

## Chapter 22 – “Protists” – The Simplest Eukaryotes

### Lecture Outline

#### *Impacts, Issues: Tiny Critters, Big Impacts*

- A. Protists and fungi are the simplest of eukaryotes.
  - 1. Collectively, coccolithophores and foraminifera have formed huge deposits of limestone such as the cliffs of Dover, England.
  - 2. The Egyptian pyramids are gigantic monuments to the endurance of limestone.
  - 3. Even the walls of the Empire State Building, the Pentagon, or Chicago’s Tribune Tower give evidence of foraminiferan shells.
- B. Water molds caused the failure of the Irish potato crop in the 1840s and forced mass emigration of people to other countries.
- C. Sudden oak death threatens forests in the United States, Europe, and Australia.

#### 22.1 An Evolutionary Road Map

- A. Protists are most like the earliest eukaryotic cells.
  - 1. They have a \_\_\_\_\_ and the usual eukaryotic organelles.
  - 2. The \_\_\_\_\_ of their chromosomes is wound around histones.
  - 3. They divide using mechanisms of \_\_\_\_\_, mitosis, or both.
- B. As an outcome of DNA sequencing studies, the kingdom is being split into monophyletic groups, shown in Figure 22.2.

#### 22.2 Heterotrophic Flagellates

- A. \_\_\_\_\_ can be transmitted during sexual intercourse and lead to damage of the urinary and reproductive tracts.
- B. \_\_\_\_\_, which can enter the body in cyst form from drinking feces-contaminated water and result in severe diarrhea (giardiasis).

#### 22.3 Euglenoids

##### A. A Look at *Euglena*

- 1. Euglenoids are \_\_\_\_\_-living, flagellated, photoautotrophic cells.
- 2. They have the same chlorophyll as green algae and plants.
- 3. An \_\_\_\_\_ detects the sunlight necessary for photosynthetic activities.

##### B. A Look at the Trypanosomes

- 1. \_\_\_\_\_, colorless flagellates with a conspicuous mass of mDNA; they are mostly parasitic.

2. \_\_\_\_\_ is carried by the tsetse fly and causes African sleeping sickness.

## 22.4 Radiolarians

A. Habitat: found in marine environments as part of the plankton.

1. \_\_\_\_\_ have delicate, glasslike shells of silica through which stiffened, thin pseudopods extend.

## 22.5 Ciliated Protozoans

A. \_\_\_\_\_ are characterized by their numerous cilia that beat in synchrony on the cell surface; *Paramecium* is typical of the group.

1. Other features include: a cell “\_\_\_\_\_” for food entrance to waiting digestive vacuoles, contractile vacuoles to get rid of excess water, and trichocysts for defense.
2. There are two types of \_\_\_\_\_: a small micronucleus and a larger macronucleus.
3. Ciliates reproduce \_\_\_\_\_ by binary fission and may demonstrate a primitive form of sexual reproduction called conjugation in which genetic material is mutually exchanged.

## 22.6 Dinoflagellates

A. Characteristics

1. Dinoflagellates abound in \_\_\_\_\_ and marine habitats and are photoautotrophs or parasitic heterotrophs.
2. These marine cells display \_\_\_\_\_ flagella located in grooves of the cellulose covering.
3. Several dinoflagellates are \_\_\_\_\_ and part of the ocean’s plankton as major primary producers.
4. When population sizes increase dramatically it can cause \_\_\_\_\_ blooms leading to the infamous red tides, which can sicken and kill aquatic organism from the metabolic wastes and oxygen depletion.
5. Some dinoflagellates produce a \_\_\_\_\_ that causes neurotoxic shellfish poisoning when shellfish contaminated with the toxin of *K. brevis* are consumed.

## 22.7 Malaria and the Night-Feeding Mosquitoes

A. Malaria, caused by *Plasmodium* and transmitted by mosquitoes, is a serious worldwide disease.

1. After multiplying first in the \_\_\_\_\_ and then in the red blood cells, breaks out into the bloodstream, causing terrific bouts of chills and fever.
  2. Malaria can be treated with \_\_\_\_\_; vaccines are in development; and mosquito control is always an option.
- B. Many strains of *Plasmodium* are \_\_\_\_\_ to antimalarial drugs; artemisinin is promising as a treatment for the symptoms and can slow the course of the infection.
- C. At present, a vaccine is being testing on African adults; a vaccine is needed for this deadly disease that kills one African child every 30 seconds.

#### 22.12 Amoeboid Cells

- A. Amoeboid protozoans have no permanent \_\_\_\_\_ structures but form extensions of the cytoplasm and cell membrane in the form of pseudopods.
1. \_\_\_\_\_ lives in the human intestine where it can cause of a severe form of dysentery.