Biology 40S

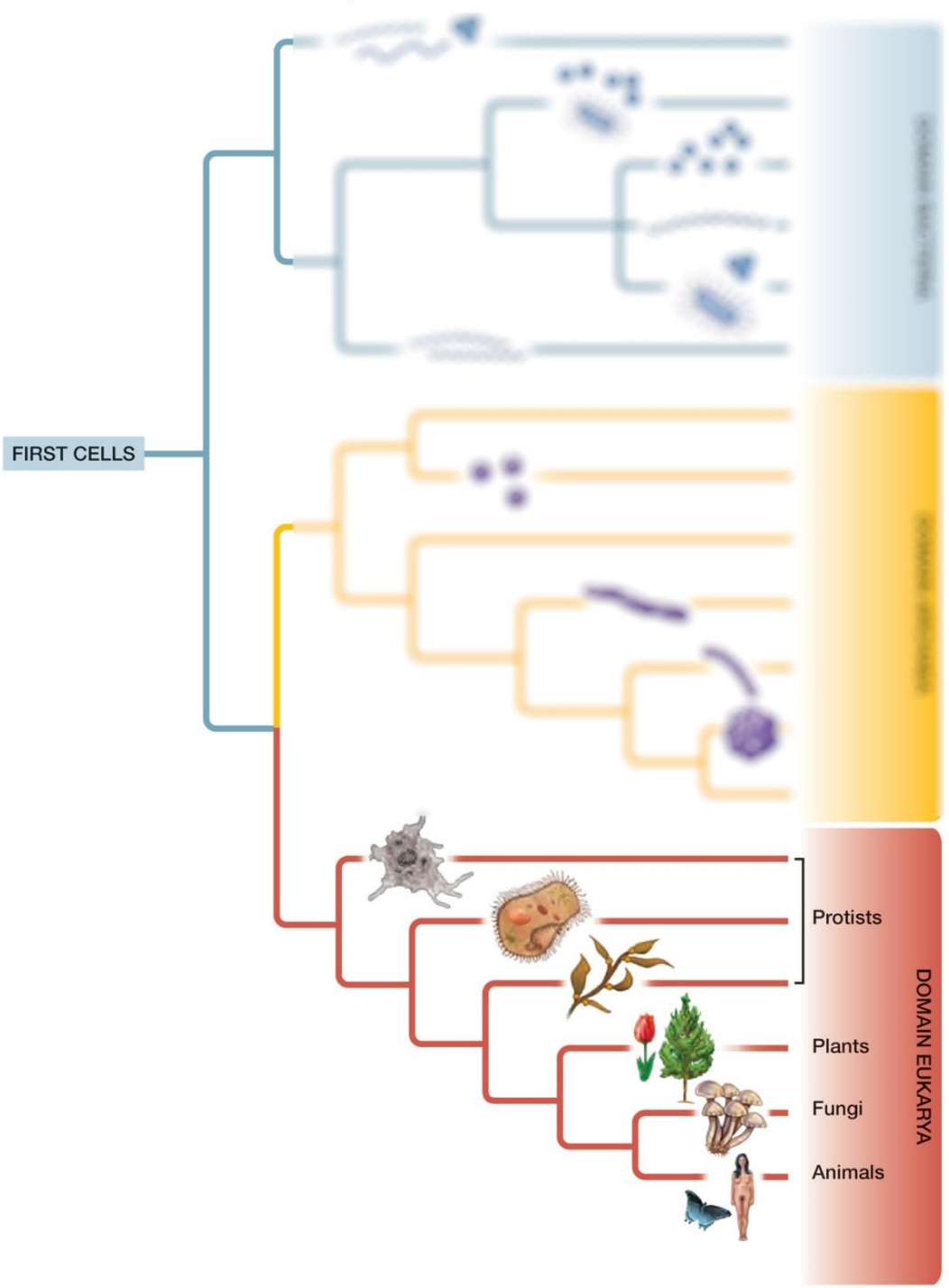
Unit #4 Organizing Biodiversity

Domain Eukarya (1): "Kingdom Protista"

The **Domain Eukarya** is a large, diverse and complex group or organisms that consist of one or more **Eukaryotic Cells**

This domain is divided into four fairly distinct kingdoms:

- Protists (Protista)
- Plants (Plantae)
- Fungi
- Animals (Animalia)



What is a Protist?

