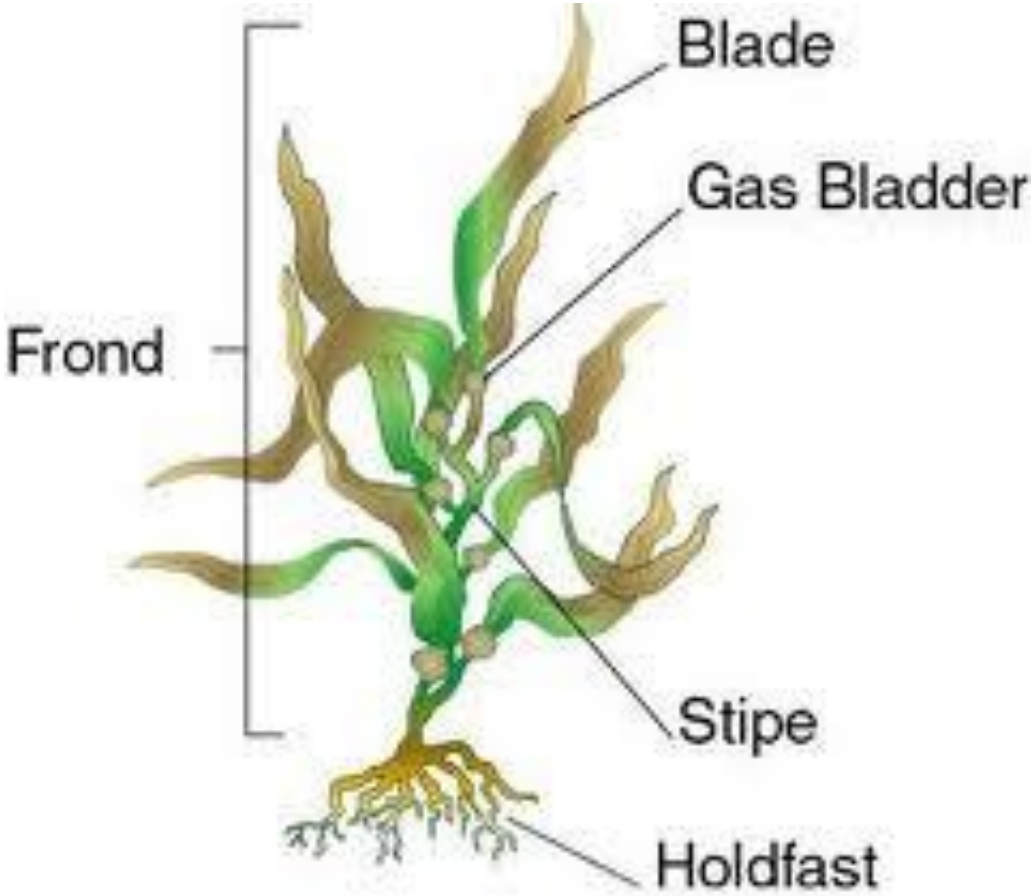
- *Euglena*
- Plant-like and Animal-Like characteristics
- Contractile vacuole to eliminate excess water


The Green Algae

The Brown Algae

Brown Algae are the most complex of all algae.

They posses specialized tissues and organs that resemble those found in true plants.



NOTE:

1. True roots, stems and leaves must contain vascular tissue (xylem and phloem).
2. The algae have no vascular tissue.

The body of **Brown Algae** consists of three general regions:

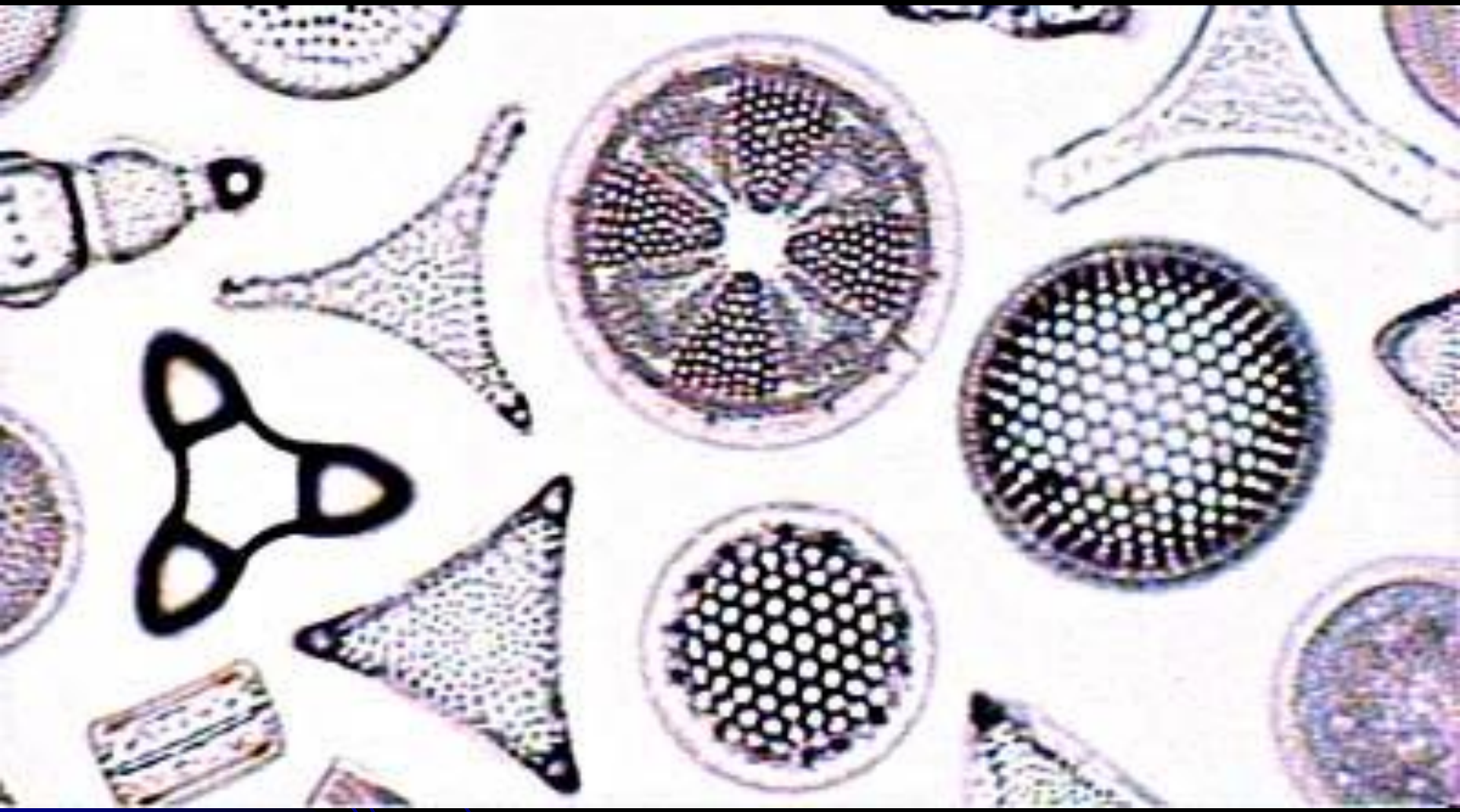
a) **Holdfast** – a root like structure that anchors the algae

