The group of Protists represents an unusual mix of organisms.

The organisms found in this group are all eukaryotes and most are single-celled for most of their life-cycle.

Eukaryotes have:
Since the organisms of this group, Protists, are made up of eukaryotic cells, they are clearly different from the Bacteria and Archaea.

- they have a nucleus with a double membrane
- 2 or more chromosomes
- linear DNA
- organelles

Past classifications of the protists organized them into three general groups based on nutritional methods:

Plant-like protists - Autotrophic (photsynthetic)
Fungus-like protists - Heterotrophic (decomposers)
Animal-like protists - Heterotrophic (hunters and symbiotic)

so they ingest their food, absorb nutrients, or capture solar energy
Phytoplankton are the photosynthetic eukaryotes at the base of most aquatic food webs.
Marine phytoplankton are responsible for ~70% of the photosynthesis (and most of the oxygen production) of the planet.

Algae are the photosynthethic protists

Protozoans are heterotrophic protists, which actively seek and ingest their food (either food particles or other organisms)

Most protists can be organized into eight general groups (see table 20-1).

However there is a good deal of uncertainty about the evolution of these groups.

The classification of the protists is a work in progress

Why the uncertainty about the classification of these groups? Because some species were grouped together because they had physical similarities but were actually from different lineages; and others with little physical likeness sometimes shared a common ancestor

Excavates
-move via flagella
-have a feeding groove ("excavated")
-heterotrophic and lack mitochondria

The two largest subgroups of the excavates are the diplomonads and the parabasalids

Diplomonads

-both free living and symbiotic species
-have 2 nuclei
-multiple flagella
-an example: Giardia is a member of this group. Makes you have diarrhea and get cysts

Parabasalids

Trichomanas vaginalis is a sexually transmitted member of this group – males can often be asymptomatic.

Aerobic
-large group of flagellated protozoans
-lack a rigid covering
-Single-celled
-some are mutualists
-others are parasitic (ex: *Trichomonas vaginalis* = an STD)

Euglenozoans

There are two major groups, the euglenids and the kinetoplastids

Euglenids:

-Most are **freshwater**
-Have 1-3 flagella
-Primarily **photosynthetic** but can switch to heterotrophic in the dark
-Have a photoreceptor called an **eyespot**
-Named after *Euglena*

Kinetoplastids
Some of the symbiotic species are parasitic. Including ***Trypanosoma*** - causing sleeping sickness

Stramenopiles (aka Chromists)
Form a clade with shared ancestry
Are many different forms
But all have fine, hair-like projections on their flagella
(that may only be present in certain stages)

Most single celled, some living as multicellular colonies

mixed nutritional methods

-Water molds

-Diatoms