**BACTERIA**

*Noun, singular: bacterium, plural: Bacteria*

The word *bacteria* is the plural of the [New Latin](https://en.wikipedia.org/wiki/New_Latin) *bacterium*, which is the [latinisation](https://en.wikipedia.org/wiki/Latinisation_%28literature%29%22%20%5Co%20%22Latinisation%20%28literature%29) of the [Greek](https://en.wikipedia.org/wiki/Greek_language) (*bakterion*) , (*bakteria*), meaning "staff, cane" because the first ones to be discovered were rod-shaped.

“Bacteria are extremely minute, rigid, unicellular micro-organisms without definite nucleus i.e. the nuclear material is not bounded by nuclear membrane wall but have a single circular chromosome and have no chloroplasts and mitochondria. “

**General characteristics of bacteria**

* Bacteria are microscopic organisms, which are often known as **‘germs’** and **‘microbes’**.
* They are among the simplest forms of life known, and, hence show the characteristics of both plants and animals.
* Bacteria are among the smallest of living organisms.
* They are unicellular (some multicellular) or thalloid living organisms.
* Belonging to [Kingdom](http://www.biology-online.org/dictionary/Kingdom) [Monera](http://www.biology-online.org/dictionary/Monera) that possess a [prokaryotic](http://www.biology-online.org/dictionary/Prokaryotic) type of [cell](http://www.biology-online.org/dictionary/Cell) structure.
* Their [DNA](http://www.biology-online.org/dictionary/DNA) (usually circular) can be found throughout the [cytoplasm](http://www.biology-online.org/dictionary/Cytoplasm) rather than within a membrane-bound [nucleus](http://www.biology-online.org/dictionary/Nucleus).
* They reproduce by [fission](http://www.biology-online.org/dictionary/Fission) or by forming [spores](http://www.biology-online.org/dictionary/Spores).
* They can inhabit all kinds of [environment](http://www.biology-online.org/dictionary/Environment), such as in air and [soil](http://www.biology-online.org/dictionary/Soil), [acidic](http://www.biology-online.org/dictionary/Acidic), hot springs, radioactive waste, seawater, deep in the Earth's [crust](http://www.biology-online.org/dictionary/Crust), and even in the bodies of other [organisms](http://www.biology-online.org/dictionary/Organisms).
* Some species of bacteria are parasites. They attack the living cells of other plants or of animals and secure their food from that source.
* But most bacteria grow as saprophytes on dead remains or the products of plant and animal life without a direct relationship with living cells.
* Parasitic bacteria are responsible for some of the diseases of plants and animals, whereas, the saprophytic kinds may be beneficial in one way or the other.
* Some are very helpful to humans. For example, bacteria in the intestine help in digestion and we often use bacteria to make food products (yoghurt).

**Types of Bacteria**

1. Psychrophilic--active at 0°-50 ° F.
2. Mesophilic--operate in 50°-100 ° F. range.
3. Thermophilic--optimum 100°-200 ° F. range

**STRUCTURE**

* Surface appendages e.g. flagella which are used for locomotion.
	+ Surface adherents e.g. capsule.
	+ Cell-wall which is thin, hard and made up of hemi-cellulose and pectin.
	+ Cytoplasm and cell organelles.

**MORPHOLOGICAL SHAPES**

Bacteria have three basic shapes i.e.

1. Coccus: these are round or Spherical e.g. micro-coccus.

a - Monococcus: Single coccus is called monococcus.

 b - Diplococcus: If cocci occur in group of two then it is called diplococcus.

c - Staphylococcus: If large no. of cocci occurs in groups.

1. Bacillus: These are elongated Rod-shaped e.g. *Bacillus*
2. Spirillum: These are Spiral coiled filaments thread-like e.g. *Streptomyces*

**Size of Bacteria**

Bacteria vary greatly in size according to the species. Regardless of their size, bacteria can be clearly seen without the aid of a microscope. The bacteria most frequently studied in the laboratory measure approximately 0.5 to 10 µm in diameter.

Staphylococci and streptococci may have diameters ranging from 0.75 to 1.25µm. Rod (bacillus) forms, such as typhoid and dysentery bacteria often have a width bet­ween 0.5 and 1 µm and a length of 2 to 3 µm. Some filamentous forms may exceed 100 µm in length and diameter between 0 5 and 1.0 µm.

**NUTRITION**

1. **Autotrophic:** Those bacteria which are able to synthesize complex organic compounds from simple inorganic salts e.g. green sulfur bacteria. These are further divided into two groups
2. **Photo-autotrophs** which use light as energy source and co2 as carbon source e.g. photosynthetic bacteria.
3. **Chemo-autotrophs** which use chemicals as energy source and co2 as carbon source .e.g. Chemotosynthetic bacteria.
4. **Heterotrophic:** these require organic matter to prepare food for their growth and survival. These are further divided into two groups.
5. **Photo-heterotrophs** which use light as energy source and an organic compound as carbon source e.g. Purple and green bacteria.
6. **Chemo-heterotrophs** which use chemicals as energy source and an organic compound as carbon source. e.g. all Plant Pathogenic bacteria