b) **Stipe** – a stem like structure that supports the leaf like structure

c) **Blade** – a leaf like structure that is the photosynthetic surface

Red Algae

Diatoms



Some **Dinoflagellates** bloom in the ocean and create red tides.

They have an abundance of carotenoids turning the water a reddish color.

They produce toxins which can kill fish and invertebrates in the area.

Some species can produce bioluminescence, a display of light that can be seen at night.

Euglenoids have both plant and animal characteristics:

Animal – like Characteristics:

a) They are highly motile and move with a flagella.

b) They can take in food through the cell membrane.

c) There is no cell wall.

Plant – like Characteristics:

They have **chloroplasts** and carry out photosynthesis.

Reproduction in Multicellular Algae

- Ex. *Ulva* (Sea Lettuce)
- **Alternation of Generations:**

  Life cycle in which the organism exists in the
  - Haploid state (n) in one generation: **Gametophyte**
  - and in the Diploid state (2n) on the next generation: **Sporophyte**

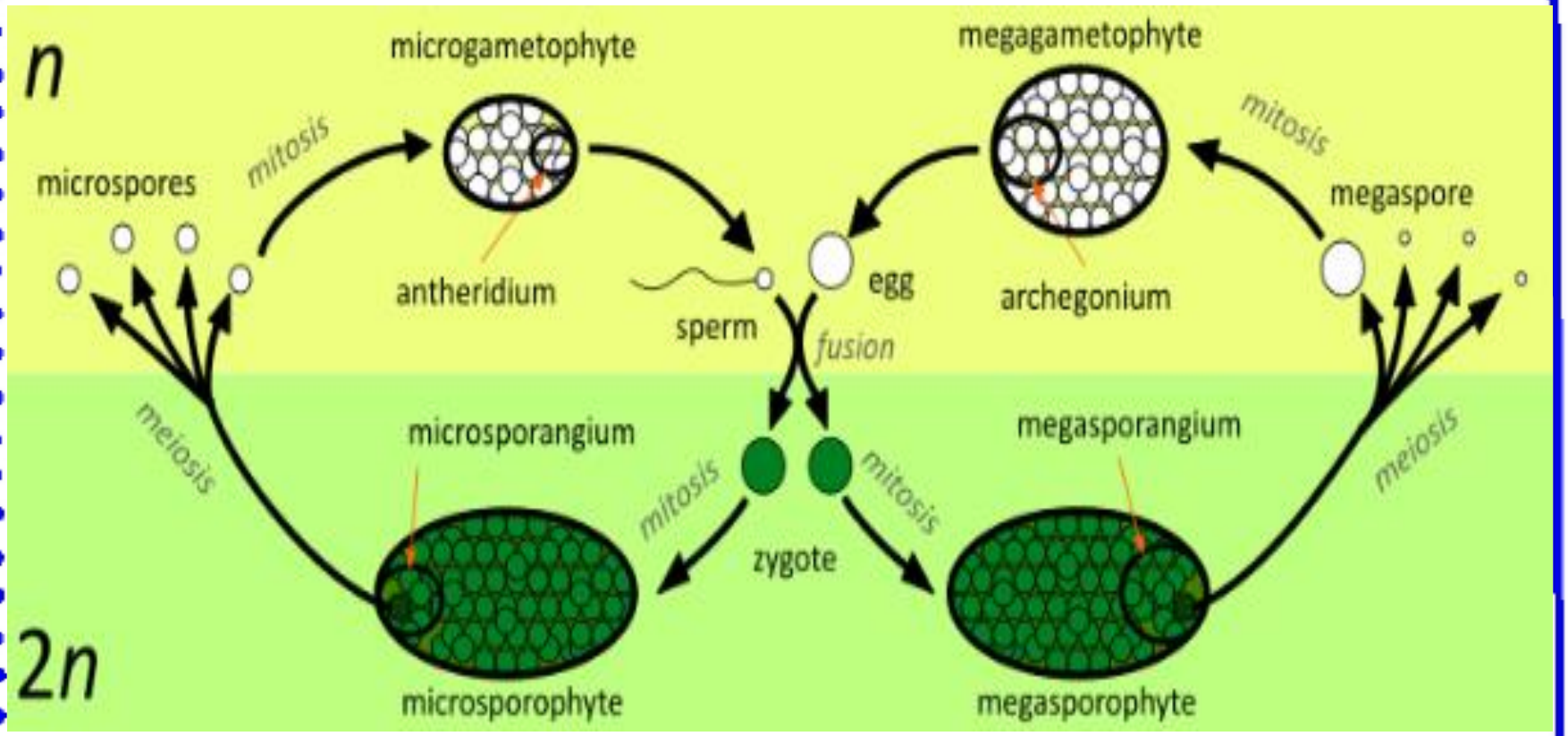
ALTERNATION OF GENERATIONS

alternates between:

(1) a sexual and asexual stage.

