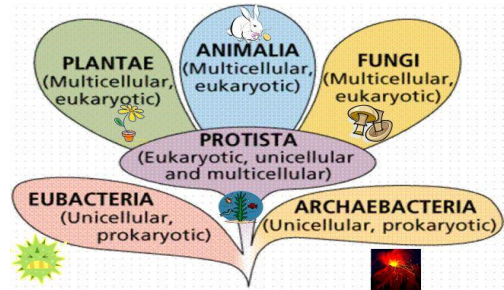
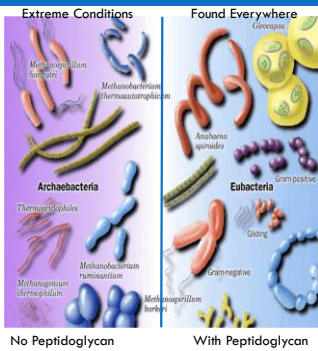


6 Kingdoms



Prokaryote = Bacteria Review

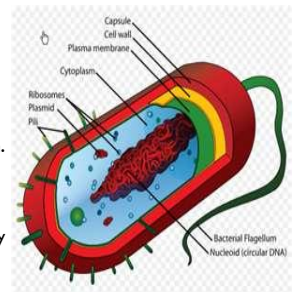
- Which two kingdoms are prokaryotic?
- What are the differences between the Archaeobacteria and Eubacteria?
- Are all bacteria harmful?



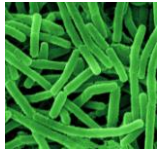
Bacteria Basics

Prokaryotes

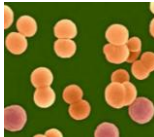
- Structure:
 1. No Nucleus
 2. No membrane bound organelles.
 3. Single cell / unicellular
 4. Cell wall with peptidoglycan.
 5. Plasmids – circular pieces of DNA.
 6. Flagella and Pili
 7. Asexual Reproduction (Binary Fission) or Conjugation (Sexual Reproduction)



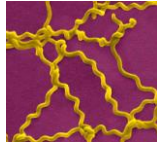
Bacterial Identification - Shapes



Rod-shaped: Bacillus



Round-shaped: Cocci



Spiral-shaped: Spirillum



Bacillus (*Pseudomonas*)



Coccus (*Staphylococcus*)

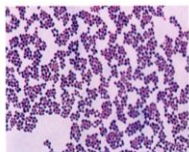


Spirillum (*Spirillum*)

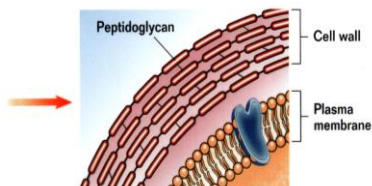
Bacterial Identification – Cell Wall

Gram Positive (+)

- Very thick cell wall, made up of **Peptidoglycan**
- Wall is less complex
- Stains Purple!



Gram-positive bacteria

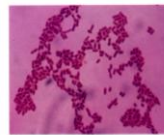


EX: Streptococcus: strep throat

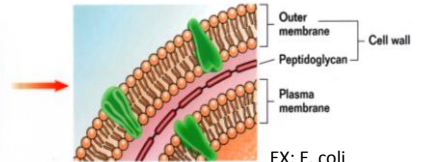
Bacterial Identification – Cell Wall

Gram Negative (-)

- Thin layer of peptidoglycan
- And an extra membrane layer – **OUTER MEMBRANE**
- More complex
- Stains Pink!



Gram-negative bacteria



EX: E. coli

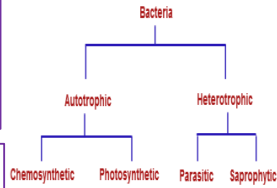
How do they get their Nutrition/Energy?

Autotroph

- Can make their own energy by photosynthesis

Chemoautotrophs

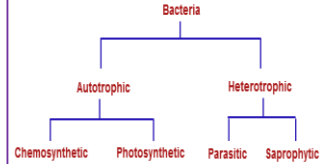
- Can make their own energy by breaking down *inorganic* compounds



How do they get their energy?

Heterotroph

- Can NOT make their own energy, need to obtain it from their surroundings. (Decomposers and parasites)



Identifying Bacteria

Shape

Cocci-Round

Bacilli-Rod

Spirilla-Spiral

Cell Wall

Gram +
Thick Cell Wall

Gram -
Thin Cell Wall

Obtain Energy

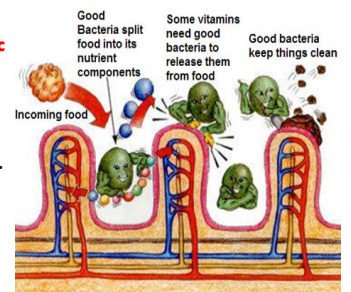
Autotrophs-
Photosynthesis

Chemoautotroph
Chemosynthesis

Heterotrophs
Decomposers
Parasitic

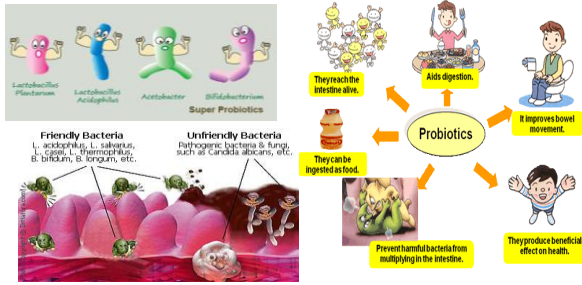
Good Bacteria: Symbiotic Relationship

- When two organisms benefit from one another – **symbiotic relationship**.
- Ex. Humans and *E.coli*
- Live in our intestines. We provide food they assist in digestion.



