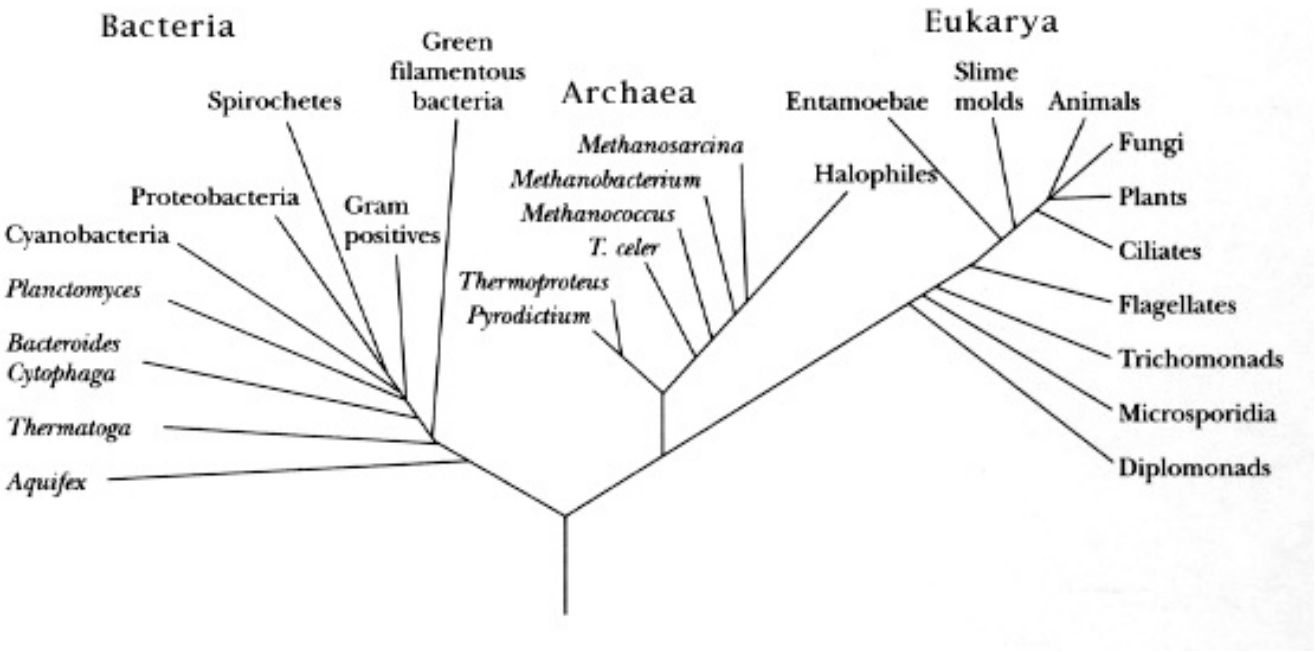