(2) a haploid and diploid generation.

(3) a sporophyte and a gametophyte generation.



ALTERNATION OF GENERATIONS

- The SPOROPHYTE generation is always **diploid** and the GAMETOPHYTE generation is always **haploid**.
  - The diploid **sporophyte** produces haploid **spores** by **meiosis**.
  - The spores divide by **mitosis** to produce the **male and female gametophytes**.
    - The haploid gametophytes produce **gametes**.
  - Fertilization of haploid gametes results in a **diploid zygote**.
  - This diploid zygote is the first step to the **sporophyte** generation.

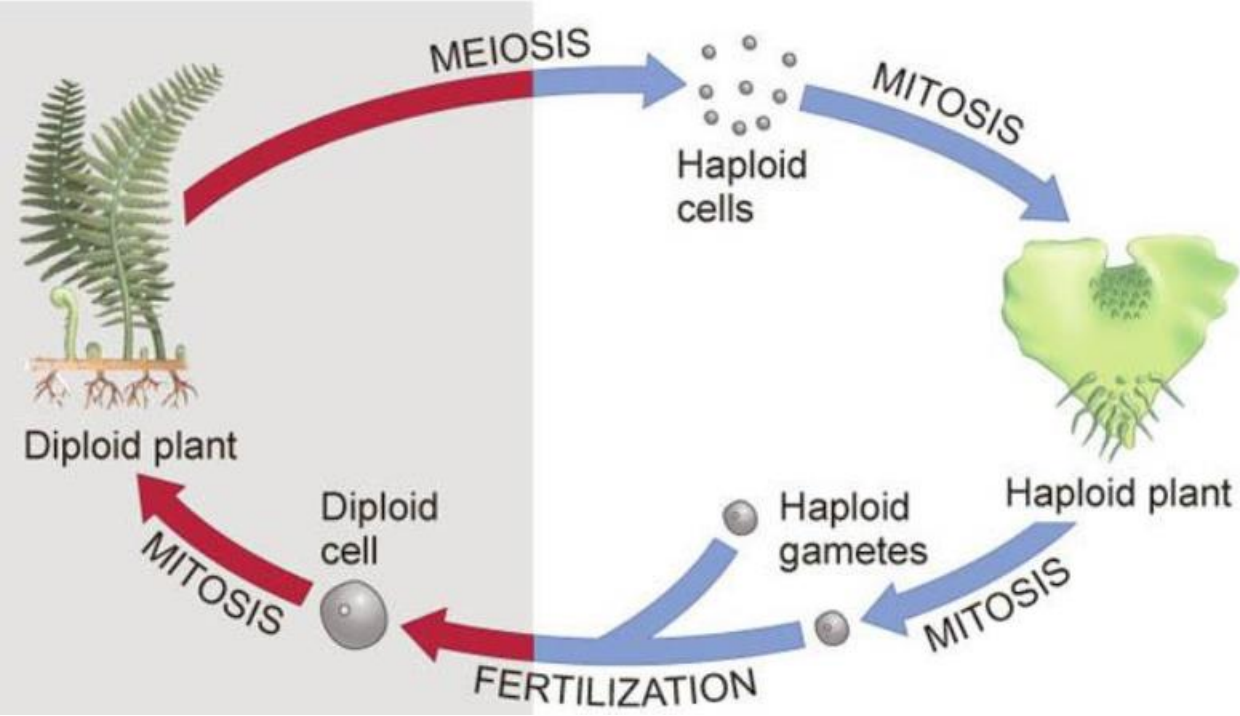
Remember:

- In animals, meiosis results in …

  … haploid gametes (egg and sperm).

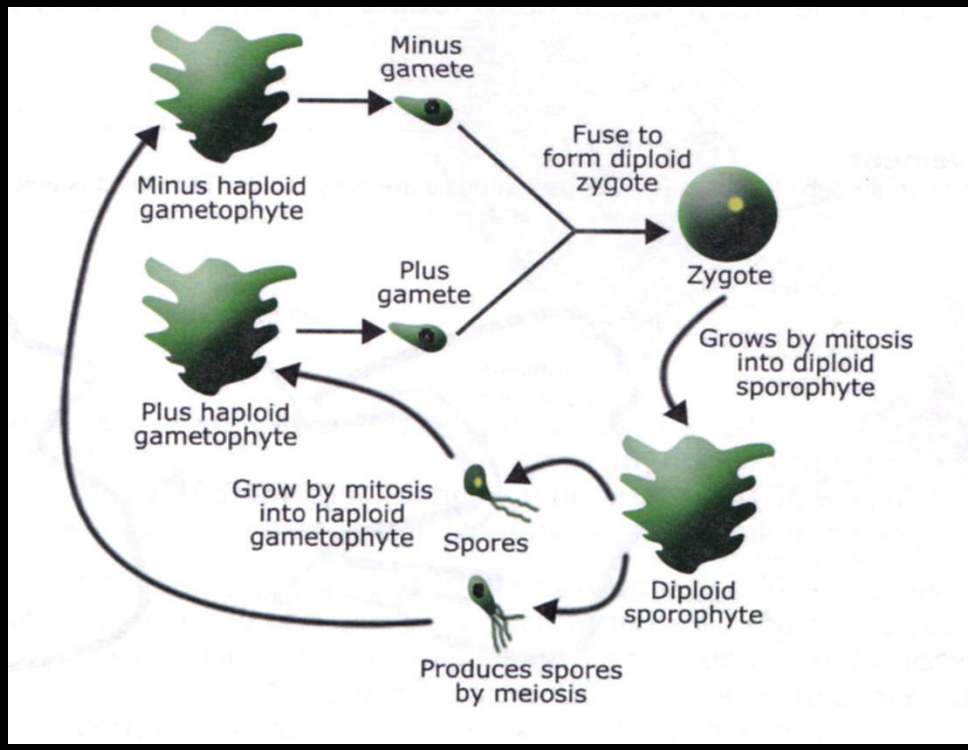
- In plants (and algae), meiosis results in….

