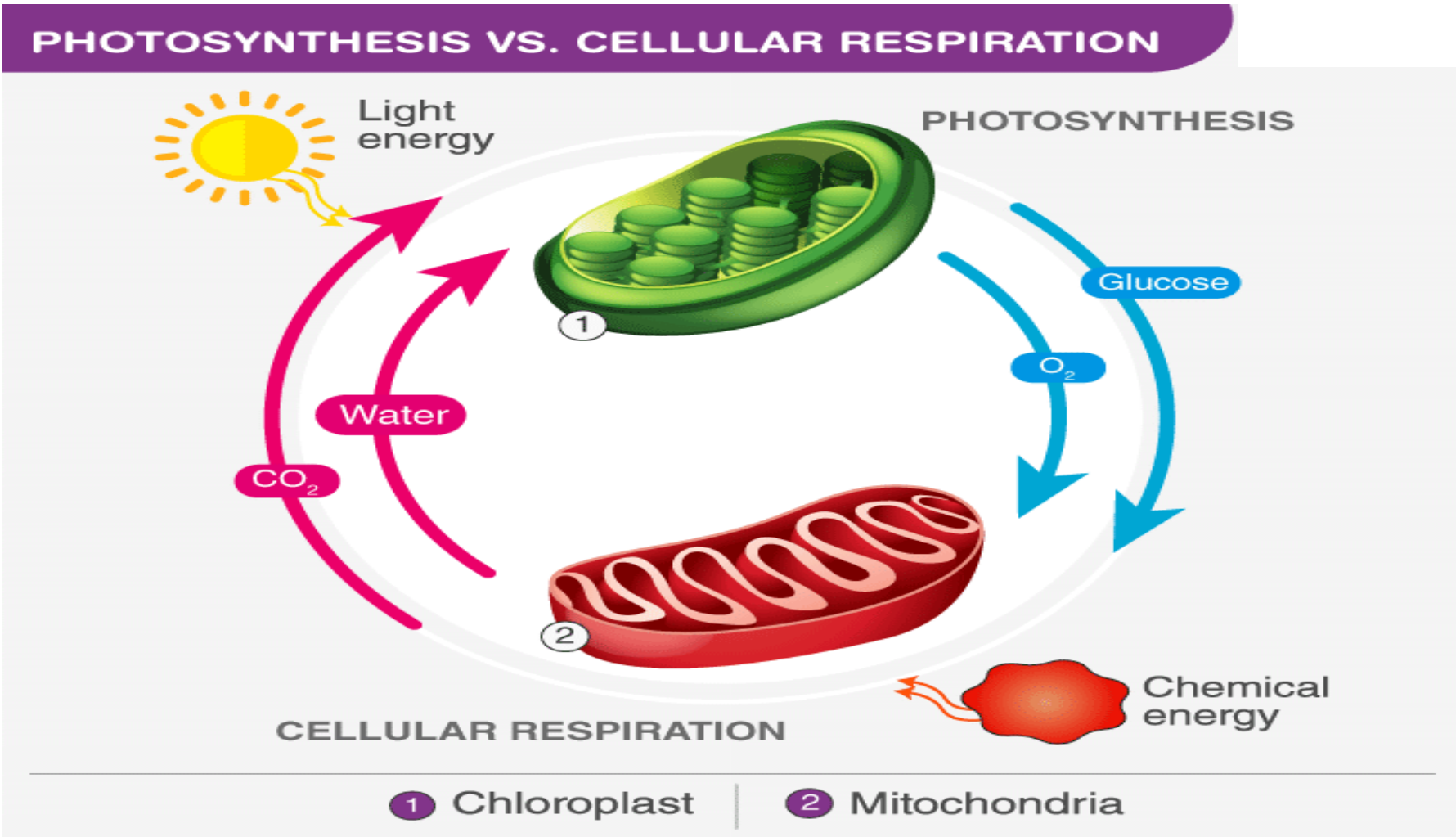
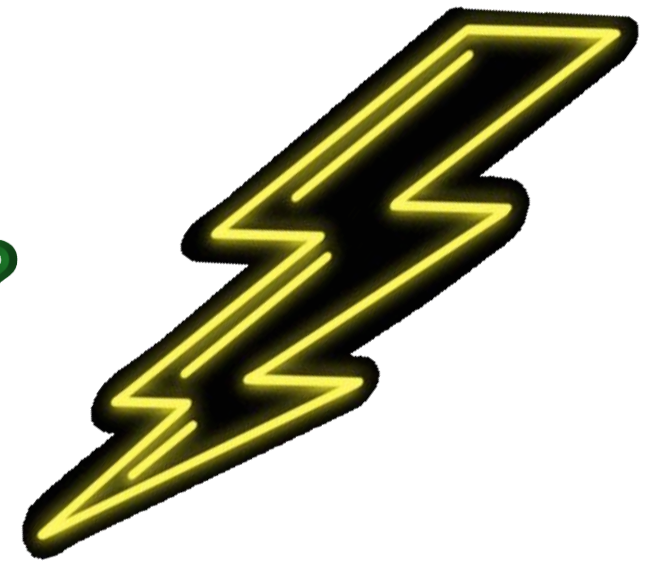


C.H.A.R.G.E.R.

How do Bacteria obtain ENERGY ?