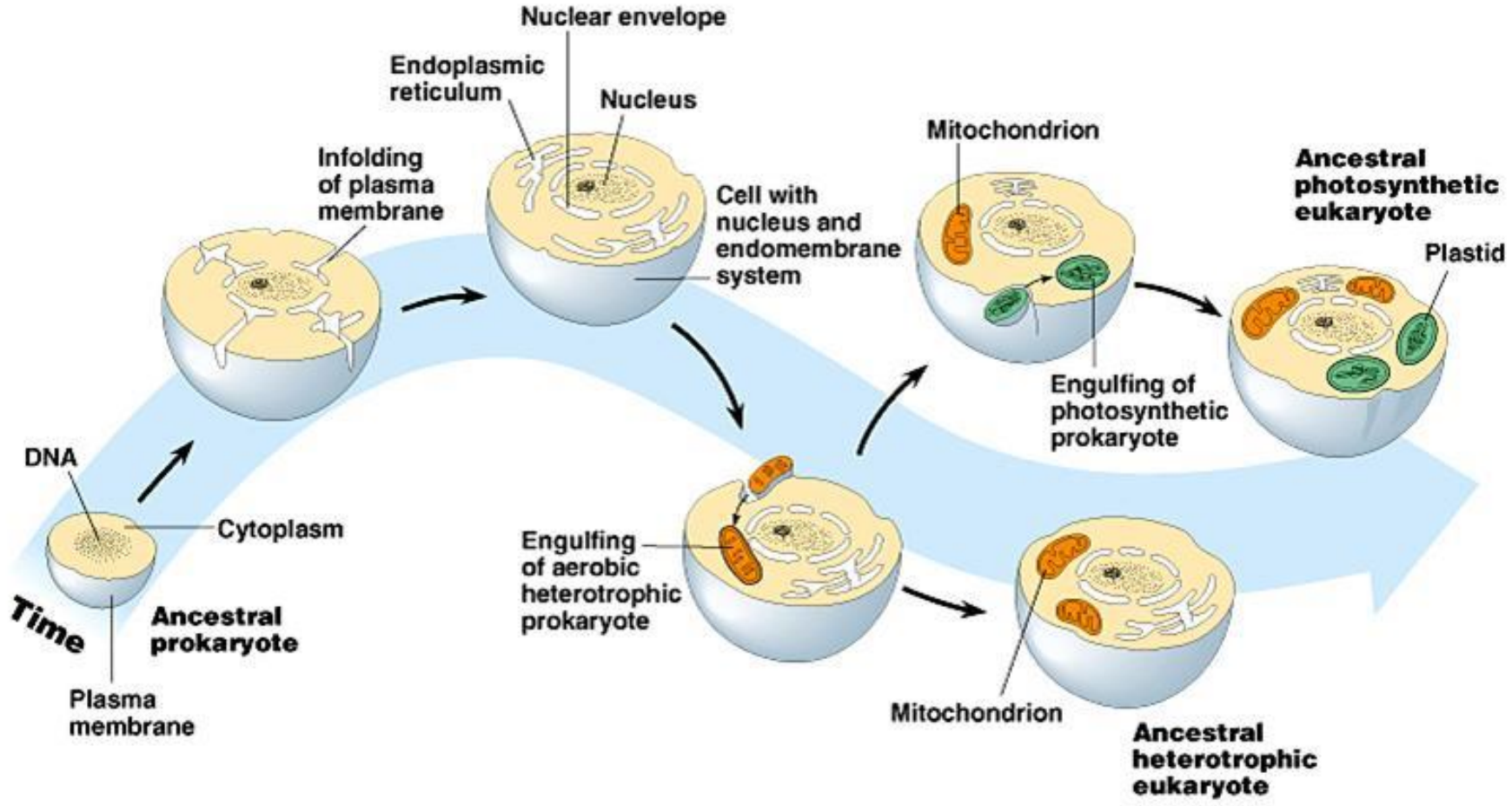
The Kingdom Protista

- **eukaryotic microorganisms**
  (nucleus and membrane bound organelles)
- **Unicellular** (mostly)
- some form colonies.
- Current theory indicates that the first eukaryotic cells took 2 billion years to evolve
- Protists are the **most basic** form of Eukaryotic life on Earth

- ***Members of the Kingdom Protista are classified together mainly because they do not fit in other Eukaryotic Kingdoms as opposed to how similar or closely related they are to each other.***

Endosymbiant Hypothesis

- This suggest that the more complex eukaryotic cells arose as complexes of prokaryotes living together.
  - Chloroplasts arose from blue-green algae
  - Mitochondria from aerobic bacteria
  - Flagella from spirochete bacteria



