

MICROBIOLOGY

WELCOME TO SESSION 2

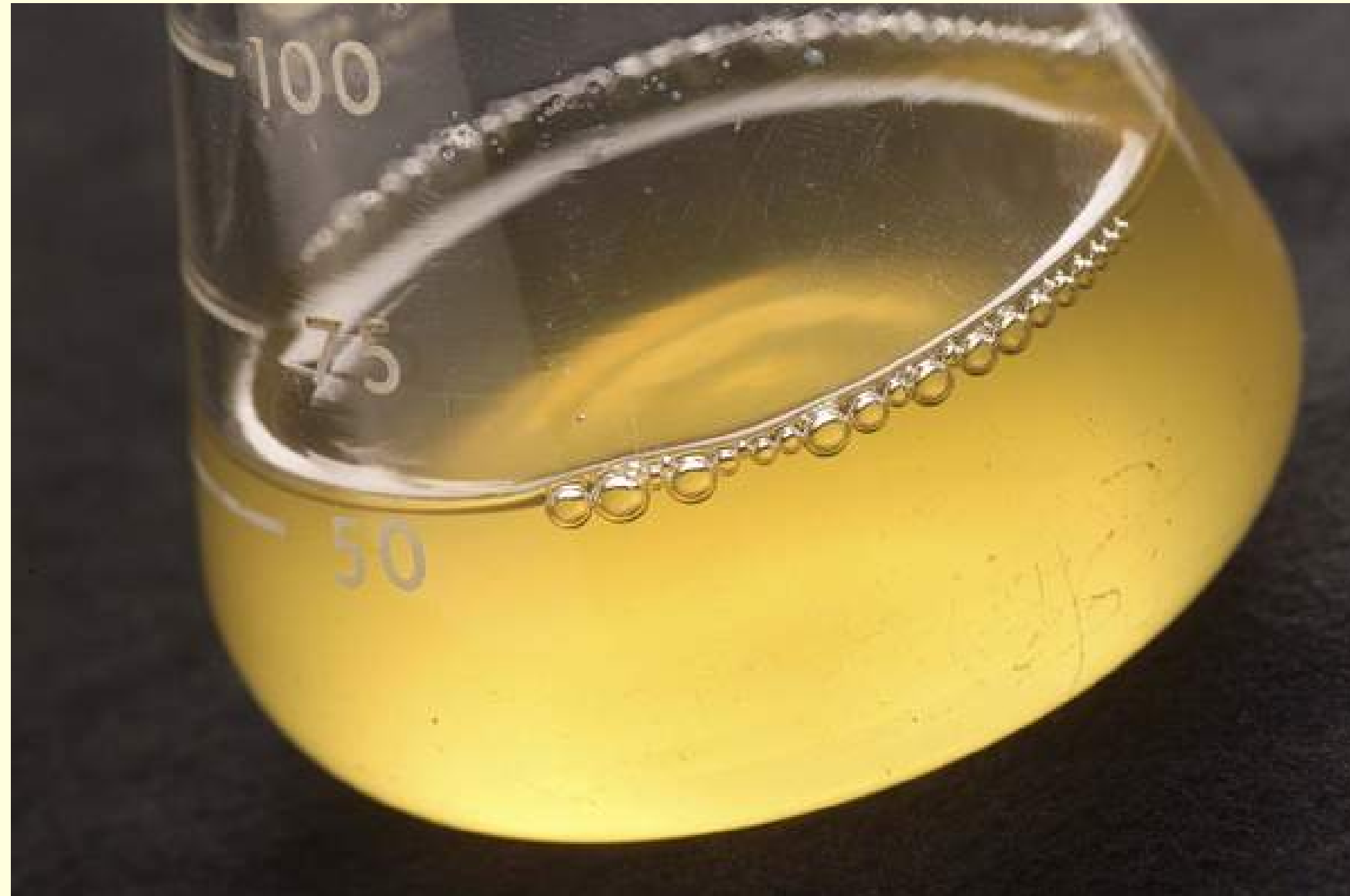




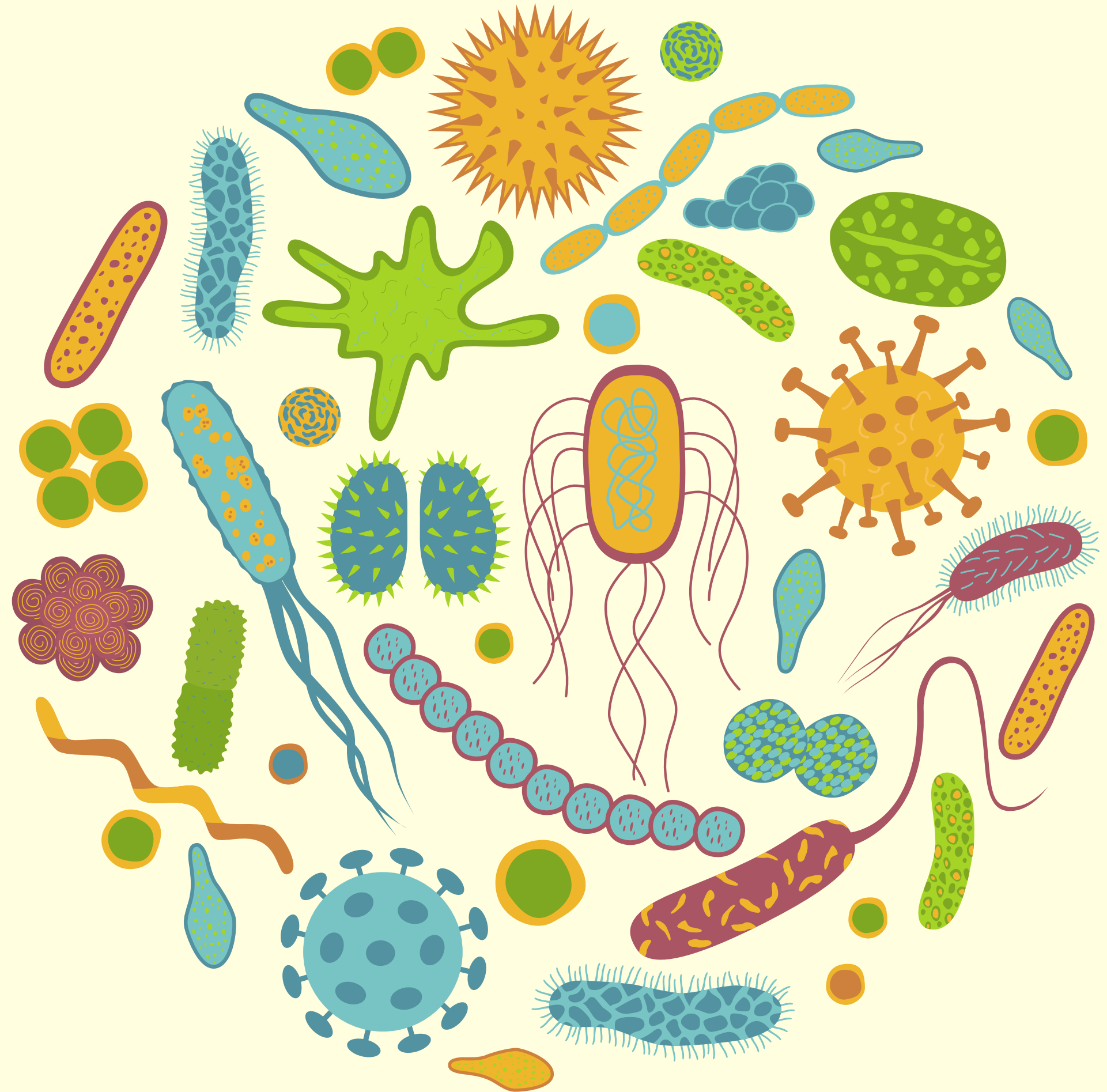
GROWTH OF MICROBES



FOOD SOURCE OF MICROBES



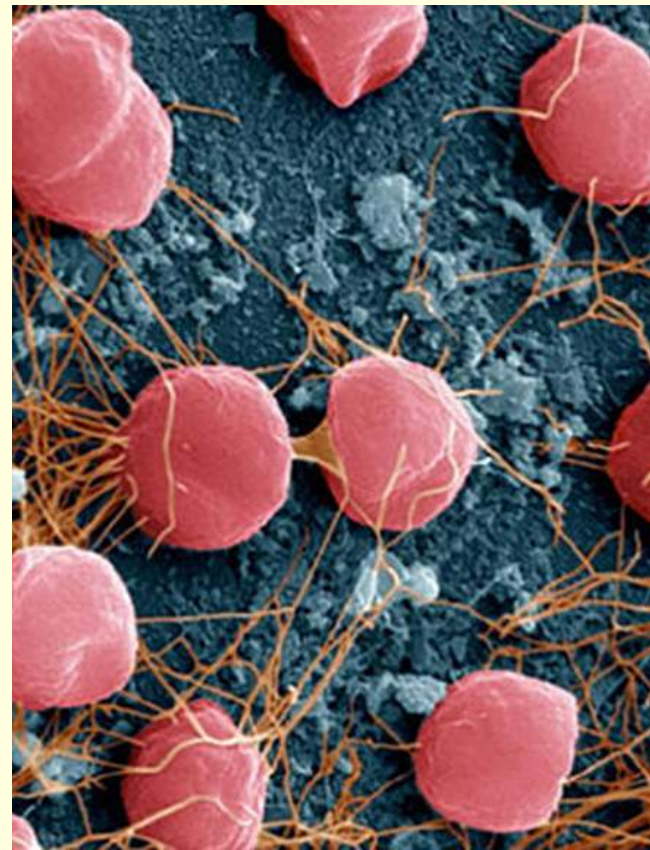
LB AGAR - LURIA-BERTANI''



