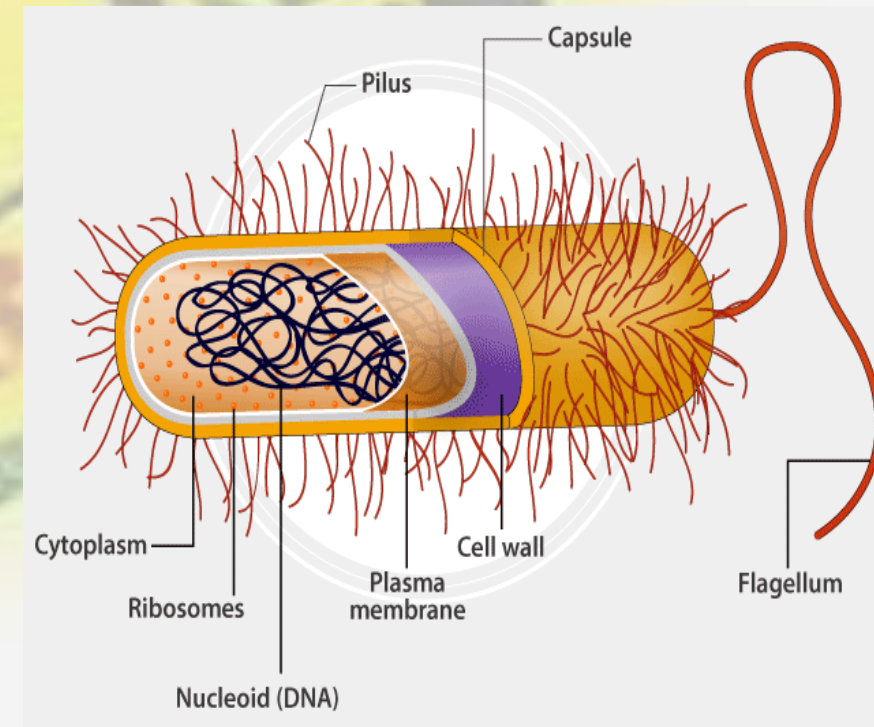


# Monera

1. The Monerans are unicellular organisms.
2. They contain 70S ribosomes.
3. The DNA is naked and is not bound by a nuclear membrane.
4. It lacks organelles like mitochondria, lysosomes, plastids, Golgi bodies, endoplasmic reticulum, centrosome, etc.
5. They reproduce asexually by binary fission or budding.
6. The cell wall is rigid and made up of peptidoglycan.
7. Flagellum serves as the locomotory organ.
8. These are environmental decomposers
9. They show different modes of nutrition such as autotrophic, parasitic, heterotrophic, or saprophytic.



# Bacterial Shape

Bacteria possess the following different shapes:

- Cocci- Bacteria are spherical or oval in shape. These can be micrococcus (single), diplococcus (in pairs), tetracoccus (in fours), streptococcus (in chains), and staphylococcus (in clusters like grapes)
- Bacilli- These are rod-shaped bacteria with or without flagella.
- Vibrios- These are comma or kidney-shaped small bacteria with flagella at one end.
- Spirillum- These are spiral or coiled shaped. They are rigid forms due to the spiral structure and bear flagella at one or both the ends.
- Filament- The body consists of small filaments like fungal mycelia.
- Stalked- The bacterium possesses a stalk.
- Budded- The body of the bacterium is swollen at places.



# Classification of Monera

Kingdom Monera is classified into three sub-kingdoms- [Archaeobacteria](#), Eubacteria, and Cyanobacteria.

- **Archaeobacteria**

- These are the most ancient bacteria found in the most extreme habitats such as salty area (halophiles), hot springs (thermoacidophiles) and marshy areas (methanogens).
- The structure of the cell wall is different from that of the other bacteria which helps them survive in extreme conditions.
- The mode of nutrition is autotrophic.

- **Eubacteria**

- Eubacteria are also known as "true bacteria".
- The cell wall is rigid and made up of peptidoglycans.
- It moves with the help of flagella.
- A few bacteria contain short appendages on the cell surface, known as pili which help the bacteria during sexual reproduction. Pili also helps a pathogen to attach to the host.
- They are divided into two categories; gram-positive and gram-negative, depending upon the nature of the cell wall and the stain they take.
- Rhizobium and Clostridium are two eubacteria.

- **Cyanobacteria**

- These are also known as blue-green algae.
- These bacteria are photosynthetic in nature.
- They contain chlorophyll, carotenoids and phycobilins.
- They are found in the aquatic region.
- Some of these even fix atmospheric nitrogen.
- Nostoc, Anabaena, Spirulina are some cyanobacteria.



