

# BACTERIA



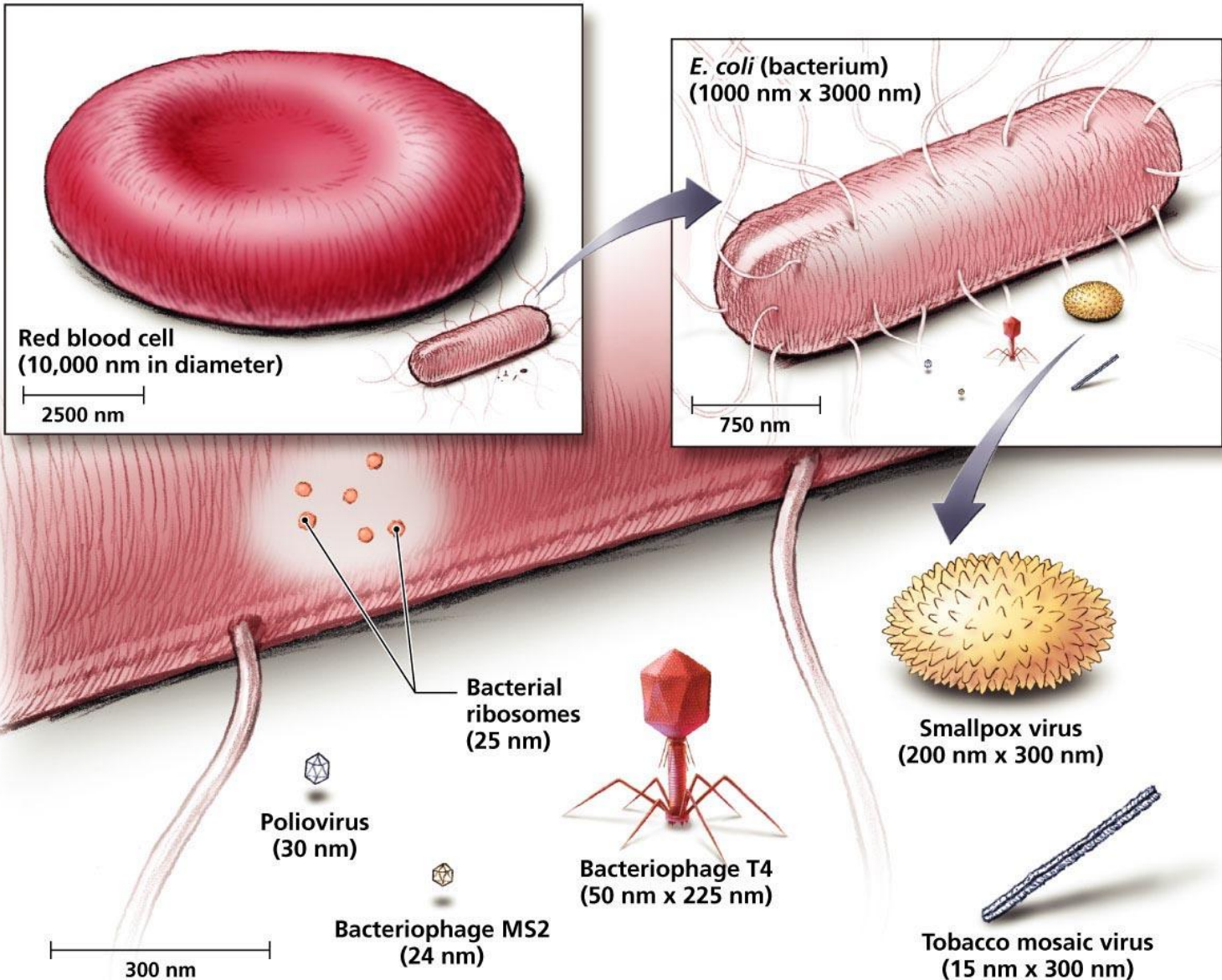
# Kingdom Eubacteria (True Bacteria)

Bacteria are located everywhere – air, water, land, and living organisms including people.