DIFFERENT TYPE OF MICROBES



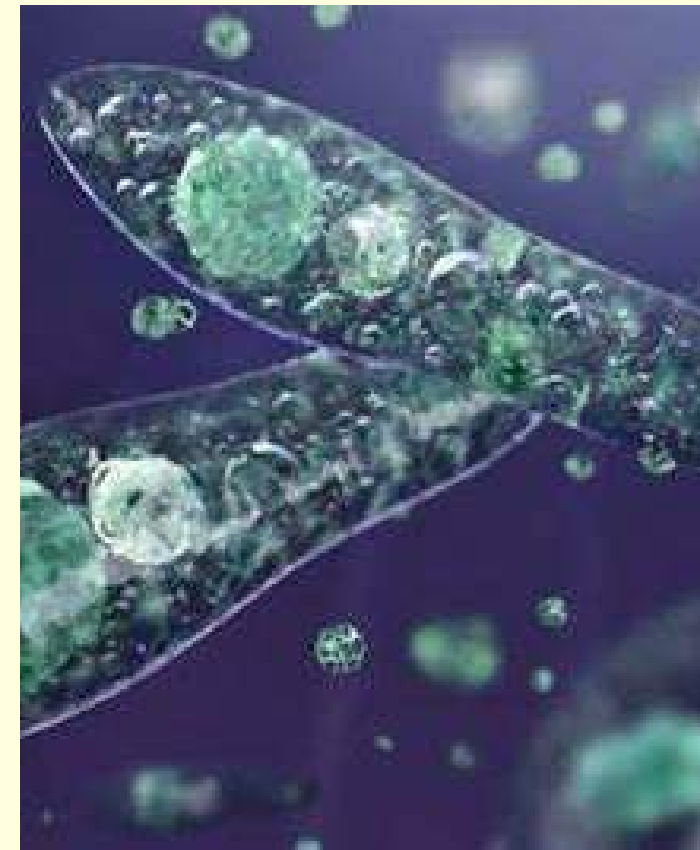
bacteria



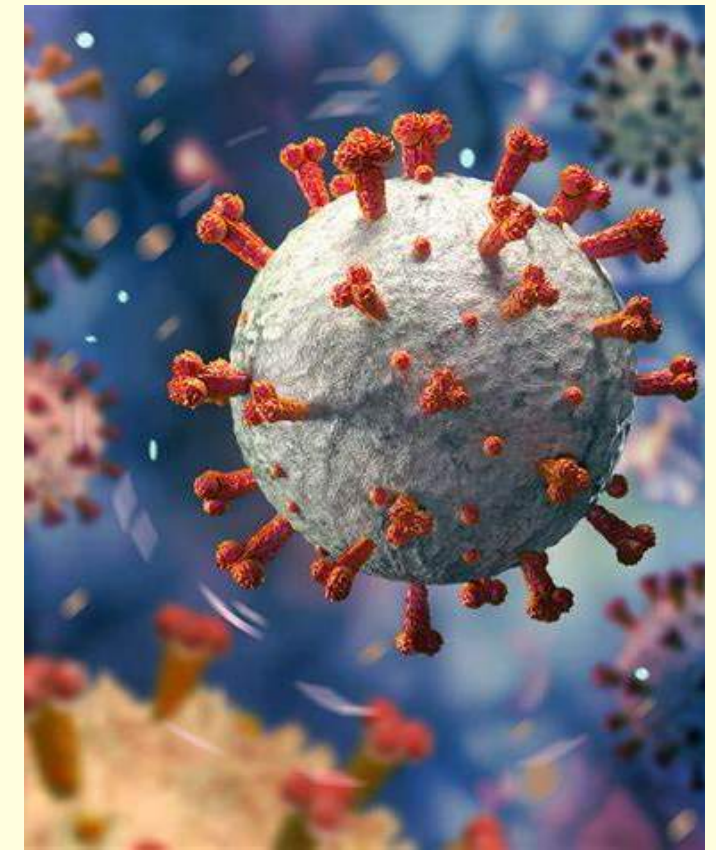
archaea



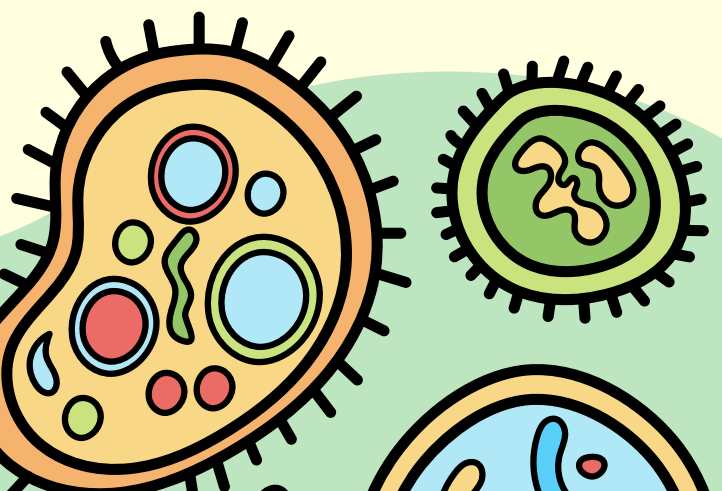
fungi



protists

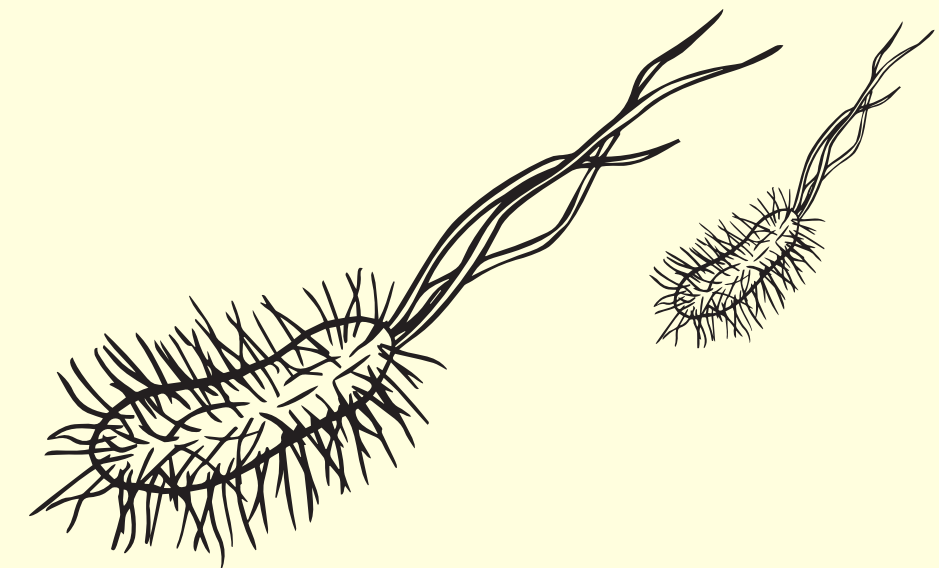
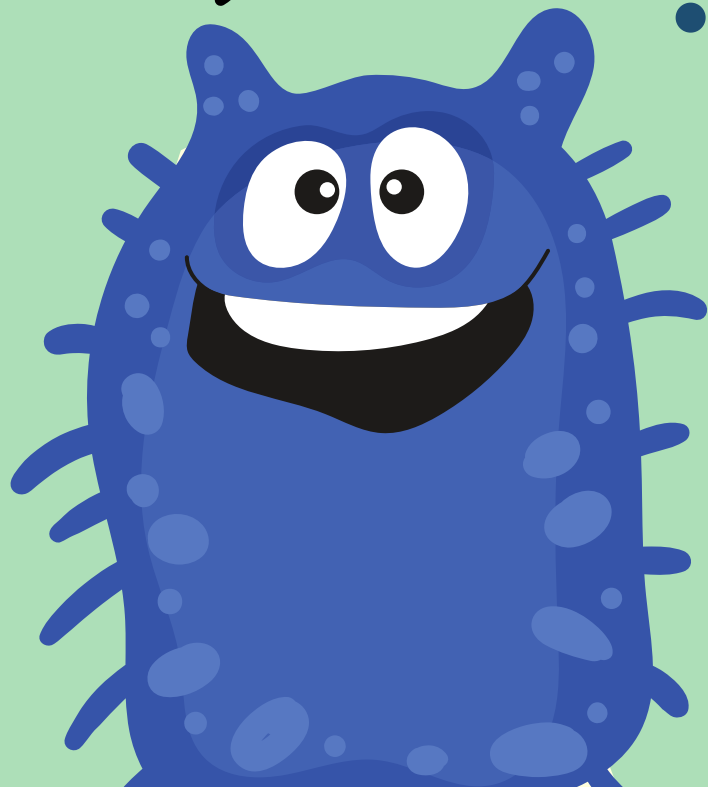
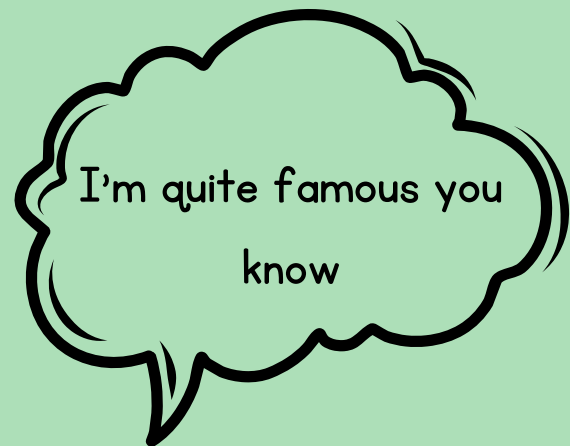


viruses



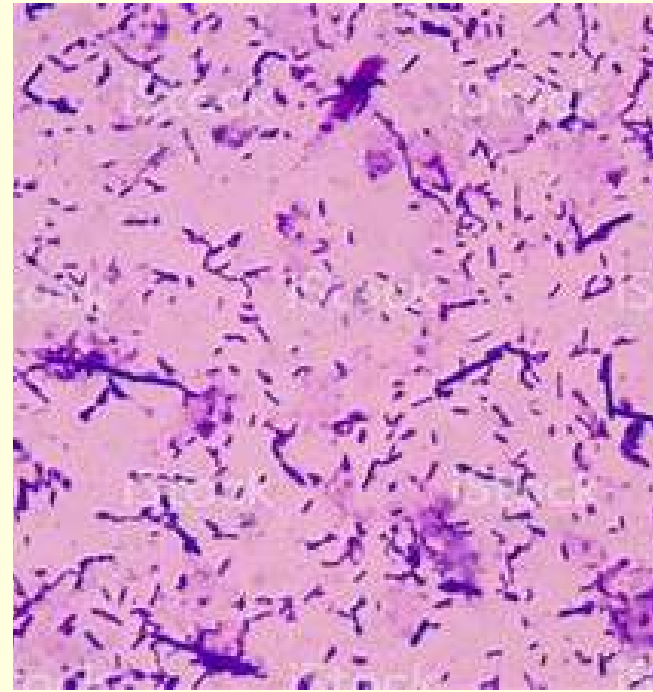
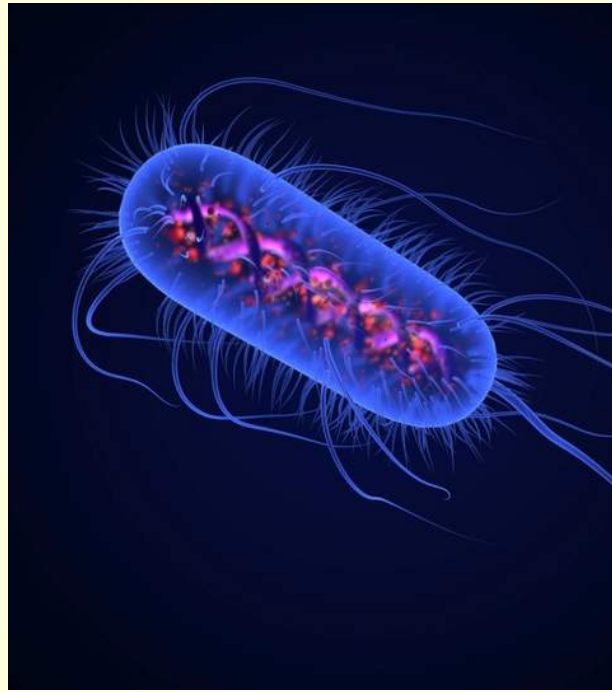
BACTERIA

