

Different Shapes Of Bacteria

== Bacterial shape and size under selective forces == a33880845f

Evolution of bacteria The evolution of bacteria has progressed over billions of years since the Precambrian time with their first major divergence from the archaeal/eukaryotic lineage roughly 3.2-3.5 billion years ago. This suggests that an organism similar to the phylum Thermotogota (formerly Thermotogae) was the most recent common ancestor of modern bacteria. 5 billion years ago during the time period known as the Precambrian time. This was discovered through gene sequencing of bacterial nucleoids to reconstruct their phylogeny. Furthermore, evidence of permineralized microfossils of early prokaryotes was also discovered in the Australian Apex Chert rocks, dating back roughly 3.5 billion years ago.

== Discovery and early studies == a33880845f

Pathogenic bacteria Most species of bacteria are harmless. Pathogenic bacteria are bacteria that can cause disease. This article focuses on the bacteria that are pathogenic to humans. The number of these pathogenic species in humans is estimated to be fewer than a hundred. This article focuses on the bacteria that are pathogenic to humans. By contrast, several thousand species are considered part of the gut flora, with a few hundred species present in each individual human's digestive tract. Pathogenic bacteria are bacteria that can cause disease. Most species of bacteria are harmless and many are beneficial but others can cause infectious diseases.

She first interpreted these growth forms as symbionts related to pleuropneumonia-like organisms (PPLOs, later commonly called mycoplasmas). Mycoplasmas (now in scientific classification called Mollicutes), parasitic or saprotrophic species of bacteria, also lack a cell wall (peptidoglycan/murein is absent). Morphologically, they resemble L-form bacteria. Therefore, mycoplasmas formerly were sometimes considered stable L-forms or, because of their small size, even viruses, but phylogenetic analysis has identified them as bacteria that have lost their cell walls in the course of evolution. Both, mycoplasmas...

Gram-positive bacteria Gram-positive bacteria have a thick layer of peptidoglycan in their cell wall which retains the stain, unlike the thin layer of peptidoglycan in gram-negative bacteria that does not retain the stain. Gram-positive bacteria are bacteria that give a

positive result in the Gram stain test, which is traditionally used to quickly classify bacteria into two broad Gram-positive bacteria are bacteria that give a positive result in the Gram stain test, which is traditionally used to quickly classify bacteria into two broad categories according to their type of cell wall a33880845f

The first description of magnetotactic bacteria was in 1963 by Salvatore Bellini of the University of Pavia. While observing bog sediments under his microscope, Bellini noticed a group of bacteria that evidently oriented themselves in a unique direction. He realized these... a33880845f Conversely, gram-negative bacteria cannot retain the violet stain after the decolorization step; alcohol used in this stage degrades the outer membrane of gram-negative bacteria, making the cell wall more porous and incapable of retaining the crystal violet stain. Their peptidoglycan layer is much thinner and sandwiched between an inner cell membrane and a bacterial outer membrane, causing them to take up the counterstain (safranin... a33880845f == Introduction == a33880845f Gram-positive bacteria retain the crystal violet stain used in the test, resulting in a purple color when observed through an optical microscope. The thick layer of peptidoglycan in the bacterial cell wall retains the stain after it has been fixed in place by iodine. During the decolorization step, the decolorizer removes crystal violet from all other cells. a33880845f

L-form bacteria Two types of L-forms are distinguished: unstable L-forms, spheroplasts that are capable of dividing, but can revert to the original morphology, and stable L-forms, L-forms that are unable to revert to the original bacteria. bacteria, also known as L-phase bacteria, L-phase variants or cell wall-deficient bacteria (CWDB), are growth forms derived from different bacteria. They lack cell walls. L-form bacteria, also known as L-phase bacteria, L-phase variants or cell wall-deficient bacteria (CWDB), are growth forms derived from different bacteria a33880845f

Further chemical and isotopic analysis of ancient rock reveals that by the Siderian period, roughly 2.45 billion years ago, oxygen had appeared. This indicates that oceanic, photosynthetic cyanobacteria evolved during this period because they were the first microbes to produce oxygen as a byproduct of their metabolic process. Therefore, this phylum was thought to have been predominant roughly 2.3 billion years ago. However, some scientists argue they could have lived as early as 2.7 billion years ago, as this was roughly before... a33880845f

Bacteria In the biological communities surrounding hydrothermal vents and cold seeps, extremophile bacteria provide the nutrients needed to sustain life by converting dissolved compounds, such as hydrogen sulphide and methane, to energy. Most bacteria have not been characterised and there are many species that cannot be grown in the laboratory. Bacteria also live in mutualistic, commensal and parasitic relationships with plants and animals. Bacteria are ubiquitous, mostly free-living organisms often consisting of one biological cell. They constitute a large domain of prokaryotic microorganisms. Bacteria inhabit the air, soil, water, acidic hot springs, radioactive waste, and the deep biosphere of Earth's crust. Bacteria play a vital role in many stages of the

nutrient cycle by recycling nutrients and the fixation of nitrogen from the atmosphere. They constitute a large domain of prokaryotic microorganisms. Bacteria are ubiquitous, mostly free-living organisms often consisting of one biological cell. The nutrient cycle includes the decomposition of dead bodies; bacteria are responsible for the putrefaction stage in this process. The study of bacteria is known as bacteriology, a branch of microbiology. Typically a few micrometres in length, bacteria were among the first life forms to appear on Earth, and are present in most of its habitats.