  … haploid spores.



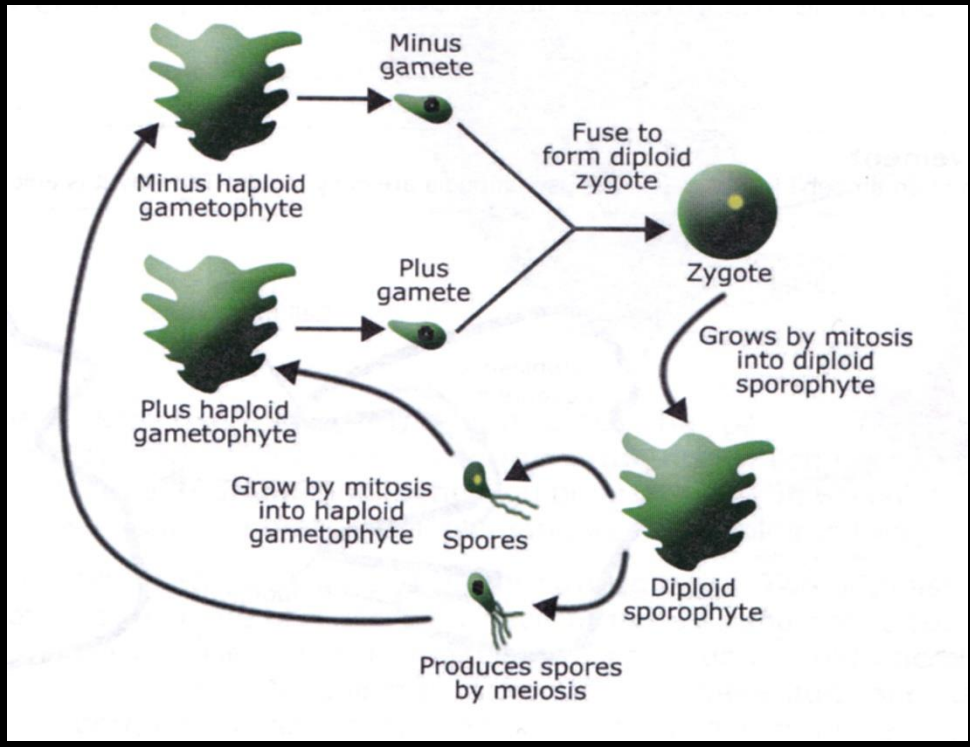
Reproduction in Multicellular Algae

- *Ulva* (sea lettuce) lives as a gamete producing, haploid (n) **Gametophyte** in one generation.
- **Gametophyte** produces haploid (n) "plus" and "minus" gametes (by mitosis).
- Gametes fuse with one another to form a **Zygote** (2n).



Reproduction in Multicellular Algae

- **Zygote** (2n) grows in size by mitosis into a spore-producing, diploid (2n) **Sporophyte**
- Sporophyte produces haploid (n) spores by meiosis
- Spores grow into the haploid (n) **Gametophytes**



Protozoans

Animal-like Protists

Protozoans

- Heterotrophic; some Parasitic
- Unicellular
- Make a large part of the **Zooplankton** population
- They have a **Food Vacuole:** membrane-bound chamber in which they break down their nutrients with enzymes.
- Classified by how they move: **flagella, cilia, pseudopods, spores.**

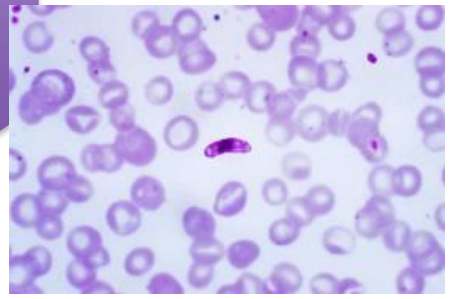
The protozoa are generally classified into four groups based on their **Method Of Movement**.

Pseudopodia (Amoebas)

Cilia (Ciliates)

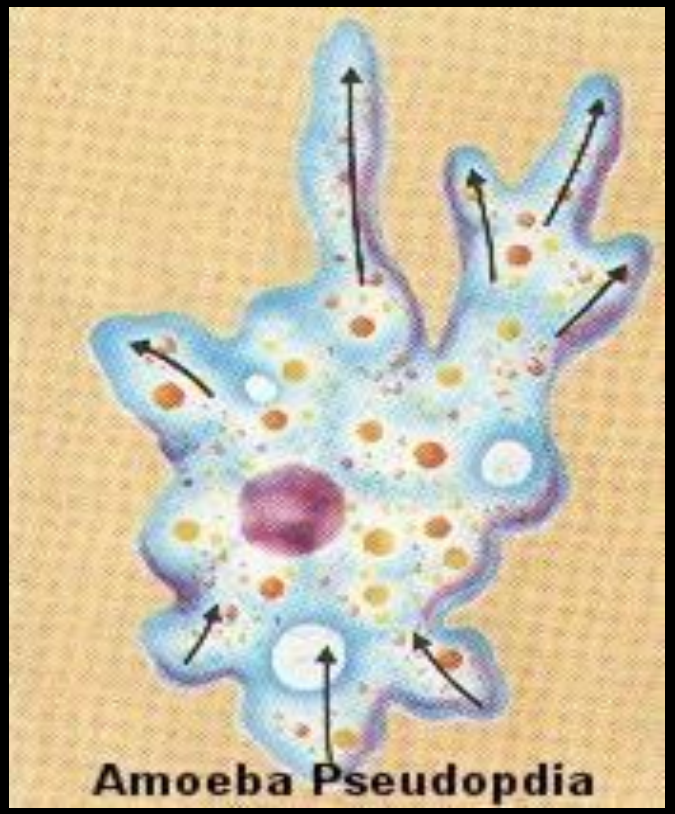
Flagella (Zooflagellates)