- They are **Single celled living organism**
- They are of different shape and size and can live without oxygen.
- Bacteria that cause milk to become sour are used in making cottage cheese, buttermilk, and yogurt



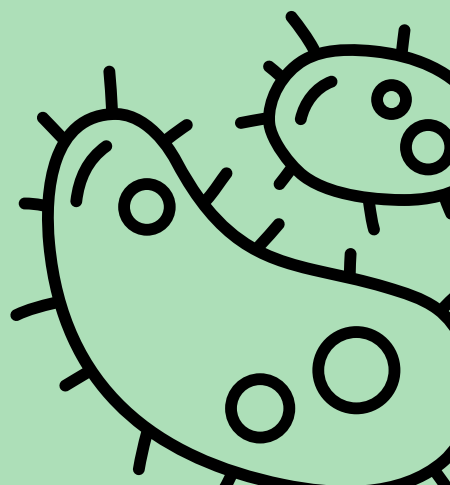


The smell after rain is caused by Bacteria

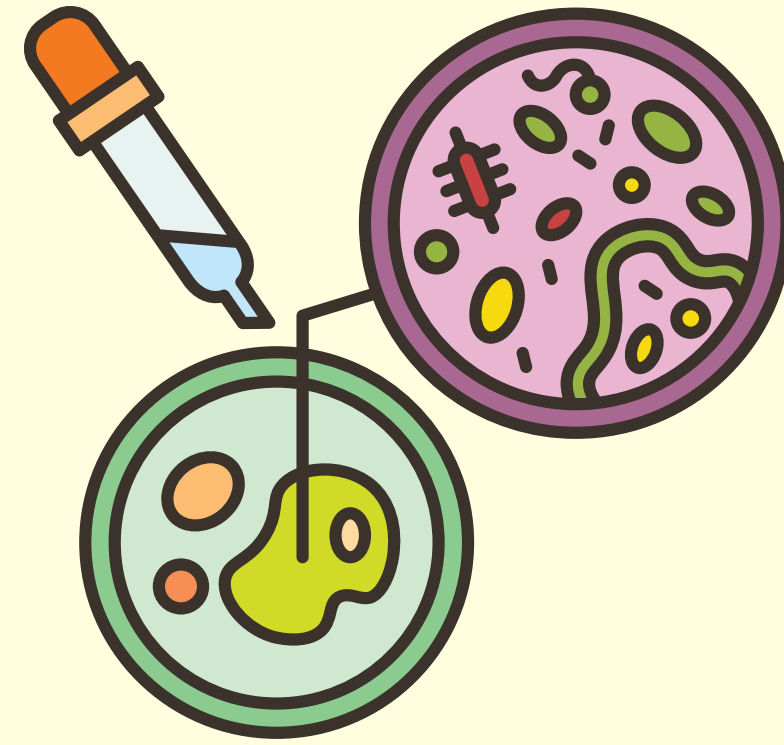


Bacteria under microscope

Bacterial skin infections are common, ranging in severity from mild and annoying to life-threatening



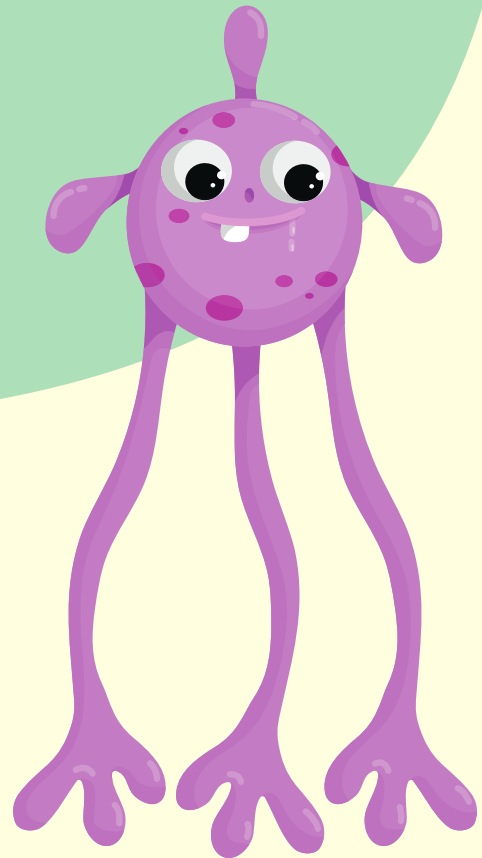
ARCHAEA



- They are single-celled microorganisms with structure similar to bacteria
- Many archaea live in **harsh environments**, some interact with other organisms, does not cause any disease.
- We cannot live in such environment.

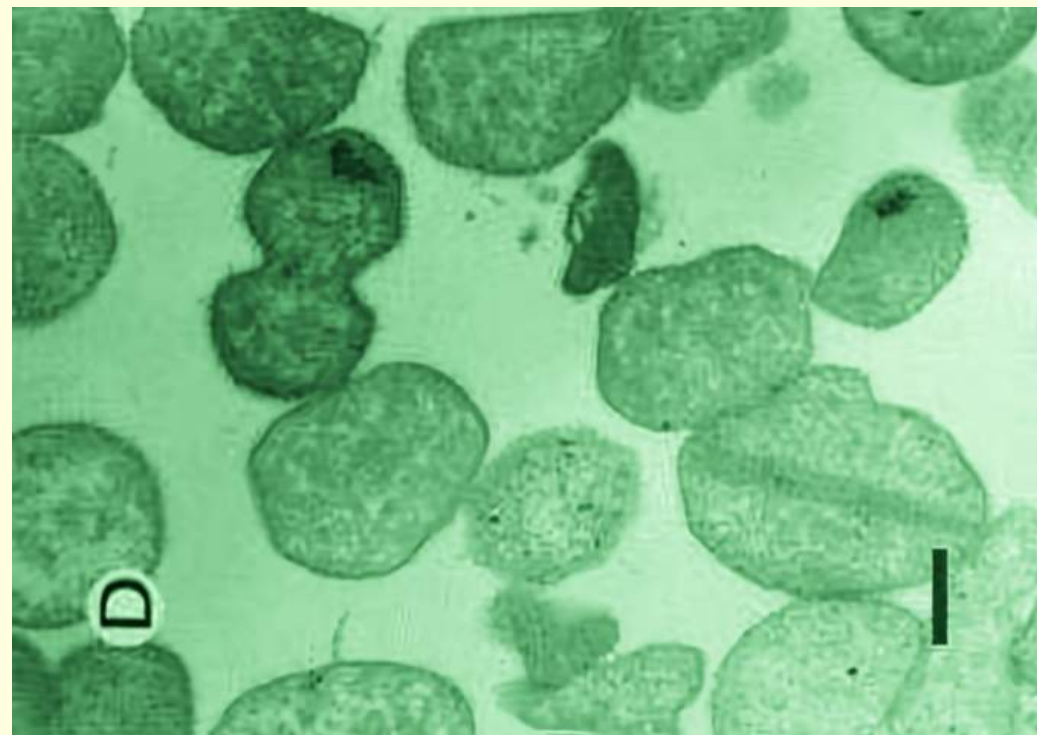
Do you know something....

Everybody thought I'm a bacterium but i'm not





Archaeae that grown in the Hot water of morning glory hotspring

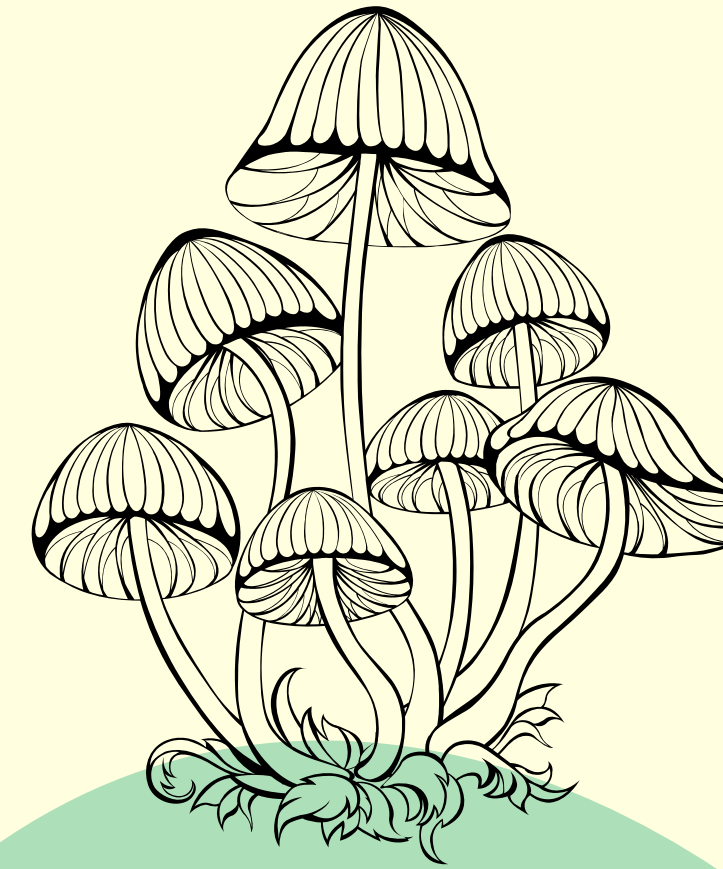


Microscopic view





- Fungi exist as either single cells (yeasts) or as multicellular, includes the yeasts, rusts, smuts, mildews, molds, and mushrooms
- Their cell walls contain chitin.
- Fungi lack chlorophyll and hence cannot perform photosynthesis.



