

# Difference Between Bacteria and Cyanobacteria

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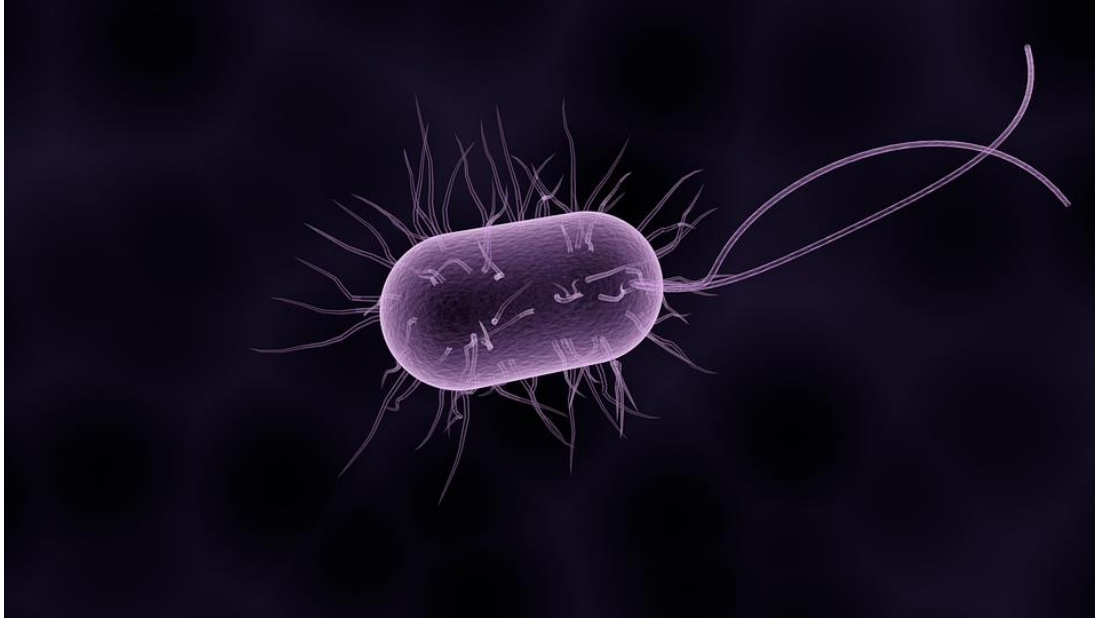
## Key Difference - Bacteria vs Cyanobacteria

Bacteria and cyanobacteria are [prokaryotic](#) microorganisms. Cyanobacteria are the largest bacteria found in aquatic environments. Both groups include [unicellular](#) microscopic organisms, and both possess a simple body structure. Cyanobacteria have a characteristic blue-green colour due to its unique pigments. They are referred as blue-green [algae](#) too. Some bacteria are able to [photosynthesize](#). But most of the bacteria are heterotrophs. Cyanobacteria are capable of photosynthesizing. The **key difference** between bacteria and cyanobacteria is that **bacteria do not produce free oxygen during their photosynthesis while cyanobacteria are capable of producing free oxygen during the photosynthesis.**

## What are Bacteria?

Bacteria are the most abundant microorganisms present in nature. They are distributed in everywhere. Hence they are known as ubiquitous organisms. Bacteria belong to the prokaryotic group. They do not possess a nucleus and the membrane-bound true organelles such as [mitochondria](#), [Golgi bodies](#), [ER](#) etc. Bacteria are unicellular and contain a simple cell structure. They may be found in a single cell or as colonies. Bacteria have a [cell wall](#) that has bacterial specific peptidoglycan layer. Based on the thickness of the peptidoglycan layer, bacteria are categorized into two major groups; Gram's negative and Gram's positive. Bacteria possess [flagella](#) for the locomotion. They multiply by the [binary fission](#). Binary fission is a mode of [asexual reproduction](#). [Conjugation](#), [transformation](#) and [transduction](#) are sexual reproductive methods used by bacteria to increase the cell number. Bacteria can have several shapes; [coccus](#), Bacillus, spirillum etc.