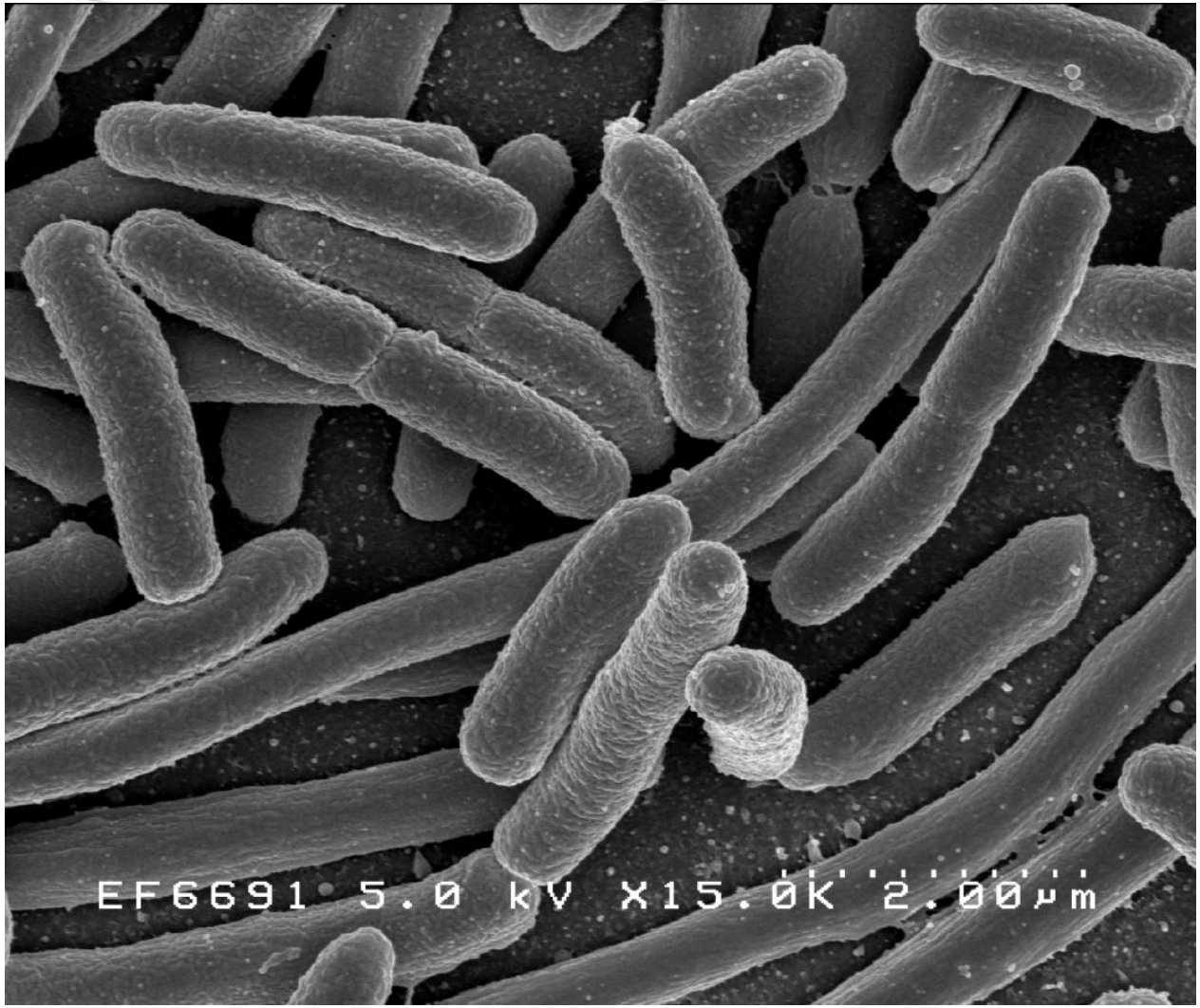
Domain