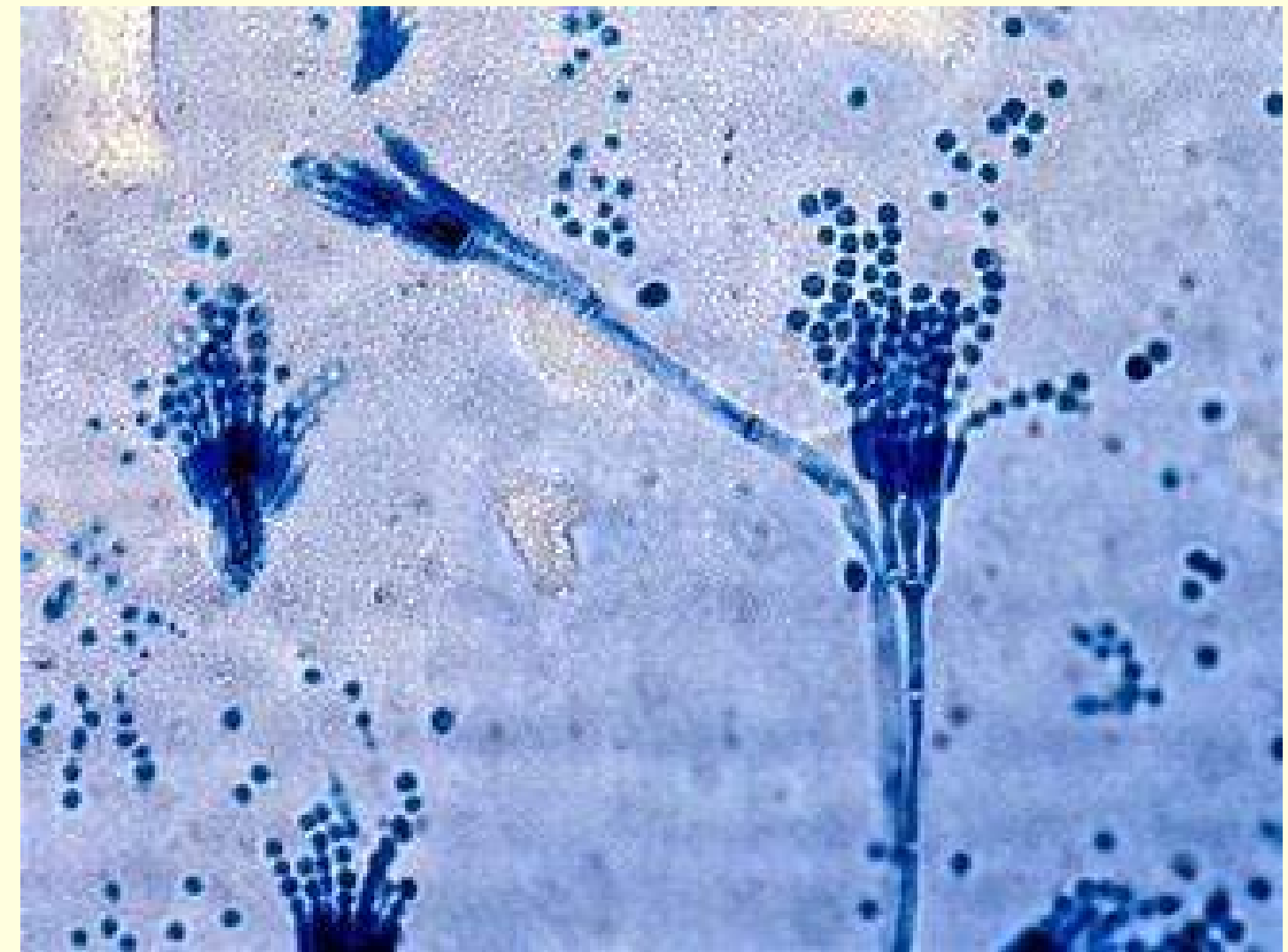
I'm edible



But i'm not



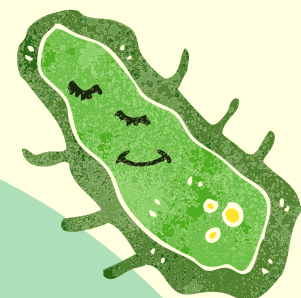
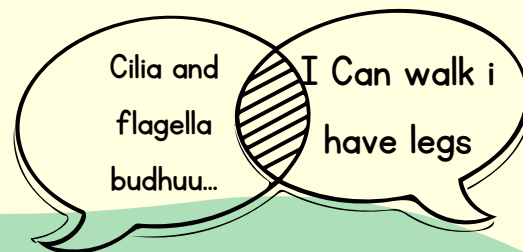
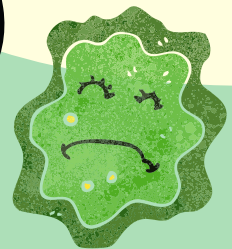
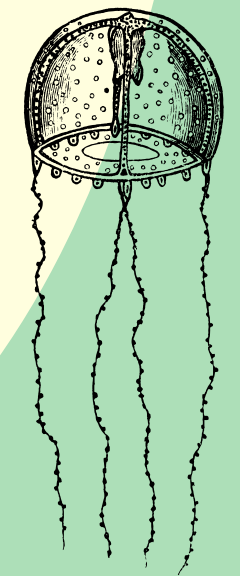
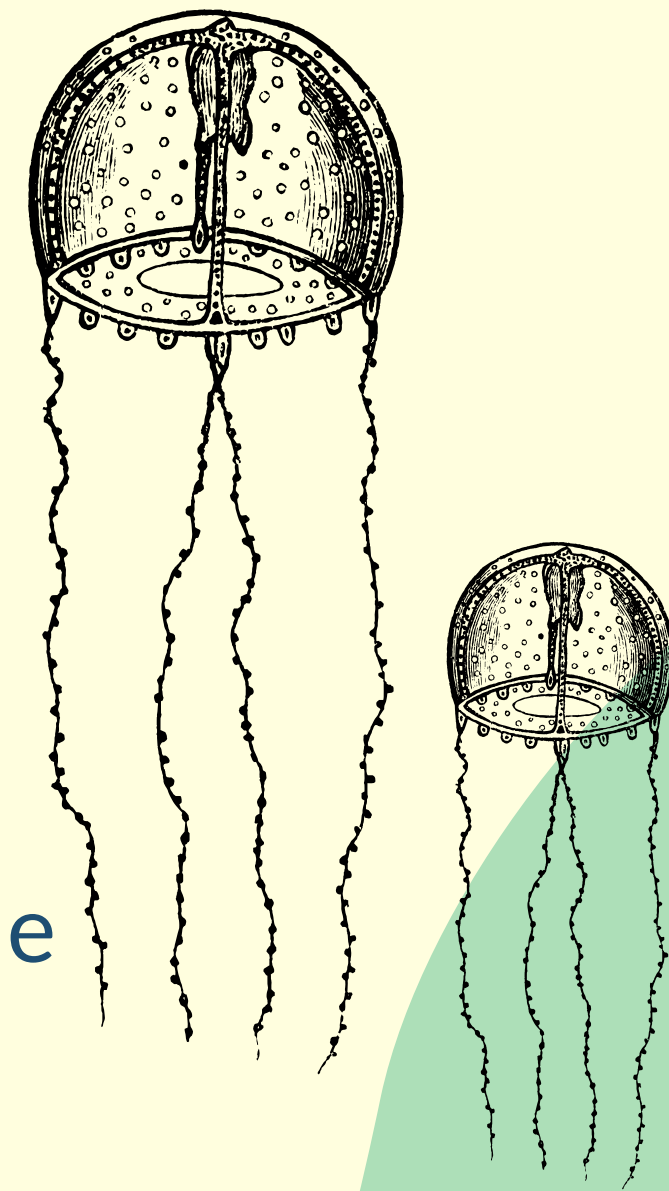
The common fungus seen around us

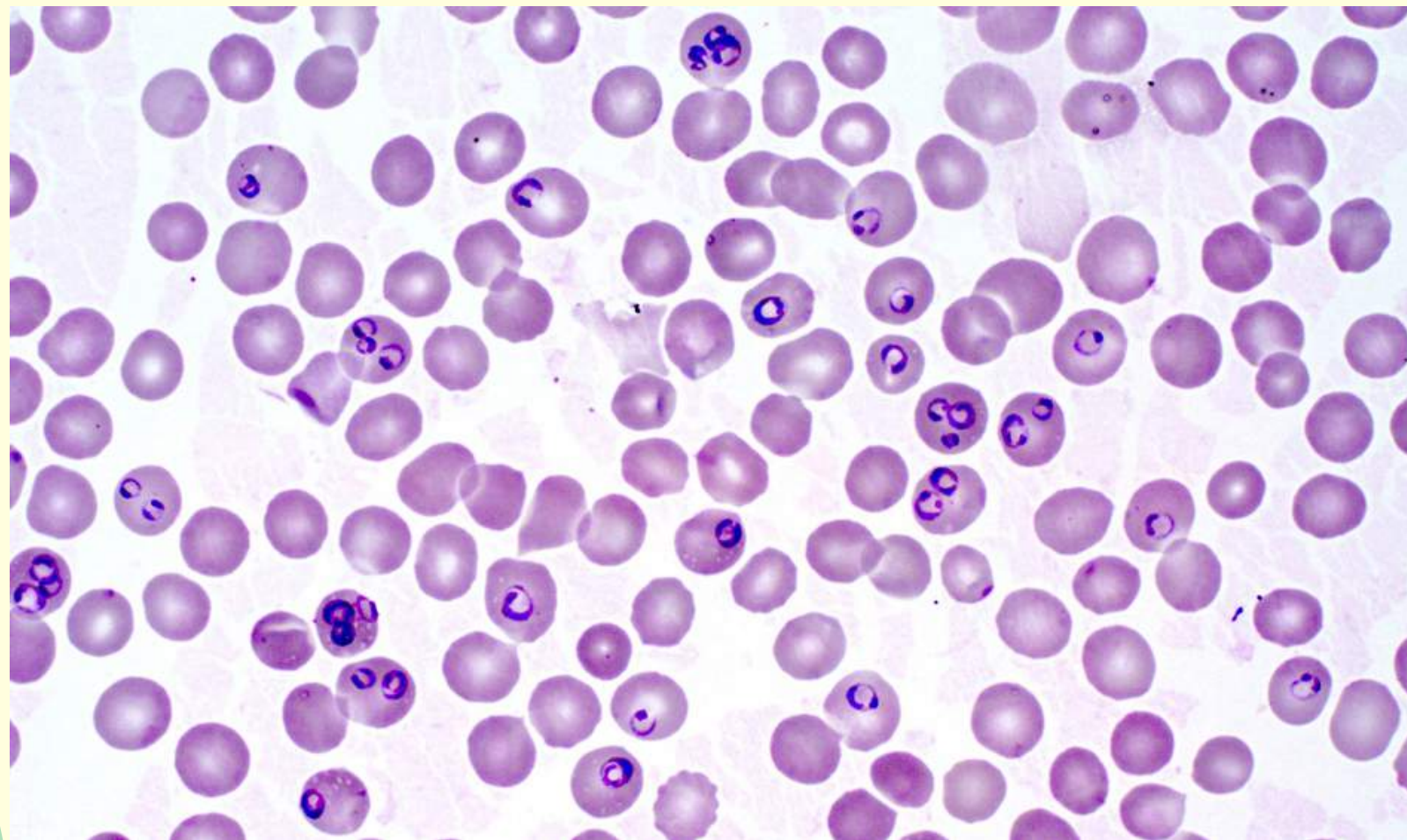


penicilium microscopic view [The main culprit in food spoilage]

PROTISTS

- Most are unicellular and include plant-like algae, animal-like protozoa and fungi-like slime molds.
- Malaria, responsible for the death of thousands of people every year caused by a protista.
- Some type causes infection of the intestines in humans. It has two nuclei – they make the cells look like they have a face!