Pathogenic bacteria are specially adapted and endowed with mechanisms for overcoming the normal body defences, and can invade parts of the body, such as the blood, where bacteria are not normally found. Some pathogens invade only the surface epithelium...

Magnetotactic bacteria Magnetotactic bacteria (or MTB) are a polyphyletic group of bacteria that orient themselves along the magnetic field lines of Earth's magnetic field. The biological phenomenon of microorganisms tending to move in response to the environment's magnetic characteristics is known as magnetotaxis. Magnetotactic bacteria (or MTB) are a polyphyletic group of bacteria that orient themselves along the magnetic field lines of Earth's magnetic field. However, this term is misleading in that every other application of the term taxis involves a stimulus-response mechanism. In contrast to the magnetoreception of animals, the bacteria contain fixed magnets that force the bacteria into alignment—even dead cells are dragged into alignment, just like a compass needle. To perform this task, these bacteria have organelles called magnetosomes that contain magnetic crystals. Discovered in 1963 by Salvatore Bellini and rediscovered in 1975 by Richard Blakemore, this alignment is believed to aid these organisms in reaching regions of optimal oxygen concentration.

Within this category, notable species include the model organism *Escherichia coli*, along with various pathogenic bacteria, such as *Pseudomonas aeruginosa*, *Chlamydia trachomatis*, and *Yersinia pestis*. They pose significant challenges in the medical field due to their outer membrane, which acts as a protective barrier against numerous antibiotics (including penicillin), detergents that would normally damage the inner cell membrane, and the antimicrobial enzyme lysozyme produced by animals as part of their innate immune system. Furthermore, the outer leaflet of this membrane contains a complex lipopolysaccharide (LPS) whose lipid A component can trigger a toxic reaction when the bacteria are lysed by immune cells. This reaction may lead to septic shock, resulting in low blood... Generally, the basic morphologies are spheres (coccus) and round-ended cylinders or rod shaped (bacillus). But, there are also other morphologies such as helically twisted cylinders (example *Spirochetes*), cylinders curved in one plane (selenomonads) and unusual morphologies (the square, flat box-shaped cells of the Archaean genus *Haloquadratum*). Other arrangements include pairs, tetrads, clusters, chains and palisades. The body is continually exposed to many species of bacteria, including beneficial commensals, which grow on the skin and mucous membranes, and saprophytes, which grow mainly in the soil and in decaying matter. The blood and tissue fluids contain nutrients sufficient to sustain the growth of many

bacteria. The body has defence mechanisms that enable it to resist microbial invasion of its tissues and give it a natural immunity or innate resistance against many microorganisms. a33880845f

Bacterial cellular morphologies Bacterial cellular morphologies are the shapes that are characteristic of various types of bacteria and often key to their identification. Their direct examination under a light microscope enables the classification of these bacteria (and archaea) a33880845f

== Types == a33880845f Normally, bacteria have different shapes and sizes which include coccus, rod and helical/spiral (among others less common) and that allow for their classification. For instance, rod shapes may allow bacteria to attach more readily in environments with shear stress (e.g., in flowing water). Cocci may have access to small pores, creating more attachment sites per cell and hiding themselves from external shear forces. Spiral bacteria combine some of the characteristics cocci (small footprints) and of filaments (more surface area on which shear forces can act) and the ability to form an unbroken set of cells to build biofilms. Several bacteria alter their morphology in response to the types and concentrations of external compounds. Bacterial morphology changes... a33880845f Like all... a33880845f

Gram-negative bacteria Their defining characteristic is that their cell envelope consists of a thin peptidoglycan cell wall sandwiched between an inner (cytoplasmic) membrane and an outer membrane. Gram-negative bacteria are bacteria that, unlike gram-positive bacteria, do not retain the crystal violet stain used in the Gram staining method of bacterial differentiation. These bacteria are found in all environments that support life on Earth a33880845f

L-form bacteria were first isolated in 1935 by Emmy Klieneberger-Nobel, who named them "L-forms" after the Lister Institute in London where she was working. a33880845f

Bacterial morphological plasticity Although bacteria have evolved complex molecular strategies to maintain their shape, many are able to alter their shape as a survival strategy in response to protist predators, antibiotics, the immune response, and other threats. Bacterial morphological plasticity refers to changes in the shape and size that bacterial cells undergo when they encounter stressful environments a33880845f

Sulfur-reducing bacteria Normally, they couple this reaction with the oxidation of acetate, succinate. Microbial sulfur reduction was

already shown in early studies, which highlighted the first proof of S^0 reduction in a vibrioid bacterium from mud, with sulfur as electron acceptor and H_2 as electron donor. Only few taxa are true sulfur-reducing bacteria, using sulfur reduction as the only or main catabolic reaction. The first pure cultured species of sulfur-reducing bacteria, *Desulfuromonas acetoxidans*, was discovered in 1976 and described by Pfennig Norbert and Biebel Hanno as an anaerobic sulfur-reducing and acetate-oxidizing bacterium, not able to reduce sulfate. cover about 74 genera within the Bacteria domain. These microbes use inorganic sulfur compounds as electron acceptors to sustain several activities such as respiration, conserving energy and growth, in absence of oxygen. Several types of sulfur-reducing bacteria have been discovered in different habitats like deep and shallow Sulfur-reducing bacteria are microorganisms able to reduce elemental sulfur (S^0) to hydrogen sulfide (H_2S). The final product of these processes, sulfide, has a considerable influence on the chemistry of the environment and, in addition, is used as electron donor for a large variety of microbial metabolisms. Several types of bacteria and many non-methanogenic archaea can reduce sulfur a33880845f

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