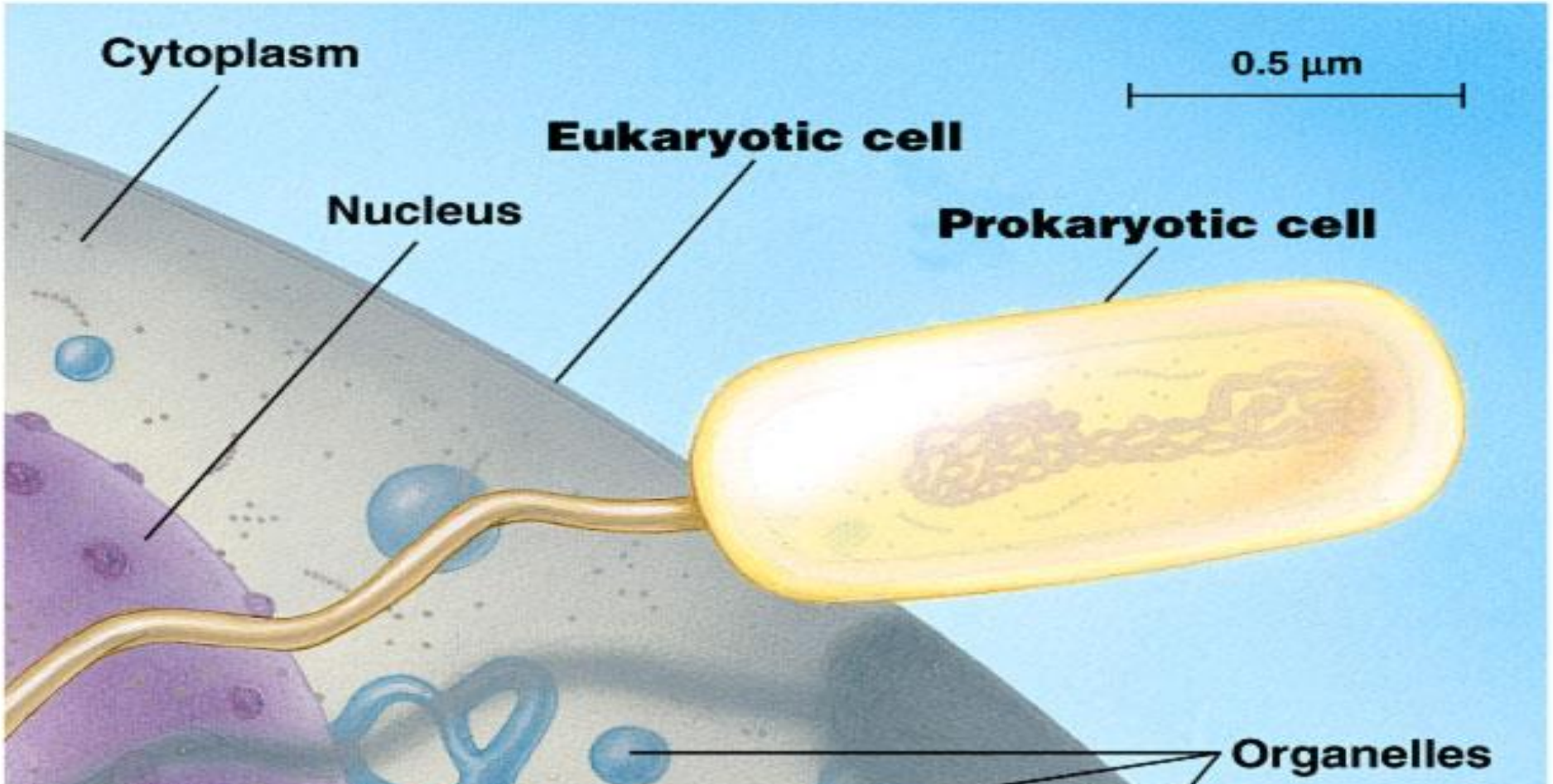
KINGDOMS Eubacteria & Archaebacteria - THE PROKARYOTES – divided into two separate Kingdoms

Approximately 40,000 Species of common bacteria have been identified, but Scientists estimate that several million species have not been identified

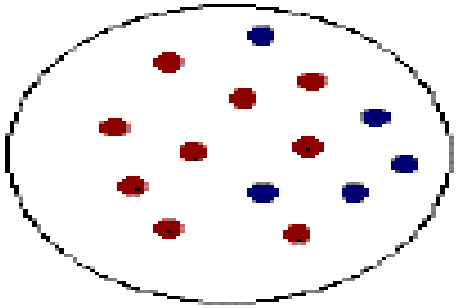
a) Archaebacteria

b) Eubacteria

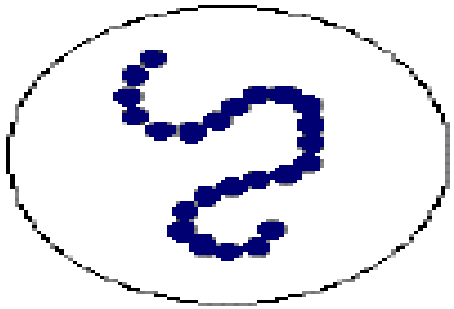


Bacteria – are Unicellular Prokaryotes. Prokaryotic cells are smaller, simpler and more primitive than eukaryotic cells. Eukaryotic cells make up the organisms found in the other four kingdoms – Protista, Fungi, Plantae and Animalia

