NOTES FOR BIOLOGY 1202

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CHAPTER 28
Protists

The **Protists** represents an unusual mix of organisms. Protists are more diverse than all other eukaryotes and are no longer considered a single kingdom

The organisms found in this are all eukaryotes and most are single-celled for most of their life-cycle however but some are colonial and there may even be multicellular forms.

Remember the eukaryotic differences:

Nucleus (with a double membrane)
Organelles
2 or more chromosomes (DNA + proteins)

Since the Protista are eukaryotic cells, they are clearly different from the Bacteria and Archaea.

The differences between the protists and the rest of the eukaryotes are not quite as clear.

Protists are nutritionally diverse and can be organized them into general groups based on nutritional methods:

Autotrophic (photosynthetic)

Heterotrophic (decomposers)

Heterotrophic (ingestion - hunters and symbiotic)

Mixotrophic (combining photosynthesis and ingestive or absorptive methods)

The evolution of protists is the results of endosymbiosis (see fig. 28.2)

Primary endosymbiosis resulted in plastid-bearing lineages which evolved into red and green algae.

Secondary endosymbiosis resulted in greater diversification.

The current state of what was kingdom protista is five supergroups (see fig 28.3).

Excavates
Chromalveolates
Rhizarians
Archaeplastids
Unikontes

****Excavates**

-move via flagella
-have a feeding groove
-heterotrophic and have modified mitochondria

The two largest clades of the excavates are the **diplomonads** and the **parabasalids**

Diplomonads

-both free living and symbiotic species
-have two nuclei
-multiple flagella

Giardia (see fig 28.3) is a member of this group – infection results from drinks untreated water causing diarrhea etc.

Parabasalids

-anaerobic
-all known species are symbiotic and some are parasitic

Trichomanas vaginalis (see fig 28.4) is a sexually transmitted member of this group – males can often be asymptomatic.

Euglenozoans is a diverse clade in the excavate linage.

-have distinctive mitochondria
-move via flagella
-mixed nutritional methods (i.e mixotrophic)

There are two major groups of euglenozoans, the **euglenids** and the **kinetoplastids**

Euglenids

-Most are freshwater
-Have 1-3 flagella
-Primarily photosynthetic but can switch to heterotrophic in the dark
-Many lack a rigid cell wall
-Have a photoreceptor called an **eyespot**
-Named after *Euglena* (see fig. 28.7)

Kinetoplastids

-One flagellum
-Single large mitochondrion
-Both free living and symbiotic species

Some of the symbiotic species are **parasitic**. Including ***Trypanosoma*** (see fig 28.6) - causing sleeping sickness

****Chromalveolates**

This is a large diverse clade which is thought to have arisen by a secondary endosymbiosis of a red algae.

Chromalveolates contains two major clades the **stramenopiles** and the **alveolates**

Stramenopiles

-have many different forms some living as multicellular colonies
-varied nutritional methods including mixotrophs

There are three major groups of stramenopiles:

-oomycotes
-Diatoms
-Brown Algae
-**Golden Algae**

Oomycotes are also called water molds

-cell walls of cellulose
-cells can form aggregated colonies
-filoentous bodies
-heterotrophic decomposers

One common water mold with economic importance is **downy mildew**.

Diatoms

-May be freshwater or marine
-Photosynthetic
-Have glass-like "shells" known as tests (see fig. 28.3) with perforation to allow for exchange of substances
-About 5,600 described living species estimates of 100,000 living species and more than 35,000 extinct species (Based on "shell" morphology)

Brown Algae

-Marine
-Photosynthetic
-Deep water to tidal
-"Brown" color caused by accessory pigments
-Cell wall has added polysaccharides
-Cells can form large aggregated multicellular colonies
-Giant kelp forest
-Many have gas-bladders to keep the plant extending toward the surface.