Bacterial genome is small and contains a single chromosome in the [cytoplasm](#). And their [DNA](#) is not associated with [histone proteins](#). They may contain extra-chromosomal DNA in the form of [plasmids](#). The [genes](#) of bacteria are found clustered together as operons. Expression of the operon is governed by one promoter. Some important genes which give the bacterium different advantages are present in plasmids. As an example, most of the antibiotic-resistant genes are located in plasmid DNA. Bacteria contain ribosomes of 70 S, unlike in eukaryotes. Bacteria communicate with other through quorum sensing.



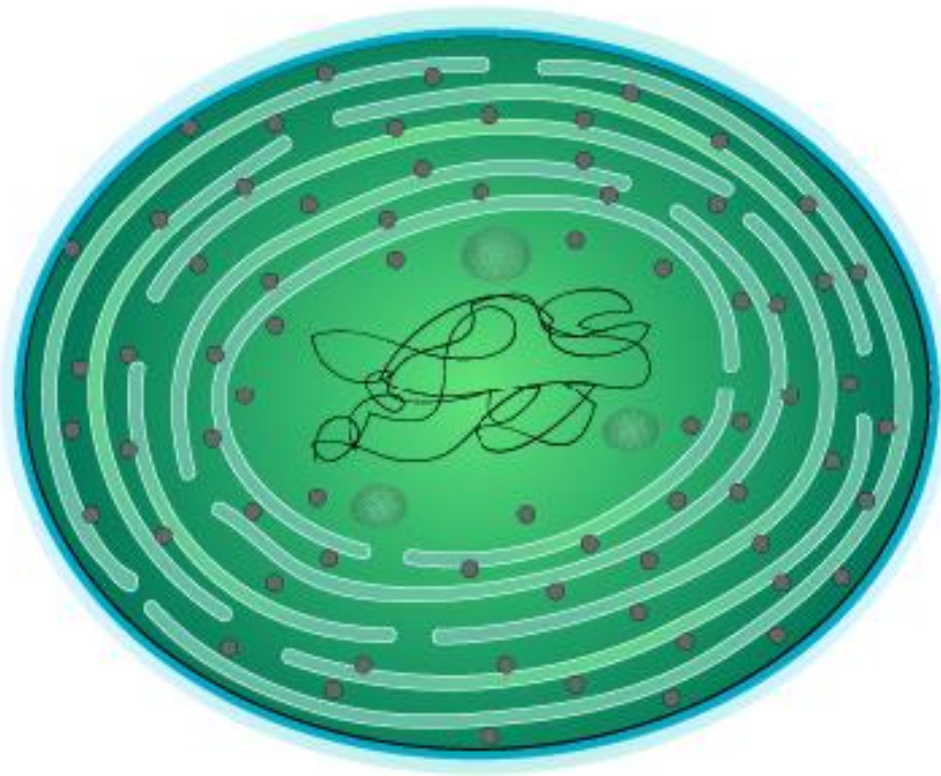
**Figure 01: Bacterium**

Most of the bacteria are nonpathogenic. However, certain bacteria cause diseases such as bacterial [pneumonia](#), [tuberculosis](#), botulism, [typhoid](#), cholera, diphtheria, [bacterial meningitis](#), tetanus, Lyme disease, [gonorrhoea](#), and [syphilis](#).

## What are Cyanobacteria?

Cyanobacteria are known as photosynthetic bacteria. They are the largest bacteria in aquatic environments. They are also can be found in soil, rocks and most habitats. This group contains about 1500 species. They are also referred as blue-green algae due to its characteristic blue-green colour. This colour is due to the blue-green pigment; phycocyanin. Cyanobacteria contain photosynthetic pigments mainly [chlorophyll a](#). Hence, they are capable of photosynthesizing and releasing free oxygen to the environment. They produce their own foods hence they are autotrophic organisms. The structure of cyanobacteria is simple and mostly unicellular or filamentous. They exist as colonies or aggregates. Cyanobacteria are prokaryotic organisms, and they are lack of true organelles such as mitochondria and chloroplasts.