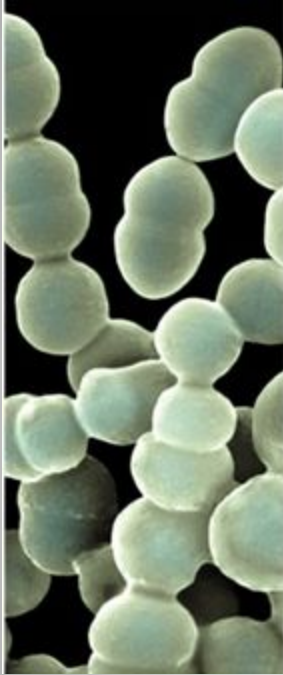
## General Characteristics:

1. All are unicellular (one-celled structural level)
2. All are prokaryotic - cells that lack nucleus (no nuclear envelope) (**PRO = NO** nucleus)
3. All have cell walls - NO cellulose in cell walls
4. Can live in both aerobic (with  $O_2$ ) and anaerobic (without  $O_2$ ) environments

# 5. Bacteria are much larger in size than viruses.



## 6. Bacteria usually have one of three different cell shapes:



Coccus

(Sphere-shaped)

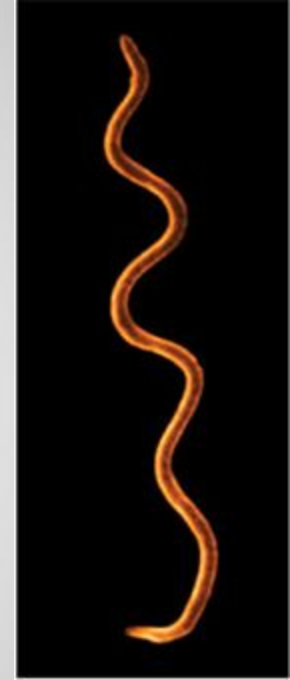
Ex: Streptococcus



Bacilli

(rod-shaped)

Ex: Lactobacillus

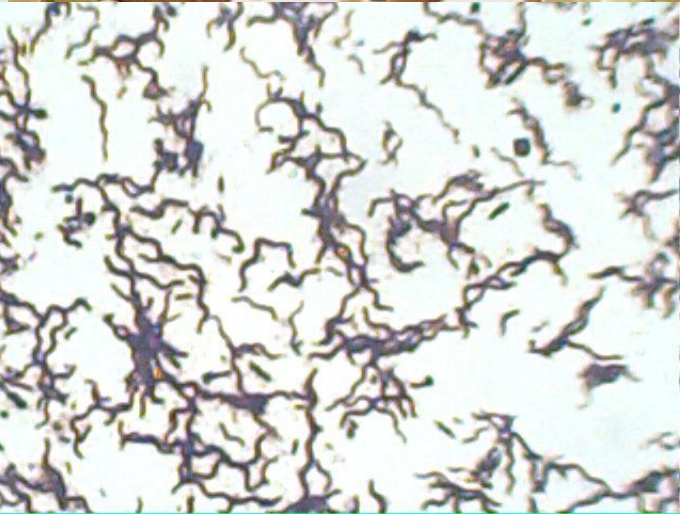
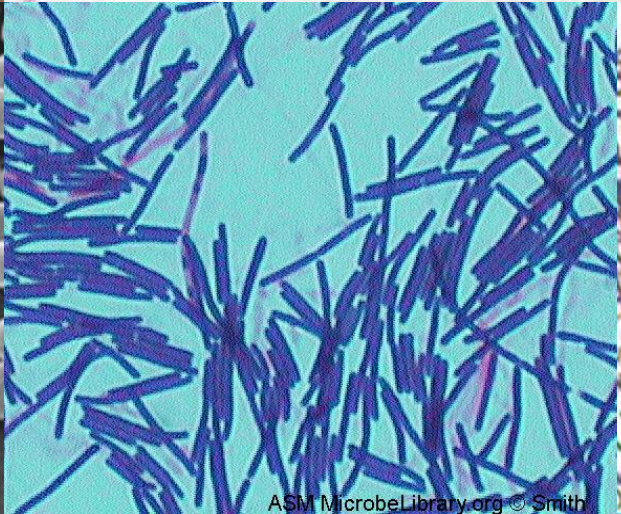
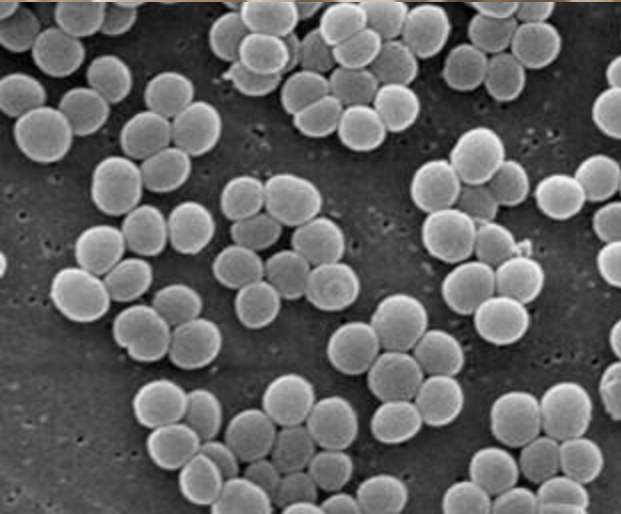
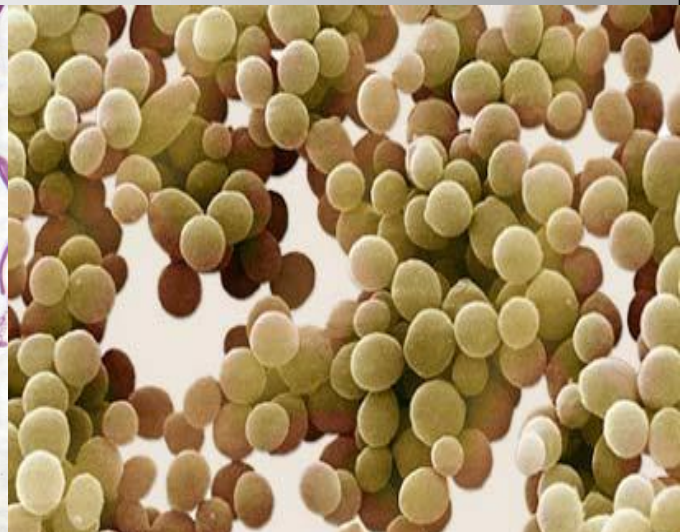