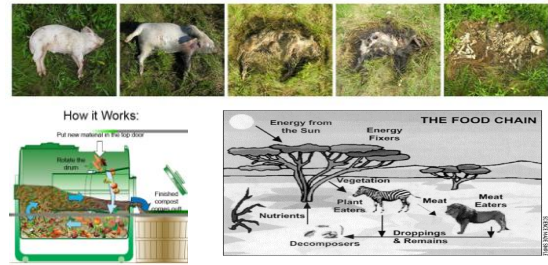
Good bacteria - Digestion

Probiotics – Promote the growth of bacteria, boost our immune system



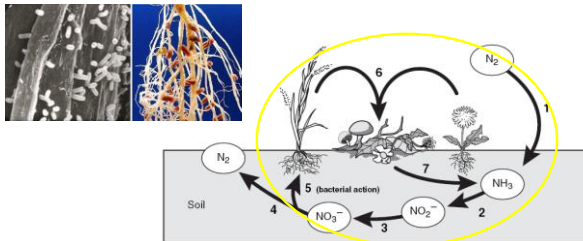
Good Bacteria: Environment

Decomposers - recycle of nutrients back into the atmosphere by decomposing organic compounds (breaking down material).



Good Bacteria: Environment

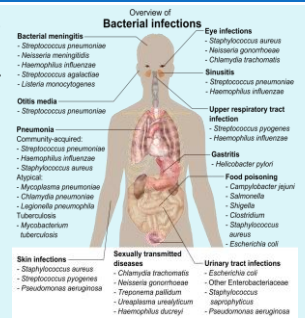
Nitrogen fixators - convert nitrogen gas (N_2) into ammonia (NH_3) and (NO_3), which plants use as nutrients. Food in the roots of plants.



Bad Bacteria: Pathogenic

Pathogen: an infectious biological agent that causes disease or illness.

Pathogenic Bacteria: Some bacteria can cause infection and disease (by releasing **TOXINS**). Only a small group of bacteria cause disease.



Bad Bacteria: Pathogenic

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Two ways to prevent this from happening:



1. **Vaccines** –made of weakened pathogen can make antibodies towards the bacteria.



2. **Antibiotics** – medicine used to block growth and reproduction of bacteria. It destroys the cell wall.

Pathogenic Bacteria

Cavities: Grow in the presents of FOOD!



Streptococcus: Causes Strep Throat, which is an infection



Salmonella: Bacteria that can be found in improperly cooked food and can cause food poisoning.



Pathogenic Bacteria

Staph aureus: bacteria infections in the skin that can cause rashes and boils.



MRSA: a very dangerous staph infection that is resistant to antibiotics. Flesh eating infection!



Preventing Bacterial Growth

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1. **Heat** – most can't stand extreme temp. (sterilize)

Very important to cook poultry and other foods properly!



1. **Disinfection** – use of chemicals.



2. **Refrigeration** – slows down bacterial growth.



Food Recalls

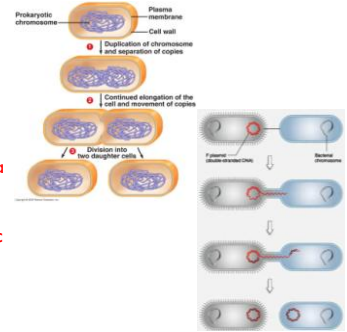
Vegetables such as tomatoes, chili peppers, lettuce, and peanuts have been recalled because of bacteria outbreaks.



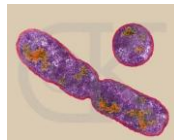
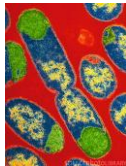
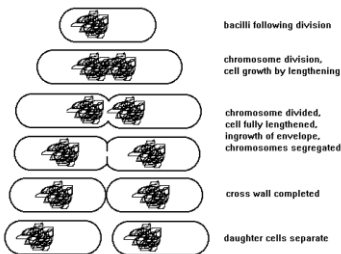
Bacteria: Growth & Reproduction

Two Types:

- **Binary Fission** – asexual reproduction. Cell splits into two identical copies.
- **Conjugation** – sexual reproduction. Bacteria exchange genetic information to ensure survival and antibiotic resistance.



Binary Fission



Bacteria: Growth & Reproduction

- Bacteria does not need a host to divide, reproduces whenever the conditions are right
- Bacteria are Biochemically diverse, can reproduce anywhere they obtain energy from.

Antibiotic Resistance:

- **Antimicrobial resistance (AMR)** is when microbes are less treatable with one or more medications used to treat or prevent infection.
- This can happen spontaneously due to mutations of the microbes themselves, to a build up of resistance over time, or to misuse of antibiotics or antimicrobials.

