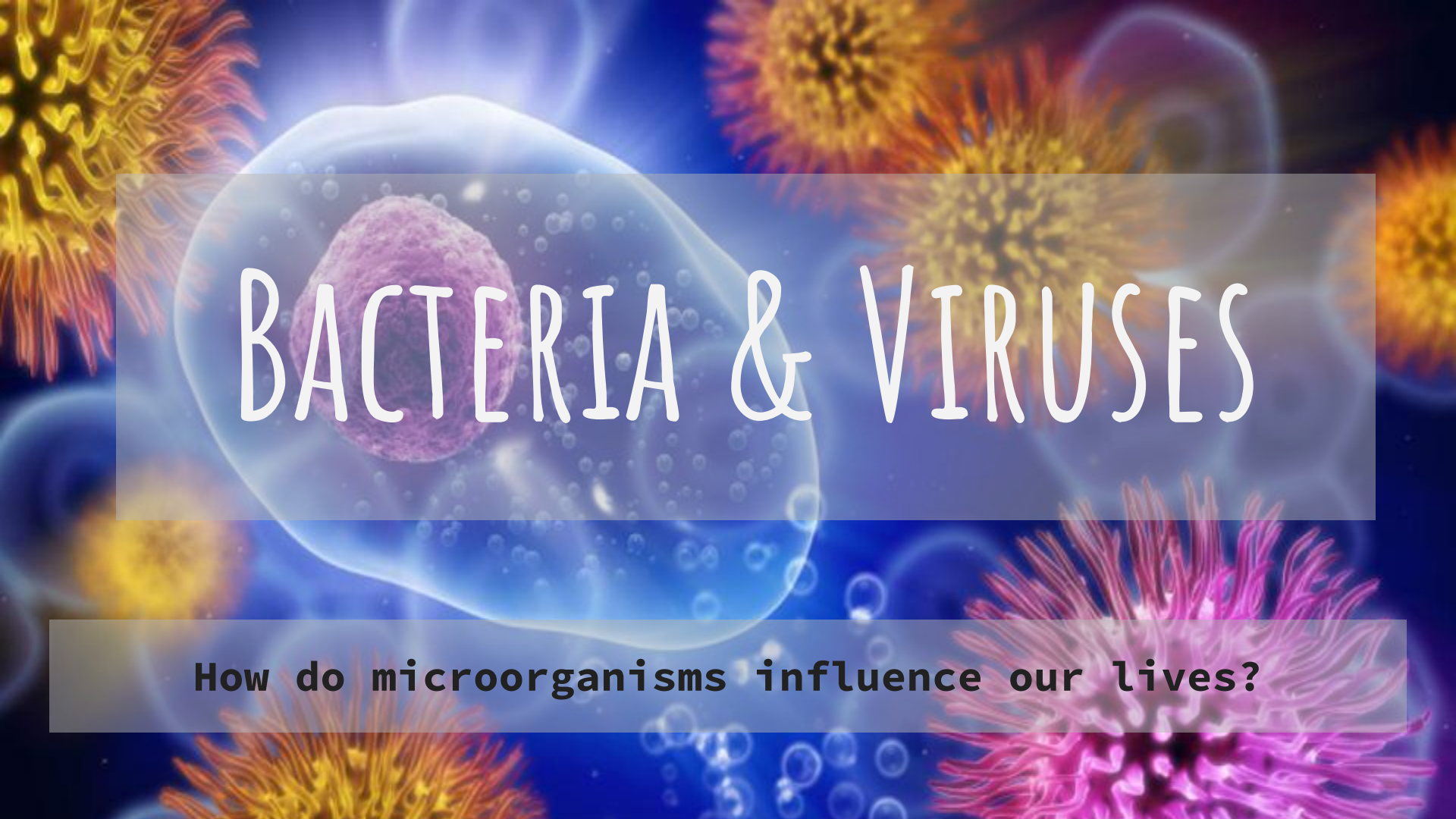


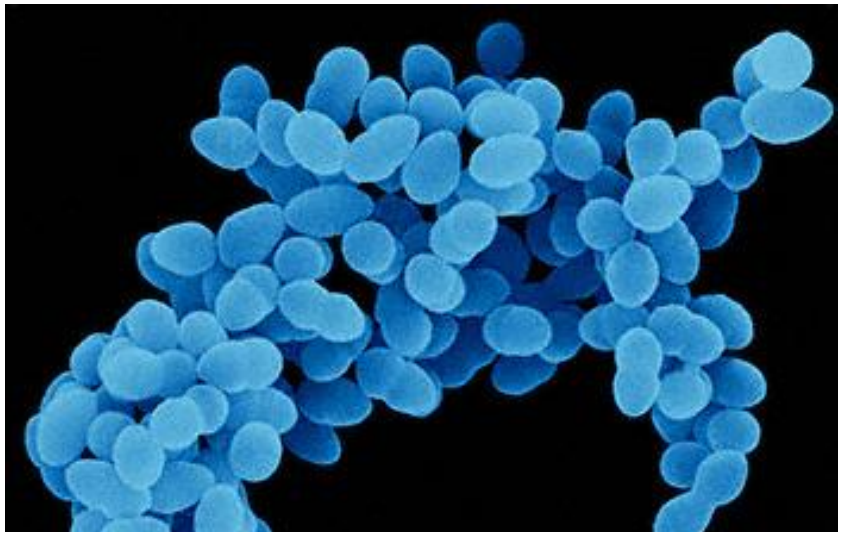
# Bacteria & Viruses

How do microorganisms influence our lives?

# Chapter 19.1: Bacteria

Microorganisms cover nearly every square centimeter of Earth.