Spirillum

(Spiral-shaped)

Ex: Spirillum

# What shape?





**Example:**

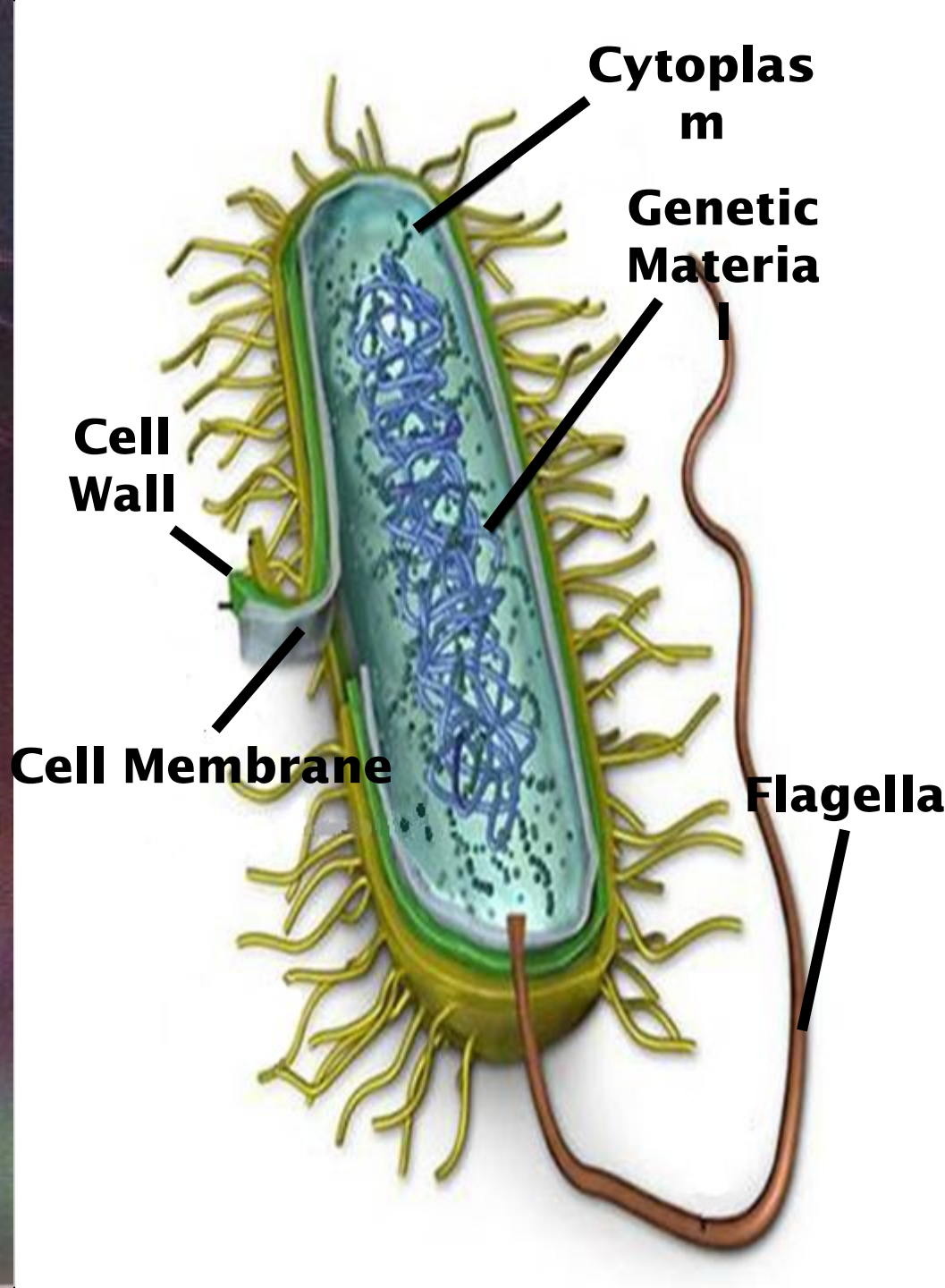




Illustration: Don Smith

Causes Disease by:

1. **Destroying cells** of infected organisms by breaking the cells down for **food**.