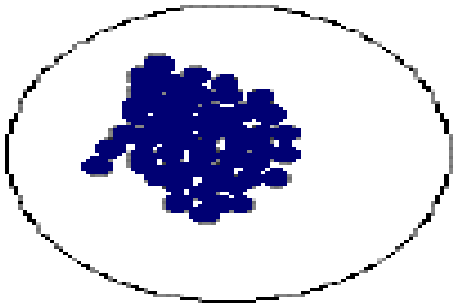
When it comes to classifying and naming bacteria, they tend to be classified according to their cell shape and by the way they grow. Some grow in chains (Strep) others in sheets (Staph)



Cocci (1000X)



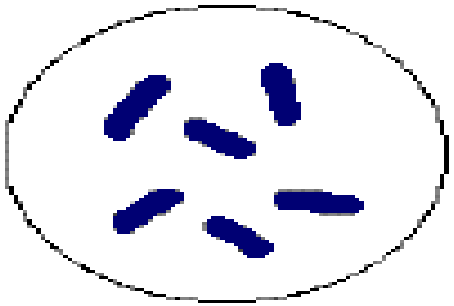
Streptococci (1000X)



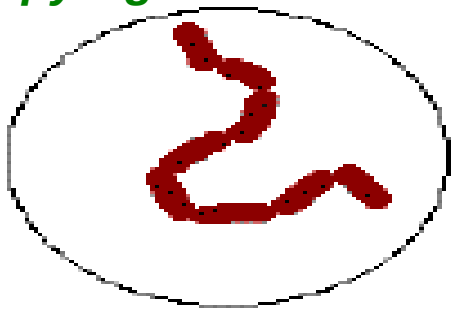
Staphylococci (1000X)

Strep Throat = *Streptococcus pyrogenes*

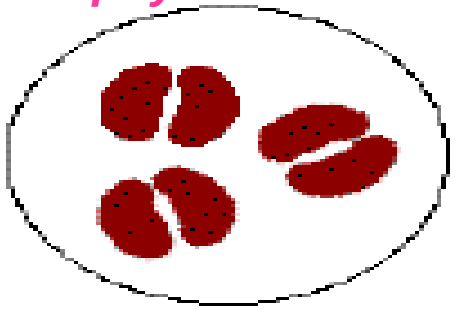
Skin Staph = *Staphylococcus aureus*



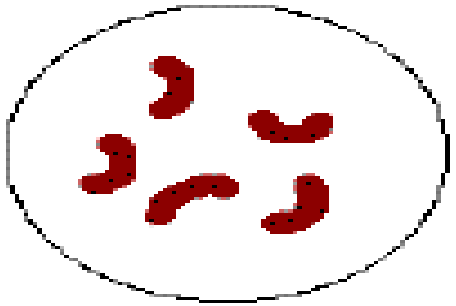
Bacilli (1000X)



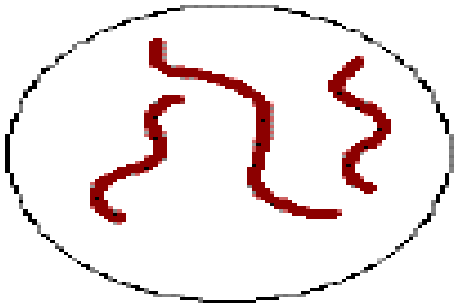
Streptobacilli (1000X)



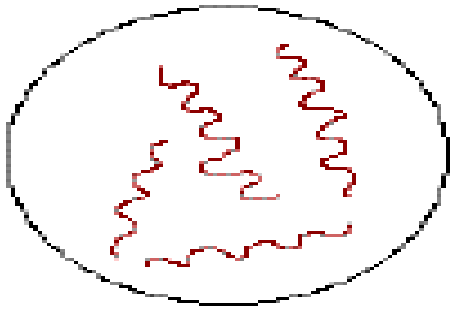
Diplococci (2000X)



Vibrios (1000X)



Spiral Bacteria (1000X)



Spirochaetes (2000X)

The Three Most common shapes are :