No movement (Sporozoans)



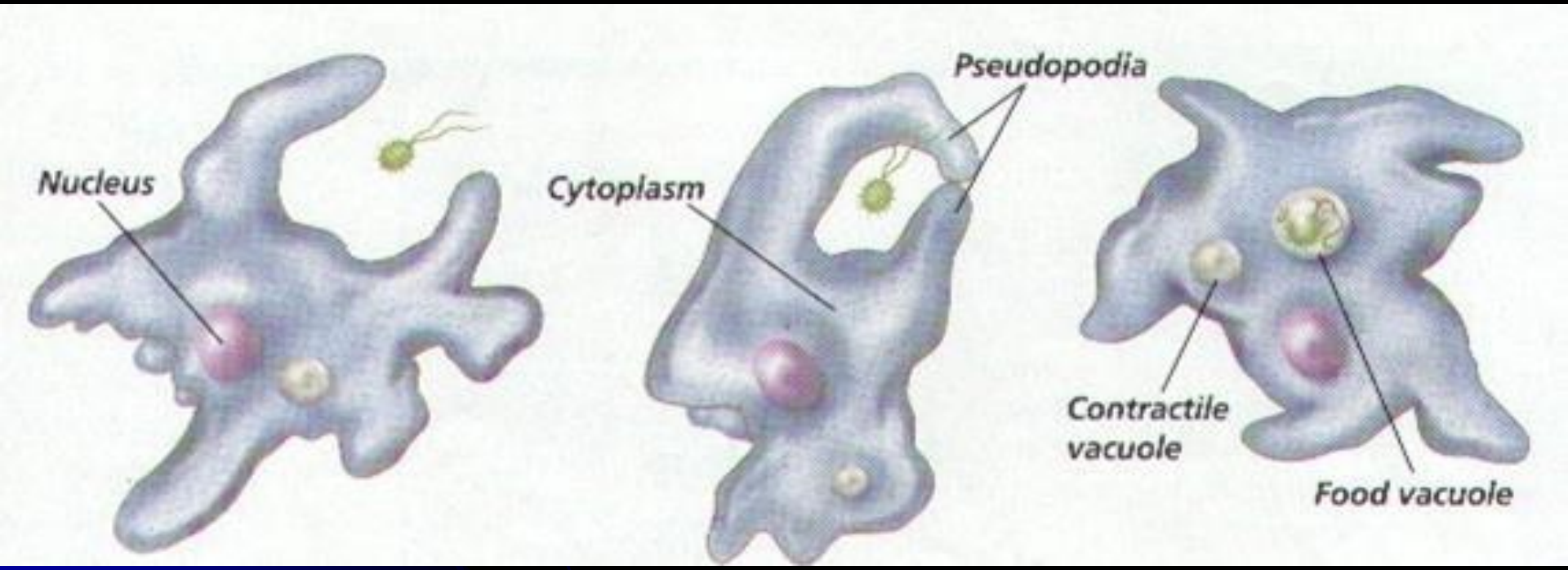
Amoebas: the "Blobs"

- Pseudopodia
- Move by **Cytoplasmic Streaming:**
  - Cytoplasm moves inside the amoeba, which causes the surface of the cell membrane to move in different directions
  - As cytoplasm and cell membrane move, it pulls the amoeba
- **Pseudopods**: extension of cell membrane formed as a result of cytoplasmic streaming



Amoebas: the "Blobs"

- They can form pseudopods to surround and trap food.
- Then form a FOOD vacuole to break down food in the cytoplasm.



Amoebas: the "Blobs"

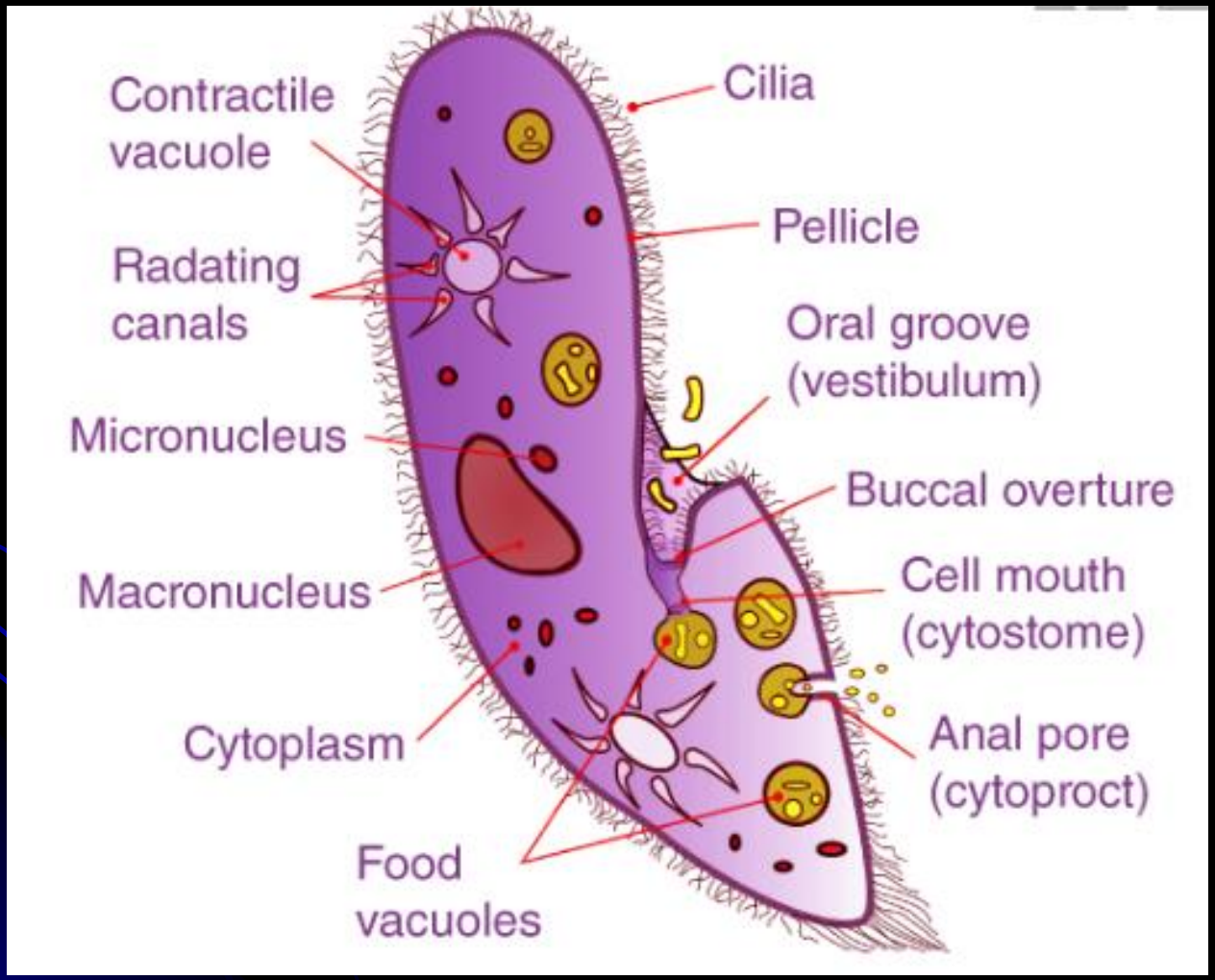
- CONTRACTILE Vacuole – collects extra water and expels it from cell.
- Some species cause Amoebic Dysentery (fever, diarrhea, bleeding, damage to intestinal wall).