2. Releases **toxins** (poisons) which **destroy** cells of infected organism.



3. Must have access to **new hosts** to spread.





# Different Hosts



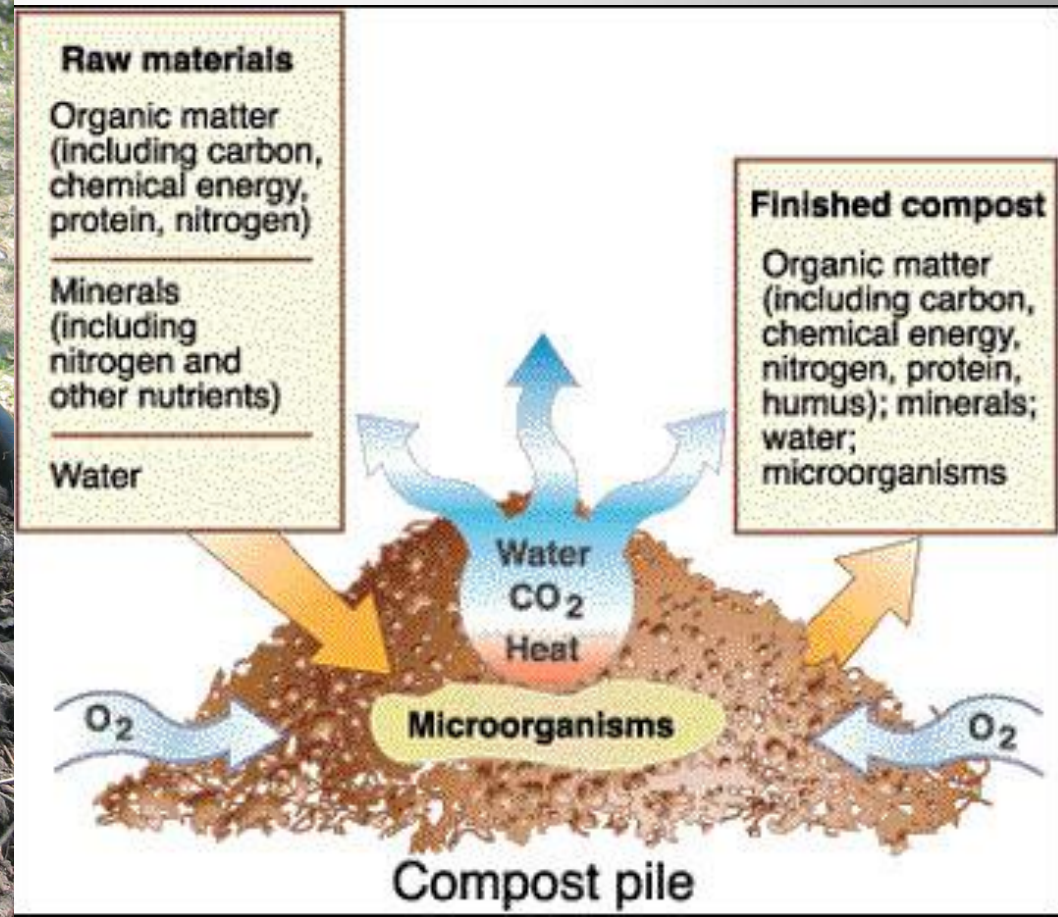
## **D. Importance:**

### **1. *Beneficial***

**a. breakdown dead matter to recycle nutrients into ecosystem - decomposers**



**Example: Compost piles need microorganisms (ex. bacteria) to decompose (breakdown) matter.**

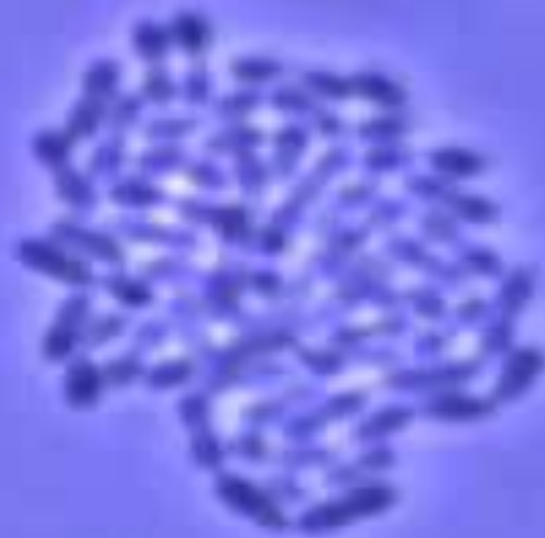


b. dairy industry - **bacteria in**

2:08 minute

video