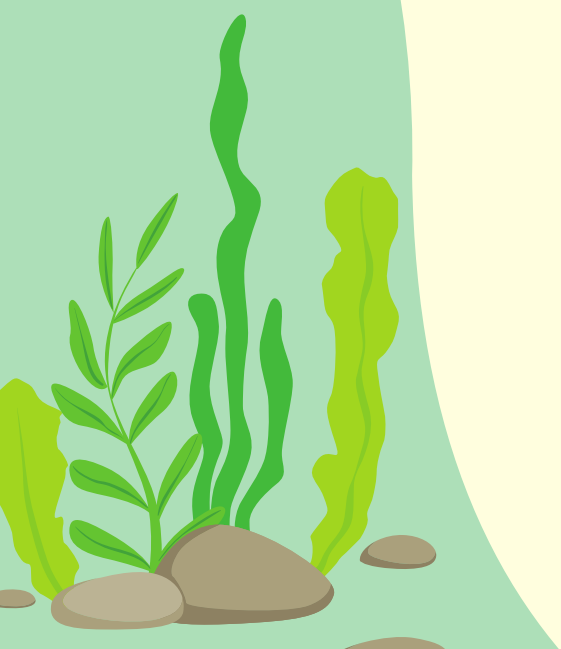




Plasmodium that causes Malaria

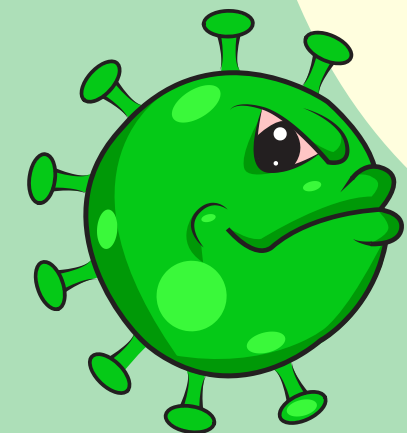


Protista under the microscope



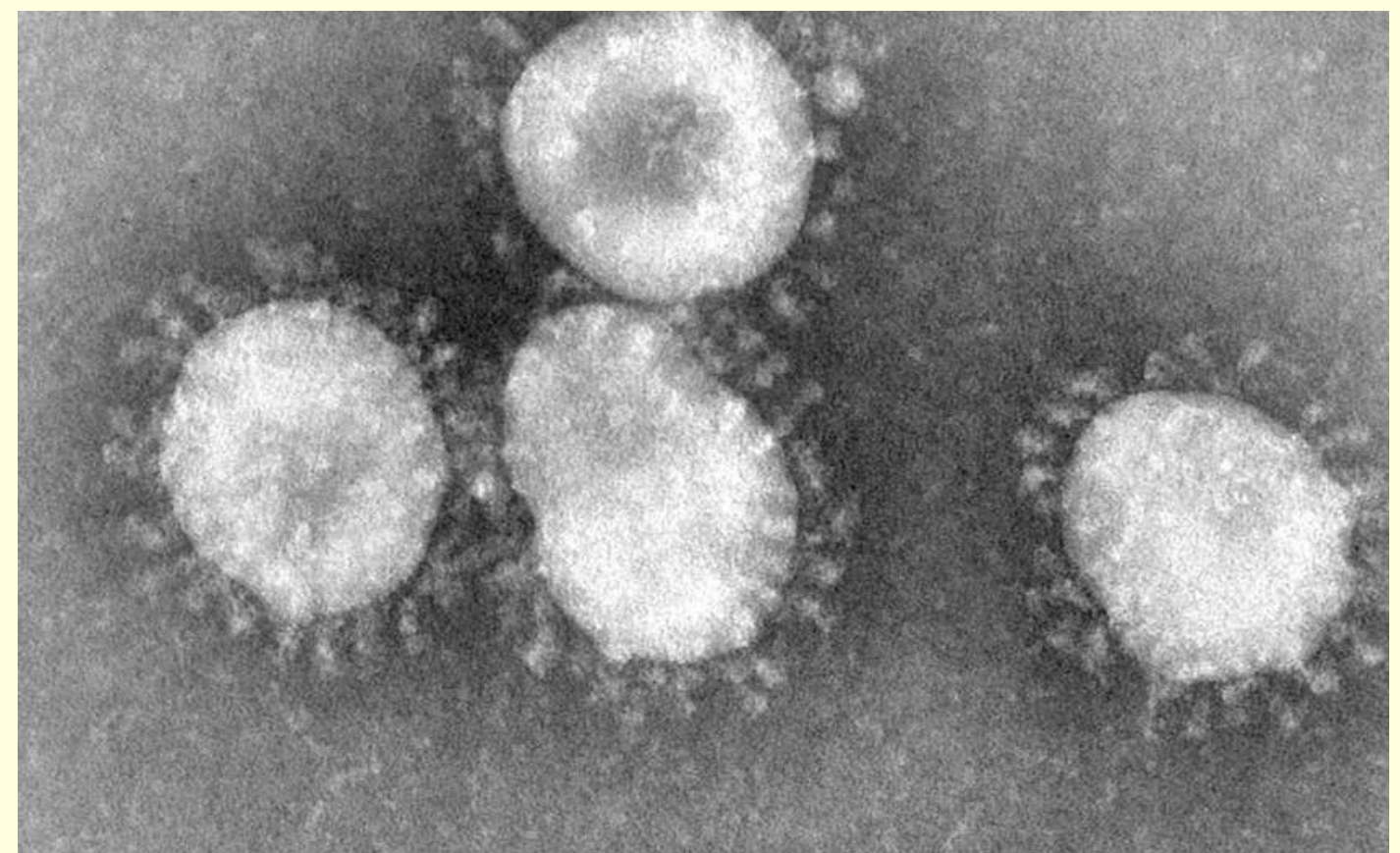
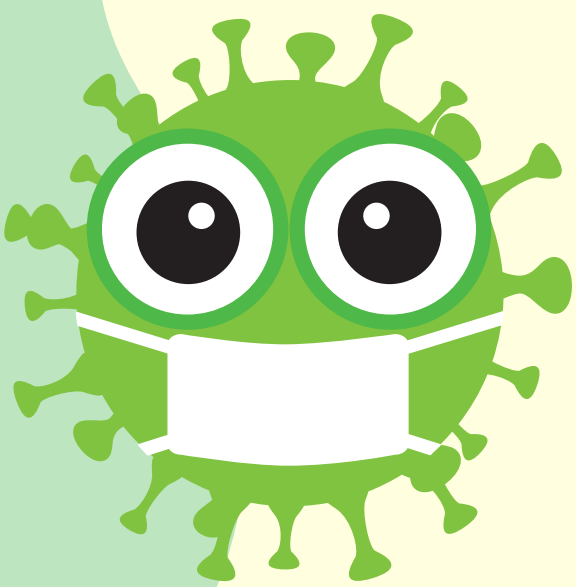
VIRUSES

- Viruses are the smallest of all the microbes.
- They are not made of cells (acellular), cannot make their own proteins and don't grow. Instead, they must infect a host cell and hijack its machinery to assemble new viruses.
- Viruses are usually only able to infect a limited number of species living organism. Bacteriophages are viruses that infect bacteria.





Most familiar corona virus



Microscopic view

**WHY DO WE NEED TO WASH
OUR HANDS?**

MUST - WASH YOUR HANDS



IMPRINTS OF UNWASHED HAND ON LB BROTH -
MICROBIAL GROWTH SEEN AFTER INCUBATION

IMPRINTS OF WASHED HAND
ON LB BROTH - MINIMAL MICROBIAL
GROWTH SEEN AFTER INCUBATION



Bacteria in the Cafeteria Game

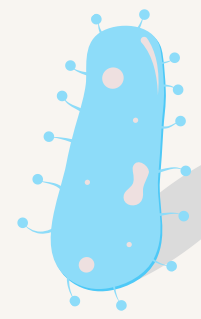
Some microbes make us sick. Most are helpful. Play this game to find out more about them.

 American Museum of Natural History

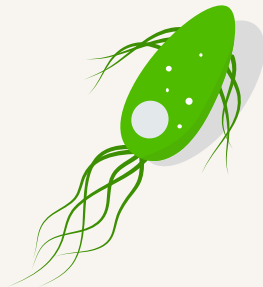
Cyanobacteria: make the oxygen

- Also known as blue-green algae.
- They are aquatic and photosynthetic.
- Help in nitrogen fixation in special cells called heterocysts.