Ciliates: the "Hairy Ones"

- *Paramecium*
- Move beating tiny hairs called **Cilia:** help organisms move, get food, and sense its environment.

Ciliates: the "Hairy Ones"

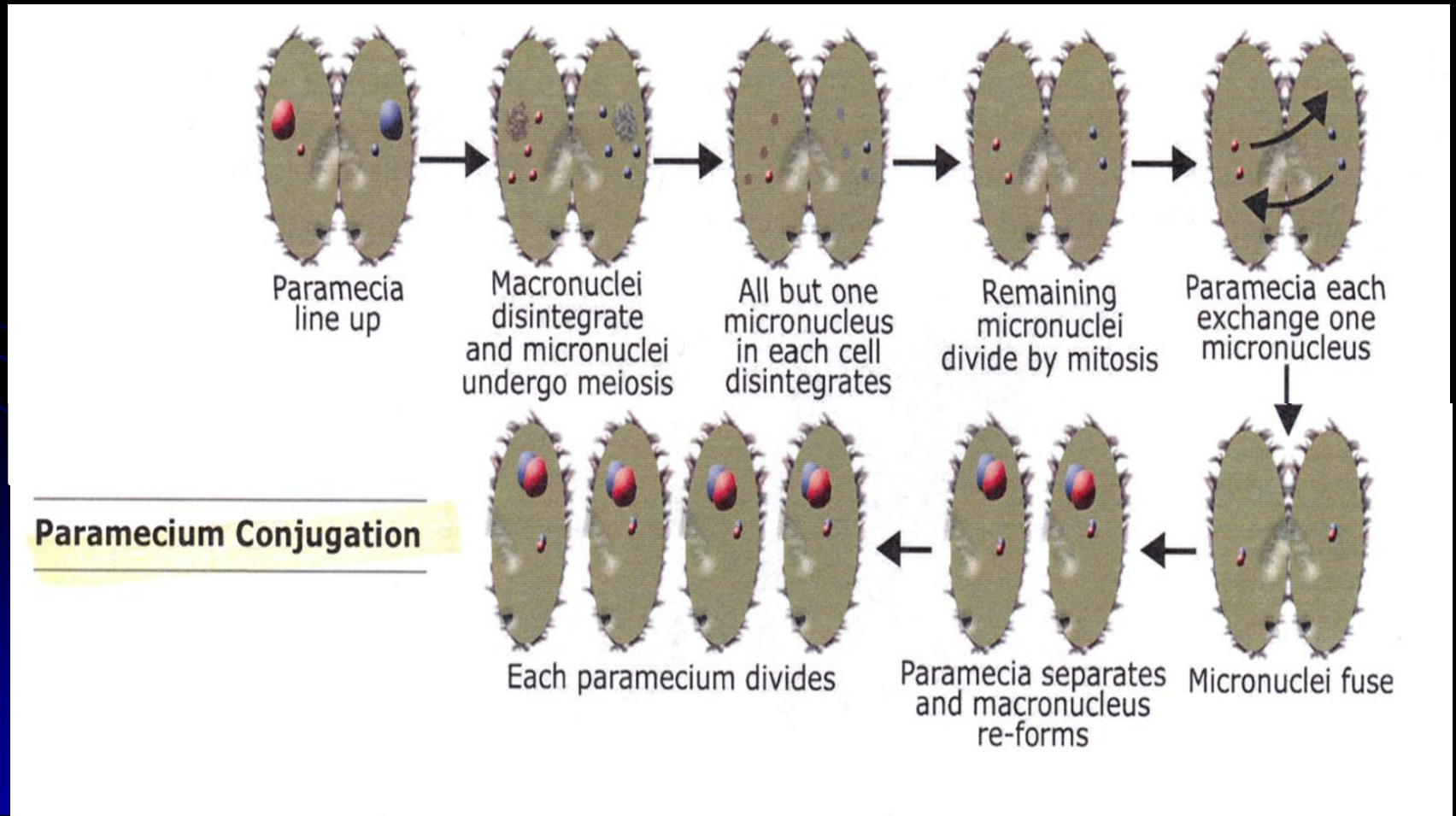
- *Paramecium*



Ciliates: the "Hairy Ones"