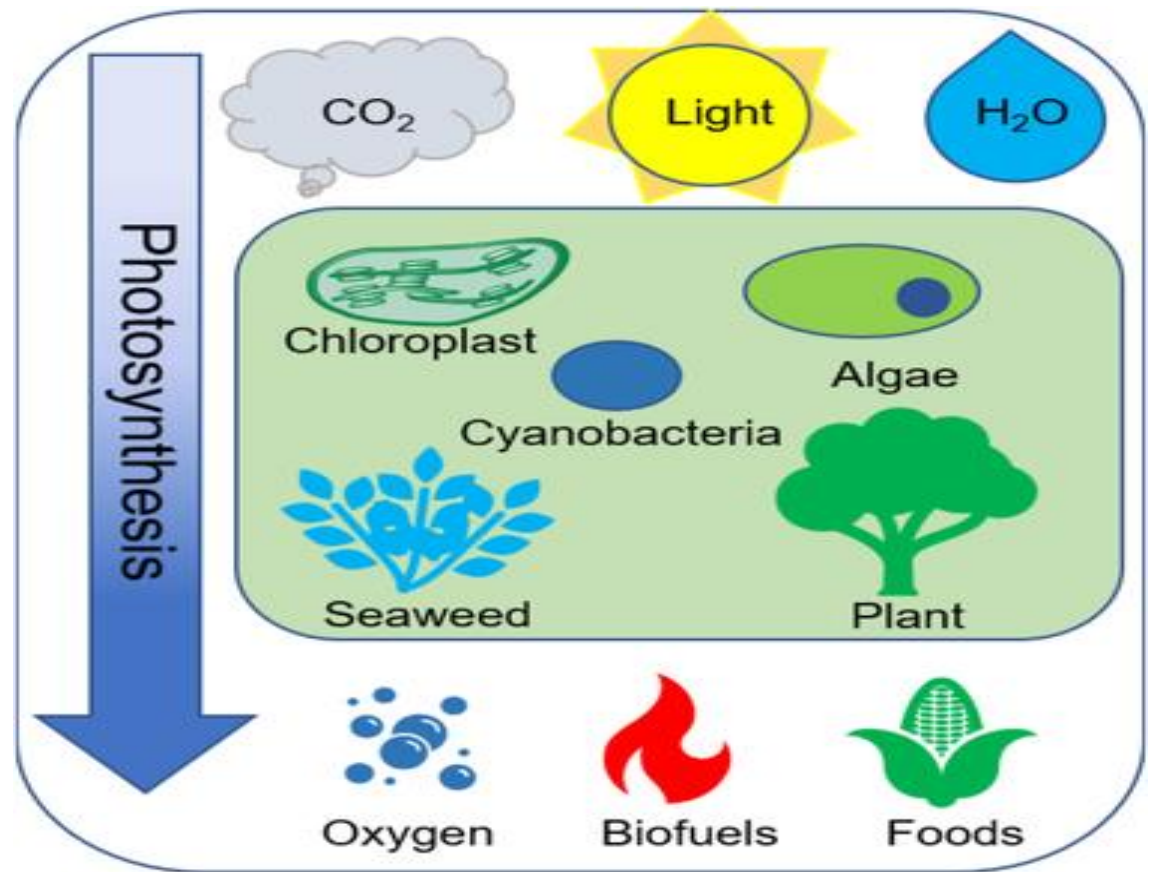


1. HOW TO GET FOOD ?



A) AUTOTROPHIC BACTERIA

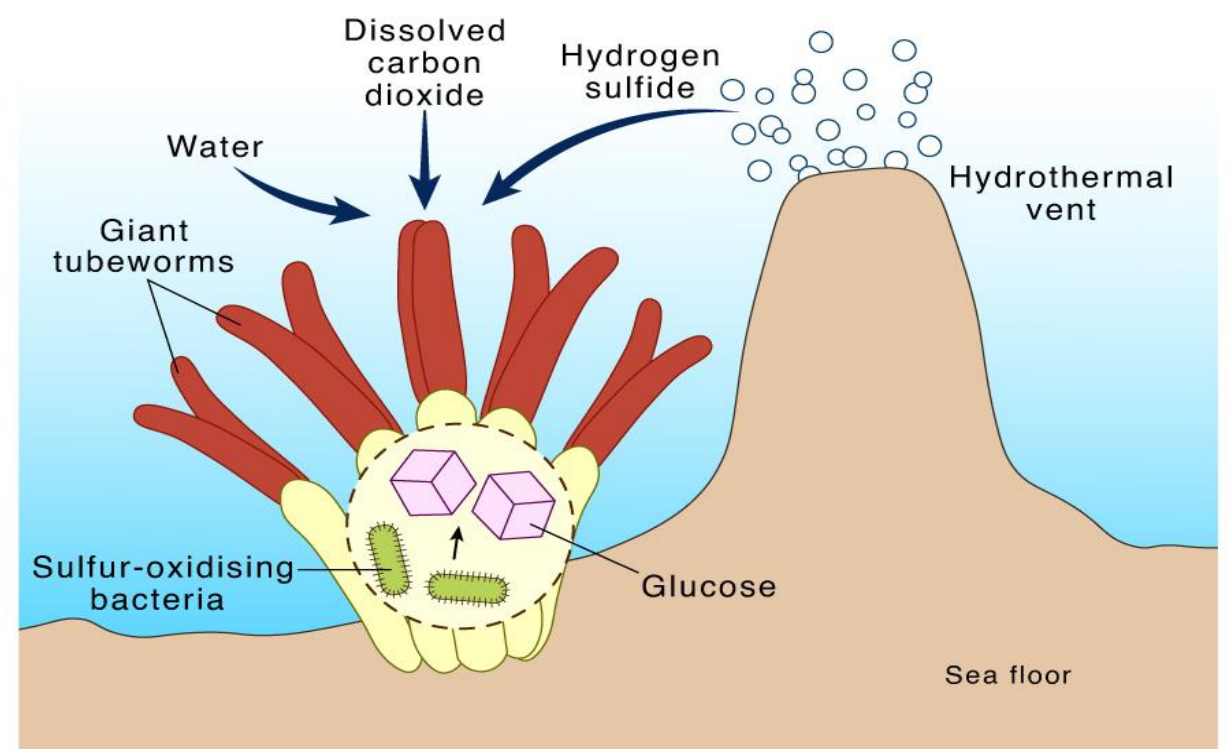
↑
SELF ↑
NOURISHER



Either way: Once you make your own food then you burn it to release energy for your own cellular processes.

