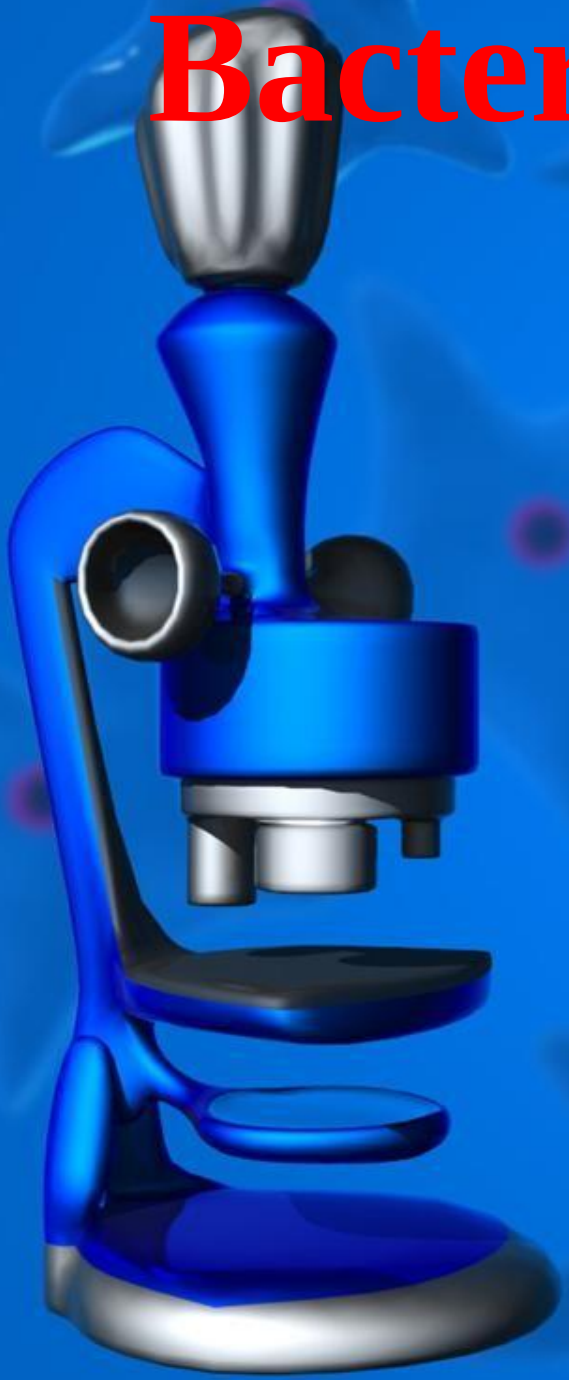
Bacteria Life Cycle with Features



Since-1981

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Contents

- Introduction
- General characters
- Structure of bacerial cell
- Shapes and size
- Gram +ive and Gram –ive baceria
- Reproduction methods
- Modes of nutrition
- Methods of respiration
- Thanks