# Characteristics of Protista:

1. They include all single-celled eukaryotes.
2. They possess a well-defined nucleus.
3. They have a cellular level of body organization.
4. They reproduce both asexually and sexually.
5. Their mode of nutrition is autotrophic and heterotrophic.
6. They move across the environment using either secretions or their locomotory organelles.
7. They contain membrane-bound cell organelles.
8. Flagella, cilia, pseudopodia, or propulsion by contraction of the body and mucilage are the most significant forms of locomotory organelles present in them.
9. Chrysophytes, Dinoflagellates, Euglenoids, Slime-moulds, and Protozoans are all members of the Protista kingdom.

# Characteristics of Fungi

**Following are the important characteristics of fungi:**

1. Fungi are eukaryotic, non-vascular, non-motile and heterotrophic organisms.
2. They may be unicellular or filamentous.
3. They reproduce by means of spores.
4. Fungi exhibit the phenomenon of alternation of generation.
5. Fungi lack chlorophyll and hence cannot perform photosynthesis.
6. Fungi store their food in the form of starch.
7. Biosynthesis of chitin occurs in fungi.
8. The nuclei of the fungi are very small.
9. The fungi have no embryonic stage. They develop from the spores.
10. The mode of reproduction is sexual or asexual.
11. Some fungi are parasitic and can infect the host.
12. Fungi produce a chemical called pheromone which leads to sexual reproduction in fungi.
13. Examples include mushrooms, moulds and yeast.



# The structure of fungi can be explained in the following points:

1. Almost all the fungi have a filamentous structure except the yeast cells.
2. They can be either single-celled or multicellular organisms.
3. Fungi consist of long thread-like structures known as hyphae. These hyphae together form a mesh-like structure called mycelium.
4. Fungi possess a cell wall which is made up of chitin and polysaccharides.
5. The cell wall comprises a protoplast, which is differentiated into other cell parts such as cell membrane, cytoplasm, cell organelles and nuclei.
6. The nucleus is dense, clear, with chromatin threads. The nucleus is surrounded by a nuclear membrane.



# Based on Mode of nutrition

On the basis of nutrition, kingdom fungi can be classified into 3 groups

1. Saprophytic - The fungi obtain their nutrition by feeding on dead organic substances. Examples: *Rhizopus*, *Penicillium* and *Aspergillus*.
2. Parasitic - The fungi obtain their nutrition by living on other living organisms (plants or animals) and absorb nutrients from their host. Examples: *Taphrina* and *Puccinia*.
3. Symbiotic - These fungi live by having an interdependent relationship with other species in which both are mutually benefited. Examples: Lichens and mycorrhiza. Lichens are the symbiotic association between algae and fungi. Here both algae and fungi are mutually benefited as fungi provide shelter for algae and in reverse algae synthesis carbohydrates for fungi. Mycorrhiza is the symbiotic association present between fungi and plants. Fungi improve nutrient uptake by plants, whereas, plants provides organic molecules like sugar to the fungus.

# Kingdom Fungi are classified into the following based on the formation of spores:

1. Zygomycetes - These are formed by the fusion of two different cells. The sexual spores are known as zygospores, while the asexual spores are known as sporangiospores. The hyphae are without the septa. Example - *Mucor*.
2. Ascomycetes - They are also called sac fungi. They can be coprophilous, decomposers, parasitic or saprophytic. The sexual spores are called ascospores. Asexual reproduction occurs by conidiospores. Example - *Saccharomyces*.
3. Basidiomycetes - Mushrooms are the most commonly found basidiomycetes and mostly live as parasites. Sexual reproduction occurs by basidiospores. Asexual reproduction occurs by conidia, budding or fragmentation. Example- *Agaricus*.
4. Deuteromycetes - They are otherwise called imperfect fungi as they do not follow the regular reproduction cycle as the other fungi. They do not reproduce sexually. Asexual reproduction occurs by conidia. Example - *Trichoderma*.



# Plant Kingdom - Plantae

- Kingdom Plantae includes all the plants. They are eukaryotic, multicellular and autotrophic organisms. The plant cell contains a rigid cell wall. Plants have chloroplast and chlorophyll pigment, which is required for photosynthesis.
- Characteristics of Kingdom Plantae. The plant kingdom has the following characteristic features:
  1. They are non-motile.
  2. They make their own food and hence are called autotrophs.
  3. They reproduce asexually by vegetative propagation or sexually.
  4. These are multicellular eukaryotes. The plant cell contains the outer cell wall and a large central vacuole.
  5. Plants contain photosynthetic pigments called chlorophyll present in the plastids.
  6. They have different organelles for anchorage, reproduction, support and photosynthesis.