**Prokaryotes**: the smallest and most common microorganism, unicellular (lack a nucleus)

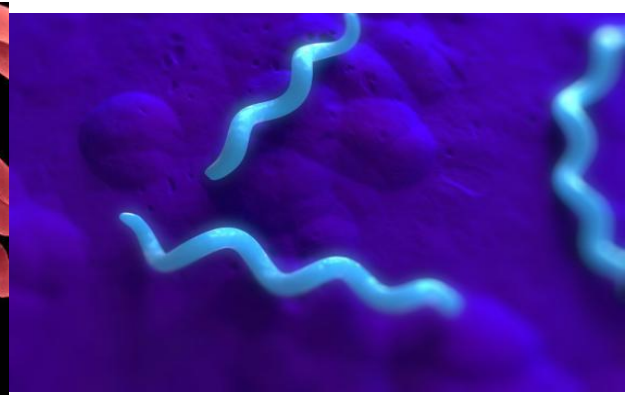


# IDENTIFYING PROKARYOTES:

1. ***Shape***

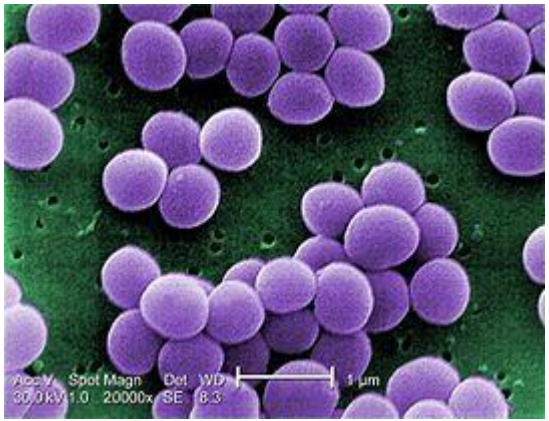
**<u>baccilli</u>:** Rod Shaped

(example: E. coli)