Domain: Bacteria
Kingdom: Eubacteria

Eubacteria

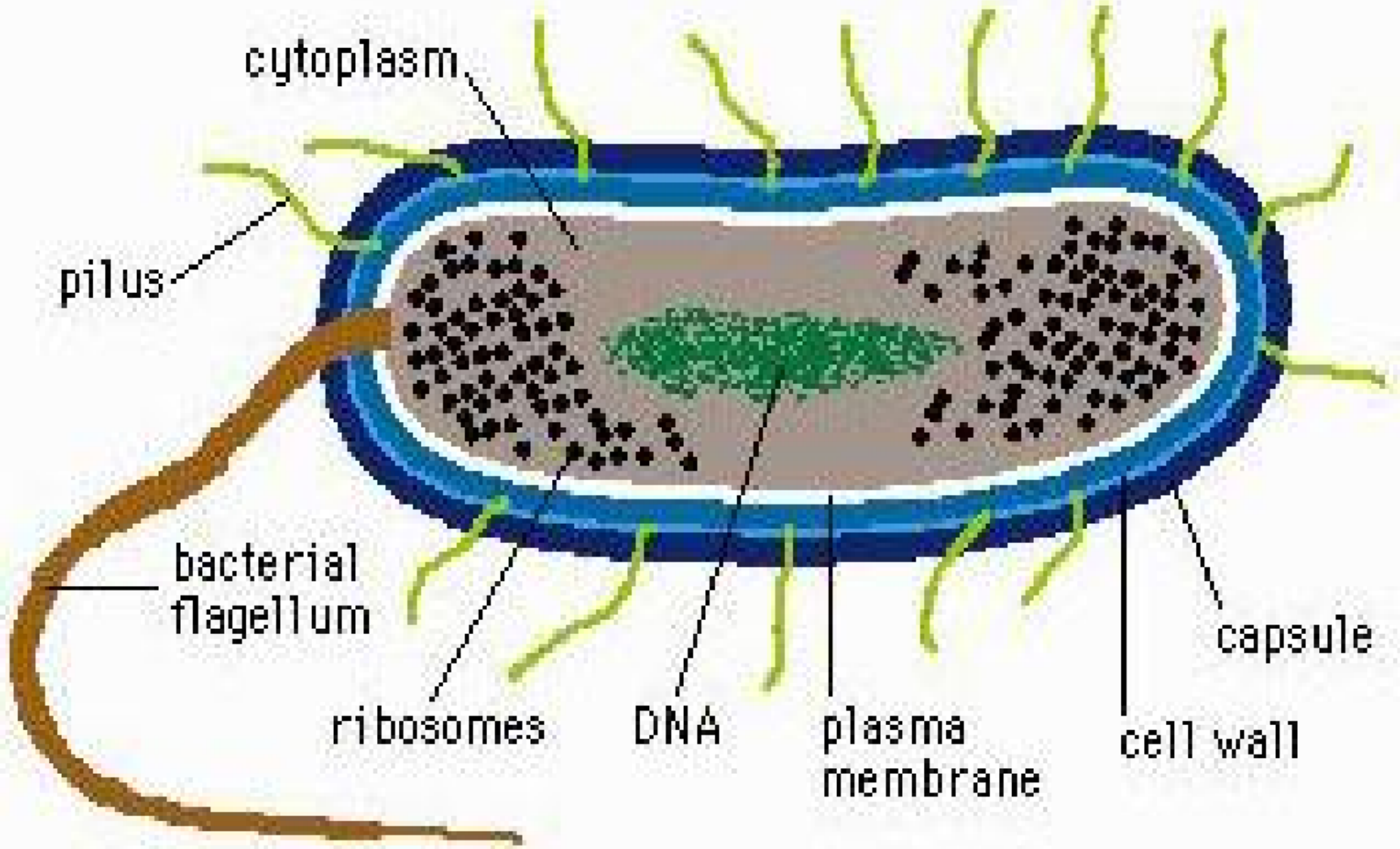
- ✓ Called the true bacteria
- ✓ Most bacteria are in this group
- ✓ Include photosynthetic Cyanobacteria

Characteristics of Bacterial Cells

- Prokaryotic
- Unicellular
- No nucleus or membrane-bound organelles
- Single, circular chromosome
- Contain ribosomes
- Reproduction is mostly asexual through binary fission
- Conjugation, a type of sexual reproduction can occur.
- Some are autotrophic, some are heterotrophic.

Structures of a Bacterial Cell…

Bacterial Cell



For Protection:

- Cell Wall made of Peptidoglycan
- May have a sticky coating called the Capsule for attachment to host or other bacteria

Sticky Bacterial Capsule

Inside the cell…

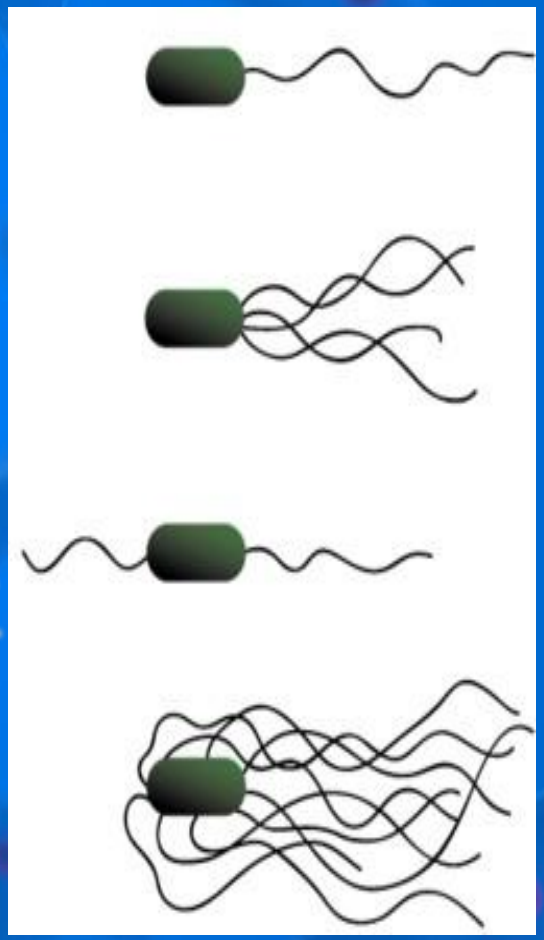
- Have small rings of DNA called Plasmids