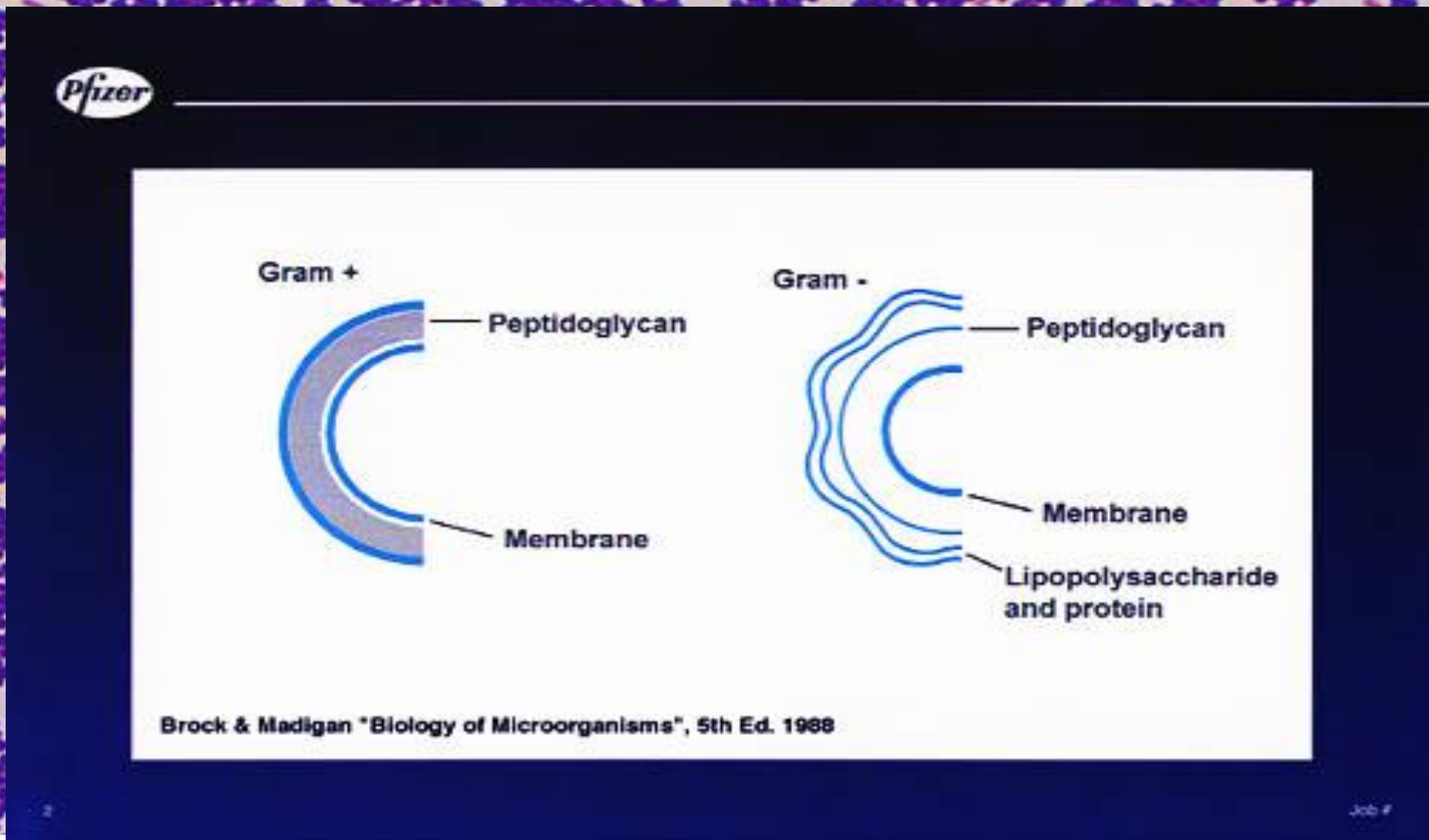
BACILLUS – Rod Shaped (stained pink) **SPIRILLUM – Spiral Shaped (stained blue)**

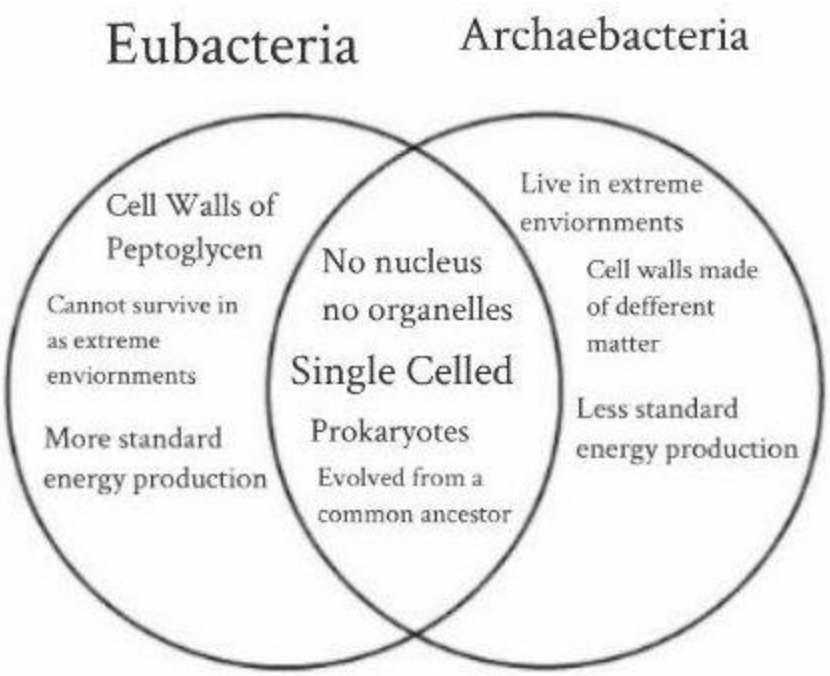
COCCUS – Spherical Shaped (stained purple)

