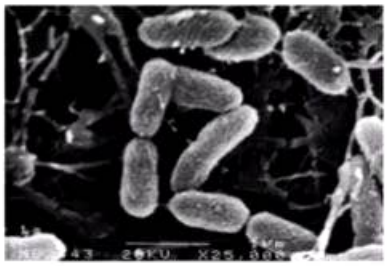
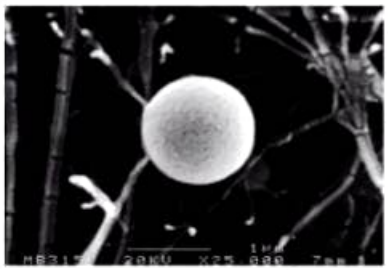
KINGDOM MONERA

- Unicellular and Prokaryotic.
- True nucleus and membrane bound organelles are absent.
- Monerans are mainly Bacterias.
- Some of them have cell wall (bacteria and BGA) and some of them don't have cell wall (mycoplasma).
- The mode of nutrition is either Autotropic(make their own food) or Hetetopic(depending on other organisms for food)
- Have two Major groups-
  1. Eubacteria(true bacteria).It includes bacteria and cynobacteia
  2. Archaebacteria (ancient bacteria)
- Examples- *E.coli , Bacteria, Anabaena, etc.*



Rod-shaped (bacillus) bacteria



Coccus-shaped bacteria

Kingdom Monera belongs to the prokaryote family. The organisms belonging to this kingdom do not contain a true nucleus. These are the oldest known microorganisms on earth. Their DNA is not enclosed within the nucleus.

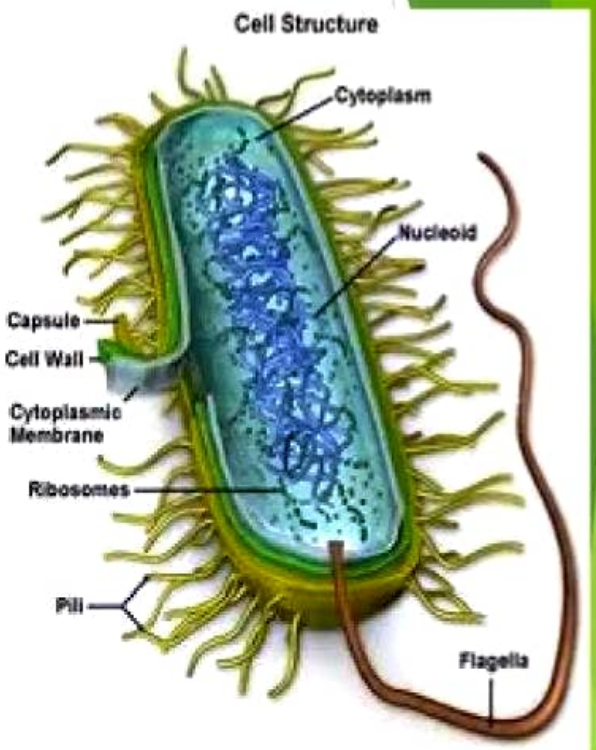
They are unicellular organisms found mostly in a moist environment. They are found in hot springs, snow, deep oceans, or as parasites in other organisms.