PLASMIDS

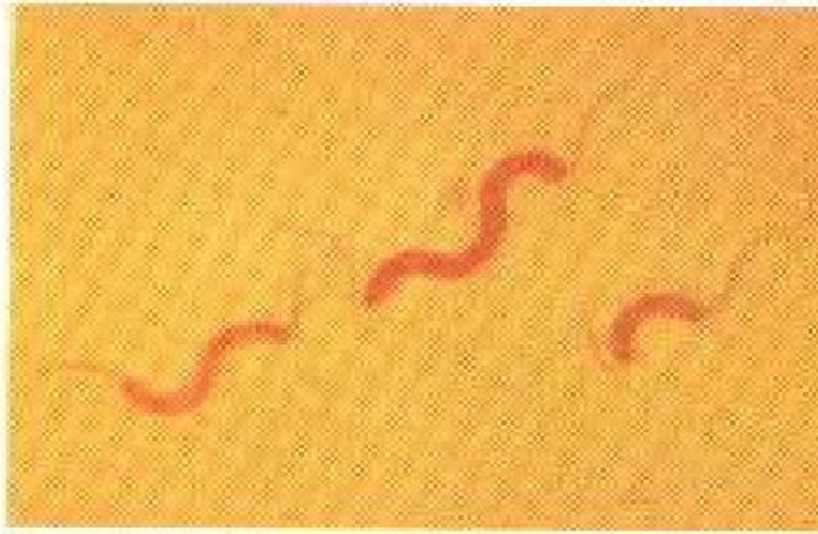
- Cell Membrane
- Cytoplasm
- Ribosomes

For Movement: The Flagellum (pl: flagella)

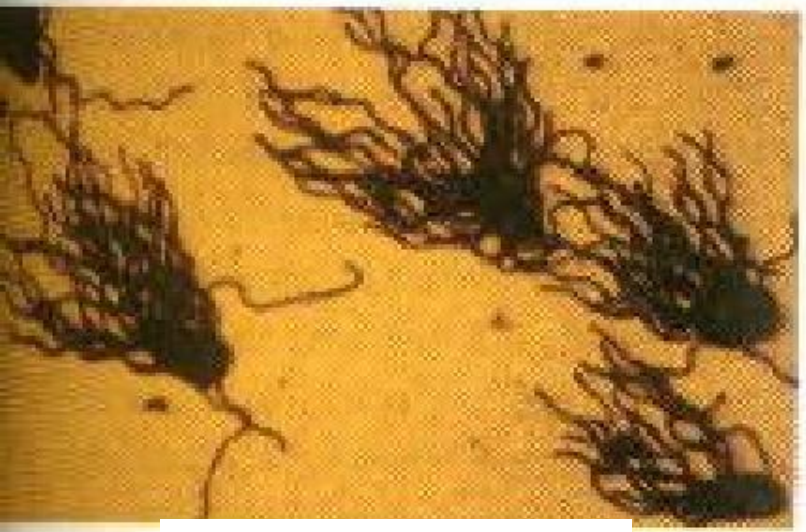
- The flagellum is a long, thin structure used for movement.
- Motile bacteria may have one or many flagella



Monotrichous



Lophotrichous



Amphitrichous

Peritrichous

Pilus (pl: pili)

- Short hair-like proteins
- Helps bacteria stick to surfaces
- Used in conjugation.