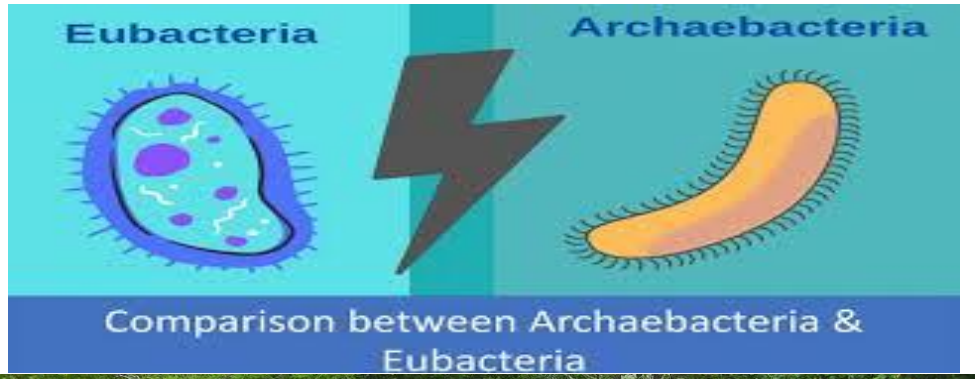
Another method used for classifying bacteria, is based on the type of cell wall they possess.

- **Some bacteria have thicker cell walls and they absorb and maintain a purple stain (Crystal Violet) – "GRAM POSITIVE"**

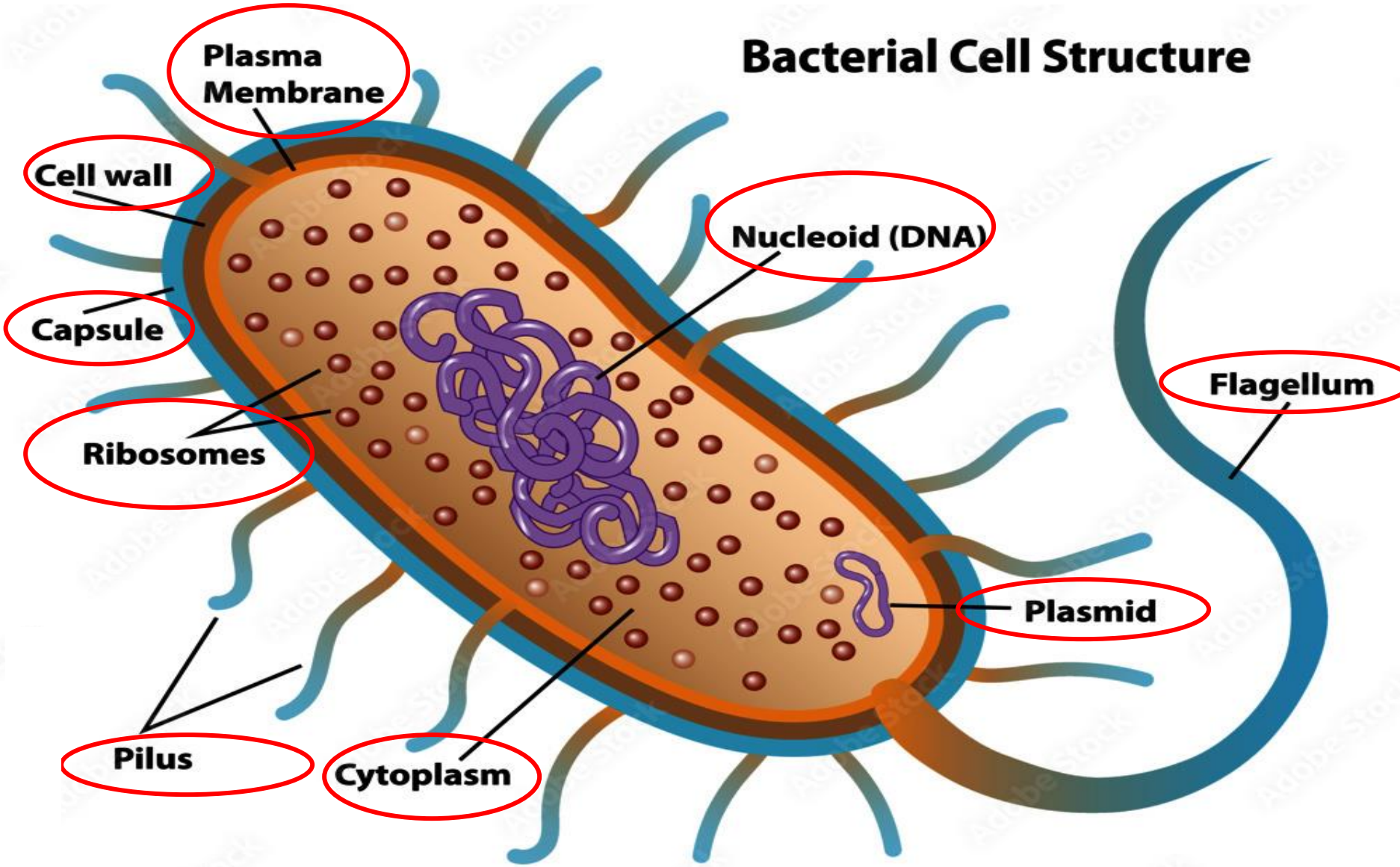
Some bacteria with a thinner cell wall absorb and maintain a pink stain (Safrinine) – "GRAM NEGATIVE" - PINK – Think – Thin -