Cyanobacteria are the creators of atmospheric oxygen at the beginning of the life on Earth. They are also capable of fixing atmospheric nitrogen and support plants for nitrogen requirement. In agriculture, cyanobacteria are used as nitrogen fertilizers due to this ability. The nitrogen fixation is done by the structures called heterocyst of the cyanobacteria. Cyanobacteria show an asexual reproduction. It is accomplished by fission. They are able to live in extreme environments. The survival is supported by the structures called akinetes. Akinetes are thick walled and are able to resist desiccation and freezing.



**Figure 02: Cyanobacteria**

Cyanobacteria are caused by the pollution of aquatic environments. Due to the accumulation of excess nitrogen and phosphorus, algal blooms can be formed. These algal blooms are mainly formed due to cyanobacteria. This phenomenon is called [eutrophication](#).

## What are the Similarities Between Bacteria and Cyanobacteria?

- Both bacteria and cyanobacteria are prokaryotes.
- Both bacteria and cyanobacteria are microbes and microscopic.
- Both bacteria and cyanobacteria have a simple structure.
- Both bacteria and cyanobacteria groups are unicellular.
- Both bacteria and cyanobacteria have a simple cell structure.
- Both bacteria and cyanobacteria groups can survive in extreme habitats.
- Both bacteria and cyanobacteria groups reproduce asexually.
- True cell organelles are absent in both bacteria and cyanobacteria.
- Both bacteria and cyanobacteria grow as colonies.
- Both bacteria and cyanobacteria groups produce resting spores.
- Both bacteria and cyanobacteria groups are capable of tolerating harsh environmental conditions.
- Both bacteria and cyanobacteria groups contain microorganisms that are capable of fixing atmospheric nitrogen.

# What is the Difference Between Bacteria and Cyanobacteria?

<b>Bacteria vs Cyanobacteria</b>	
Bacteria are a prokaryotic organism possessing a simple unicellular structure.	Cyanobacteria are a group of bacteria possessing chlorophyll a, making them able to photosynthesize.
<b>Photosynthesis</b>	
Some bacteria are able to photosynthesize. Most of the bacteria are heterotrophs.	Cyanobacteria can photosynthesize. Hence they are autotrophs.
<b>Chlorophyll a</b>	
Bacteria do not contain chlorophyll a. Bacteria contain bacteriochlorophylls.	Cyanobacteria contain chlorophylls a.
<b>Size</b>	
Bacteria are comparatively smaller than cyanobacteria.	Cyanobacteria are comparatively larger than bacteria.
<b>Distribution</b>	
Bacteria are ubiquitous, hence present in everywhere.	Cyanobacteria are found in places where there are sunlight and moisture.
<b>Flagella for Locomotion</b>	
Bacteria may bear flagella.	Cyanobacteria do not possess flagella.
<b>Nutrition</b>	
Bacteria are autotrophic or heterotrophic.	Cyanobacteria are autotrophic.

## Summary - Bacteria vs Cyanobacteria

Bacteria and cyanobacteria are two groups of prokaryotic, microorganisms. Cyanobacteria are a type of bacteria. They share a lot of similarities. However, they differ in certain characteristics. Cyanobacteria possess a unique blue-green colour due to the presence of the pigment phycocyanin. And they are able to photosynthesize and release oxygen due to the presence of chlorophyll a. Some bacteria are photosynthetic.

But most of the bacteria are heterotrophic. This is the difference between bacteria and cyanobacteria.

**Reference:**

1. Cyanobacteria. [Available here](#)
2. "About Microbiology – Bacteria." Microbiology Online. [Available here](#)

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