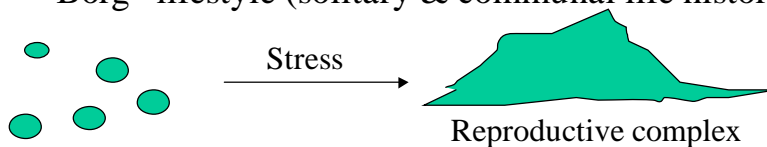


## Kingdom Protista

- Unifying characteristics of Kingdom Protista
  - Eukaryotic (duh!)
  - not animals, not plants, not fungi
  - small, poorly understood
- Challenges of Protist Classification
  - rapidly changing as new information come “on-line”
  - classification system used this semester differs from last spring!
- Divide 15 phyla into 7 “groups” based on nutrition, locomotion, and cell structure.

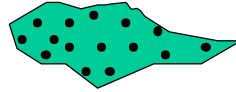
## Kingdom Protista: Group #1-Molds

- “MOLDS” key characteristics
  - Like true fungi, have absorptive nutrition
  - Restricted mobility
  - cell walls (if present) made of cellulose
- #1- Acrasiomycota (Cellular slime molds)
  - haploid cells most of the time
  - “Borg” lifestyle (solitary & communal life history)



## Kingdom Protista: Molds

- #2- Myxomycota (Plasmodial slime molds)
  - feeding stage = plasmodium (coenocytic mass)
- #3- Oomycota (Water molds)
  - mostly aquatic
  - diseases
    - aquarium fish “ick”
    - potato blight (potato famine of 1800’s)
  - coenocytic, filamentous body w/ cellulose cell walls



## Kingdom Protista: Group #2-Sarcodina Unifying Characteristics of Sarcodinans

- unicellular
- heterotrophic
- not flagellated and have no permanent locomotion apparatus

## Kingdom Protista: Sarcodina

### #4. Rhizopoda (amoebas)

- Pseudopods (false foot)
- widely distributed in moist places
- human disease

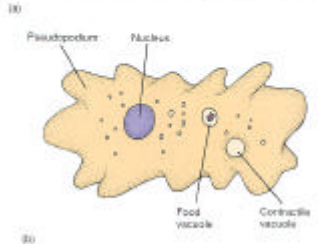
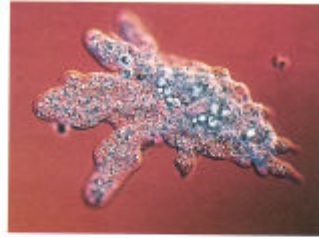


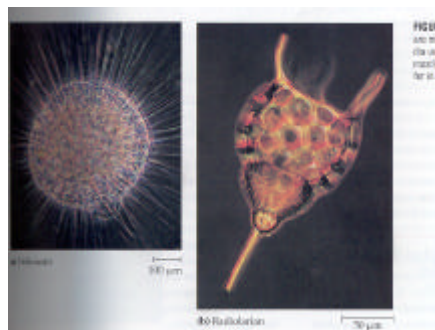
FIGURE 20.1

Phylum Rhizopoda. (a) Light micrograph of *Amoeba proteus* showing blunt pseudopodia (1605). (b) Drawing showing the anatomy of *Amoeba proteus*.

## Kingdom Protista: Sarcodina

### #5. Actinopoda

- silica shells w/ needle-like pseudopodia
- marine and freshwater
- accumulate at bottom of sea as ooze



## Kingdom Protista: Sarcodina

### #6. Foraminifera

- multi-chambered, CaCO<sub>3</sub> shell
- exclusively marine
- many have algal symbionts
- important components of sediments (white cliffs of Dover)



FIGURE 15.3  
REPRESENTATIVE FORAMINIFERANS

## Kingdom Protista: Group #3-Sporozoans

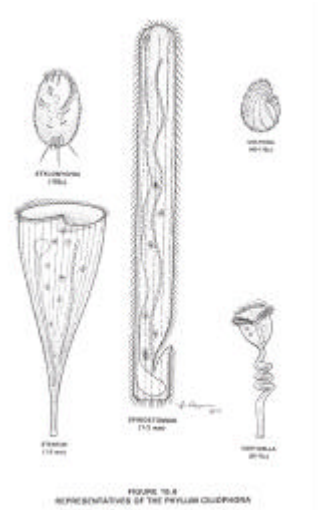
### #7. Apicomplexa

- unicellular & non-motile
- spore-forming parasites
- most have complex life cycles involving multiple hosts
- human diseases- malaria (fig 31.20)