Eubacteria
Archaebacteria
Cell Walls of Peptoglycen
Cannot survive in as extreme enviornments
More standard energy production
No nucleus
no organelles
Single Celled
Prokaryotes
Evolved from a common ancestor
Live in extreme enviornments
Cell walls made of defferent matter
Less standard energy production


Eubacteria
Archaebacteria
Comparison between Archaebacteria & Eubacteria

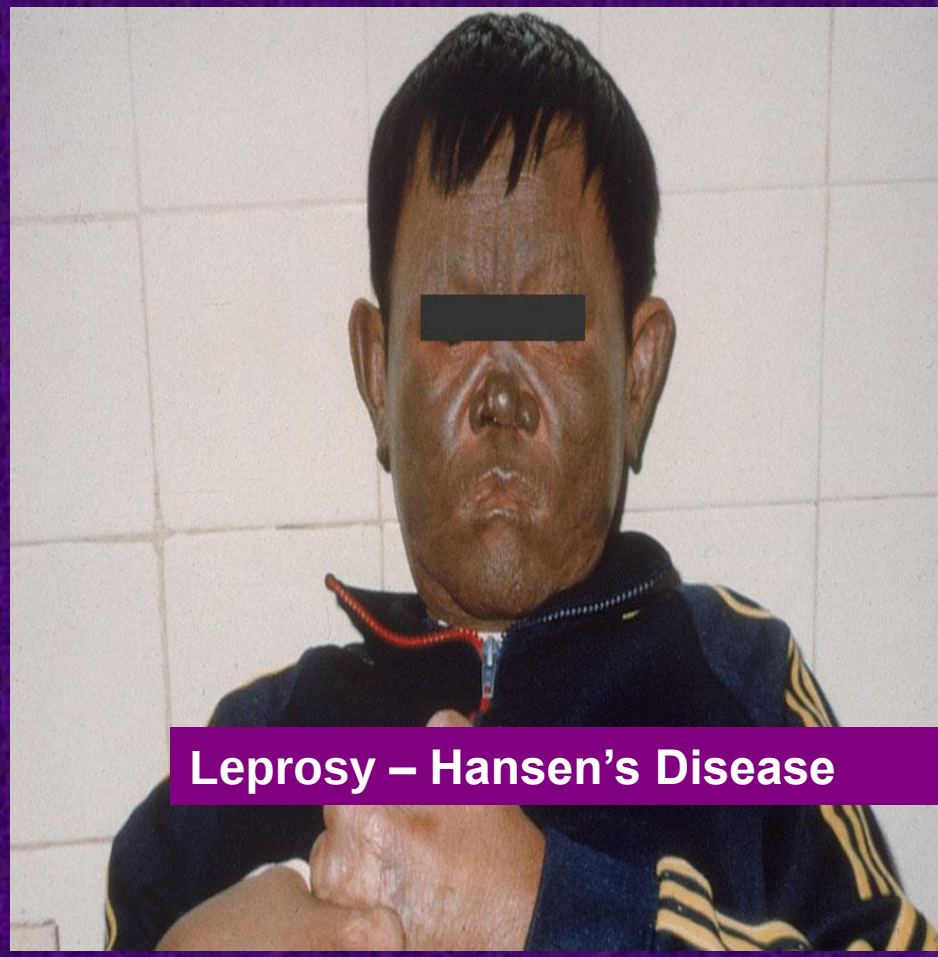
BACTERIAL STRUCTURE



WHY STUDY BACTERIA?

Worldwide, bacterial infections are responsible for more deaths than any other cause. The most common invasion routes are inhalation of airborne bacteria, ingestion into the gut from dirty hands or utensils, or through contaminated water, direct contact (touch) with an infected area of another person's body, contaminated blood, or by insect bite.

These large, dark, boil-like blisters are a diagnostic symptom of necrotizing fasciitis (also known as flesh-eating disease).
(Source: EMBBS, 1996 http://mdchoice.com/)



Leprosy – Hansen's Disease

Any of these sound familiar?