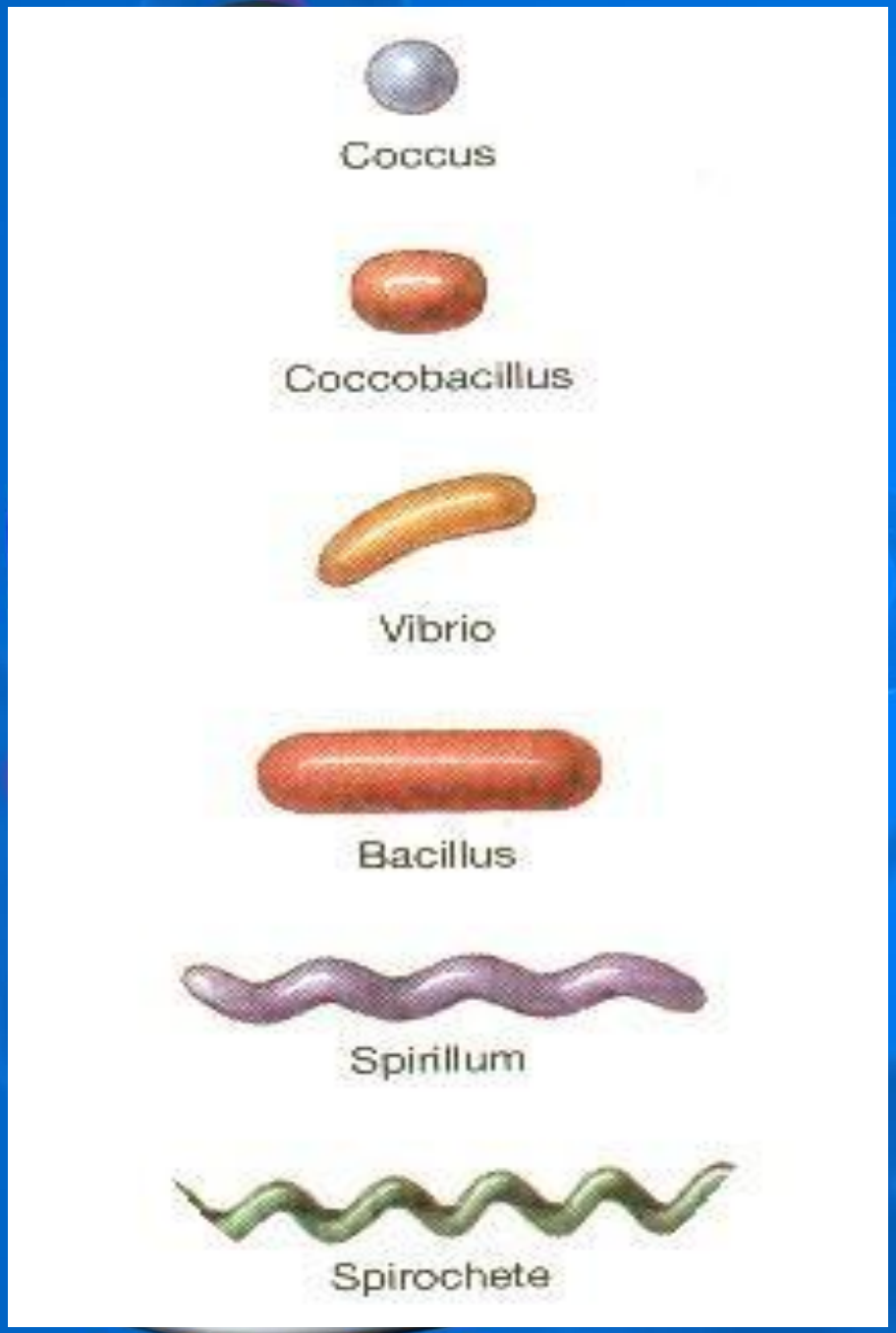
Classifying and Identifying Bacteria:

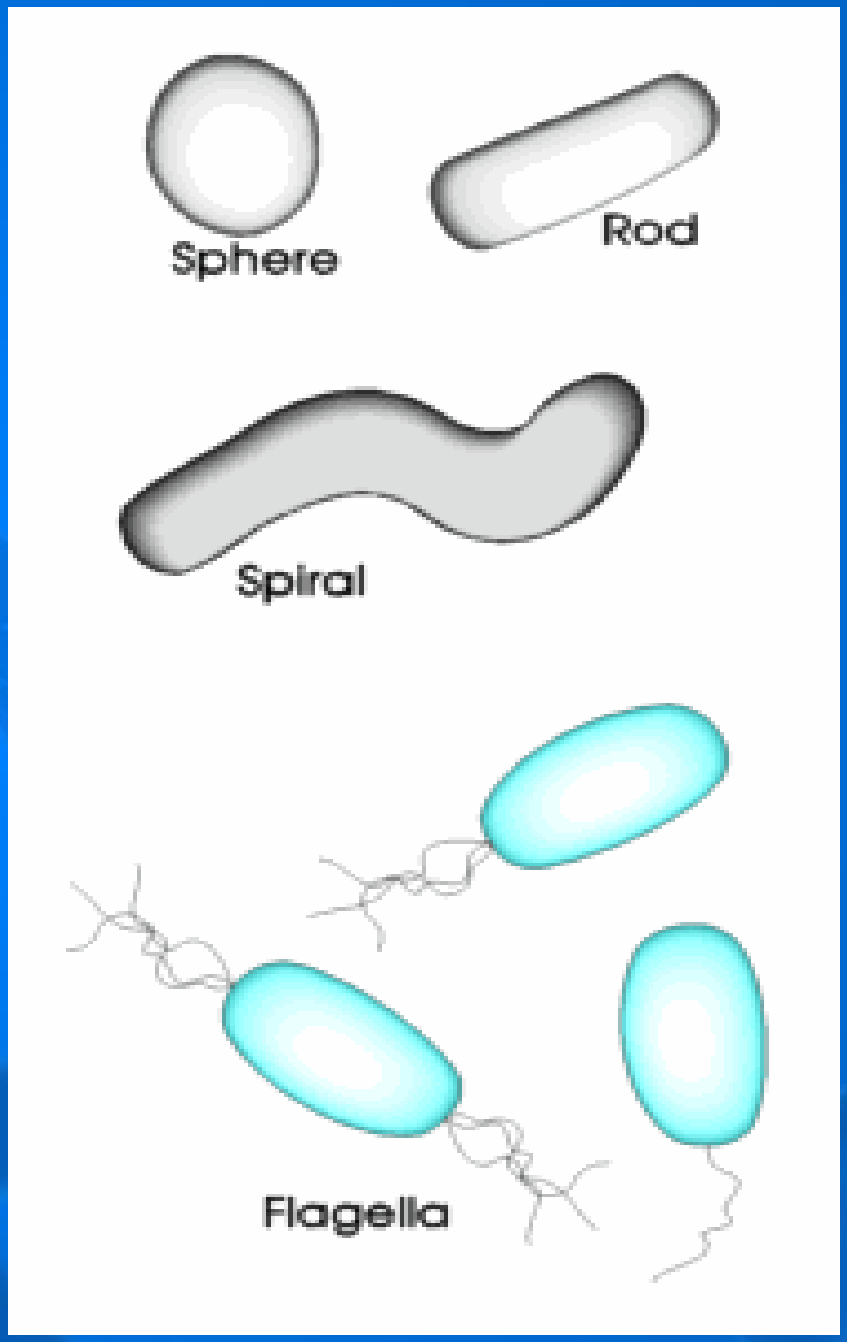
1) Shape
2) Gram-Stain
3) Reproduction
4) Nutrition
5) Respiration

Three Basic Shapes Are Used to Classify

- **Bacillus:** Rod shaped
- **Coccus:** Spherical (round)
- **Spirillum:** Spiral shape

(Pl: bacilli, cocci, spirilla)