**<u>Spirilla</u>**: spiral or corkscrew shaped

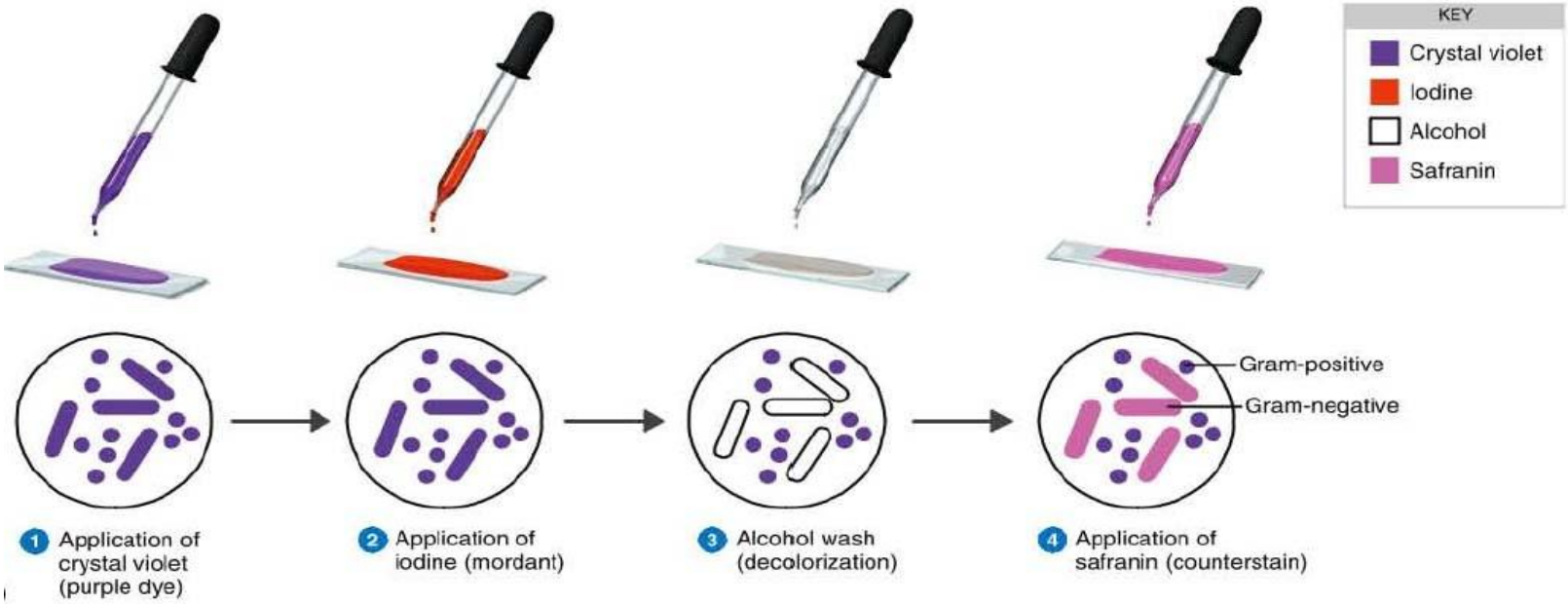
(example: syphillis)




**<u>cocci</u>**: sphere shaped

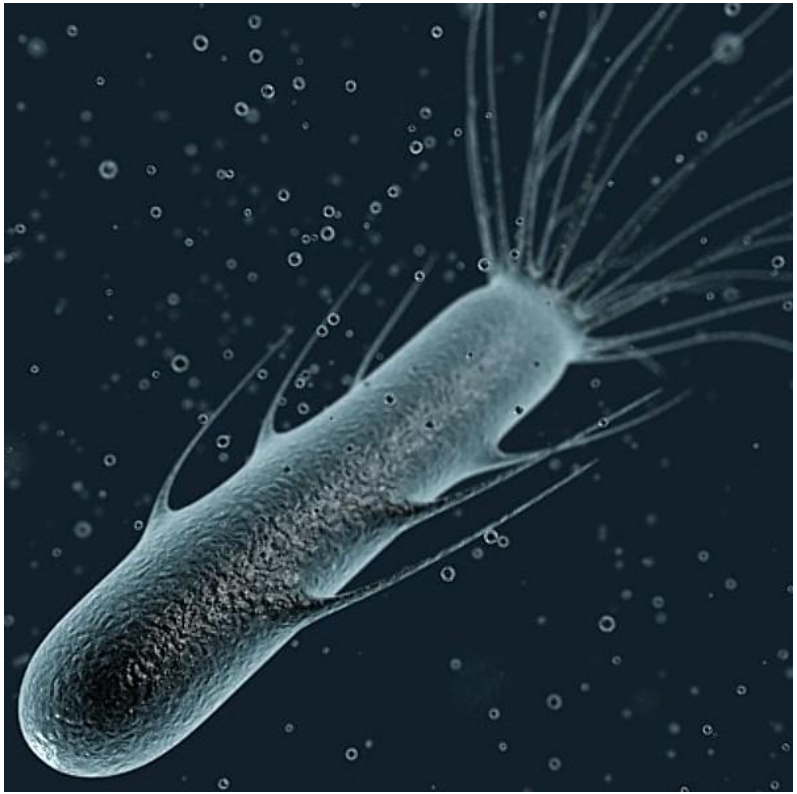
(example : gonorrhea)

2. <u>the Gram staining method</u>: cell walls which contain peptidoglycan can be determined by a violet stain..




2nd stain (counterstain) is red shows the Gram- negative bacteria making them appear pink or light red

3. **Movement** also can tell use what kind of prokaryote they are.