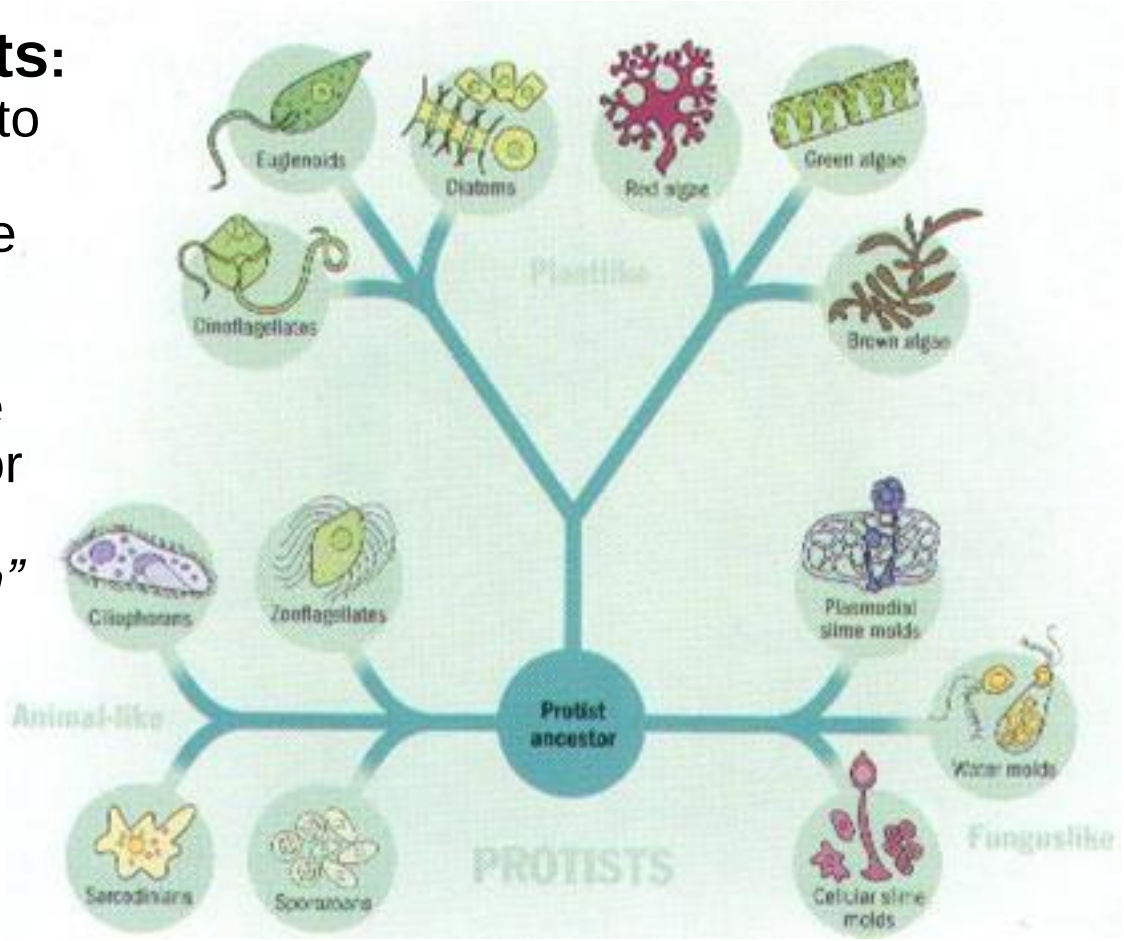
Classification of Protists:

- The kingdom was created to classify simple organisms that didn't fit anywhere else

- They can be defined by exclusion. That is, they are not plants, animals, fungi or prokaryotes

"the Junk Drawer of Eukarya"

- **Protists are divided into the animal-like, plant-like and fungus-like organisms**



Animal – Like Protists

(Protozoa)

- Protozoa means "first animal"
  (but animal – like protists are not animals!)
- **Most are free-living heterotrophs**
- **None have cell walls**
- **Most are unicellular** (some form colonies)

Flagellates

- Animal Like Protists that use **flagella** to move

(ex) *Trypsomas*

Sarcodines

- Animal Like Protists that use **Pseudopods** (limb-like extensions) to capture and engulf food

(ex) *Amoebas*, *Formanifera*

Ciliates

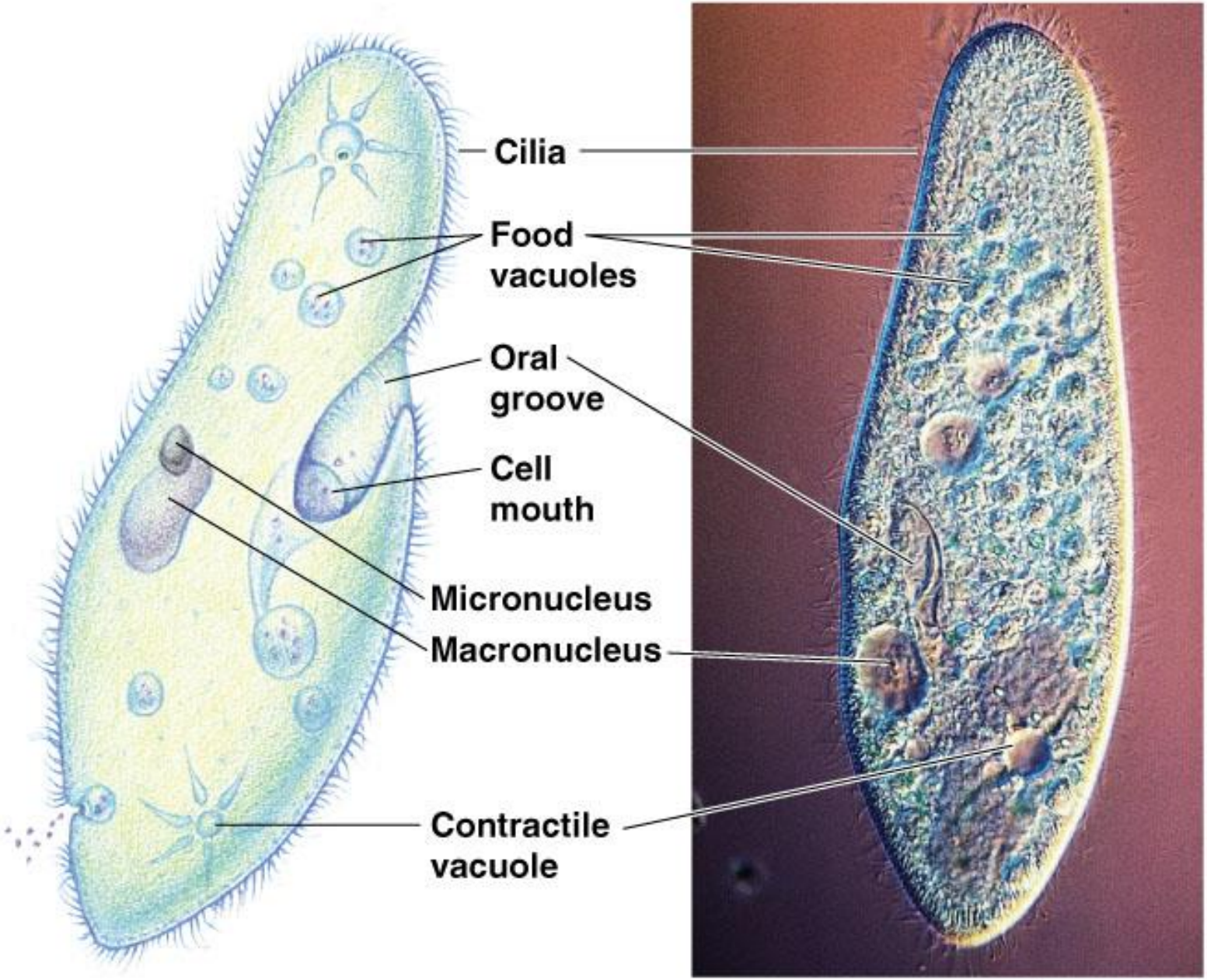
- Animal Like Protists that use **cilia** to move and to help ingest food