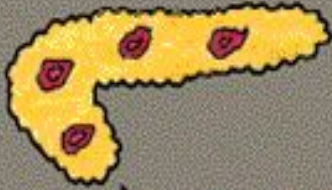
**yogurt, sour cream and cheese**



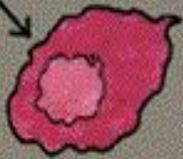


c. Oil spills - bacteria can digest small oil spills

Pancreas



Insulin-producing Cell



Strand of DNA from Insulin-producing Cell



Insulin Gene is Cut Out of DNA



Bacterium



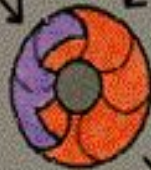
Plasmid—a Ring of DNA— from Bacterium



Plasmid is Cut Open



Insulin Gene is Spliced into Plasmoid



Hybrid Plasmid is Put Back into Bacterium



Bacterium Makes Human Insulin



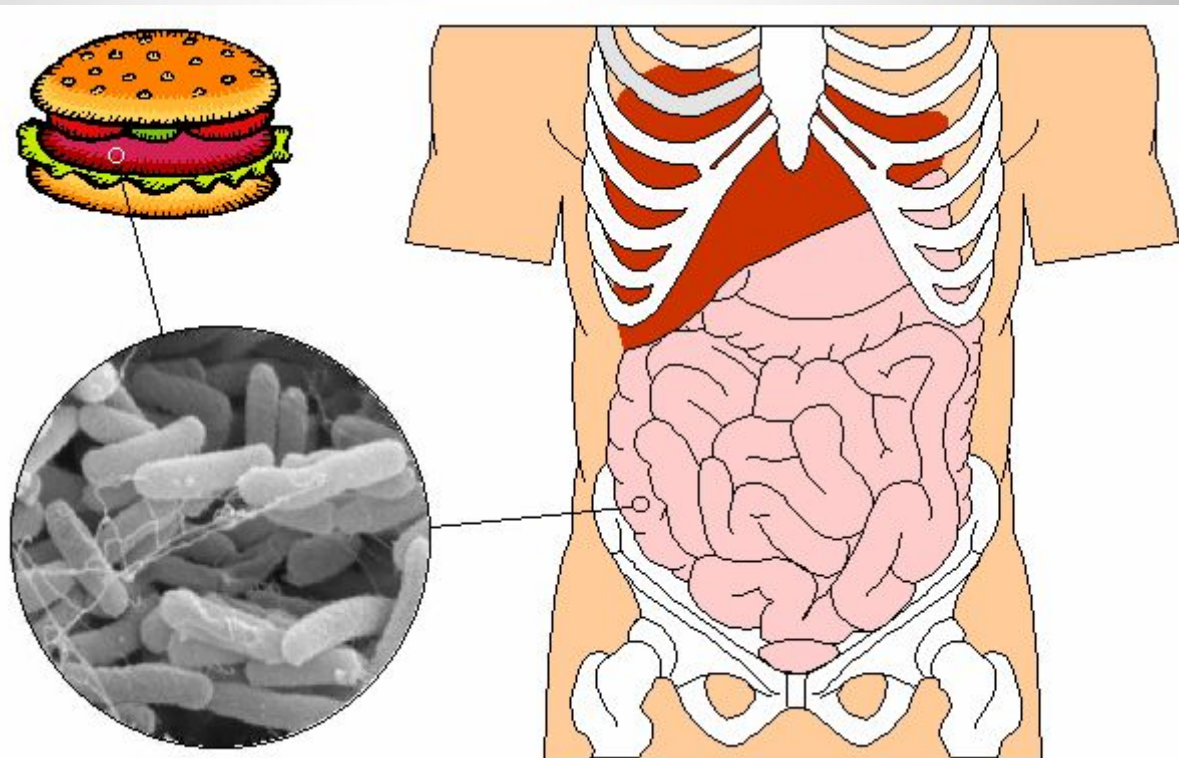
d. Genetic engineering—

**Recombinant/synthetic DNA (Ex: Insulin)**

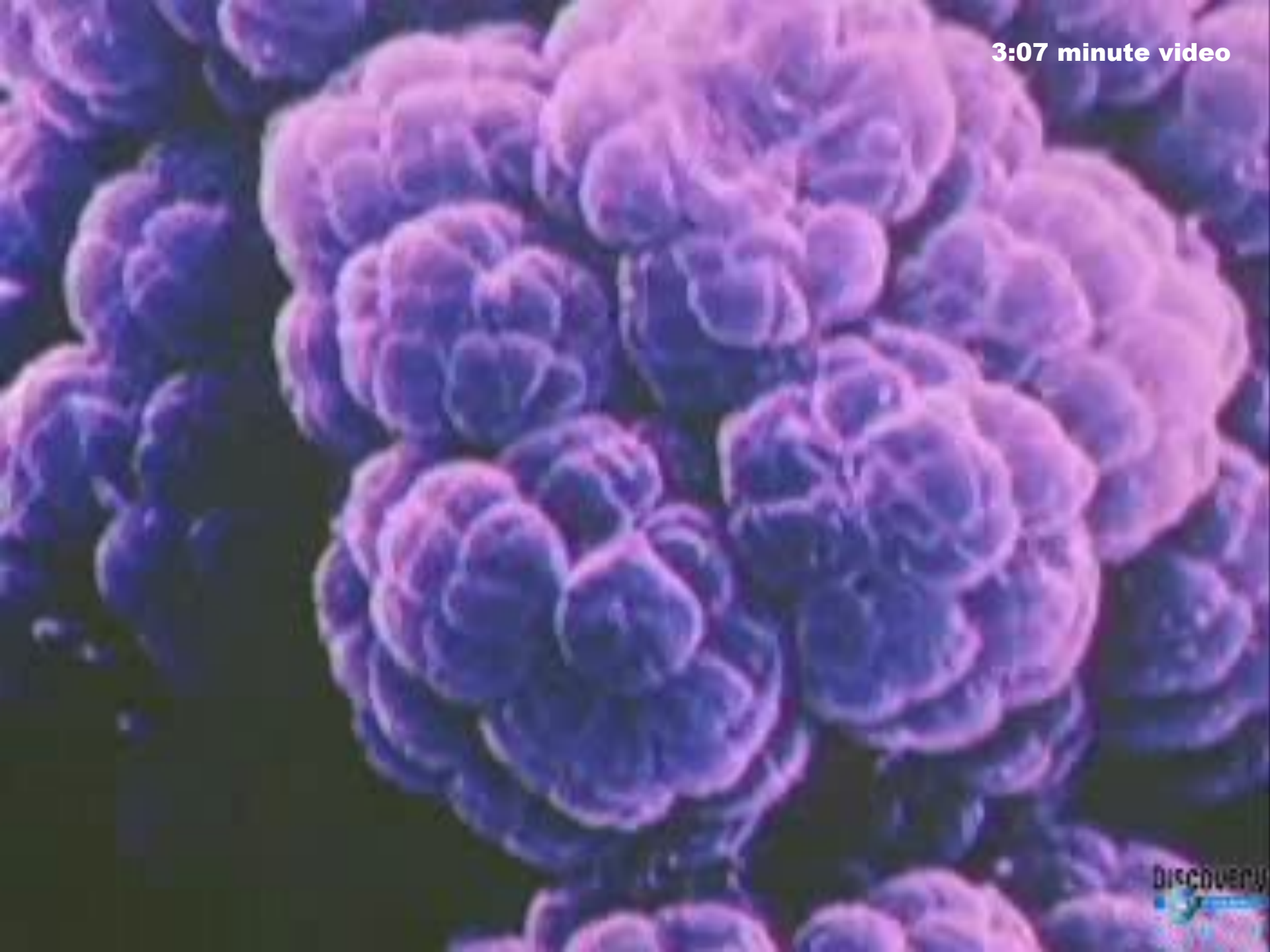
## e. symbiotic relationship - *E. coli* and our intestines-both organisms benefit

Example: *E. coli* in intestines helps us digest food and make vitamins (such as Vitamin K and B-complex) In return, human intestines provide food and shelter for bacteria.

(This strain of *E. coli* is different from the *E. coli* strain that causes food poisoning.)