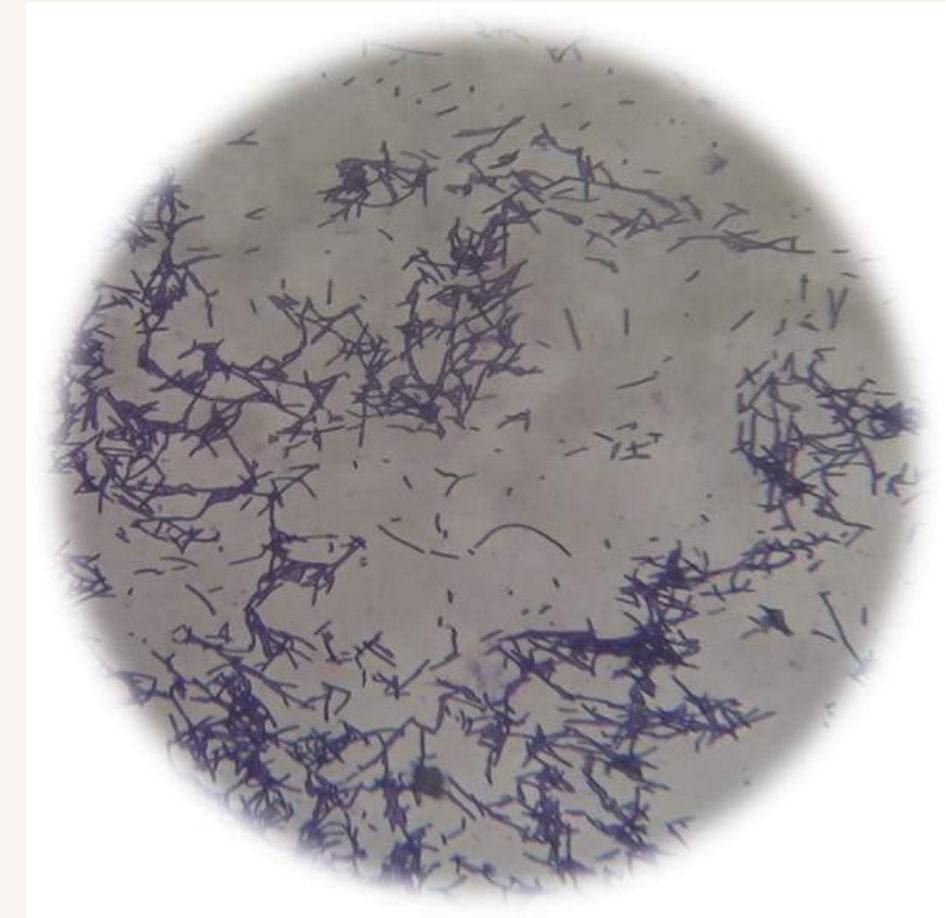


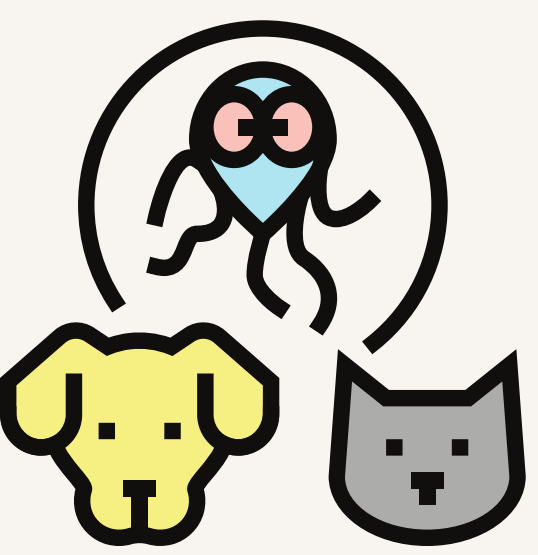


Lactobacillus : Yogurt production



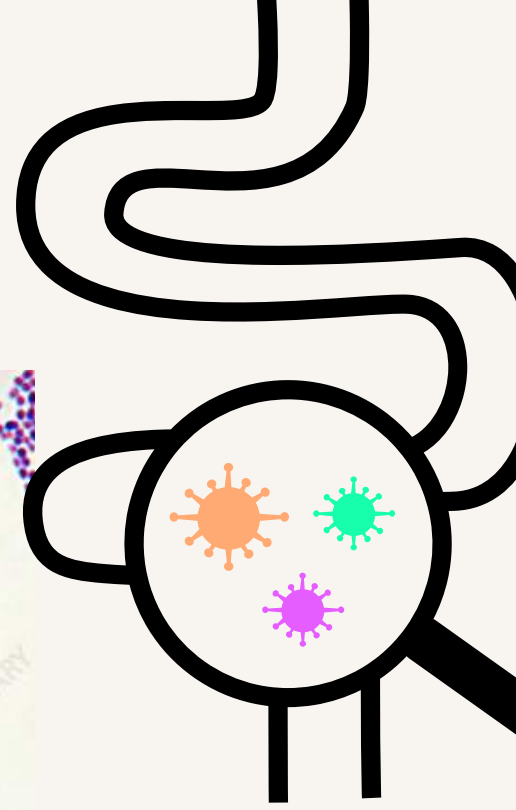
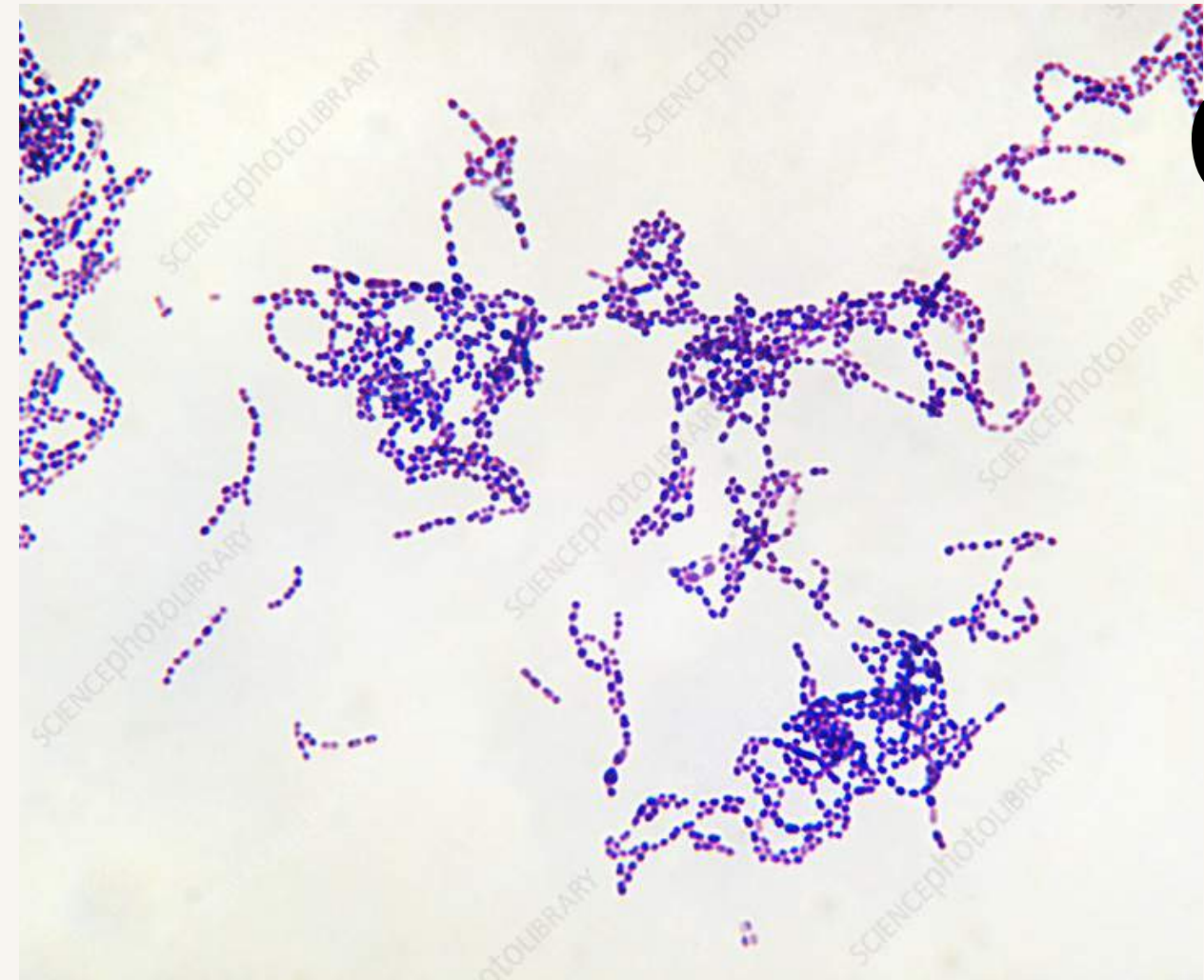
- It is found in human digestive and urinary tract.
- Rod shaped bacteria.





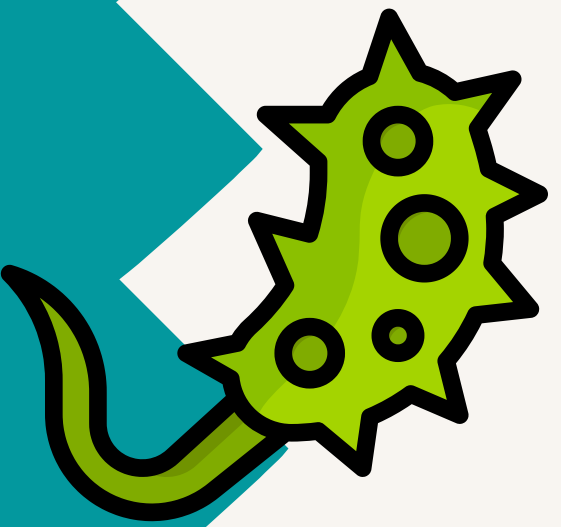
Streptococcus: Bacteria from bathroom

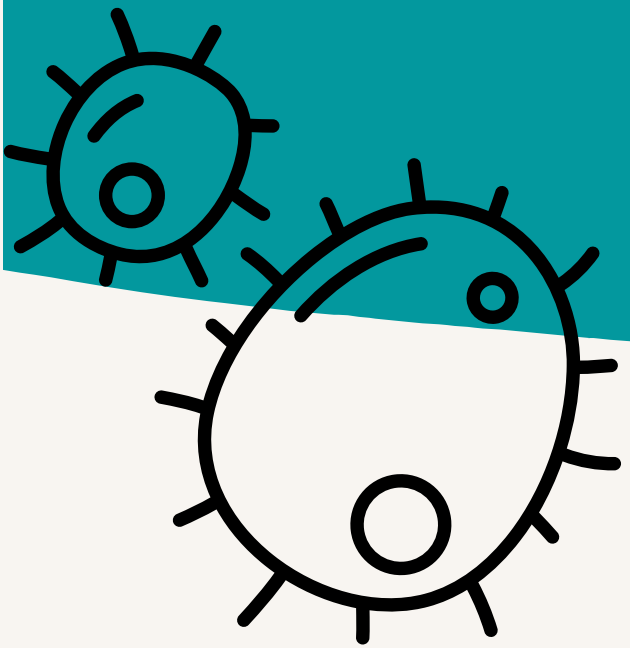
- Spherical bacteria
- It can cause diseases. Some of them are not pathogenic.
- Can also cause dental plaques..



Vibrio cholerae water borne disease.

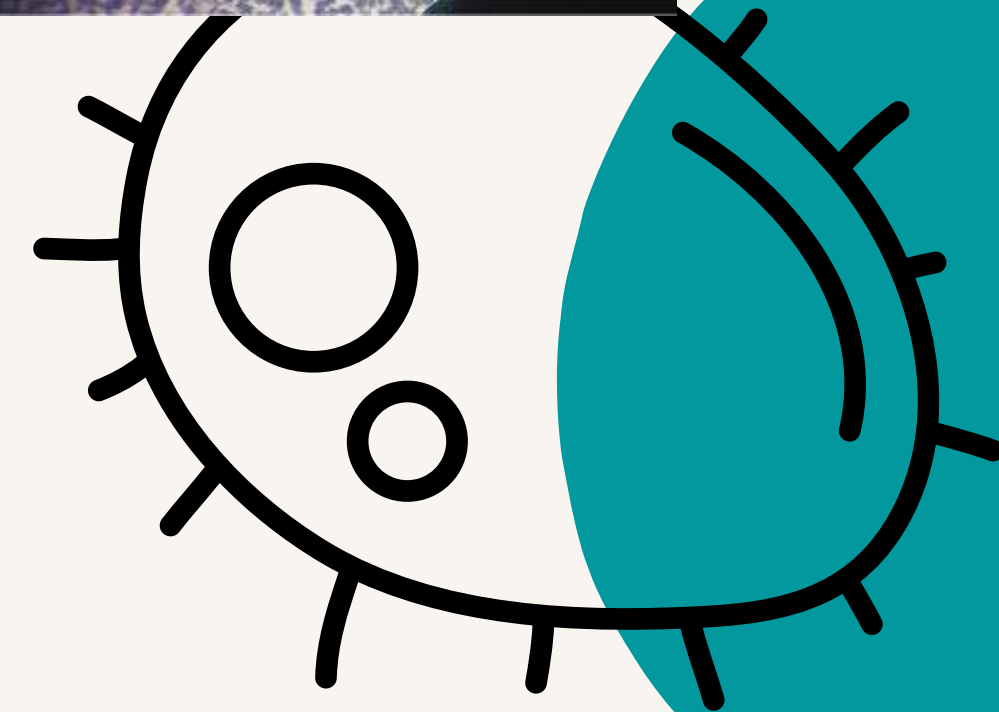
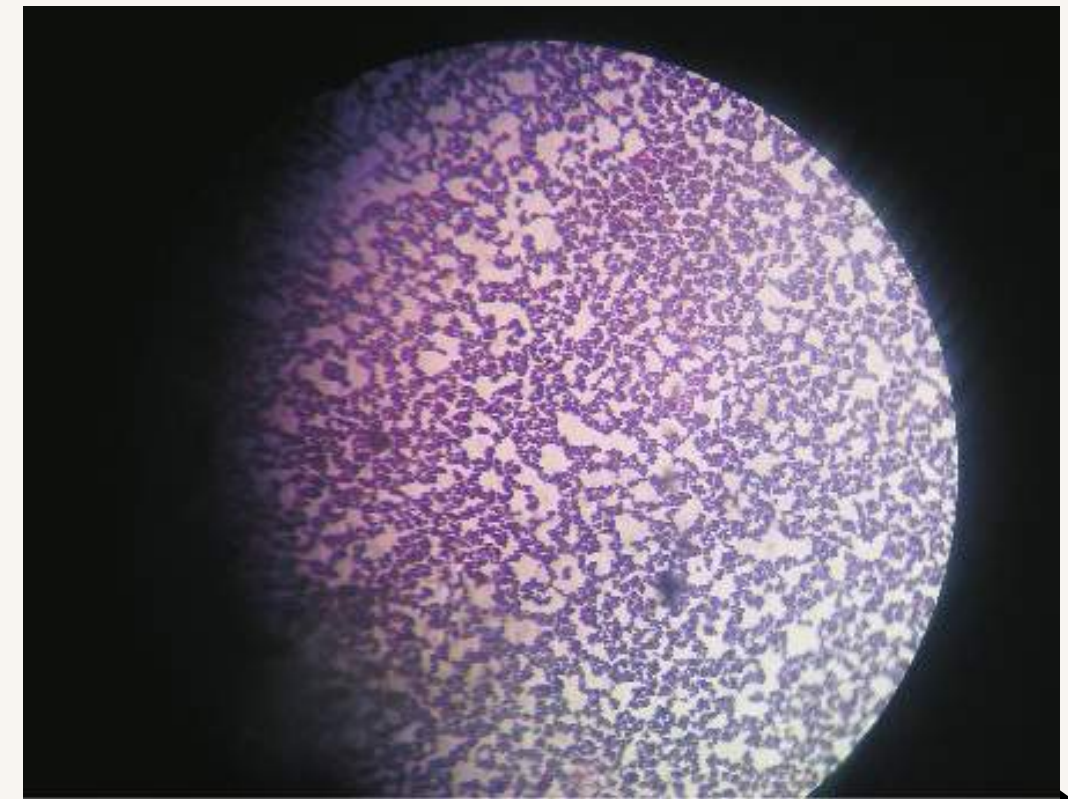
- Cholera is an diarrhoeal infection caused by ingestion of contaminated food or water with the bacterium *Vibrio cholerae*