(ex) *Paramecium*

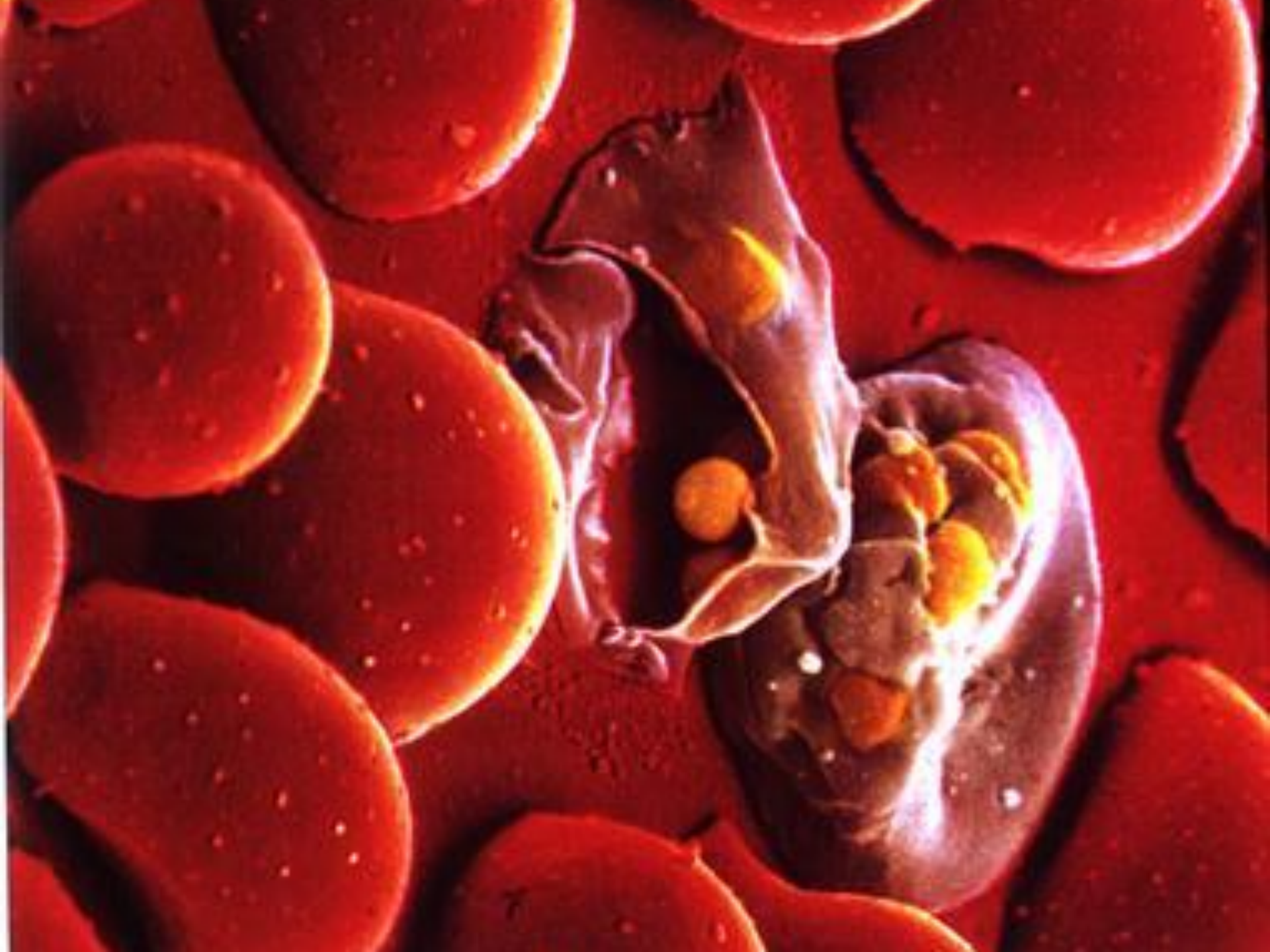
Sporazoans

- Parasitic Animal Like Protists that invade host organisms and release spores

(ex) *Plasmodium*



(c) *Paramecium*

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How Animal – Like Protists fit into the world

