

Table 5.2 Most Important Characteristics of Marine Microbes

Group	Distinguishing Features	Photosynthetic Pigments	Major Food Reserves	Major Cell-Wall or Cell-Membrane Components	Significance in the Marine Environment
Viruses 	Non-cellular, parasites of all organisms	None	None	Capsid of protein, sometimes lipids	Infect all marine organisms, release dissolved organic matter (DOM) from destroyed cells
Bacteria 	Prokaryotic, unicellular, some form colonies	Chlorophyll <i>a</i> , phycobilins, carotenoids in cyanobacteria; bacteriochlorophyll in other photosynthetic bacteria	Variety of types	Cell wall of peptidoglycan containing muramic acid, chains of amino sugars, and amino acids in cyanobacteria	Essential role in nutrient cycles; autotrophs (especially cyanobacteria) and heterotrophs (including decomposers), nitrogen fixers; components of detritus, some cause diseases, symbiotic in many organisms, some produce blooms
Archaea 	Prokaryotic, unicellular	Bacteriorhodopsin in light-capturing archaea	Variety of types	Cell wall made up of variety of compounds but no muramic acid	Autotrophs and heterotrophs, nitrogen fixers
Diatoms 	Eukaryotic, unicellular, some form chains, mostly planktonic	Chlorophyll <i>a, c</i> , carotenoids	Chrysolaminarin, oil	Cell membrane secretes frustule of silica, pectin	Important primary producers, frustules are components of siliceous sediments
Dinoflagellates 	Eukaryotic, unicellular, two flagella, mostly planktonic, some bottom-dwelling	Chlorophyll <i>a, c</i> , carotenoids	Starch, oil	Cell membrane secretes cellulose plates (thecae)	Primary producers, symbiotic with other organisms as zooxanthellae, red tides, many are bioluminescent, some cause diseases (<i>Pfiesteria</i>)
Silicoflagellates 	Eukaryotic, unicellular, two flagella, planktonic	Chlorophyll <i>a, c</i> , fucoxanthin	Starch	Cell membrane secretes silica skeleton	Primary producers, skeletons are components of siliceous sediments, some produce blooms
Coccolithophorids 	Eukaryotic, unicellular, one or two flagella, planktonic	Chlorophyll <i>a, c</i> , carotenoids	Starch	Cell membrane secretes calcium carbonate plates	Important primary producers, plates are components of calcareous sediments, some produce blooms
Cryptophytes 	Eukaryotic, unicellular, usually two flagella, planktonic	Chlorophyll <i>a, c</i> , carotenoids, phycopilins	Variety of types	Cell membrane made up mostly of protein	Important primary producers
Foraminiferans 	Eukaryotic, unicellular, bottom-dwelling and planktonic	None	Variety of types	Cell membrane secretes calcium carbonate shell (test)	Heterotrophs, shells are components of calcareous sediments
Radiolarians 	Eukaryotic, unicellular, some colonial, mostly planktonic	None	Variety of types	Cell membrane secretes silica shell	Heterotrophs, shells are components of siliceous sediments
Ciliates 	Eukaryotic, unicellular, planktonic and bottom-dwelling	None	Variety of types	Cell membrane made up mostly of lipids	Heterotrophs, some associated with marine animals
Fungi 	Eukaryotic, unicellular or multicellular, mostly bottom-dwelling	None	Variety of types	Cell wall of cellulose, chitin, and other compounds	Decomposers, many cause diseases, symbiotic with algae or cyanobacteria in lichens