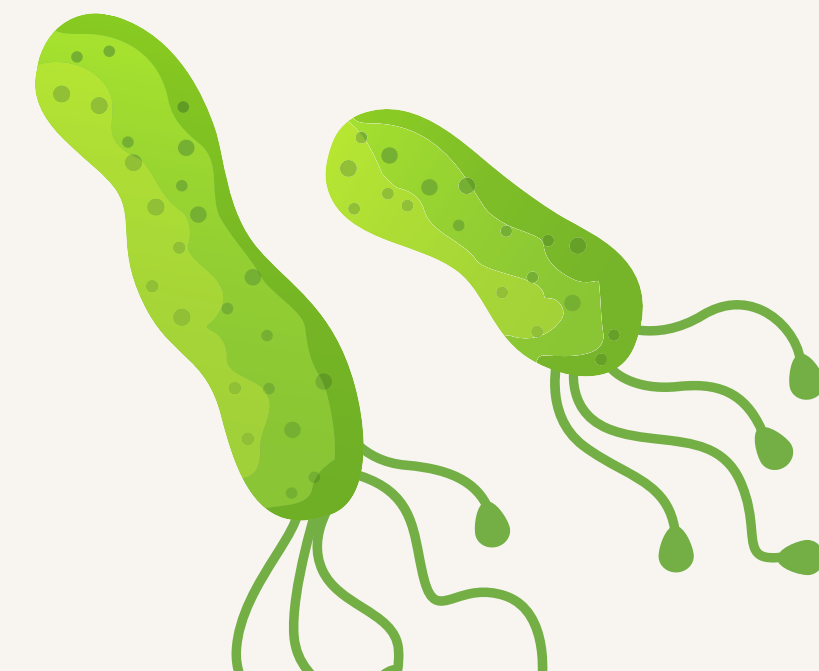
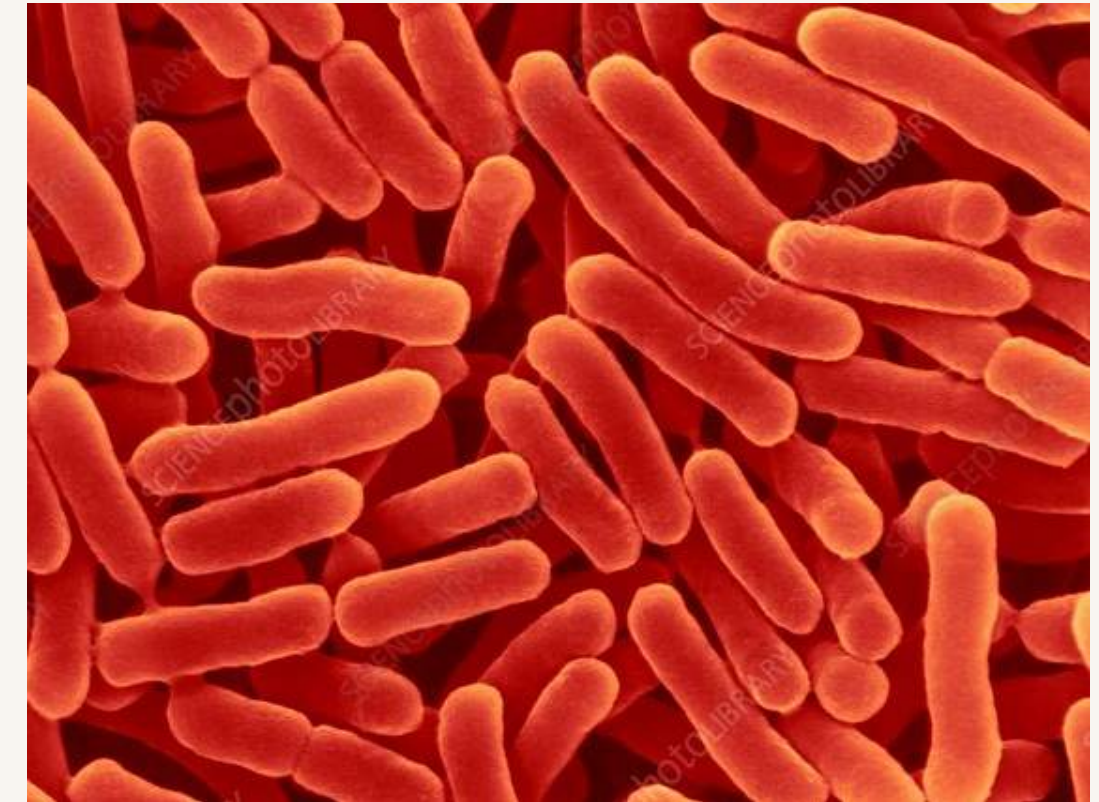
Staphylococcus: microbe that enters through a wound

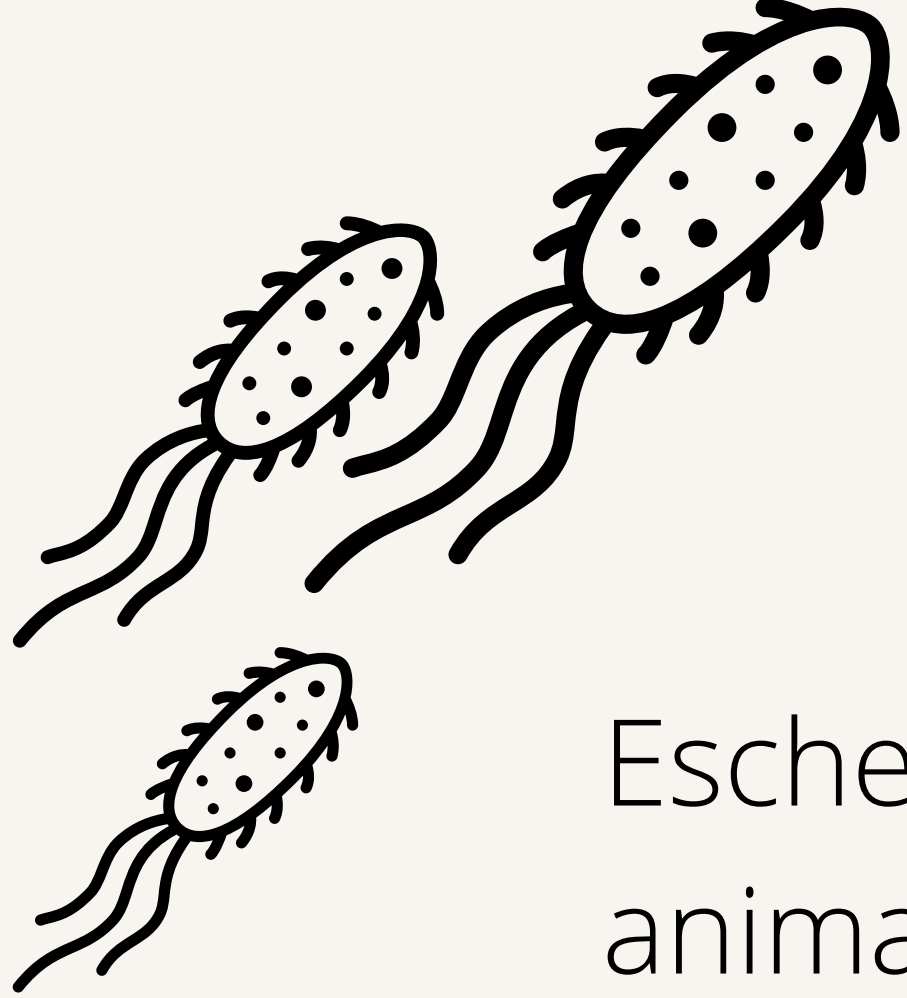
- Spherical in shape and is a group of Gram-positive bacteria.
- Causes skin infections.