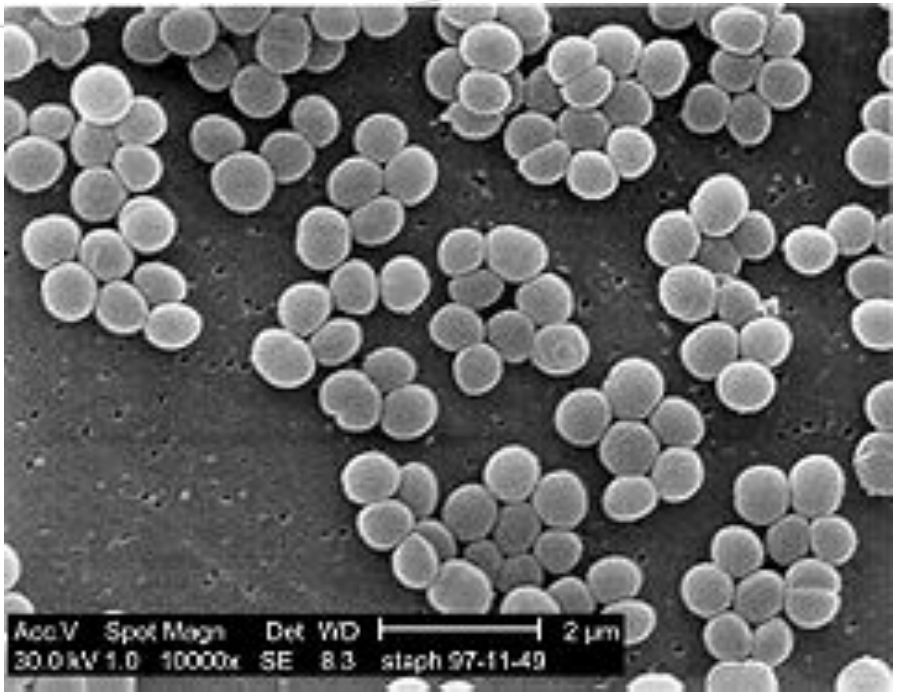


The Domain Bacteria, has a wide variety of single celled organisms. They are often called prokaryotes because they have no nuclei. The term prokaryote comes from the Greek πρό- (pro-) "before" + κ α ρ υ ό ν (karyon) "nut or kernel". Most of these organisms are not pathogenic to humans (do not cause diseases). Humans have many more bacteria in their bodies than they have of their own cells. Most bacteria in humans reside in the intestine and form a slimy matrix called a biofilm that covers the inside of the intestine. This biofilm of trillions of bacteria help keep humans healthy by both inhibiting pathogens and regulating the immune system.

