

The Protists

(160,000 living & extinct species; estimates to 200,000 actual species)

mostly single-celled, eukaryotes restricted to aquatic, or moist environments: oceans, ponds, lakes, rivers, damp soil, tree bark, snow, etc.; some species are colonial or multicellular; autotrophs & heterotrophs; with or without cell walls; most motile. Genetic analyses have dramatically changed the classification scheme of this group of organisms. In this course we will discuss examples of three main types of protists; algae, protozoa and slime & water molds.

Algae [Plant-Like Protists]

(22,000 living species)

diverse group of mostly unicellular protists, some colonial or multicellular; restricted to aquatic or moist environments: oceans, ponds, lakes, rivers, soil, bark, snow, etc.; photosynthetic with chloroplasts containing chlorophyll and other pigments, most motile; most with cell wall; cell walls of cellulose, proteins, silica or other materials classified according to their kinds of photosynthetic pigments and composition of cell wall

Fire Algae (Dinoflagellates; Phylum Pyrrophyta, 2100 species)

unicellular, many symbiotic as zooxanthellae; some produce cell walls of armored plates, blooms produce toxic red tides, bioluminescent

Diatoms (Glass Algae; Phylum Chrysophyta, 28000 living & extinct species)

most abundant group of algae; unicellular, radial symmetry, cell walls contain silica; common in freshwater and oceans; source of diatomaceous earth; gliding movement,

Euglenas (Phylum Euglenophyta, 1000 species)

unicellular, only algae without a cell wall; mainly in eutrophic ponds and pools, motile by flagellum

Green Algae (Phylum Chlorophyta, 9000 species)

aquatic and terrestrial; some form lichens with fungi; diverse body forms, mostly unicellular and colonial, some filaments or sheets; probably gave rise to plant kingdom; motile by flagella, cell wall of cellulose; energy stored as starch in vacuole

Red Algae (Red Sea Weeds; Phylum Rhodophyta, 4000 species)

mostly multicellular, body of filaments or sheets attached to substrate by holdfast; some excrete calcium carbonate=coralline algae; found in warm tropical oceans; thick starchy cell walls yield commercial quantities of agar and carrageenan

Brown Algae (Brown Sea Weeds; Phylum Phaeophyta, 1500 species)

all multicellular, some up to 60 m long; body differentiated into blade, stipe, floats and holdfast; found in cooler marine waters especially intertidal areas; used as food especially in SE Asian countries

Protozoa [Animal-Like Protists] (>50,000 living & extinct species)

mostly single celled or colonial, heterotrophs, nonphotosynthetic, no chloroplasts; lack cell wall, heterotrophic nutrition, most are motile; classified according to type of motility

Amoebas (Phylum Sarcomastigophora) 44,000 living & extinct species

simplest of protozoan protists; 'amoeba' means to change form - move by means of false feet (pseudopodia) some species produce shells of silica (radiolaria) or calcium carbonate (foraminiferans)

Flagellates (Phylum Sarcomastigophora) 1,500 species

most are symbiotic with other organisms, a few are pathogens; move by one or more flagella

Ciliates (Phylum Ciliophora) 8,000 species

the largest, most diverse group of protozoans; most are freelifving, motile by cilia; great diversity of size, shape and internal organelles

Apicomplexans (Phylum Apicomplexa) 5,000 species

all are nonmotile parasites with complex life cycles that alternate between sexual and asexual reproduction

Slime & Water Molds [Fungus-Like Protists] (11,500 living species)

Superficially resemble fungi; nonphotosynthetic heterotrophs with body of hyphal filaments; produce flagellate reproductive cells; some have cell wall of cellulose, others of chitin.

Plasmodial Slime Molds (Phylum Myxomycota) (500 sp)

feeding stage is motile, plasmodial stage; fruiting body a sporangium producing swarm cells and myxamoeba

Cellular Slime Molds (Phylum Acrasiomycota) (65 sp)

feeding stage is unicellular amoeboid like cells; fruiting body is multicellular pseudoplasmodium (=slug) producing spores.

Water Molds (Phylum Oomycota & Chytridiomycota) (170 sp)

aquatic multicellular heterotrophs; mycelium of threadlike hyphae; most are saprobes others are parasites of plants, animals and other fungi; mostly aquatic, a few are terrestrial