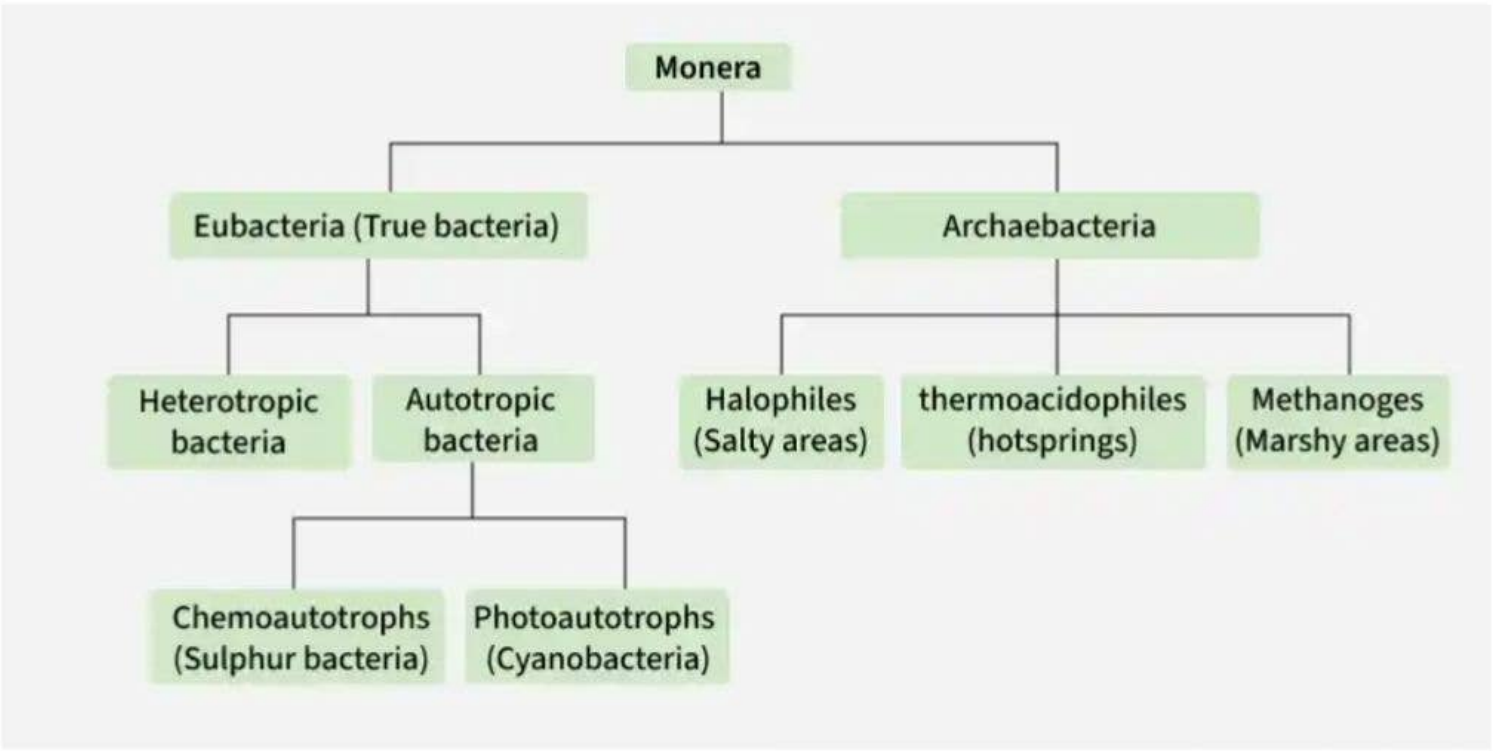
The monerans do not possess any membrane-bound organelles.

Let us go through the kingdom monera notes to explore the characteristics and classification of monera.

Diagram of a typical bacterial cell

- **Pili** = for movement
- **Cell wall** = structure, support, & protection of bacteria
- **Cytoplasm** = fluid part around organelles
- **Ribosome** = make proteins
- **Flagellum** = some have these for movement
- **Chromosomes** = circular DNA – genetic information





Classification of Kingdom Monera

What are Archaebacteria?

Archaebacteria:

- A group of monerans that can be found living in extremely harsh environments.
- They can live where no other organisms can survive.
  - Acidic hot springs
  - Near undersea volcanic vents
  - Highly salty water
  - Oxygen free environments
- They can be divided into three groups:
  - Methanogens
  - Thermophiles
  - Halophiles

Archaebacteria:

- Methanogens
  - Live in oxygen free environments and produce methane.
  - Live in digestive tract of cows, sewage and swampy areas.
- Thermophiles
  - Live in extremely hot water (60C -250C)
  - Hot springs
- Halophiles (salt lovers)
  - Live in extremely salty conditions
  - Can be found in the Great Salt Lake in Utah and the Dead Sea
  - Places where the salt levels are 10x higher than sea water.