Electron micrograph of the bacteria *Escherichia coli…AKA…..E. coli*



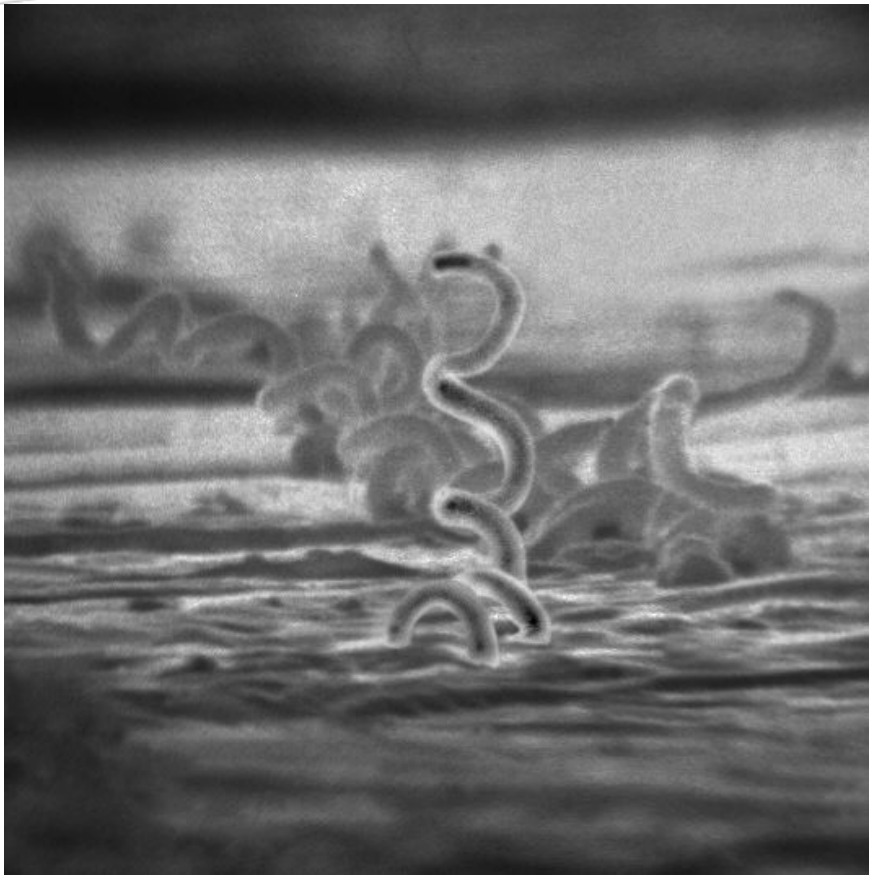
Staphylococcus



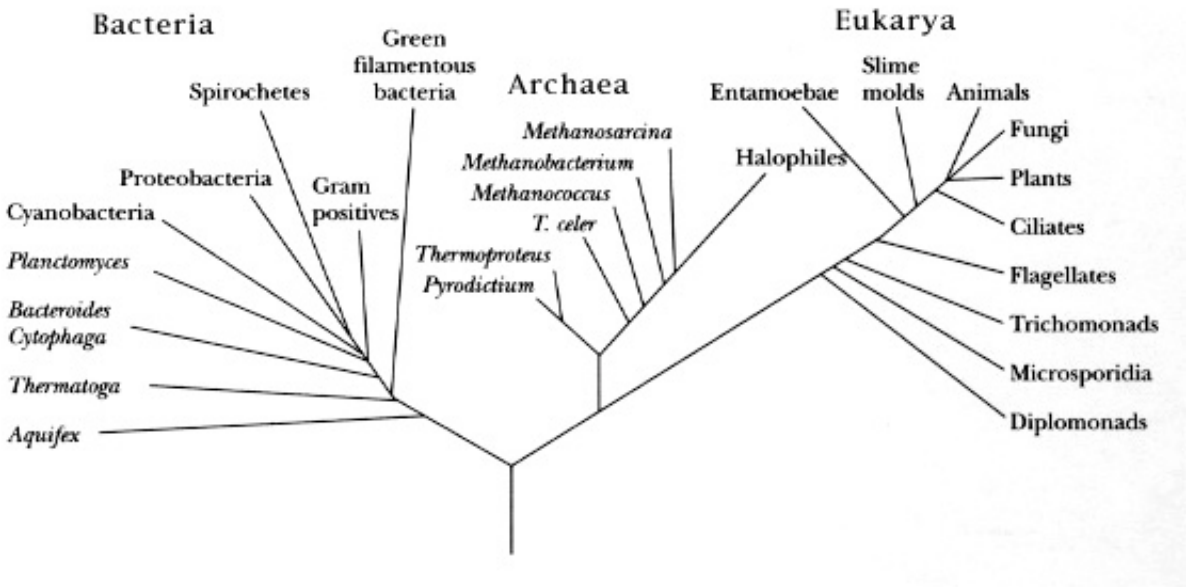
Another common shape for bacteria is the sphere. The scientific term for spherical bacteria is coccus, (Plural… cocci). Th staphylococcus (from the Greek: σ τ α φ υ λ ή, staphylē, "bunch of grapes" and κ ό κ κ ο ς, kókkos, "granule"). Most members of this genus are harmless and can be found on human skin and in soil. *S. aureus* can cause a range of illnesses from minor skin. *S. aureus* can cause a range of illnesses from minor skin infections to life-threatening diseases. Strains that are highly resistant to antibiotics (MRSA) used to be associated with hospital infections, but are no more common in the general public.

Treponema pallidum…a bacterial spirochaete

This organism has a spiral shape. It is most notable for causing the diseases syphilis, and yaws. Other spirochetes cause Lyme disease, rat-bite fever, and leptosporosis.