- **HARMFUL RELATIONSHIPS**

  Plasmodium causes malaria

  Trypanosoma causes African sleeping sickness

  Entamoeba causes dysentery

- **HELPFUL RELATIONSHIPS**

  Trichonympha live in the digestive tracts of termites and allow them to digest cellulose

Plant – Like Protists

- **contain chloroplasts and are photosynthetic**
- **All have cell walls**
- They are among the most abundant photosynthetic organisms in the oceans

Green Algae

- Most "plant-like" of the plant-like protists.
- Most commonly found in fresh water
- Most are unicellular and have the same type of chlorophyll and land plants

Brown Algae

- Mostly **multicellular** marine plant – like protists found in colder ocean water

(ex) *Brown Seaweeds*

Red Algae

- **Multicellular** marine plant-like protists found in warmer seawater

(ex) *Red Seaweeds*

Diatoms

- Most abundant unicellular algae in oceans
- Contain Silicon in their cell walls
- Largest source of photosynthesis in the oceans

(ex) *Phytoplankton*

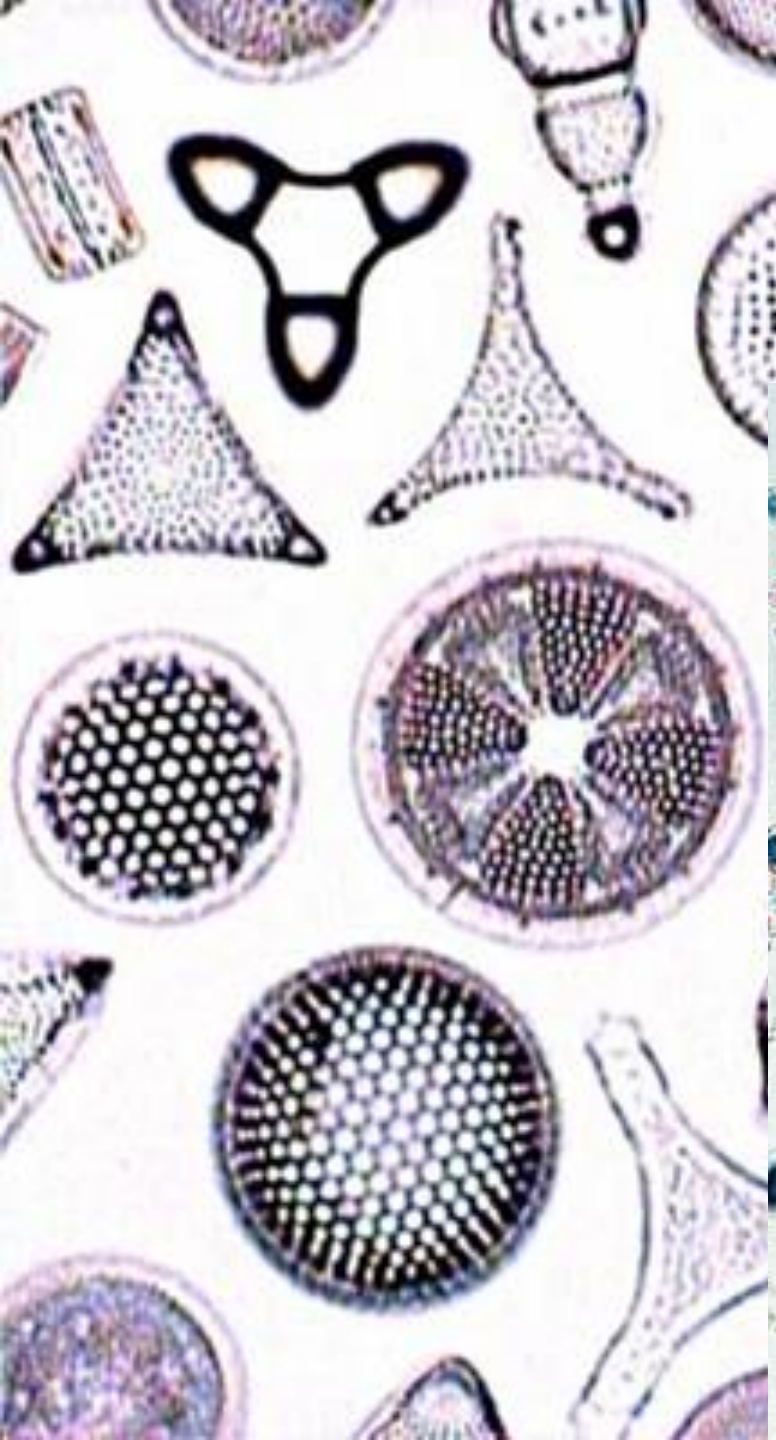
Dinoflagellates

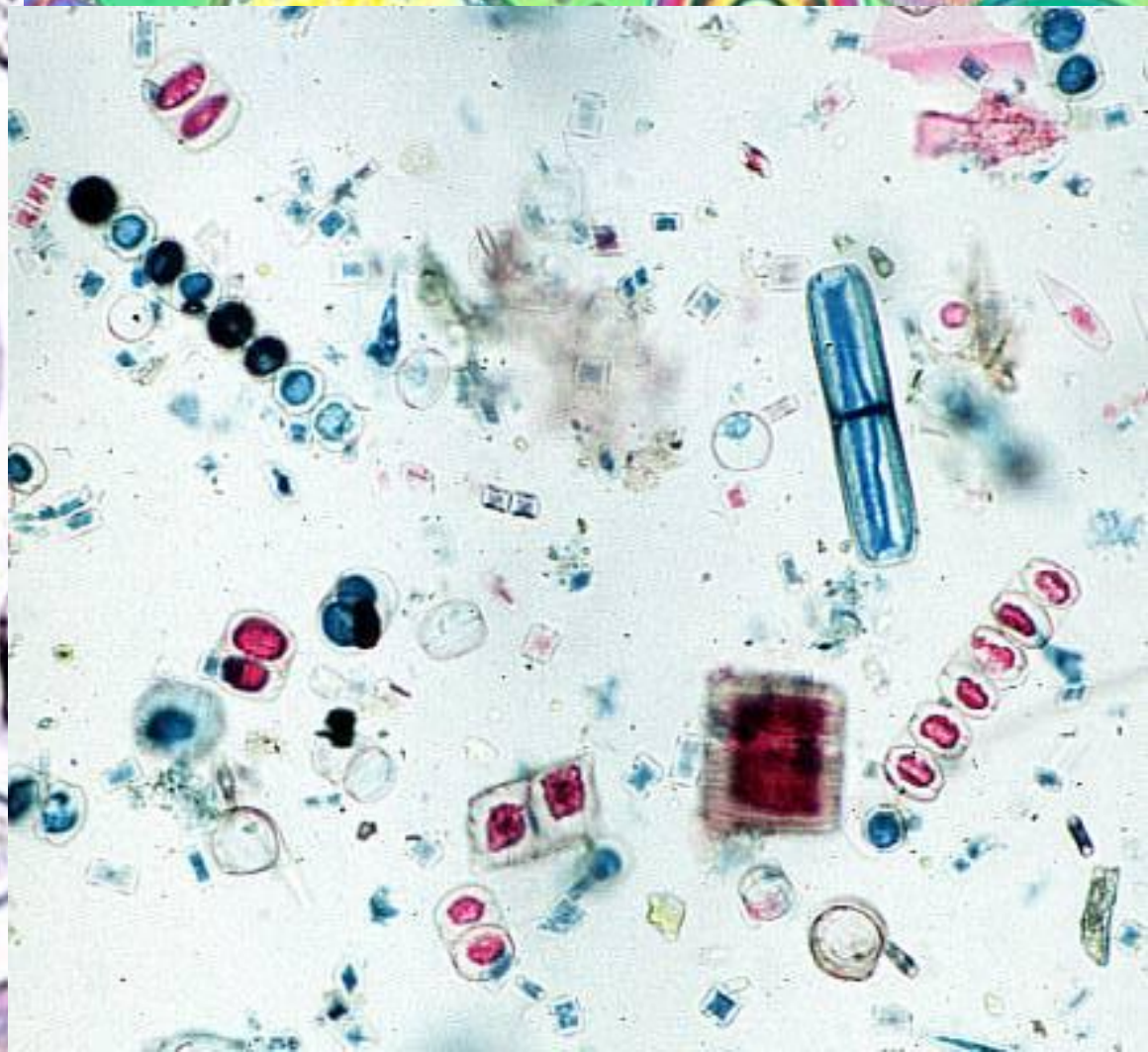
- Plant – like protists that contain 2 flagella
- Reproduce in large numbers, rapidly and densely producing **“red-tide”**
- Dense populations release toxins into the surrounding waters

Euglenoids

- Small fresh-water unicellular protists with 2 mismatched flagella (one is much longer than the other)
- **Will lose there chloroplasts and become heterotrophic in the absence of light**