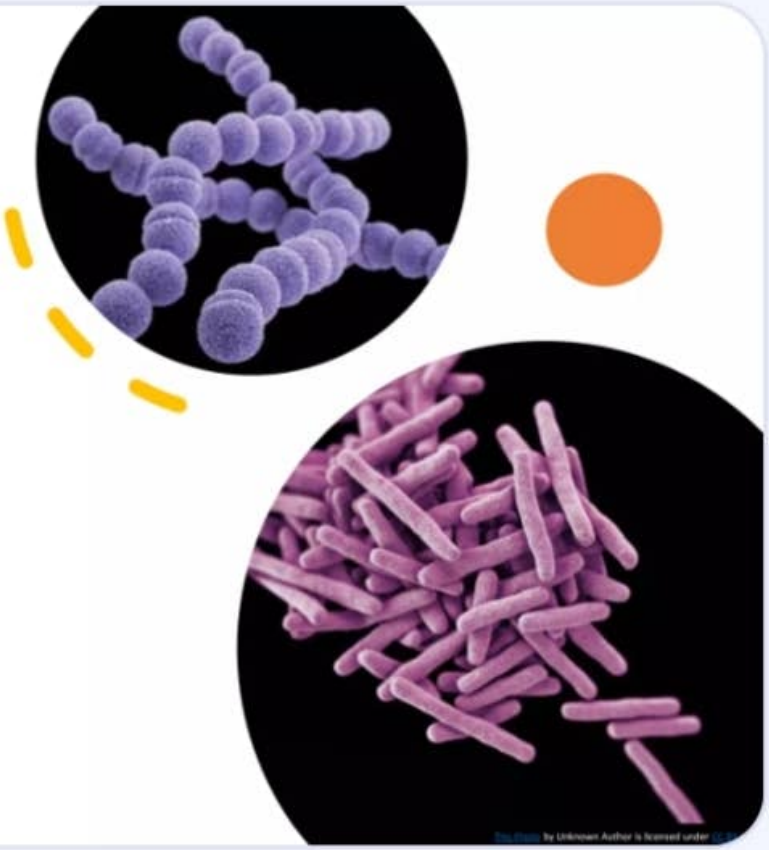
What are
“Eubacteria”?

Eubacteria Characteristics:

- Eubacteria are an **extremely diverse** group of **Monera**.
- Eubacteria are called **true bacteria.**
- Most are **unicellular**.
- They can be found in environments **less harsh** than archaebacteria.
- There are so many members of this group that it becomes difficult to classify them.
- Scientists classify them by comparing the molecular biology of the different organisms.
- Molecular biology looks at things like: (basically the inner workings of the organism)
  - Cell wall
  - Cell shape
  - Nutrition
  - Respiration

Eubacteria Shape:

- Eubacteria come in different shapes (6)
  - Cocci and bacilli are the major shapes.
  - Vibrio, rods, filaments and spirochetes are the other shapes of eubacteria.



Cell Wall Composition:

- Most monerans have a cell wall but the structure can differ.
- Scientist developed a method for identifying different species of bacteria based on differences with their cell wall.
- Gram Staining:
  - This method identifies two groups of bacteria
  - Gram positive and gram negative
  - Both groups include bacteria that cause diseases like :
    - Toxic shock syndrome and scarlet fever

Gram Staining:

- Eubacteria are stained first with a purple dye, rinsed and then stained with a red dye.
- Depending on the thickness of the cell wall the eubacteria will appear red or purple.
- Gram **positive** eubacteria absorb **purple** dye
- Gram **negative** eubacteria absorb **red** dye

Gram Staining:

- Whether a bacteria is classified as gram positive or negative will depend on how thick their cell wall is.
- Some bacteria have an extra "lipid bilayer"
  - Aka an extra cell wall or double cell wall.
- Bacteria that have this **extra layer** would be classified as ***Gram-Negative!***
- By having this extra layer, the bacteria **prevents** antibiotics from entering the cell.
- This makes the antibiotic ineffective.
- **This makes gram staining important in BOTH identification and treatment of infection.**

Nutrition:

- Organisms that can't make their own food are known as **heterotrophs**.
- **MOST** monerans are **heterotrophs** meaning they get their energy by consuming organic molecules made by other organisms.
- **Autotrophs** are organisms that make their own food.
- Organisms that make food by using sunlight and CO_2 they are called **photo-autotrophs.**
- Organisms that make food by using chemicals such as ammonia are called **chemo-autotrophs.**