Chemosynthesis

ScienceFacts.net



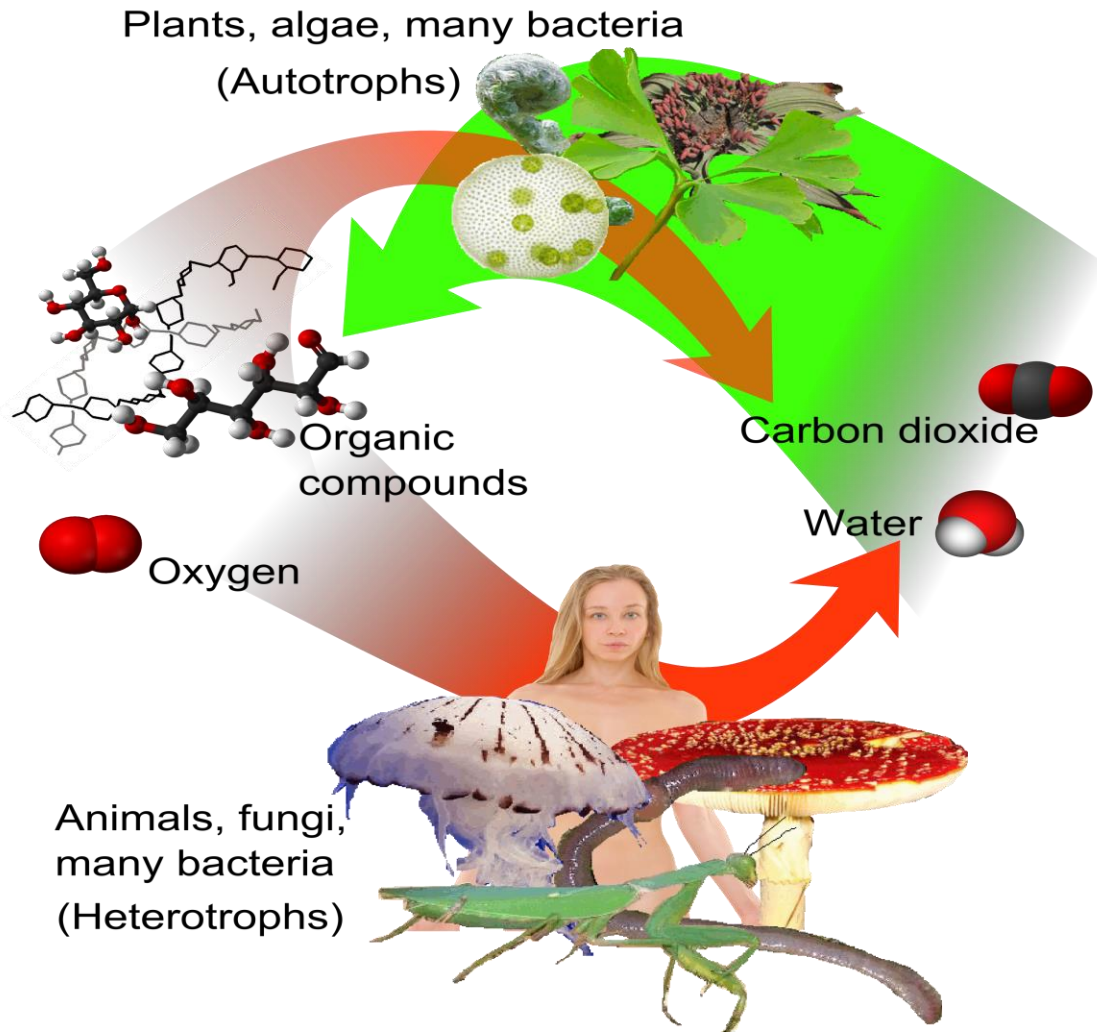
Can take low energy CO_2 , H_2O and harness Light Energy to run reactions to make high energy Sugar and Oxygen

The process of harnessing chemical energy from inorganic compounds to produce high energy organic compounds like Sugar.

B) HETEROTROPHIC BACTERIA

↑
DIFFERENT ↑
NOURISHER

Organisms that have to take in **ORGANIC** compounds (food) from a different source



