

# Microorganisms

A **microorganism** is an organism (living thing) that is microscopic (too small to be seen by the human eye).

The study of microorganisms is called microbiology.

Microorganisms include:

1. Bacteria
2. Fungi,
3. Protists

Most microorganisms are single-celled, (AKA **unicellular**) **and** are microscopic. Some unicellular protists are visible to the average human.

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Amoeba

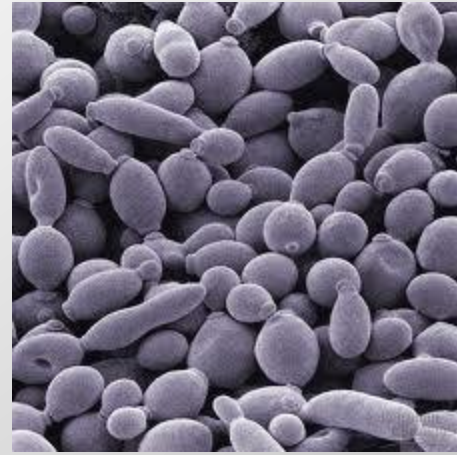
Some unicellular protists are visible to the average human.

Microorganisms live almost everywhere on Earth where there is liquid water, including hot springs, on the ocean floor, and deep inside rocks within Earth's crust. Some microorganisms are very helpful in keeping us healthy. Other microorganisms, however, can cause diseases that kill millions of people every year.

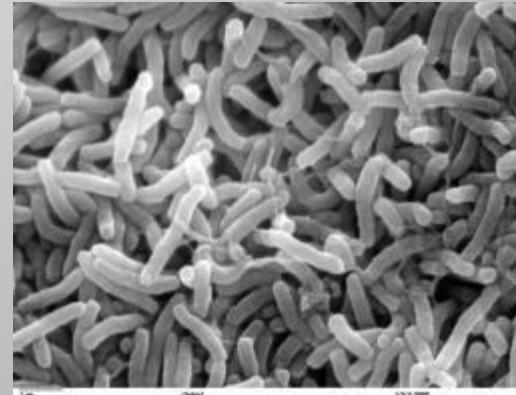


Hot spring

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Yeast is helpful.



Cholera bacteria is harmful.

## Bacteria

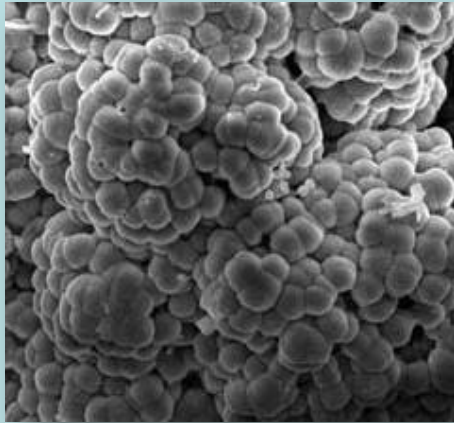
Bacteria are the simplest of creatures that are considered alive. Bacteria are everywhere. They are in the bread you eat, the soil that plants grow in, and even inside of you. Bacteria are small single celled organisms that do not have an organized nucleus. Their whole purpose in life is to replicate.



# Two Groups of Bacteria

## Archaeobacteria

- Smallest living thing (microscopic)
- Single-celled organisms that do not have nuclei
- Found in environments that have: --
  - Extremely high temperatures (volcanoes, hot springs)
  - Strong acids
  - Extreme salt concentrations (salt marsh)

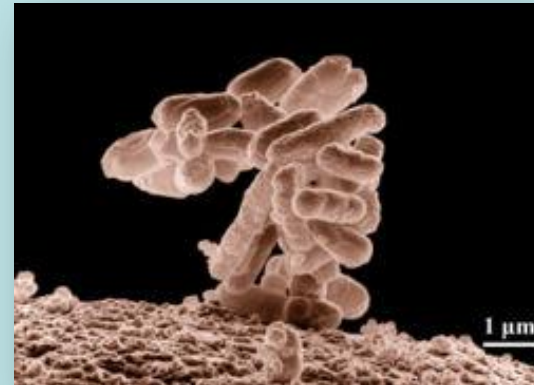


Methane bacteria

## Eubacteria

- Smallest living thing (microscopic)
- Single-celled organisms that do not have nuclei
- Found in mild environments such as ponds, lakes, soil, animals and plants

Examples: E. Coli, Streptococcus, and Salmonella



E-Coli Bacteria

# FUNGUS AMONG US

What we call **MOLDS** are actually **fungi**. That's a bunch of fungus. Mold is actually a type of fungus. While yeasts are single celled fungi, molds are multicellular fungi. Bread takes one kind of fungus (**yeast**) to make it rise. If you leave the bread out on the counter, another type of fungus comes in (bread mold) to break it down. It's not amazing, but it's true!

# Fungus

- Absorbs food from decaying organisms and waste
- Singled celled or Multi-Cellular

Examples: Mushrooms, molds and yeast



THE CLASSIC SHAPE OF  
A SPECIES FROM THE  
CLUB FUNGI GROUP





# Protists

- Protists are a diverse group of organisms, that cannot be classified in any of the other kingdoms as fungi, bacteria, animals, or plants. They are usually treated as the kingdom Protista.
- Can be either unicellular(one celled), or they are multicellular(many cells).

Examples: Green algae, slime mold, and protozoa



Slime mold



Green algae



Water protists

# Microorganisms: Beneficial or Harmful?

Microorganism	Beneficial or Harmful	What do I do?
Baking Yeast (Fungus)	Beneficial	Help bread rise
Bacteria in milk	Beneficial	Cause milk to curdle to produce buttermilk, cheese, and yogurt-also aids in digestion
Fungus used to make Antibiotics (Penicillin)	Beneficial	Help fight disease and infection
Fungus (black Mold)	Harmful	Creates respiratory distress and flu like symptoms
Bacteria on unclean food (Example E. Coli)	Harmful	Makes people sick and can cause an upset stomach.
Decomposing Bacteria	Beneficial	Helps to break down rotten leaves or dead animals into material that can fertilize soil.
Flu Virus	Harmful	Can possibly cause a stuffy nose, fevers, achy muscles, chills, etc.
Salmonella- found in raw meat or eggs	Harmful	. cause stomach illnesses or even death
Mold found on food	Harmful	Causes food to spoil and can cause stomach illness
Ringworm or Athletes foot	Harmful	cause skin (fungus) disease- rash like
Plankton (protist)	Beneficial	Begin food web in the ocean

# The Six Kingdoms

**Plant kingdom**

Animal Kingdom

**Archaeobacteria Kingdom**

Eubacteria  
Kingdom

Fungus Kingdom

Protist Kingdom