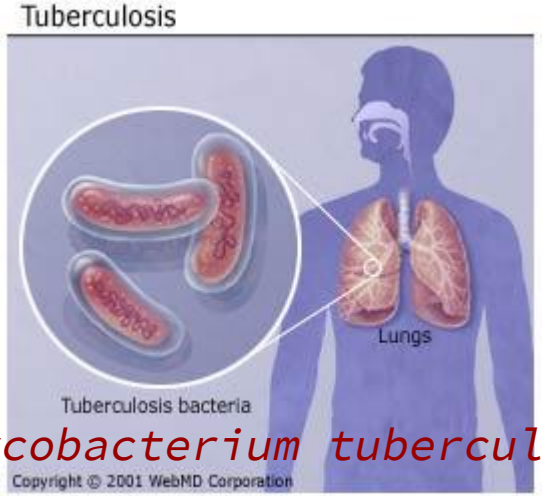
***Flagella***: whip-like structure, used for movement.

# Metabolic diversity

The ways in which bacteria obtain energy and whether they use oxygen for cellular respiration

| Mode of Nutrition | Energy Source | Carbon Source | Types of Organisms |
|---|---|---|---|
| **Autotroph** | | | |
| Photo-autotroph | Light | $CO_2$ | Photosynthetic prokaryotes, including cyanobacteria; plants; certain protists (algae) |
| Chemo-autotroph | Inorganic chemicals | $CO_2$ | Certain prokaryotes (for example, *Sulfolobus*) |
| **Heterotroph** | | | |
| Photo-heterotroph | Light | Organic com-pounds | Certain prokaryotes |
| Chemo-heterotroph | Organic com-pounds | Organic com-pounds | Many prokaryotes and protists; fungi; animals; some parasitic plants |

Energy is released by cellular respiration or fermentation or both.




*mycobacterium tuberculosis*

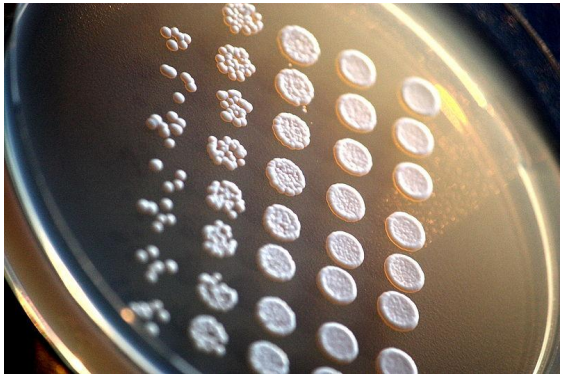
*clostridium botulinum*

**Obligate aerobes**: organisms that require a constant supply of oxygen

**obligate anaerobes**: must live in the absence of oxygen, they are killed by it!

**Facultative anaerobes**:do not require oxygen but are not killed by it either.

They can switch between cellular respiration & fermentation!

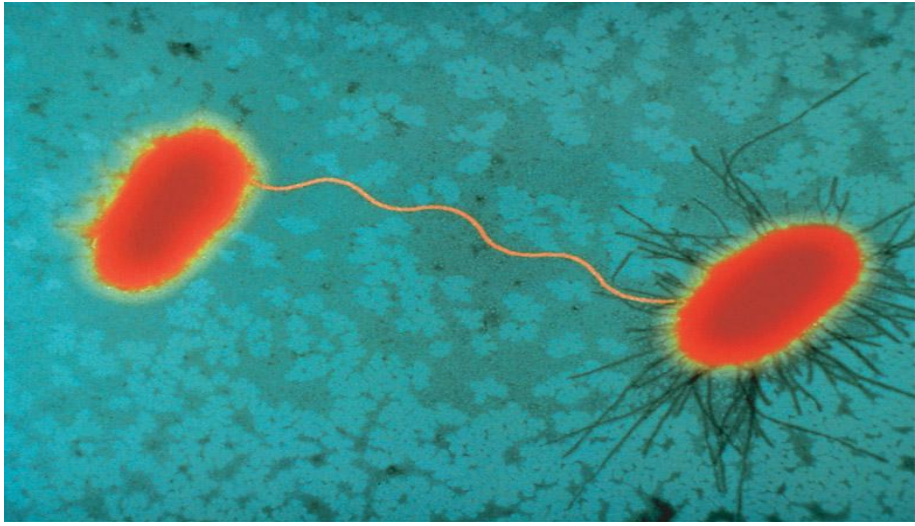


*Saccharomyces cerevisiae*

# GROWTH & REPRODUCTION

**Binary Fisson**: when a bacterium has doubled in size, it replicates its DNA and divides in half.

**Conjugation**: the exchange of genetic information by a hollow bridge



# GROWTH RATES

Some bacteria grow astonishingly quickly, some divide every 20 minutes!

Food and waste production limit bacteria from taking over the world...