AUTOTROPH

VS

HETEROTROPH

PRODUCERS

CONSUMERS

Produce their own food for energy. Use Photosynthesis or Chemosynthesis

Eat other organisms to get proteins and energy



Sun



Grass
Photosynthesis



Grasshopper



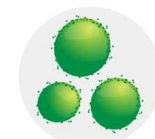
Toad



Plants



Some
bacteria



Algae



Animals

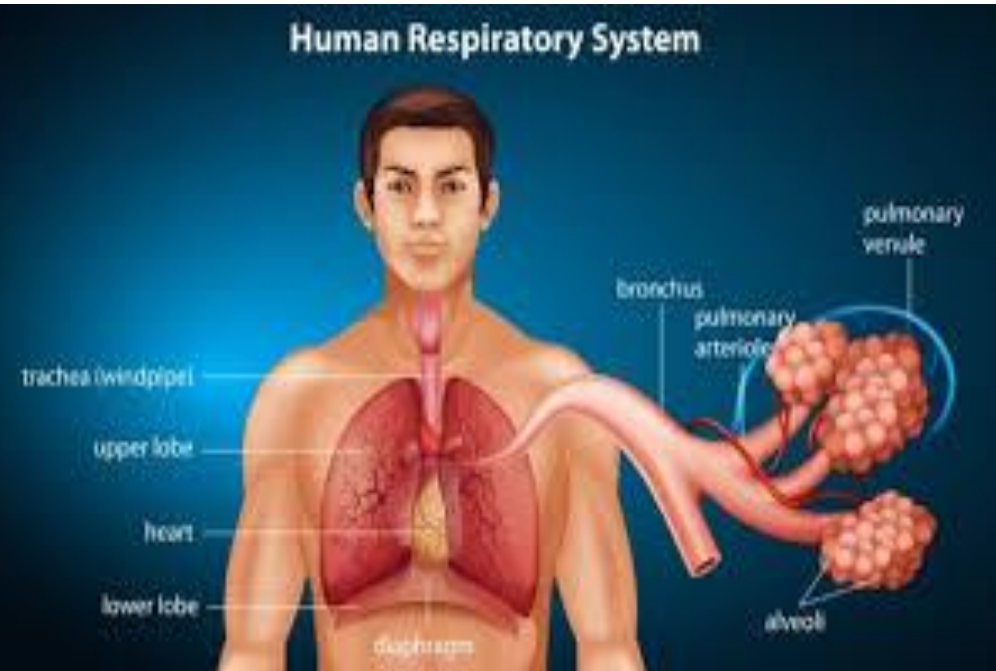


Most
bacteria

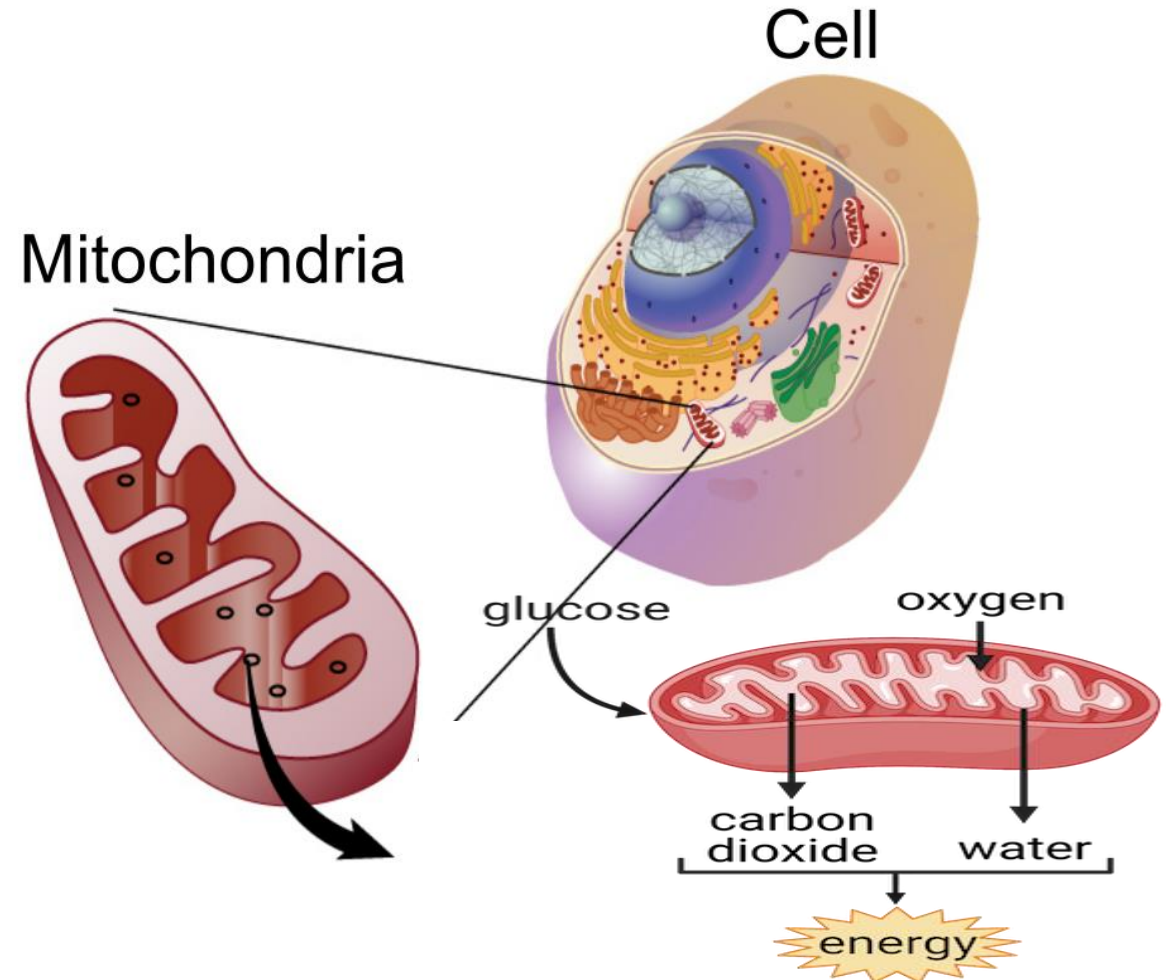


Fungi

2. HOW TO GET GASSES ? - RESPIRATION



To run most energy releasing cellular reactions some organisms also need to take in Oxygen

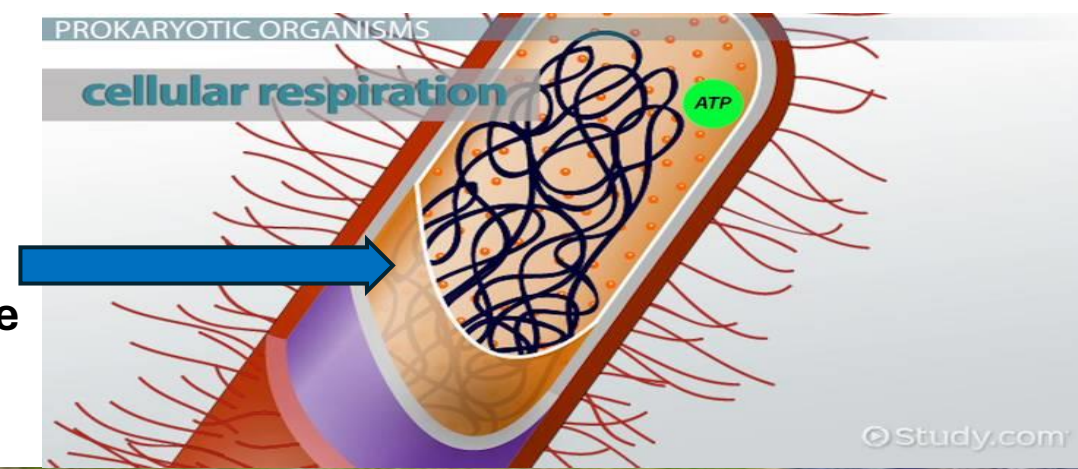


THREE CATEGORIES

A) Like us some Bacteria are **OBLIGATE AEROBES**

They require a supply of oxygen to stay alive and run their metabolic (cellular) reactions

These bacteria will use enzymes in their cell membrane to burn the food with Oxygen



B) Some bacteria are the opposite, they can survive and grow without Oxygen. Some of these species, are actually, poisoned by Oxygen. All of these are classified as