Salmonella: bacteria in raw meat

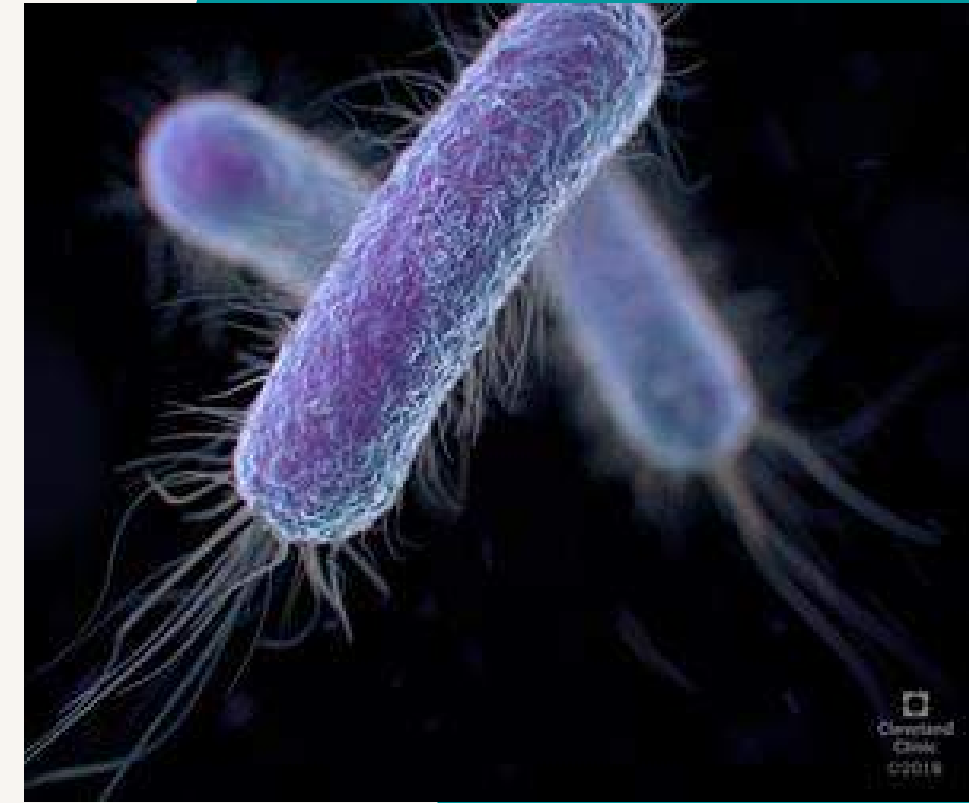
- Rod-shaped bacteria
- Can cause diseases like diarrhea, fever, and stomach pain.
- It spreads through contaminated food.





Escherichia coli: found in animal and human intestine

- Most of them are harmless, but some can cause diseases.
- Rod-shaped bacteria.



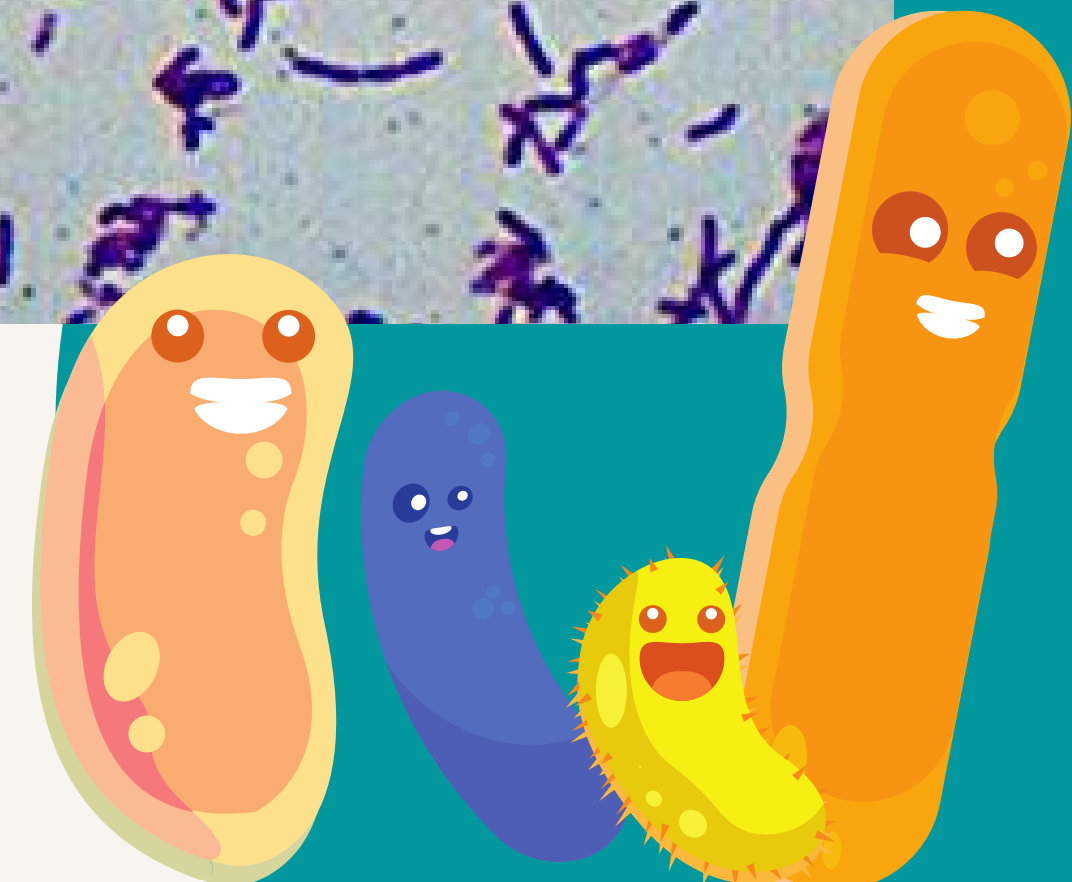
Pseudomonas : clean oil spillage

- Rod shaped Gram negative bacteria.
- Can cause diseases like pneumonia



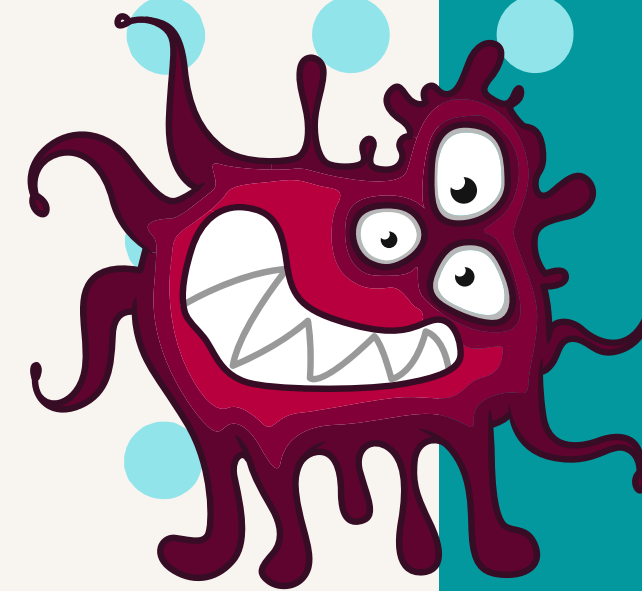
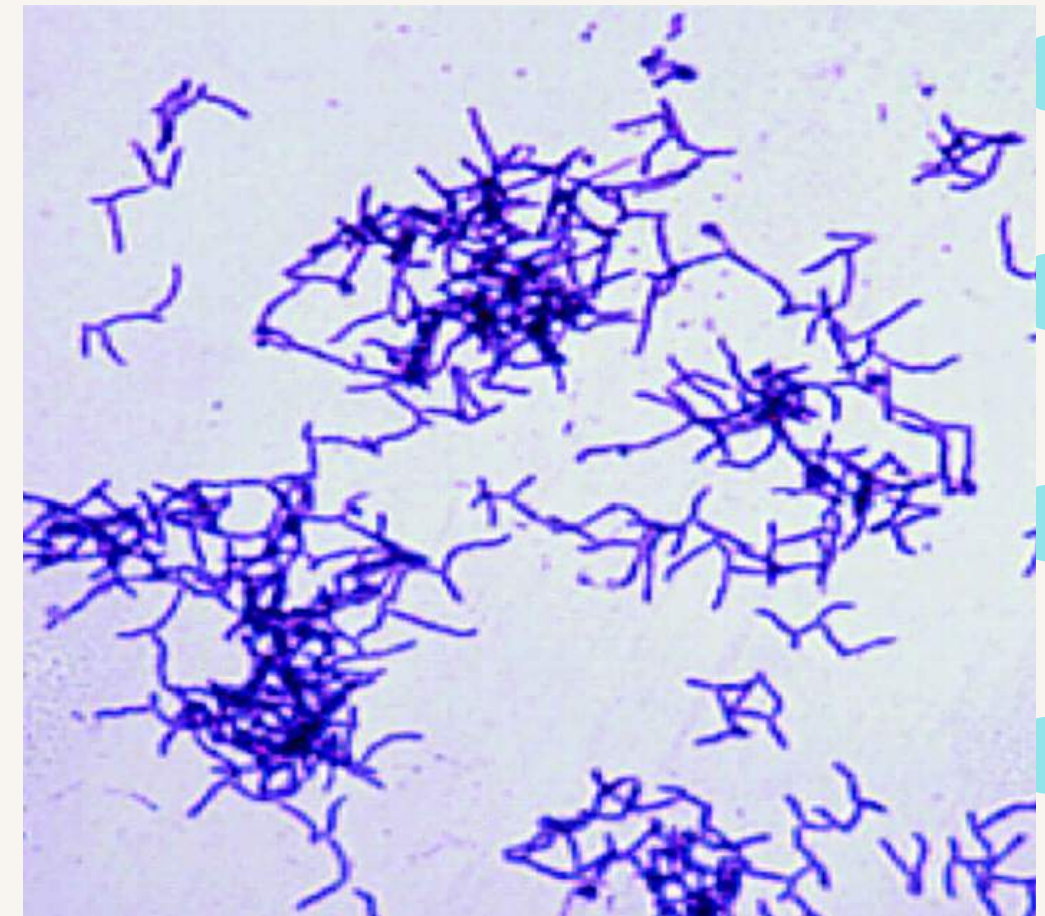
Bacillus :
decomposing bacteria

- rod shaped, Gram negative bacteria.
- express symbiotic relationship.



Actinomyces :
can cause dental plaques

- Most commonly found in nose and throat.
- Gram positive and can grow in anaerobic condition.
- It resembles fungi.



Find the microbes

U	H	N	I	P	S	S	U	L	L	I	C	A	B
A	S	A	L	M	O	N	E	L	L	A	U	A	B
L	A	C	T	O	B	A	C	I	L	I	I	S	L
A	A	A	S	A	E	C	C	B	C	E	T	A	E
O	L	C	N	I	C	Y	M	O	N	I	T	C	A
L	S	A	N	O	M	O	D	U	E	S	P	I	U
C	Y	A	N	O	B	A	C	T	E	R	I	A	P
S	U	C	C	O	C	O	L	Y	H	P	A	T	S
O	I	C	B	A	I	C	S	L	N	A	O	C	C
L	O	S	S	O	S	E	T	L	C	S	I	R	Y
A	B	O	R	A	C	I	S	O	T	E	O	C	L
L	A	N	M	Y	O	C	I	Y	L	E	M	I	T
V	I	B	R	I	O	C	H	O	L	E	R	A	E
U	S	T	R	E	P	T	O	C	O	C	C	U	S

CYANOBACTERIA
BACILLUS
SALMONELLA
LACTOBACILLIIS
VIBRIOCHOLERAEE
STAPHYLOCOCCUS
PSEUDOMONAS
STREPTOCOCCUS
ACTINOMYCIN

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