# Classification of Kingdom Plantae

A plant kingdom is further classified into subgroups. Classification is based on the following criteria:

1. Plant body: Presence or absence of a well-differentiated plant body.  
E.g. Root, Stem and Leaves.
2. Vascular system: Presence or absence of a vascular system for the transportation of water and other substances. E.g. Phloem and Xylem.
3. Seed formation: Presence or absence of flowers and seeds and if the seeds are naked or enclosed in a fruit.



The plant kingdom has been classified into five subgroups according to the above-mentioned criteria:

1. Thallophyta
2. Bryophyta
3. Pteridophyta
4. Gymnosperms
5. Angiosperms

**1. Thallophyta** includes plants with primitive and simple body structures. The plant body is thallus, they may be filamentous, colonial, branched or unbranched. Examples include green algae, red algae and brown algae. Common examples are *Volvox*, *Fucus*, *Spirogyra*, *Chara*, *Polysiphonia*, *Ulothrix*, etc.



**2. Bryophytes** do not have vascular tissues. The plant body has root-like, stem-like and leaf-like structures. Bryophytes are terrestrial plants but are known as "amphibians of the plant kingdom" as they require water for sexual reproduction. They are present in moist and shady places. Bryophyta includes mosses, hornworts and liverworts. Some of the common examples are *Marchantia*, *Funaria*, *Sphagnum*, *Antheoceros*, etc.

**3. Pteridophytes** have a well-differentiated plant body into root, stem and leaves. They have a vascular system for the conduction of water and other substances. Some of the common examples are *Selaginella*, *Equisetum*, *Pteris*, etc.



4. **Gymnosperms** have a well-differentiated plant body and vascular tissues. They bear naked seeds, i.e. seeds are not enclosed within a fruit. Some of the common examples of gymnosperms are *Cycas*, *Pinus*, *Ephedra*, etc.

5. **Angiosperms** are seed-bearing vascular plants with a well-differentiated plant body. The seeds of angiosperms are enclosed within the fruits. Angiosperms are widely distributed and vary greatly in size, e.g. Wolffia is small measuring about 0.1 cm and Eucalyptus trees are around 100 m tall. Angiosperms are further divided into monocotyledons and dicotyledons according to the number of cotyledons present in the seeds. Some of the common examples are mango, rose, tomato, onion, wheat, maize, etc.



# Cryptogams and Phanerogams

The plant kingdom is also classified into two groups:

- ❑ **Cryptogams** - Non-flowering and non-seed bearing plants.  
E.g. Thallophyta, Bryophyta, Pteridophyta
- ❑ **Phanerogams** - Flowering and seed-bearing plants. E.g.  
Gymnosperms, Angiosperms

- The kingdom includes organism that are multicellular eukaryotic without the presence of cell wall. They have a heterotrophic mode of nutrition. They exhibit great diversity. Some organisms are simple while others have a complex body with specialised tissue differentiation and body organs.
- The animal kingdom is divided into many phyla and classes. Some of the phyla are Porifera, Coelenterate, Arthropoda, ECHINODERMATA, CHORDATA etc. Examples are hydra, starfish, earthworms, monkeys, birds etc.



- The animal kingdom can be divided into several groups based on their nutrition
- ❑ Herbivores - The animal that consume the plant-based materials. They are adapted to digest cellulose .
- ❑ Carnivores - They primarily feed on other animals and consume meat
- ❑ Omnivores - Their diet contains both plant and animal material.
- ❑ Detrivores- Detrivores feed on the decomposing organic matter such as dead plant and animals.

**Q) What is the primary characteristic that defines the organisms in Monera?**

- a) Eukaryotic cells
- b) multicellular organism
- C) prokaryotic cells
- d) autotrophic nutrition

**Q) which of the following is a common example of a Monera organism?**

- A) Dog b) Rose plant c) bacteria d) Mushroom

**Q) Monera includes organisms that are primarily classified into which two major groups?**

- A) Protists and algae b) Archaea and bacteria c) insects d) mammals and reptiles

**Q) which monera group is known for thriving in extreme environments, such as hot springs and deep-sea hydrothermal vents?**

- A) Cyanobacteria b) Eubacteria c) Archaea d) protozoa