OBLIGATE ANAEROBES

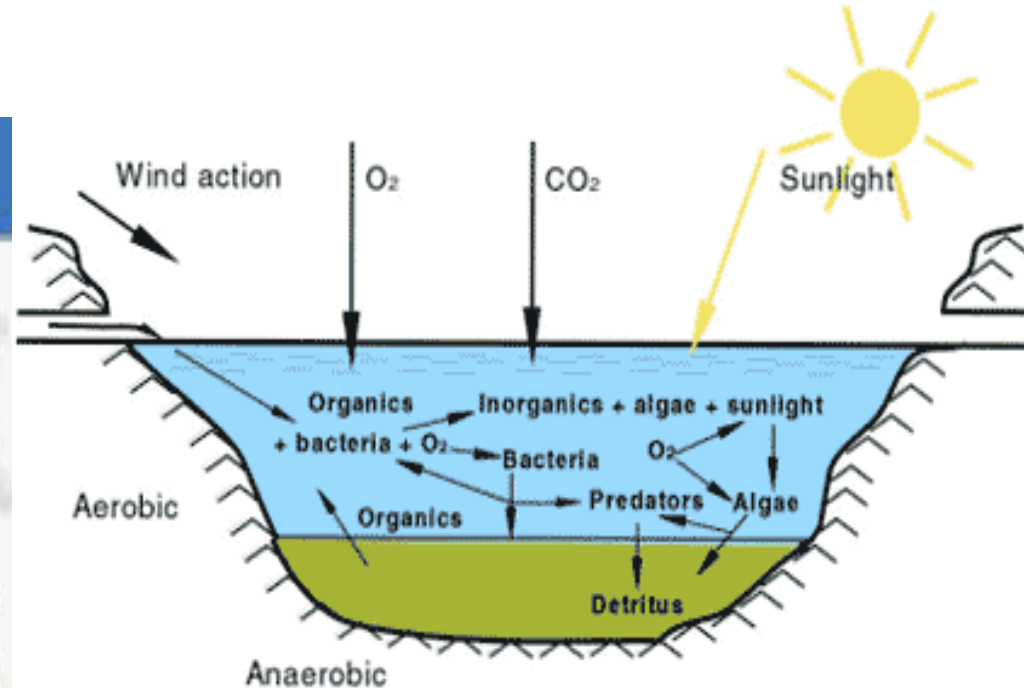


Anaerobic bacteria



Anaerobic bacteria are bacteria that can live in the absence of molecular oxygen.

Clostridium botulinum is an obligate anaerobic bacterium

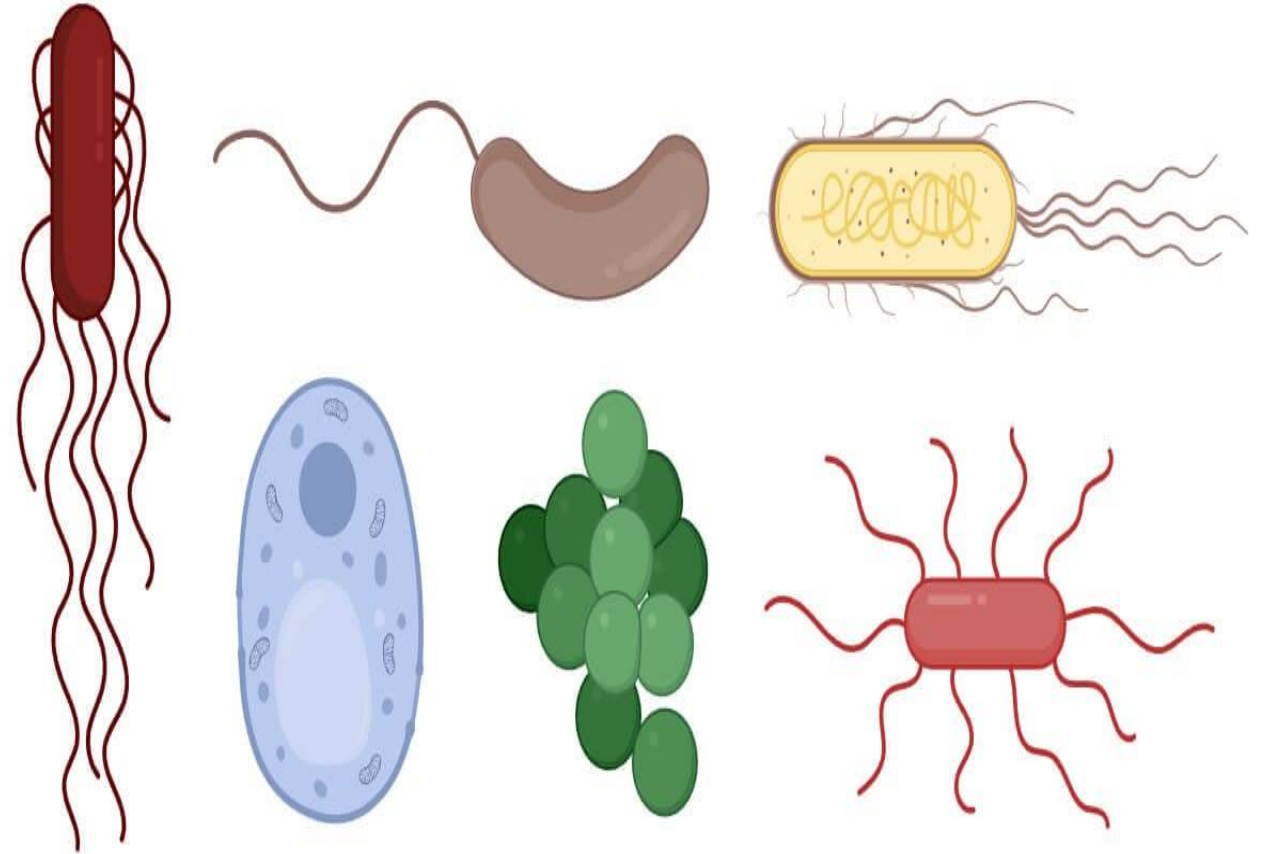


C) The third group are the **FACULTATIVE ANAEROBES**

They have the best of both worlds they can run their cellular reactions with Oxygen or without Oxygen.



Facultative Anaerobes



These bacteria can virtually live in almost every environment on the surface of Planet Earth.

C.H.A.R.G.E.R.