- Have at least 2 nuclei:
  - Macronucleus: cell's metabolism
  - Micronucleus: cell's reproduction
- Asexual and Sexual Reproduction
- Sexual Reproduction by Conjugation

Ciliates: *Paramecium* Conjugation



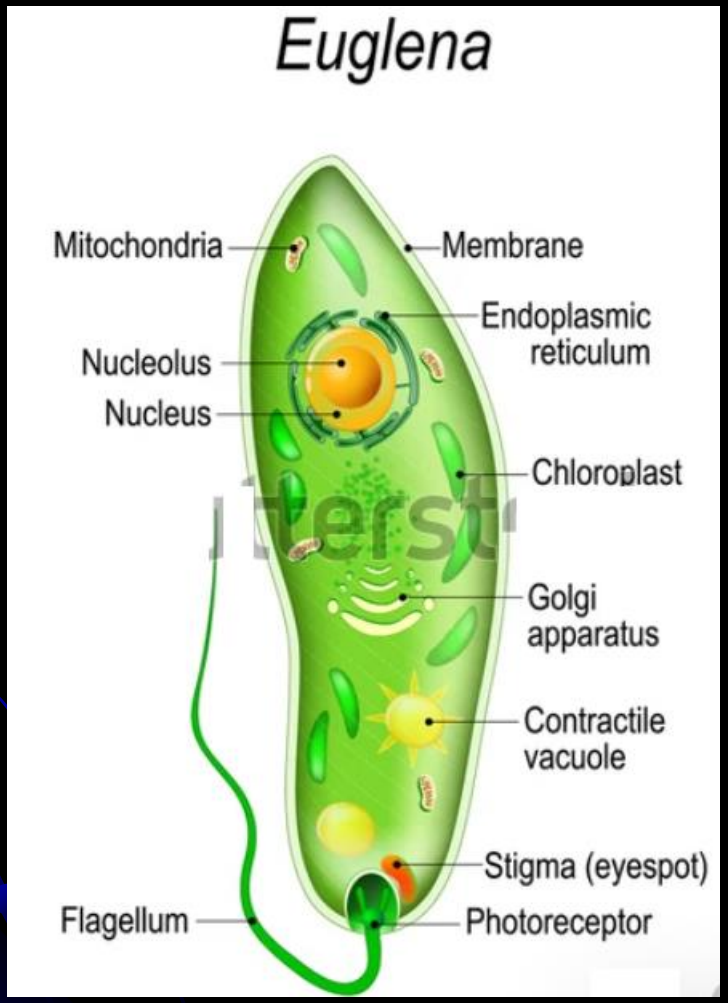
Paramecium Conjugation

Zooflagellates: the "Motorboats"

- Use whip-like extension called flagella to move
- Some cause diseases:
  - *Trypanosoma*: African Sleeping Sickness
  - *Giardia*: Hiker's Diarrhea
  - *Trichomonas*: Sexually Transmitted Disease (STD)

Zooflagellates: the "Motorboats"

- Most reproduce by binary fission.

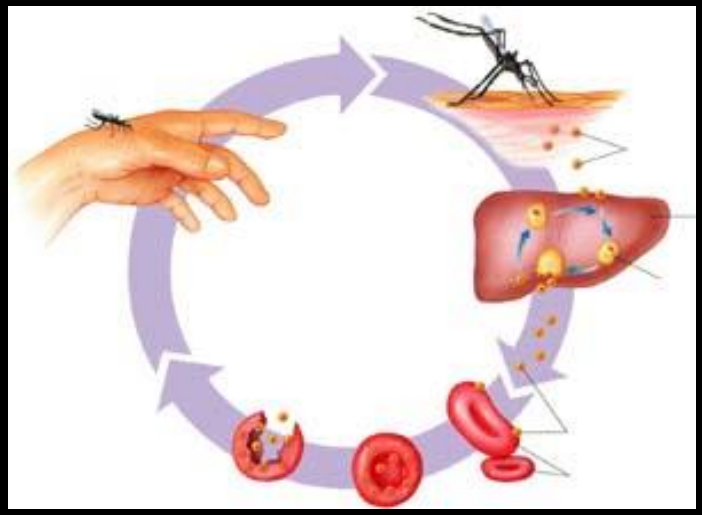


Sporozoans: the Parasites

- Cause the most human disease of any organisms on earth (parasites)
- *Adult forms cannot move*
- **Vector:** Organism that transports the parasite
- **Host:** Organism infected
- *Plasmodium sp.*