Pink Eye

Lyme's Disease

Strep Throat

Bacterial Pneumonia

Tuberculosis

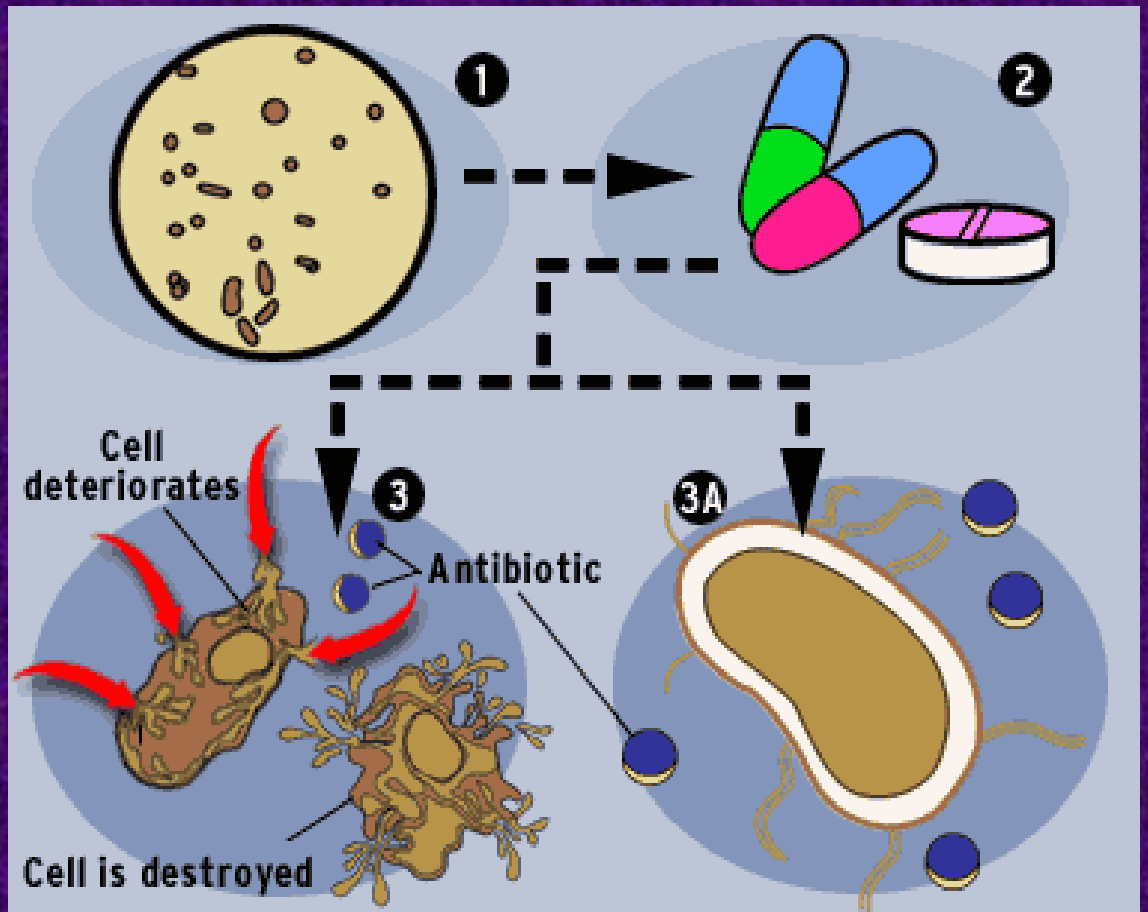
Tetanus

Whooping Cough

Botulism, Salmonella, E-coli and other types of food poisoning

ANTIBIOTICS : Chemicals that kill bacteria

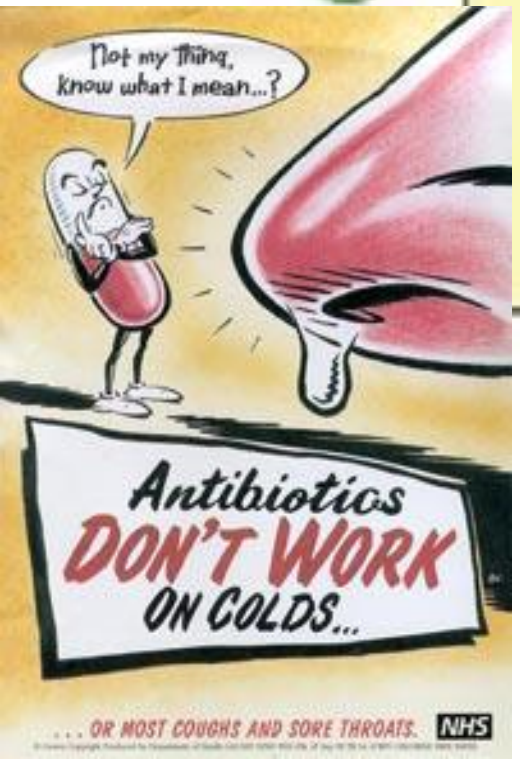
Tend to kill bacteria by preventing them from making their cell wall or by shutting down their ribosomes which synthesize necessary protein or blocking specific enzymes that they use.



PREVENT SUPERBUGS

Help Your Antibiotics Do Their Job

- Take as directed
- Finish the full prescription even if you are feeling better
- Help prevent antibiotic resistance



THERE IS NOTHING GOOD ABOUT BACTERIA!