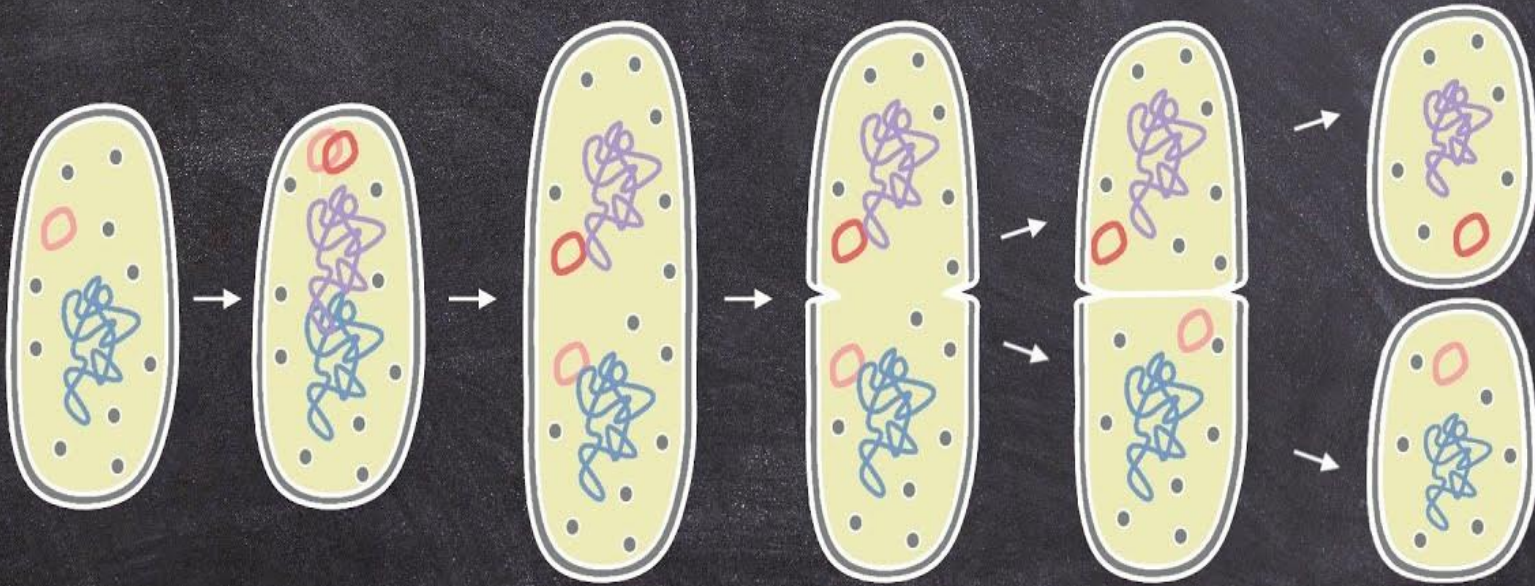


3. HOW DO THEY **R**EPRODUCE?



A) Main method is **BINARY FISSION**

BINARY FISSION



This is a very simple and **FAST** method of reproduction. It requires that the DNA and Plasmid DNA be copied and then the cell divides into **TWO** daughter cells that are clones of each other.

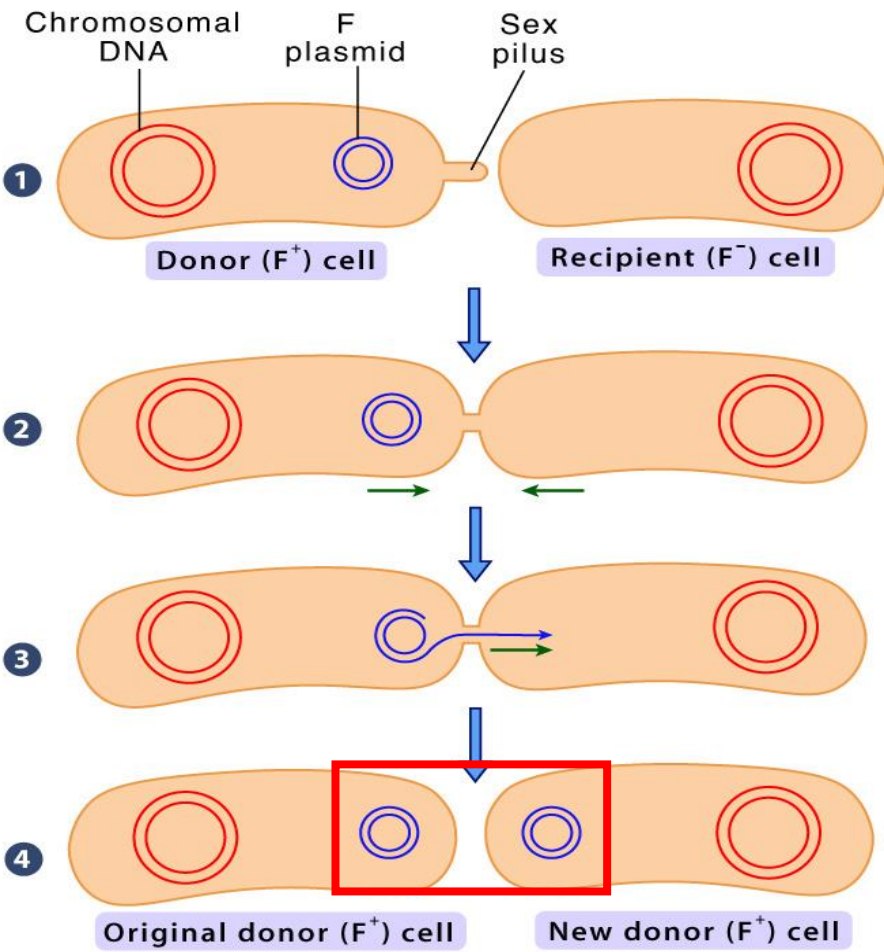
If a small colony of bacteria containing 4 bacteria undergo binary fission every 20 minutes how many bacteria will there be after 2 hours, if space, food etc is optimal to maintain this rate of division?

- What is the biggest disadvantage of this method of reproduction when it comes to **SURVIVAL OF THE FITTEST** ?

B) Some species of Bacteria spice it up with some CONJUGATION

Bacterial Conjugation

ScienceFacts.net



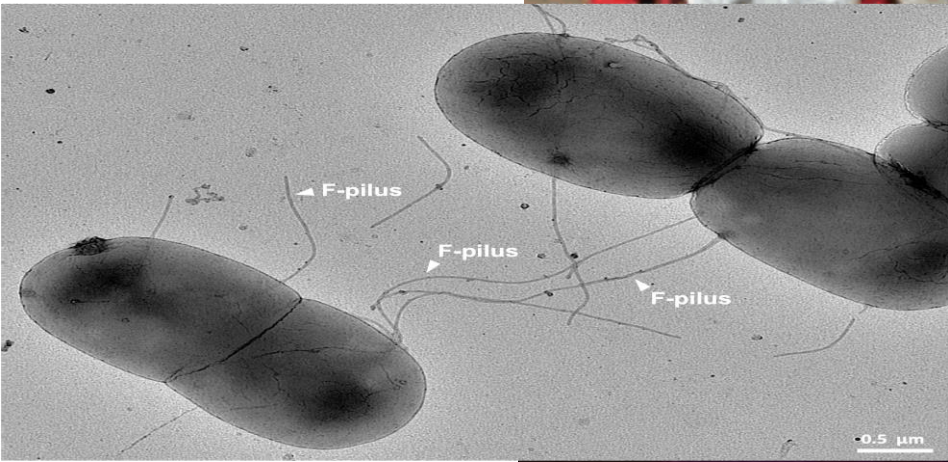
F⁺ cell produces sex pilus that extends towards the F⁻ cell