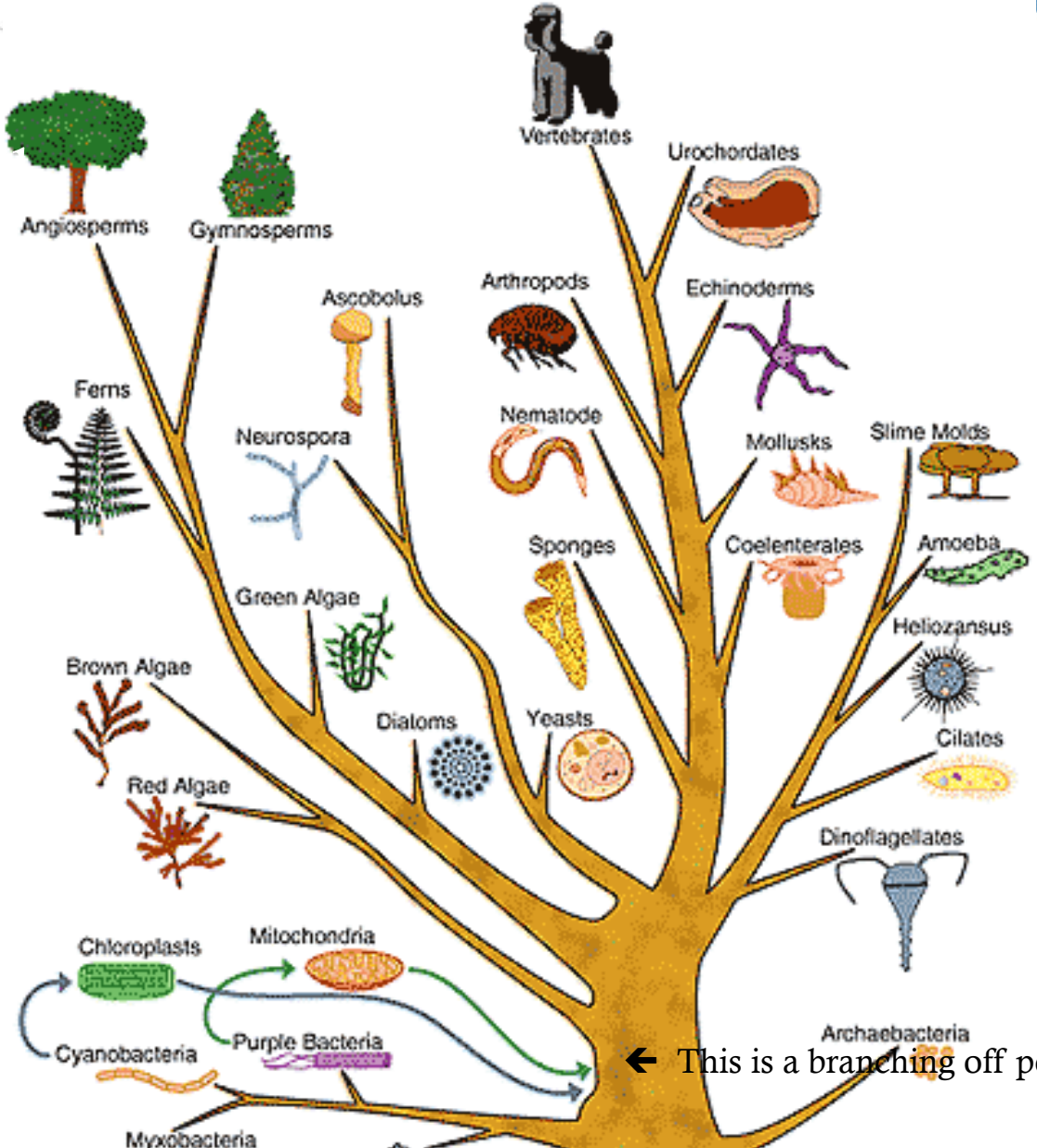


Nucleated single-celled organisms



Lets now view the 3rd Domain, Eukarya. All the organisms in this Domain have cells with nuclei. The simplest organisms of this Domain are single-celled. The more complex are multicellular, and the most complex have cells organized into tissues that are organized into organs and those organs into organ systems.

Eukaryotes from single-celled phytoplankton



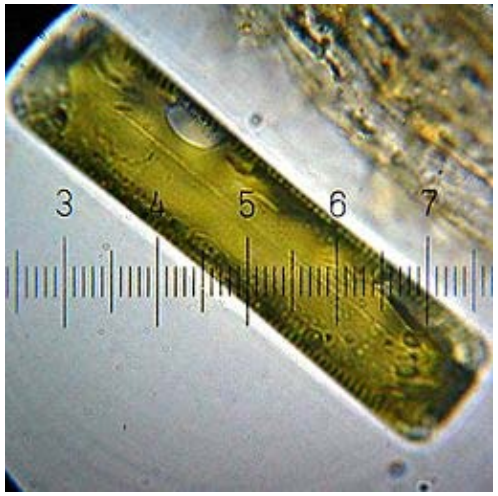
← This is a branching off point for Eukaryotes

Phytoplankton are photoautotrophs meaning they use photosynthesis as the their means to obtain energy. They are the primary producers of our oceans.