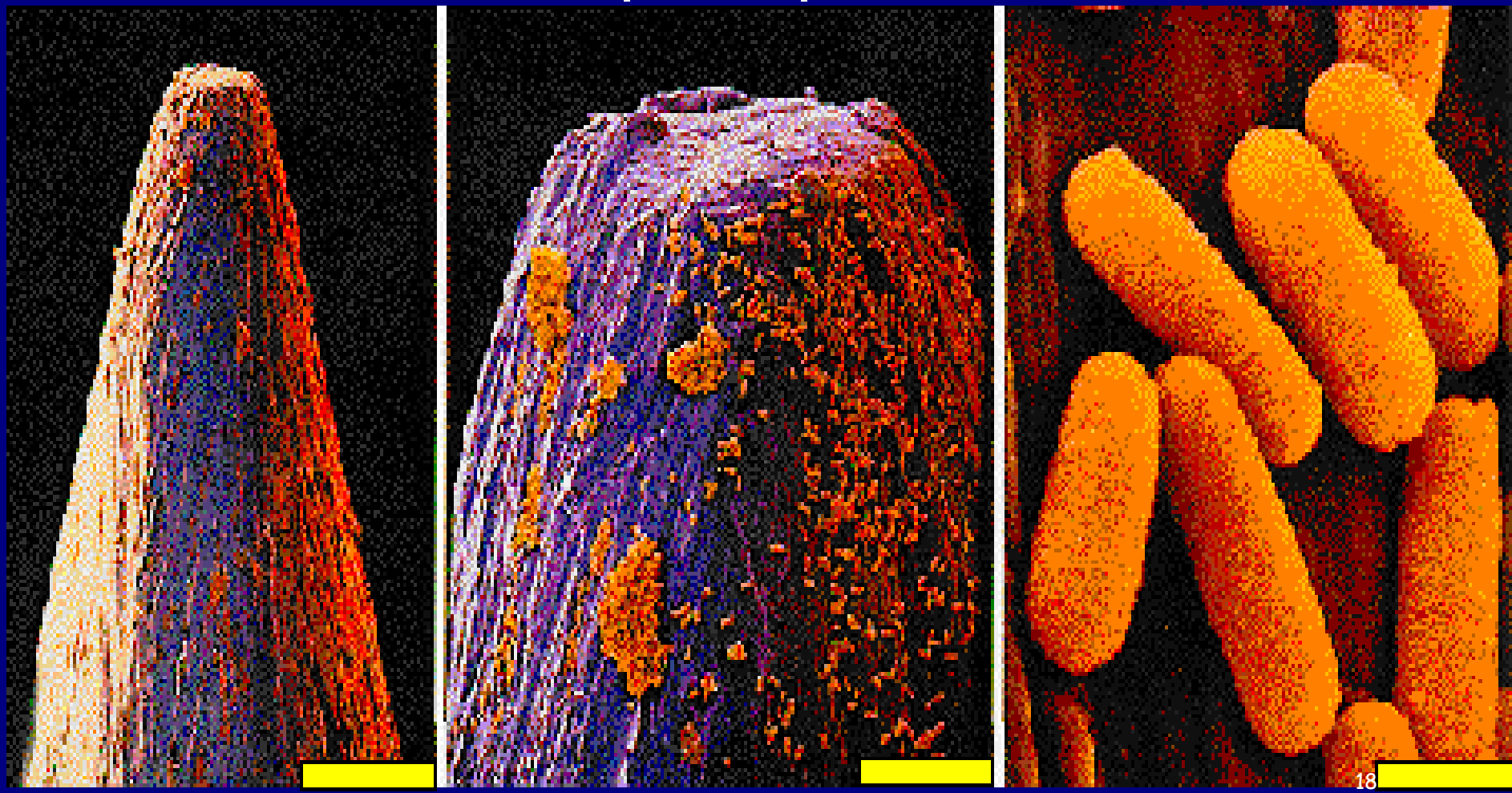

Coccus
Coccobacillus
Vibrio
Bacillus
Spirillum
Spirochete


Sphere
Rod
Spiral
Flagella

Bacillus - *E. coli*

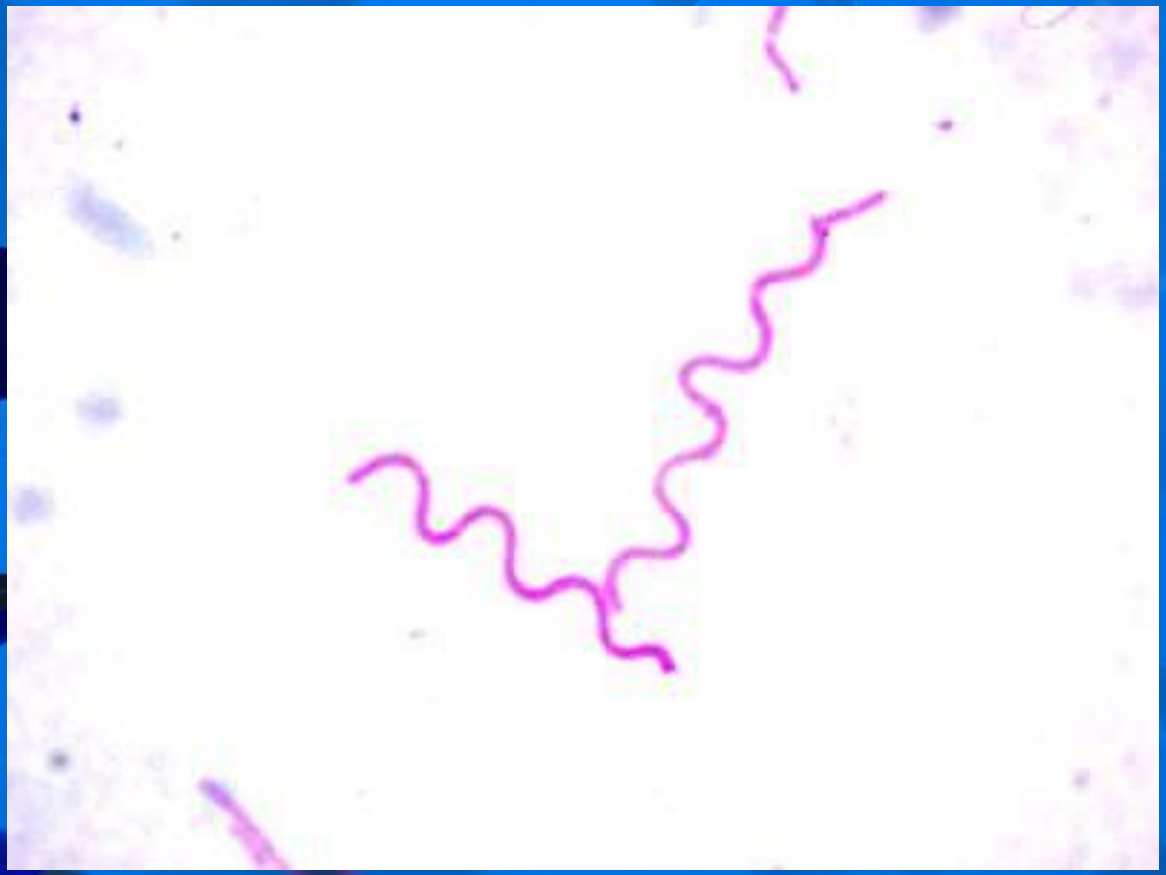
Size of Bacteria