Sex pilus connects F⁺ and F⁻ cells

Replication and transfer of F plasmid through the sex pilus

Complementary strand synthesis and forming a new donor F⁺ cell

A form of sexual reproduction whereby the Plasmid DNA from one bacteria is replicated and transferred to the other bacterium



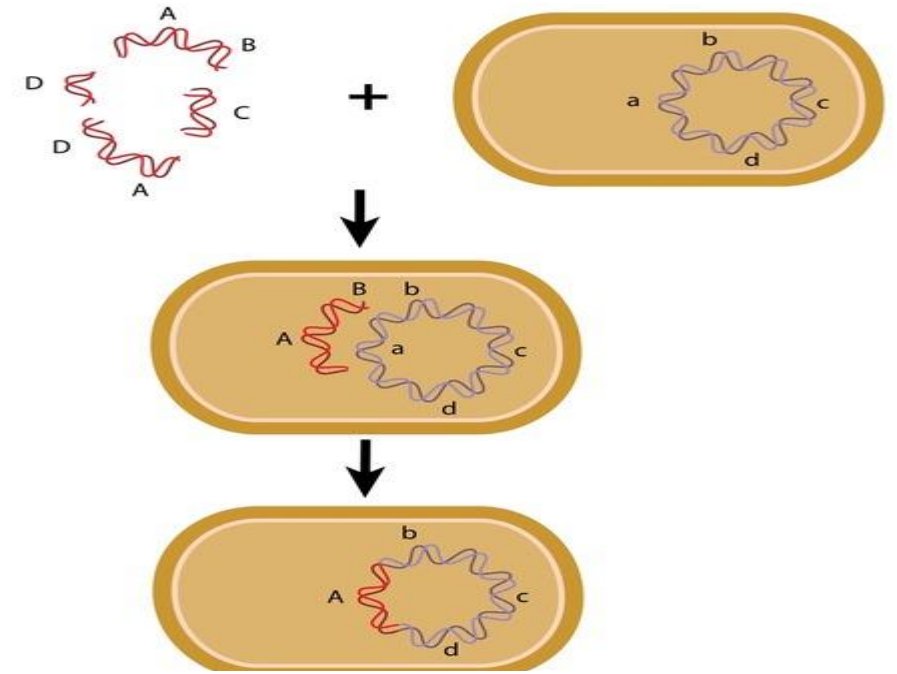
MORE DIVERSITY

Another method that bacteria use to create more diversity to ensure their survival is

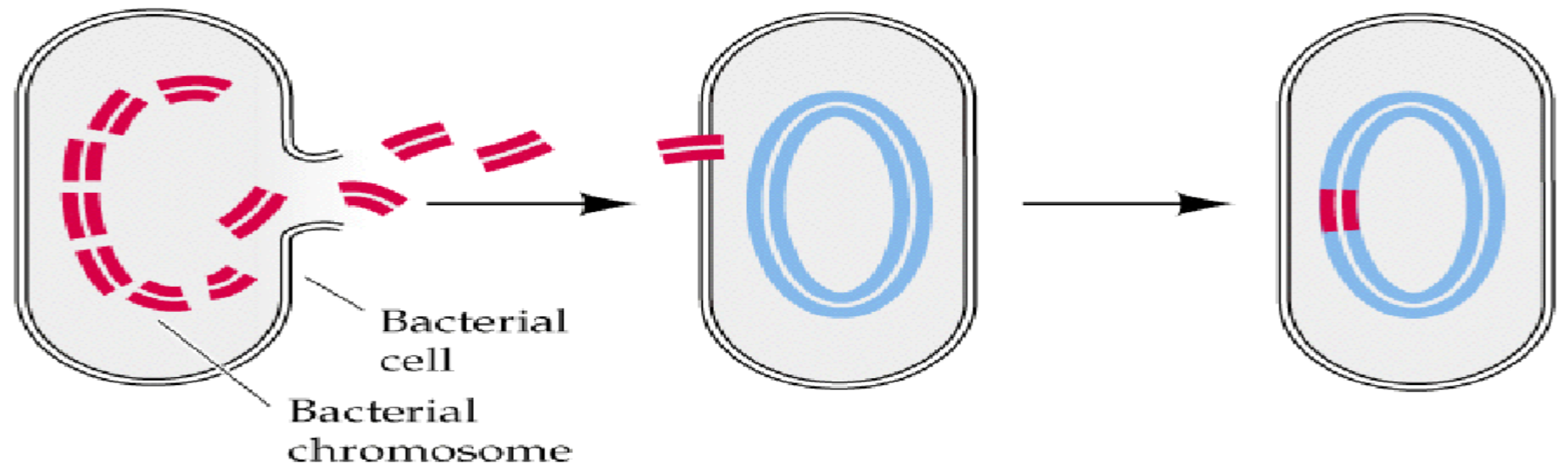
BACTERIAL TRANSFORMATION.

During this process, bacteria will take in stray DNA from dead bacteria and incorporate that DNA into their own DNA