3:07 minute video





*Harmful :*

a. human diseases –

**strep throat, tuberculosis,**  
**tooth decay and bad**  
**breath, anthrax, plague,**  
**tetanus, food poisoning**

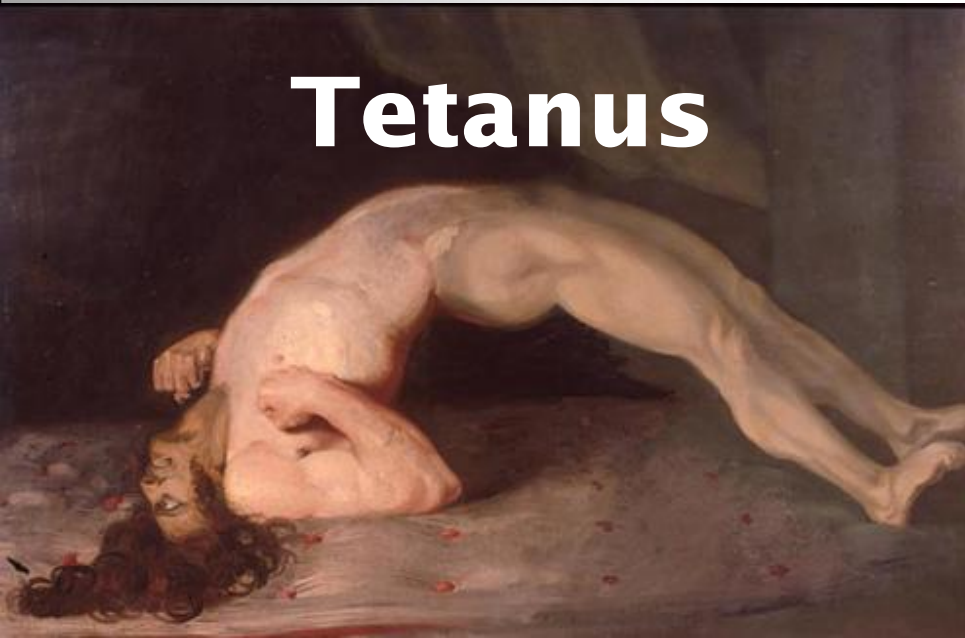


Cutaneous anthrax skin infection



**Anthrax**

**Tetanus**



White drainage patch



Swollen and sore throat

Tonsil

**Strep Throat**

3:15 minute video



## b. food spoilage and poisoning – caused by Salmonella and Staphylococcus



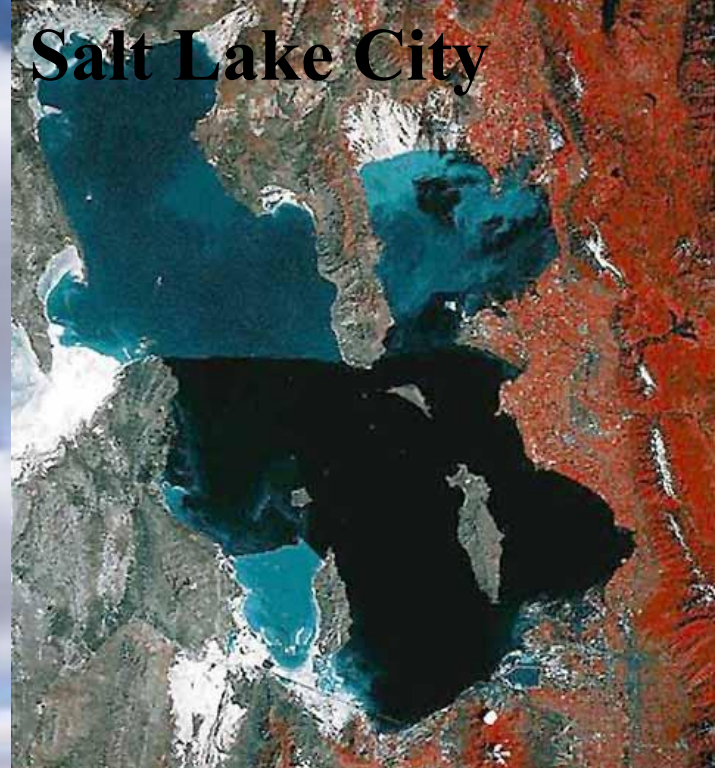
c. Treated with antibiotics – Some bacteria are able to survive in presence of antibiotics that kill other bacteria – antibiotic resistant bacteria

Note: This is why doctors tell you to take the entire amount of medicine given even if you start to feel better because if not, bacteria will have the chance to evolve and become antibiotic resistant.