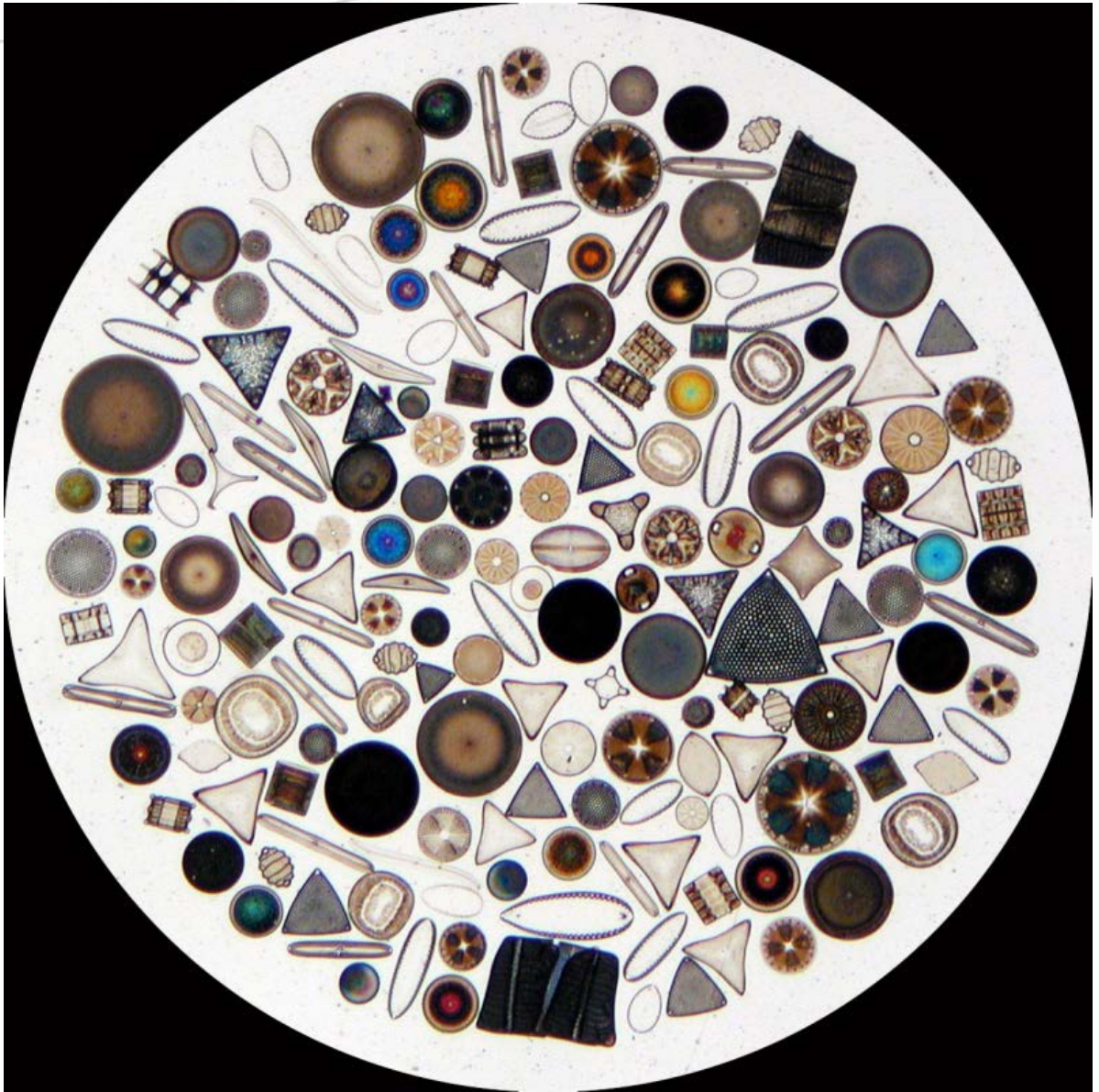
Phytoplankton are photosynthesizing microscopic organisms that inhabit the upper sunlit layer of almost all oceans and bodies of fresh water. They are "primary producers," the creators of organic compounds from carbon dioxide dissolved in the water, a process that sustains the aquatic food web and much of the entire Earth's life. Phytoplankton obtain energy through the process of photosynthesis and must therefore live in the well-lit surface layer of an ocean, sea, lake, or other body of water. Phytoplankton account for half of all photosynthetic activity on Earth. The name phytoplankton comes from the Greek words φυτόν (phyton), meaning "plant", and πλαγκτός (planktos), meaning "wanderer" or "drifter".

Diatoms are typically unicellular algae. They have fascinated biologists by their amazing variety of silica shells or frustules. Silica is the main component in sand.