(ex) Euglena



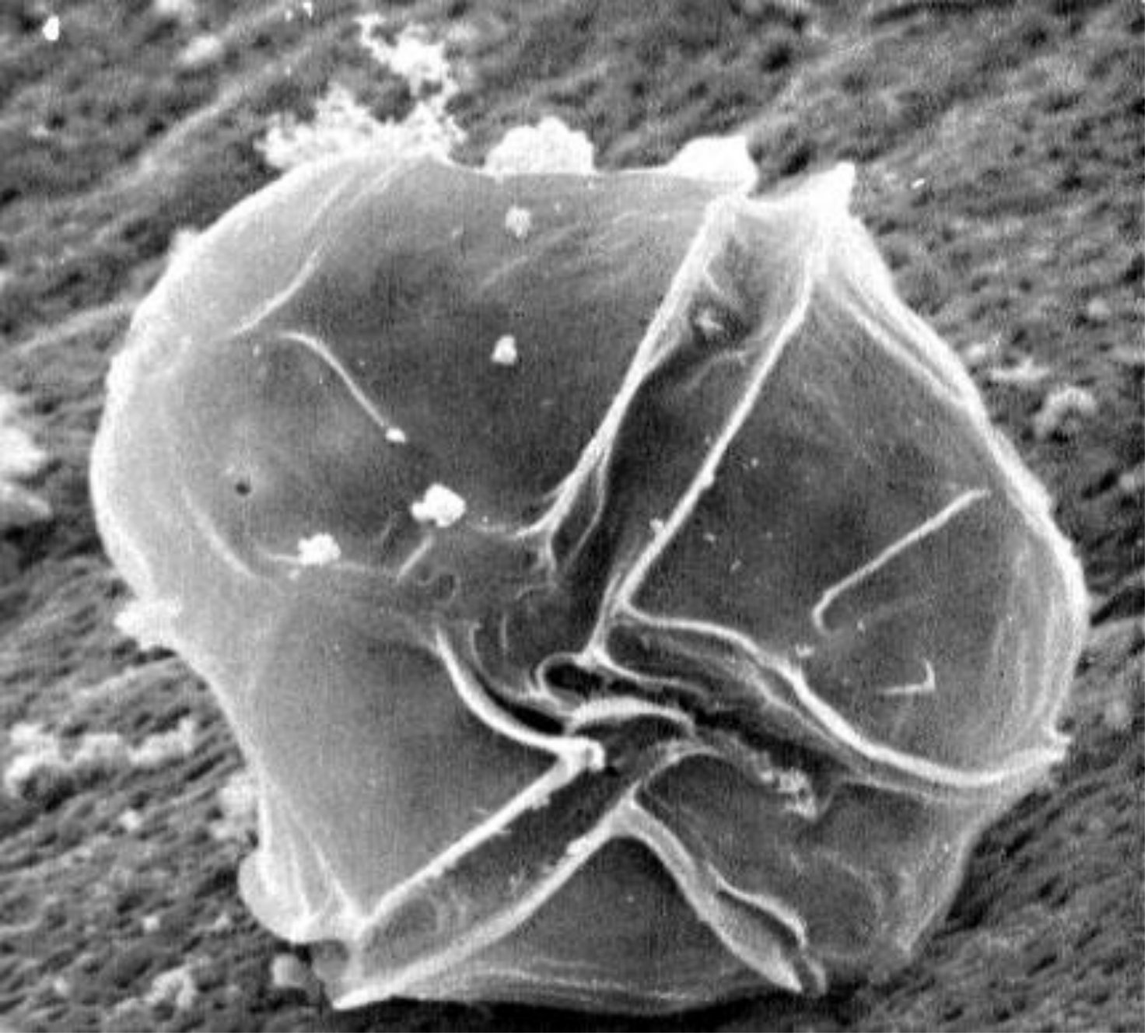


How Plant – Like Protists fit into the world

- **HARMFUL RELATIONSHIPS**

  They populate rivers and streams. Where there is excessive nutrient runoff a bloom can occur, resulting in eutrophication of the body of water