## Kingdom Protista: Group #4-Ciliates

### #8. Ciliophora

- Many cilia
- unicellular- but incredible sub-cellular specialization
- possess two types of nuclei
- Complex reproduction
  - asexual (fission)
  - sexual (conjugation)



## Kingdom Protista: Group #5-Flagellates

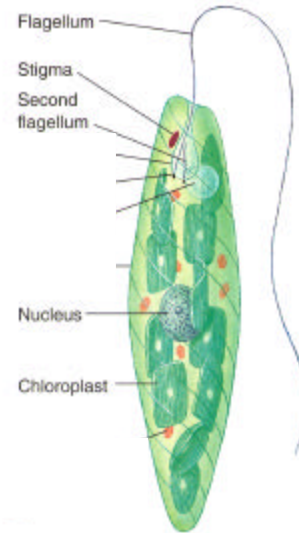
- whip-like flagella
- #9. Zoomastigophora
- most are free-living predators
- some species capable of breaking down cellulose
- some species cause disease -
  - Trypanosoma- African sleeping sickness
  - Giardia- Hiker's diarrhea



## Kingdom Protista: Flagellates

### #10. Euglenophyta

- Flagellated & common in freshwaters
- both animal and plant characteristics
  - in light - develop chloroplast & become photosynthetic
  - in darkness - lose chloroplast & are heterotrophic
- Sigma (eye-spot) = light-sensitive organ



## Kingdom Protista: Flagellates

### #11. Pyrrhophyta (fire plants)

- photosynthetic organisms
- two flagella perpendicular to each other
- Covered w/ heavy cellulose plates
- Store oil
- many are bioluminescent
- organism which causes “Red Tides”
- important to coral reef communities

Kingdom Protista: Group #6-Diatoms

#12. Chrysophyta

- most important primary producer of oceans
- Heavy silica 'tests'
- store oil
- important in formation of sediments
- Many human uses
  - diatomaceous earth (filtering)
  - gentle abrasive (early toothpaste!)
  - calibrate microscope resolution!

Kingdom Protista: Group #7-Algae

- Photosynthetic
- Usually multicellular
- Cell walls made primarily of cellulose

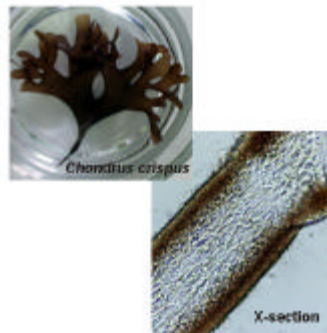
Kingdom Protista: Algae  
#13. Phaeophyta (brown algae)

- Multi-cellular, marine organisms
- body differentiated into 3 tissues
  - holdfast, stipe, blade
  - analogous (but not homologous) to plant roots, stems, and leaves
- ecological importance-
  - kelp beds
  - Sargasso Sea



Kingdom Protista: Algae  
#14. Rhodophyta (red algae)

- Multi-cellular, marine algae
- Often occur deeper than other algae-
  - problems: low light, light quality
  - unique red pigments help solve these problems
- Agar & agar-type compounds
  - lab media for bacterial growth
  - cosmetics
  - dairy products





## Kingdom Protista: Algae

### #15. Chlorophyta (green algae)

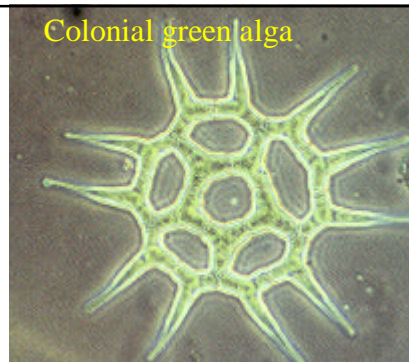
- Appear to be closely related to “higher plants”
  - chloroplast structure
  - chlorophyll A & B
  - cell walls of cellulose
- Huge diversity of forms
  - many unicellular species
  - complex multicellular species too

Unicellular green alga



*Chlamydomonas*

Colonial green alga



*Spirogyra*

Multicellular green alga



Filamentous green alga