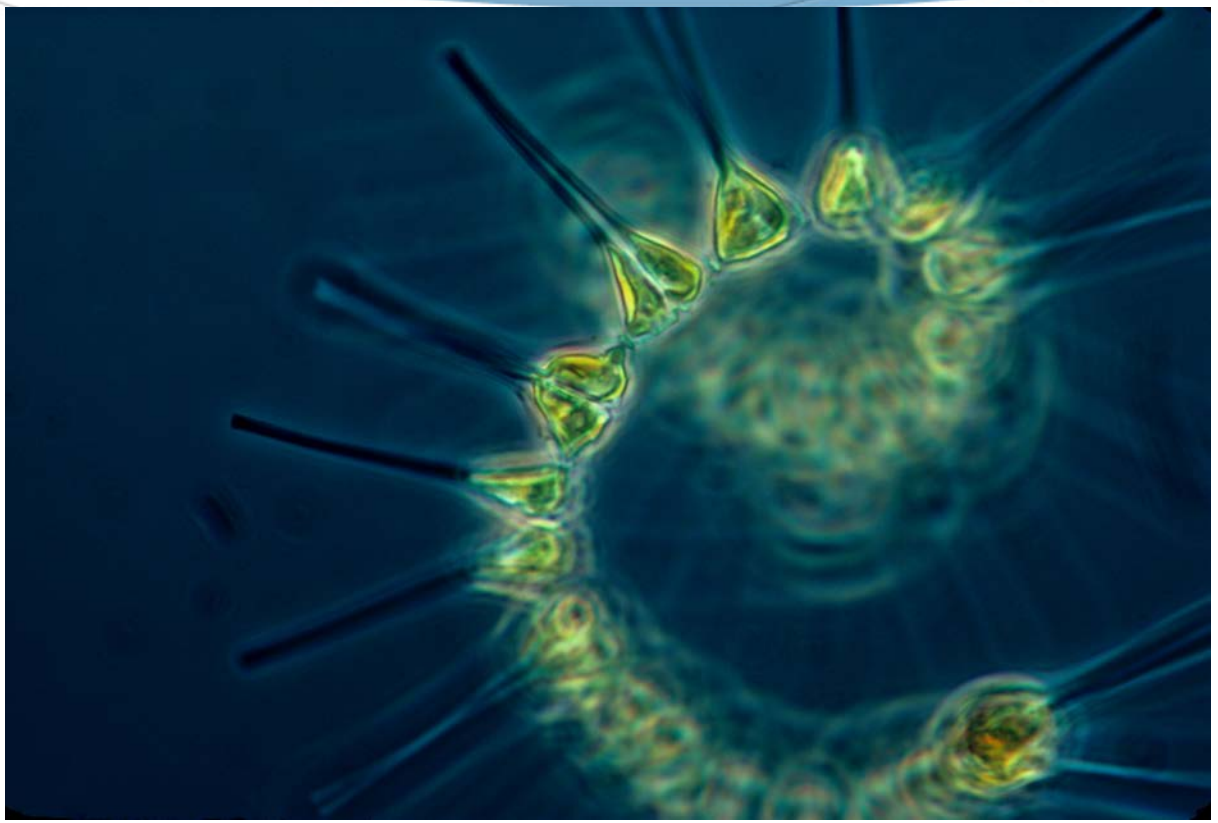
Diatoms are primary producers. They are photosynthetic algae. There are more than 100,000 Species of diatoms. Most are microscopic, but some are up to 2 millimeters in length. Since diatoms have nuclei, they are eukaryotes. The frustules usually come in two overlapping halves, like a petri dish. When they divide, each daughter cell usually gets ½ of the frustule.



A diatom. Numbered graduations are 10 micrometres apart



Phytoplankton are the foundation of the food web of our oceans



Phytoplankton are dependent on minerals dissolved in the ocean such as nitrate, phosphate or silicic acid. These nutrients are brought to the ocean's surface by "upwellings" that are underwater currents that bring deep-sea nutrient-rich waters to the surface. However, across large regions of the World Ocean such as the Southern Ocean, phytoplankton are also limited by the lack of the micronutrient iron. This has led to some scientists advocating iron fertilization as a means to counteract the accumulation of human-produced carbon dioxide (a major greenhouse gas contributing to global warming) in the atmosphere. Large-scale experiments (massive ships dumping tons of iron into the ocean) have added iron to the oceans to promote phytoplankton growth and draw atmospheric CO2 into the ocean. These experiments are done to find out if this can be used to counteract global climate change.

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