  - Some species produce a toxin that gets into food sources.
    - EG: Red Tide



Dinoflagellate
Gonyaulax


@ PJS Franks

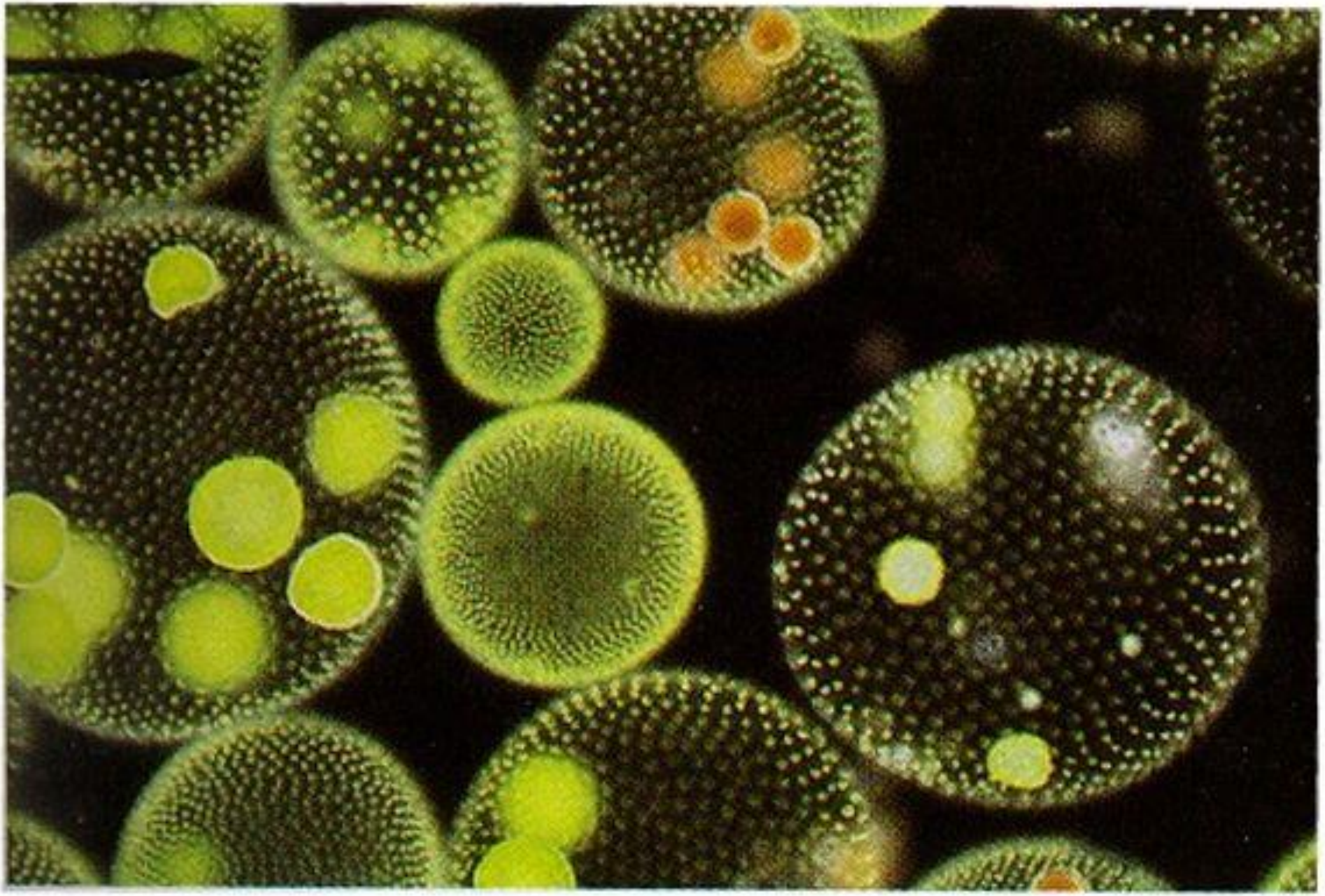

CLOSED
TO ALL SHELLFISHING

- **HELPFUL RELATIONSHIPS**

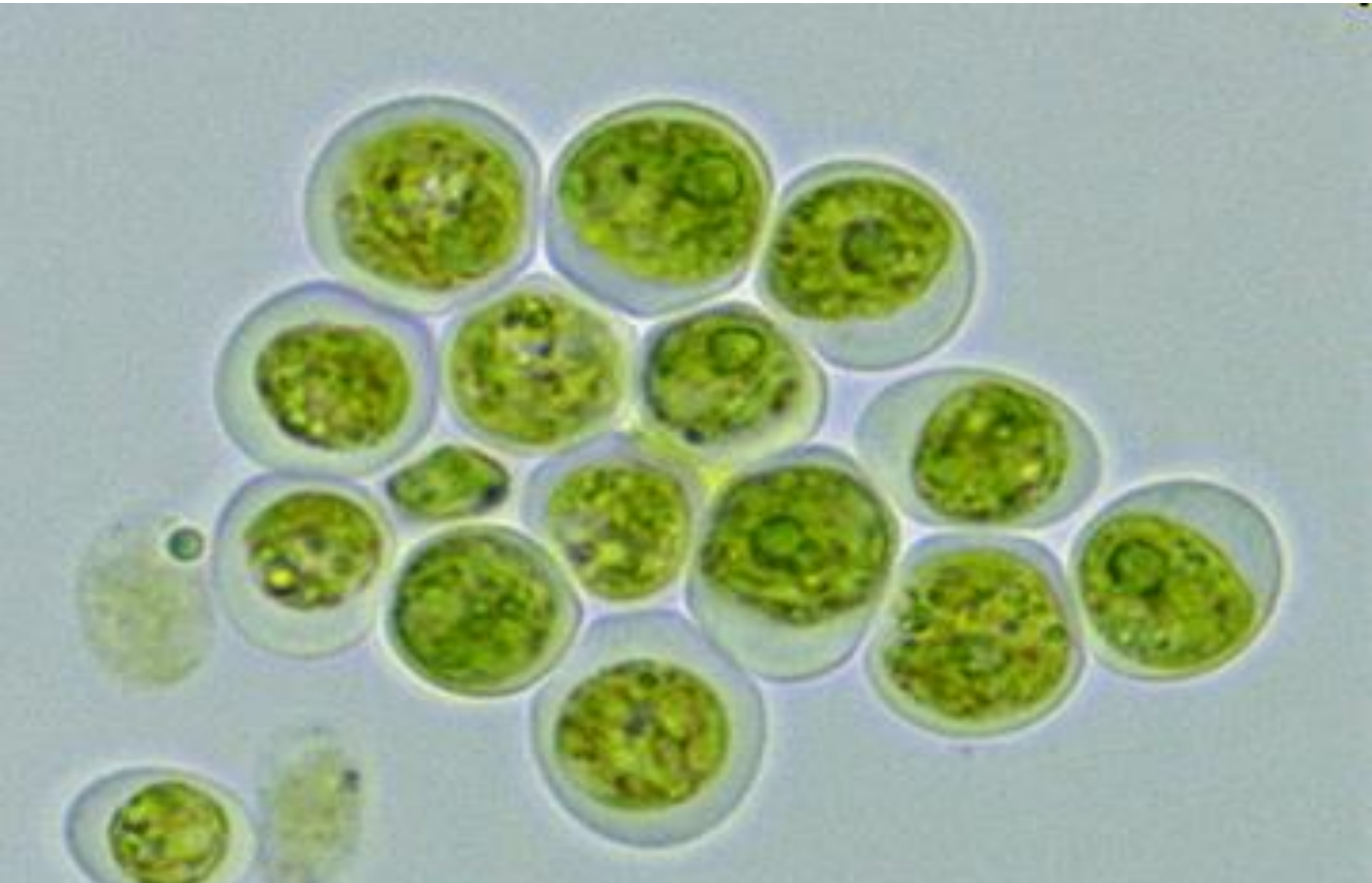
  Symbiosis: Dinoflagellates can live as intracellular symbionts with coral reducing their need for nutrients

- **Phytoplankton**, the small photosynthetic organisms in the surface water of the sea are the producers in many food chains.

- 70% of the Earth's O_2 comes from these organisms.



Unicellular algae



Fungus – Like Protists

- **Are heterotrophic decomposers**
- Release digestive enzymes to decompose dead organic matter
- Are unicellular but can act together as a colony
  - Examples:
    - slime moulds
    - water moulds