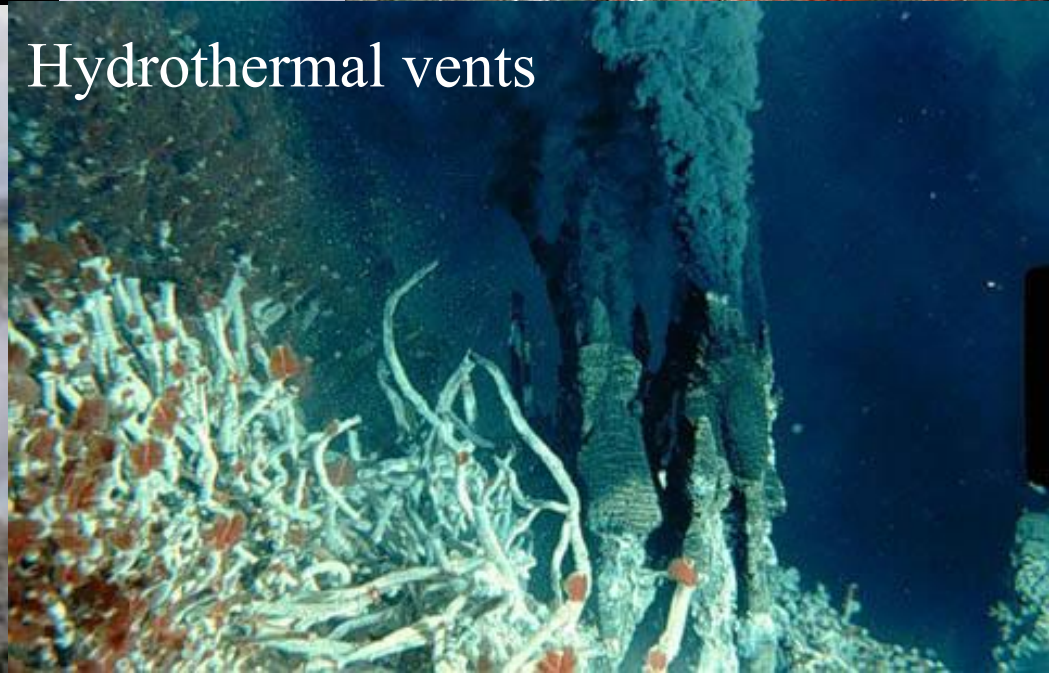
# Kingdom Archaeobacteria

- a. First known prokaryotes-  
Archaeobacteria (archae=ancient)
- b. Live in very harsh environments  
(known as extremophiles)– high salt content, hot temperatures, acidic or alkaline environments

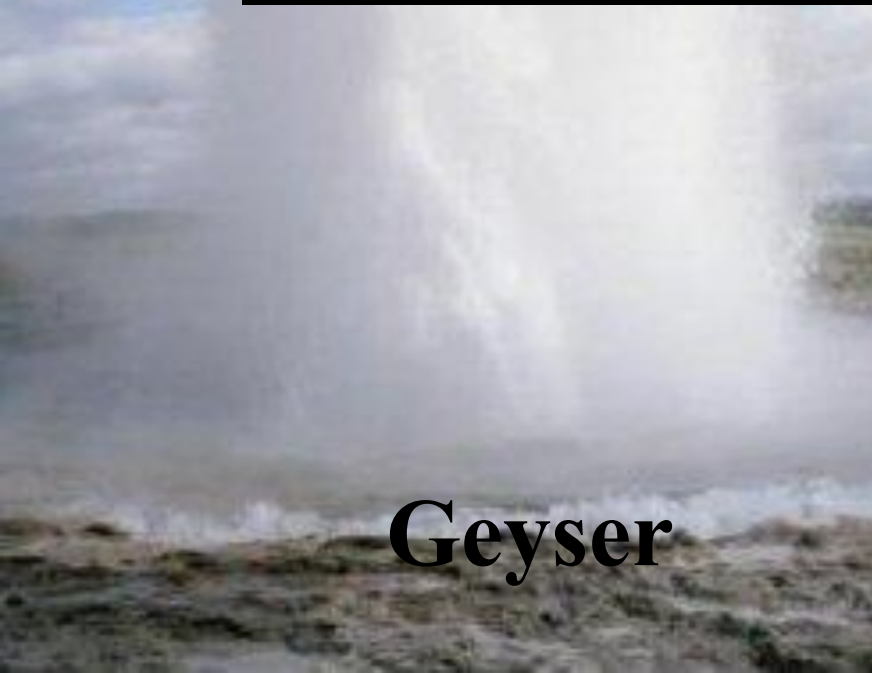
Salt Lake City



Hydrothermal vents



Geyser



3:12 minute video



c. Live in intestines of animals, especially cows and other grazing animals – methanogens

Produce methane gas – greatly affects our atmosphere by combining with  $O_2$  to make  $CO_2$  for photosynthesis

methanogenic  
archaebacteria



**d. Same size and shape as Eubacteria, but different biochemical makeup**