Genetic Transformation



Transformation



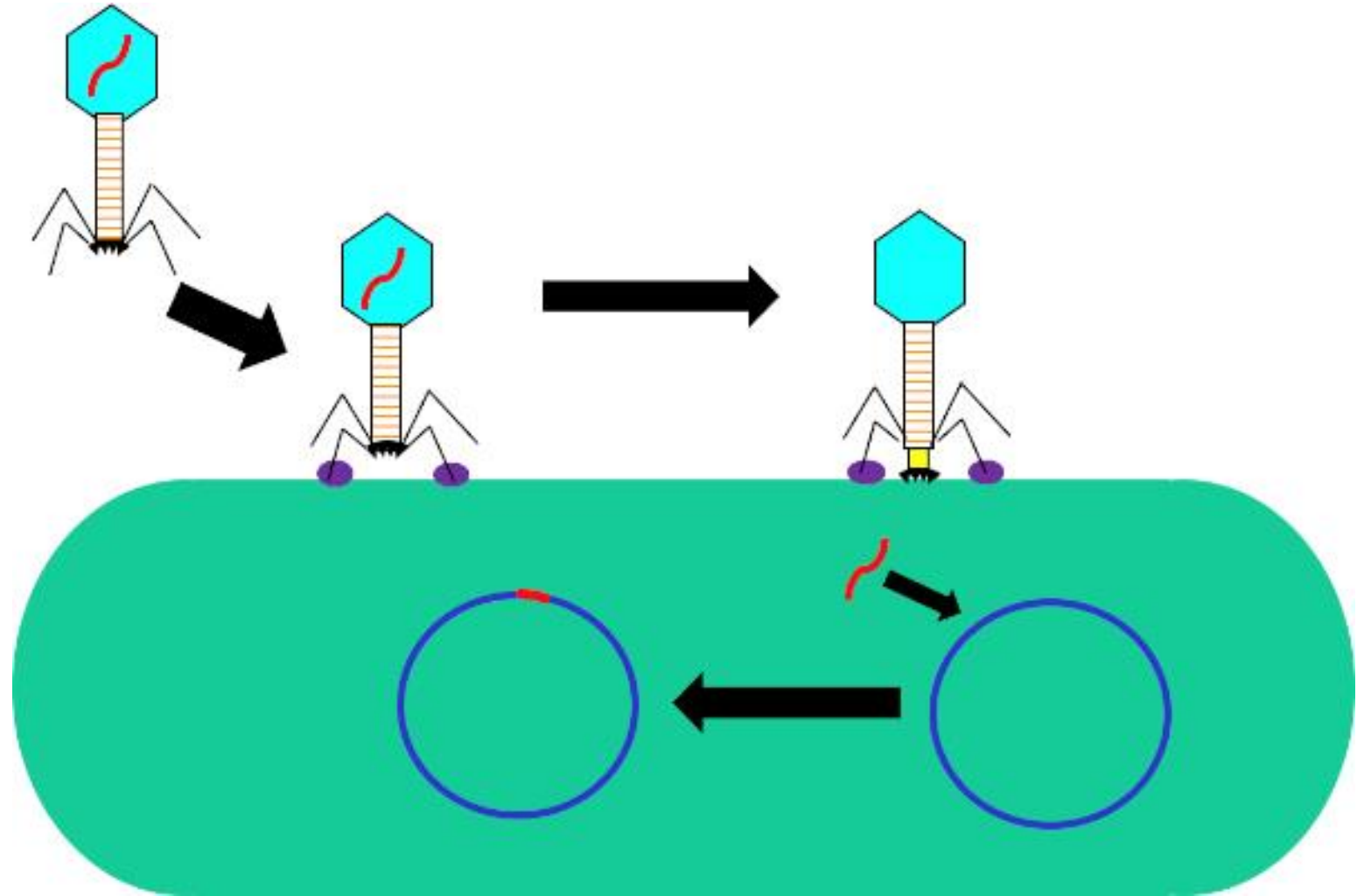
Even More Diversity

Another common process that alters bacteria and creates more diversity to increase their chances of survival is

**BACTERIAL
TRANSDUCTION.**

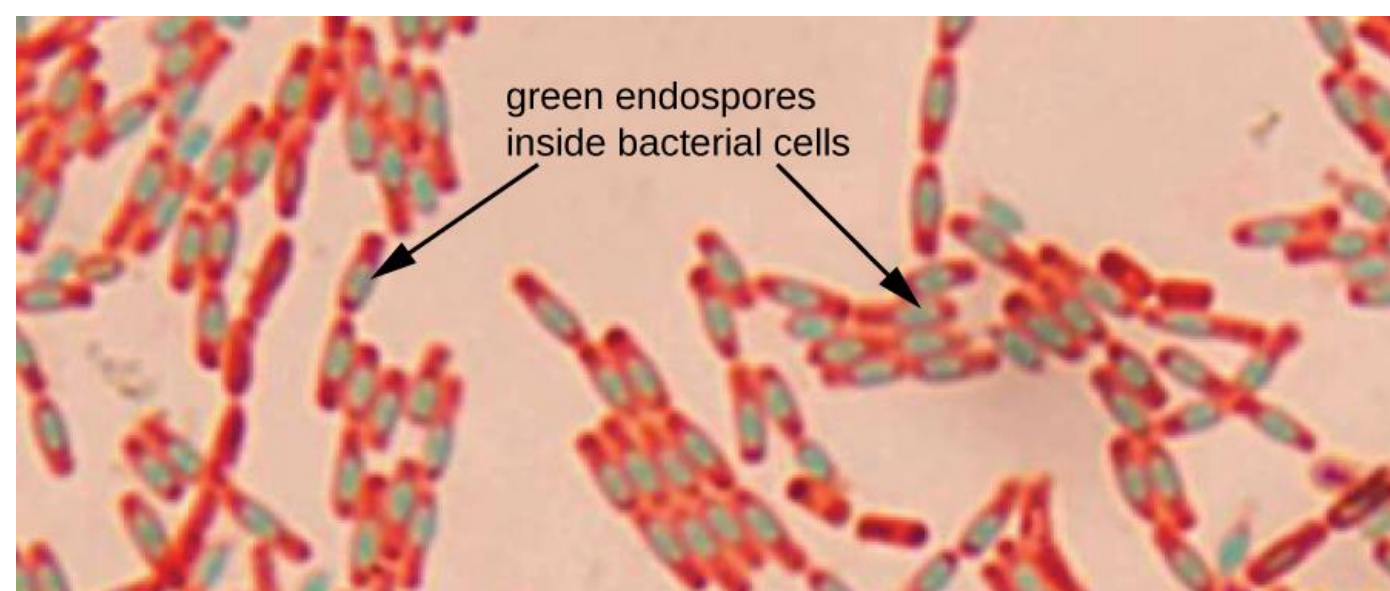
During Transduction a virus inserts foreign DNA into the host bacterium and the bacterium incorporates it into its own DNA.

Lysogenic to Lytic etc



4. HOW DO THEY SURVIVE ?

To survive harsh times, many bacteria will portion off their DNA and some of their Cytoplasm and encase with a thickened cell wall that can protect it against desiccation (drying out). This **ENDOSPORE** will remain dormant until favourable conditions return. Some endospores can remain viable for **DECADES**.



Endo-spore formation