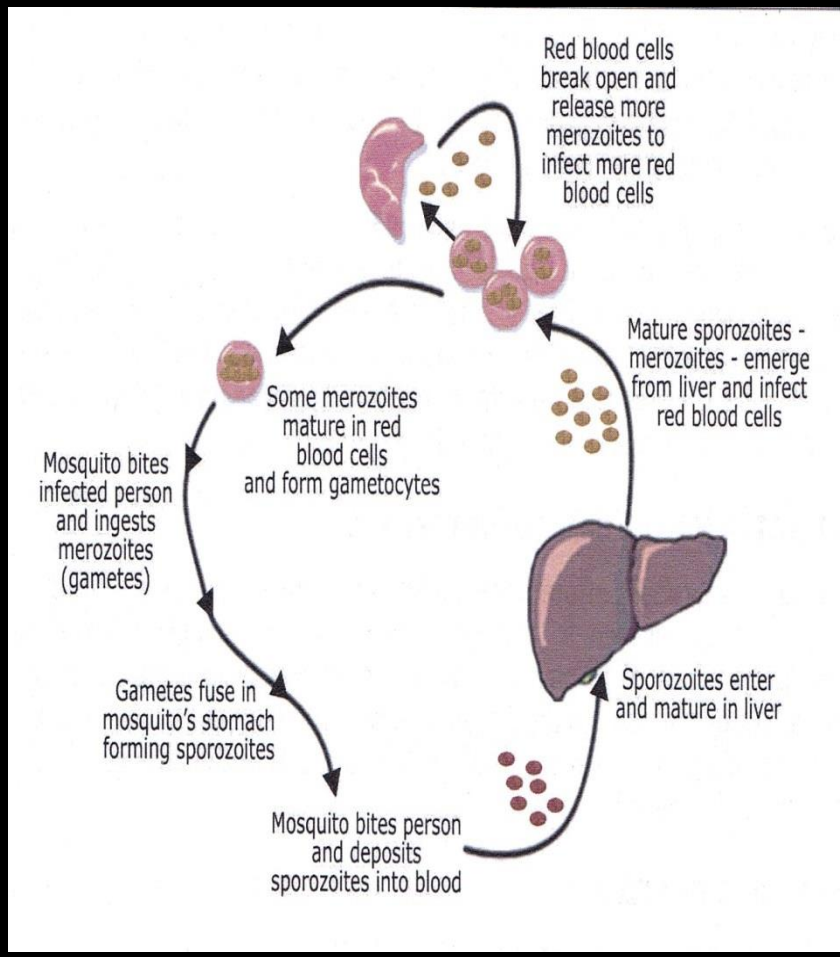
Sporozoans: the Parasites

- **Malaria** caused by *Plasmodium.*
- Causes fever, tiredness, anemia, kidney failure, and death.
  - Vector: *Anopheles* mosquito
    - Sporozoite and Gametocyte forms
  - Host: Humans
    - Sporozoite, Merozoite, and Gametocyte forms



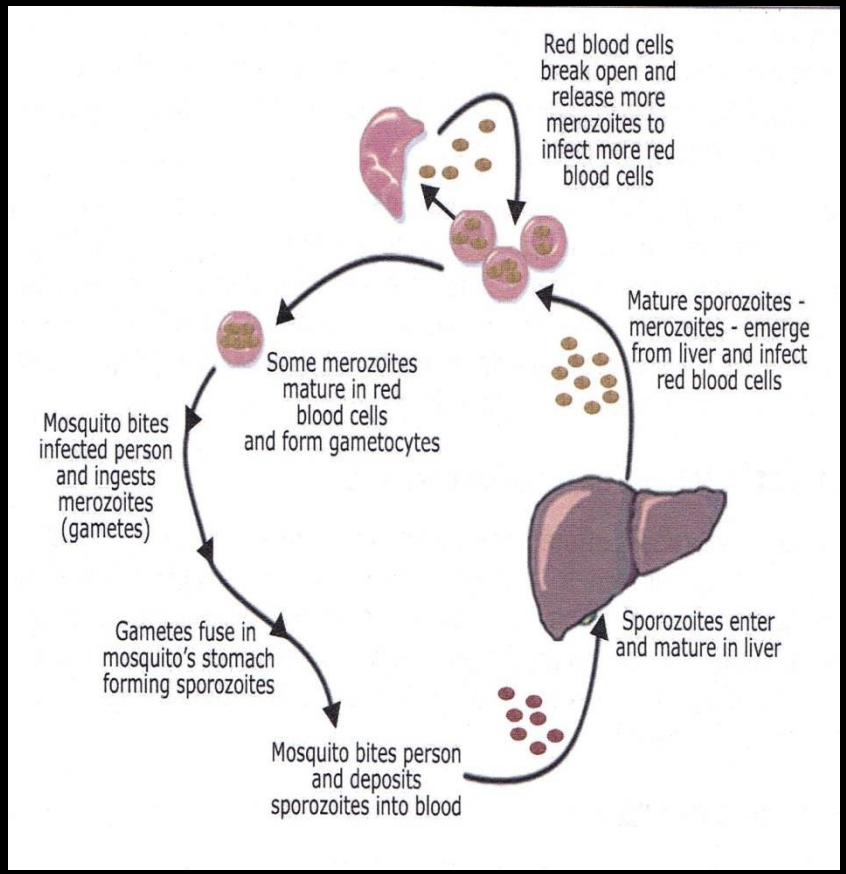
Sporozoans: *Plasmodium* Life Cycle

- Mosquito that has Gametocytes in the stomach (which fuse to form Sporozoites) bites a human – Sporozoites introduced in the host's blood.
- Sporozoites infect liver and mature into Merozoites – infect Red Blood Cells (RBCs).
- At regular intervals, RBCs break open causing fevers, anemia, and other symptoms.



Sporozoans: *Plasmodium* Life Cycle

- Some merozoites mature into Gametocytes in the RBCs.
- When infected person is bitten by mosquito, gametocytes are taken into the stomach – combine to form Sporozoites.
- Whole cycle starts over.



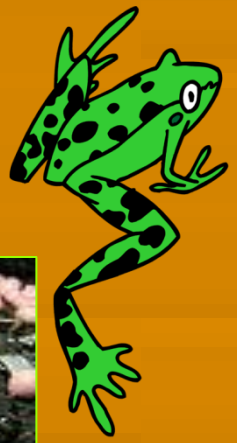
Both the *Plasmodium* and the *Anopheles* mosquito have become resistant to drugs and pesticides.

In recent years there has been a resurgence of malaria, killing 2 million people a year.

Fungus-like Protists

Slime Molds and Water Molds

SLIME MOLDS



Slime molds are typically found growing on damp soil, rotting logs, or decaying leaves.

They appear as <u>glistening masses of slime</u> that may be white, red or yellow.

SLIME MOLDS

They spend part of their life in a mobile, amoeba-like feeding form, engulfing organic materials, and part of their life in a stationary reproductive stage.

The slime molds play a key role in the recycling of organic material (**Decomposers**).

Water Molds

A water mold is a fungus-like organism composed of branching filaments of cells.

Most water molds are aquatic, but some live in the soil, and others are parasitic.

Water molds are sometimes seen as the white fuzz on diseased aquarium fish.

Potato Blight killed potato plants and caused Irish famine in mid 1800s