WRONG

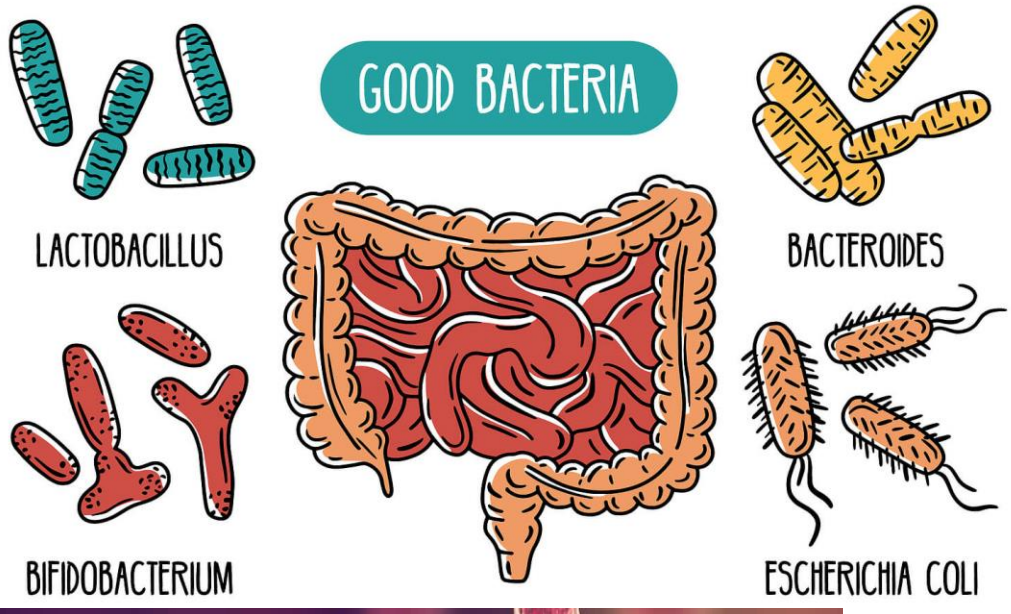
Beneficial bacteria

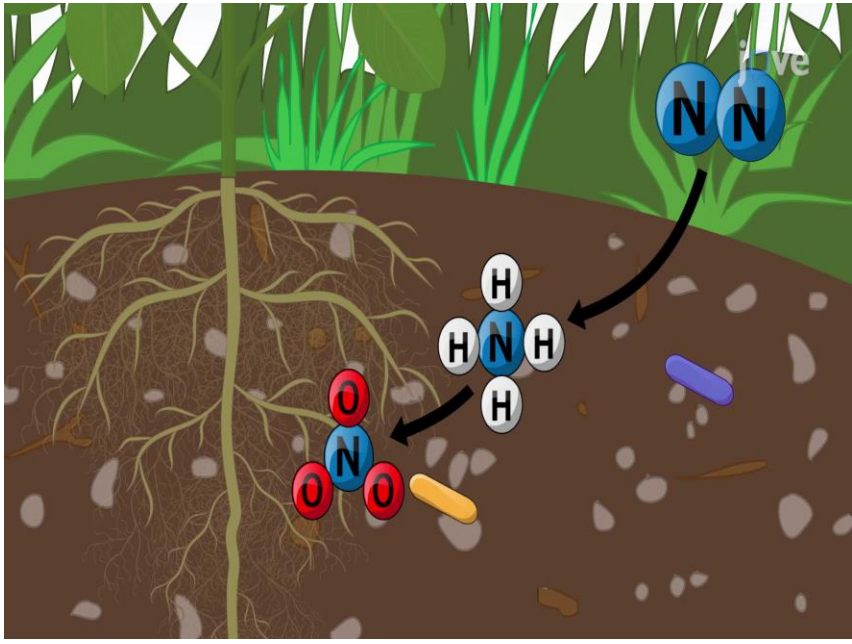
- Bacteria are used in sewage treatment to break down wastes.
- Strains of bacteria exist that can feed on petroleum. These have been used to clean up oil spills. Others can extract metals from mining waste, and are becoming used in mining and in environmental clean-up.
- As a byproduct of photosynthesis, blue-green bacteria, or cyanobacteria, produce much of the oxygen that we and other organisms breathe.

