

## ZOOLOGY 101 SECTION 2 LECTURE NOTES

### I. Protists

- Commonly called protozoans
- All single celled eukaryotes

Three most important phyla:

1. Sarcomastigophora: includes the amebas and the flagellates
2. Apicomplexa: all parasitic
3. Ciliophora: ciliates

### Maintaining Homeostasis for a Single Cell

#### 1. Locomotion:

- a. Pseudopodia (false feet) are the chief mechanism of amoeboid movement, also used for food gathering and defense
- b. Cilia (hair like) and flagella (whip like) are other locomotory structures that beat the water, also used for feeding, reproduction, respiration, excretion, and Osmoregulation

#### 2. Nutrition/Digestion:

- a. Autotrophic (*holophytic*) = make their own food
- b. Heterotrophic = obtain food from other sources
  - i. Phagotrophs (*holozoic*) = ingest solid visible particles of food
  - ii. Osmotrophs (*saprozoic*) = ingest food in a soluble form, digested externally

#### 3. Excretion/Osmoregulation:

- a. Excess water and some nitrogenous wastes are expelled by **contractile vacuoles**

#### 4. Respiration:

- a. Respiration and most waste elimination are through the cellular membrane

#### 5. Reproduction: (*All protozoa can reproduce asexually*)

##### a. **Asexual Reproduction** (fission)

- i. Binary fission = one cell divides into two equal and identical cells
- ii. Multiple fission (schizogony) = a number of individuals are produced simultaneously
- iii. Budding = fission of smaller daughter cells from adult, unequal division

##### b. **Sexual Reproduction**

- i. Syngamy = fertilization of a gamete by another, different gamete
- ii. Autogamy = fusion of nuclei from the same gametes to form a zygote within the same organism
- iii. Conjugation = the full or partial exchange of genetic material between two organisms, no offspring

### Life Cycles

- Consist of active or vegetative phases and cyst phases (encystment)
- Cyst = a resistant, quiescent (sleeping) stage in a cyst wall

## II. Phyla of Protozoa

### A. Phylum Sarcomastigophora

- Includes protozoa that move by flagella (Mastigophorans) and those that move by pseudopodia (Sarcodinans)

### Subphylum Mastigophora (flagellates)

- Have one or more flagella
- Found in fresh and marine water
- Reproduce asexually by *longitudinal* binary fission

#### 1. Class Phytomastigophorea (phytoflagellates)

- important producers in marine communities
- contain chlorophyll in one or more chloroplasts
- most are photosynthetic
- some have a **stigma**, or eyespot, a light sensitive receptor

*Ex. Euglena*

#### 2. Class Zoomastigophorea (zooflagellates)

- colorless
- heterotrophic, holozoic or saprozoic
- many are medically important parasites

*Ex. Trypanosoma* (African Sleeping Sickness)

### Subphylum Sarcodina (amebas)

- Move and feed by means of pseudopodia
- Some have protective shells called **tests**
- Found in fresh and marine water, moist soils
- Some are planktonic
- A few are parasitic
- Heterotrophic, holozoic omnivores
- Feed by **phagocytosis**
- Reproduce by binary fission and budding
- Produce spores by **sporulation**

*Ex. Entamoeba histolytica* (amebic dysentery)

## Special Groups of Sarcodinans

### Foraminiferans:

- Mostly marine
- Many chambered tests of calcium carbonate and sand grains

### Radiolarians:

- Marine forms, planktonic
- Tests made of siliceous (glass) material

## B. Phylum Apicomplexa

- All are endoparasites of animals
- Contain **apical complex** organelles
- Move by pseudopodia, flagella, and body contractions
- Both asexual and sexual reproduction
- Multiple hosts
- Some point develop spore (oocyst) which is infective for the next host

*Ex. Plasmodium vivax* (malaria), *Toxoplasma* (defects)

## C. Phylum Ciliophora

- Move by cilia
- Found in fresh and marine water
- Most are free living, though some are commensalistic or parasitic
- Usually solitary and motile
- Are always multinucleated, possessing at least one *macronucleus* and one *micronucleus*:
  - a) Macronuclei: metabolic and cellular functions
  - b) Micronuclei: used for sexual reproduction
- **Pellicle**: thickened cell membrane or tough outer sheath
- Cilia short and arranged in longitudinal or diagonal rows

- Cilia may cover whole surface or be restricted to certain areas
- Possess **cytostome** (cell mouth) and **cytopharynx** (gullet)
- Contractile vacuole typically present
- Most are holozoic heterotrophs
- Reproduce by binary fission and sexual conjugation

*Ex. Paramecium*

### Ecological Relationships:

~ 10,000 species are symbiotic

Mutualism = both partners benefit

Commensalism = one partner benefits without affecting the other

Parasitism = one partner benefits at the expense of the other