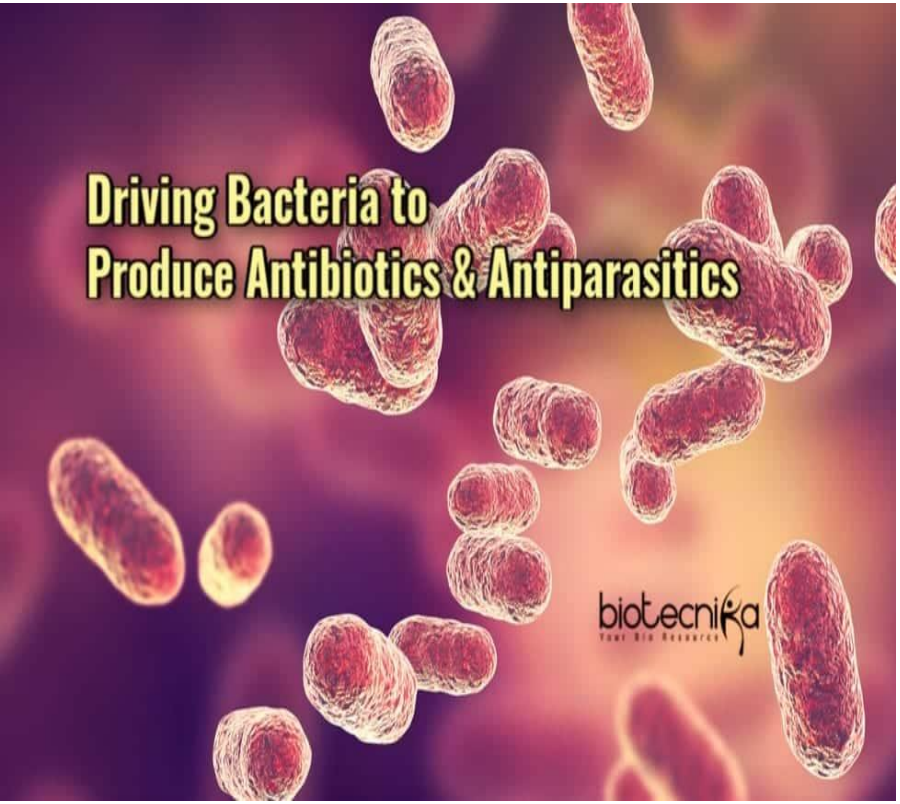

DECOMPOSERS

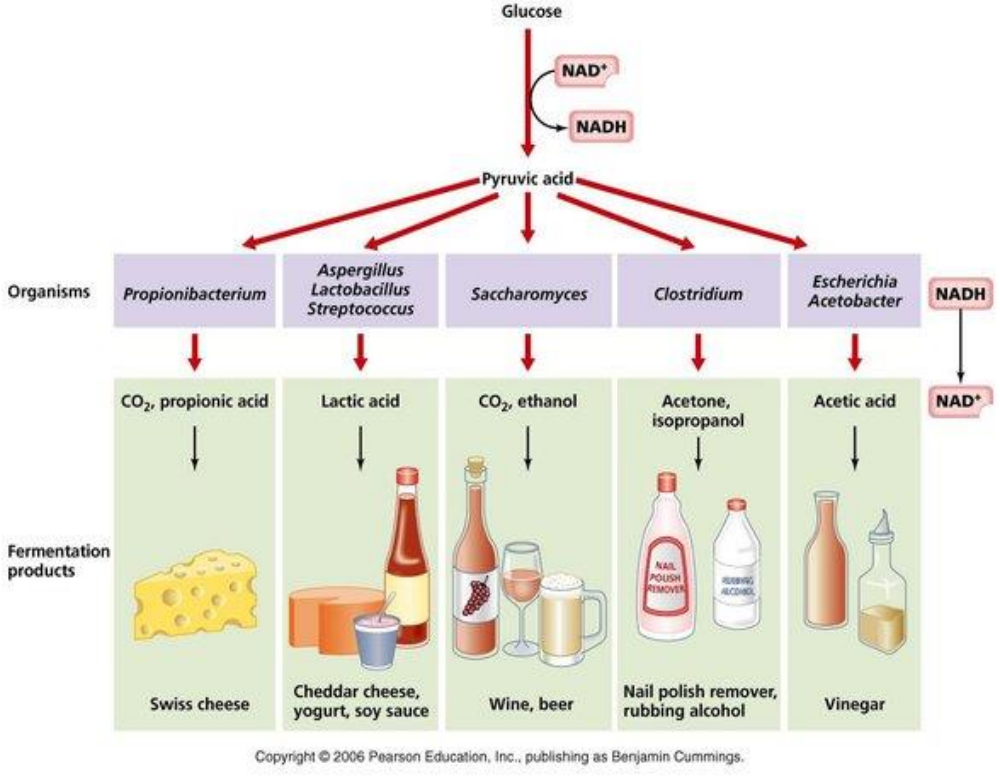
Beneficial bacteria

- *Escherischia coli* bacteria in your intestines help you digest food. They also make vitamin K and vitamin B_{12}.
- Bacteria living inside the roots of plants, such as alfalfa, take up nitrogen gas from the air and convert it into a form the plant can use (nitrates)
- A few bacteria produce antibiotic drugs such as streptomycin and nocardicin.
- Bacteria used in the food industry convert milk to buttermilk and yogurt, and wine to vinegar.


GOOD BACTERIA
LACTOBACILLUS
BACTEROIDES
BIFIDOBACTERIUM
ESCHERICHIA COLI


jove
N N
H
H N H
H
O
O N
O O


Driving Bacteria to
Produce Antibiotics & Antiparasitics
biotecnika


Glucose
NAD+
NADH
Pyruvic acid
Organisms
Propionibacterium
Aspergillus
Lactobacillus
Streptococcus
Saccharomyces
Clostridium
Escherichia
Acetobacter
NADH
NAD+
CO2, propionic acid
Lactic acid
CO2, ethanol
Acetone, isopropanol
Acetic acid
Fermentation products
Swiss cheese
Cheddar cheese, yogurt, soy sauce
Wine, beer
Nail polish remover, rubbing alcohol
Vinegar
Copyright © 2006 Pearson Education, Inc., publishing as Benjamin Cummings.