Bacillus cells on the tip of a pin.



Spirillum

Spirochetes

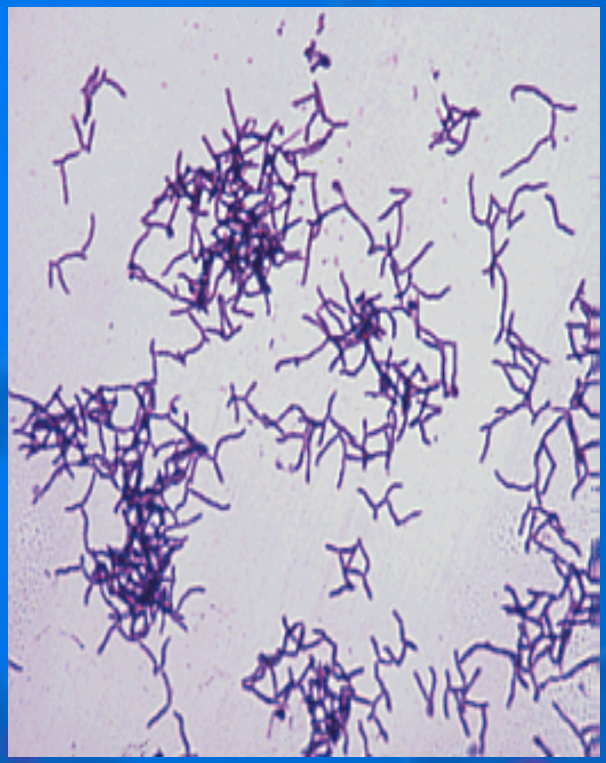


Gram Staining

- Divides the bacteria into <u>two groups</u>:
  - Gram-positive
  - Gram-negative

Gram Positive

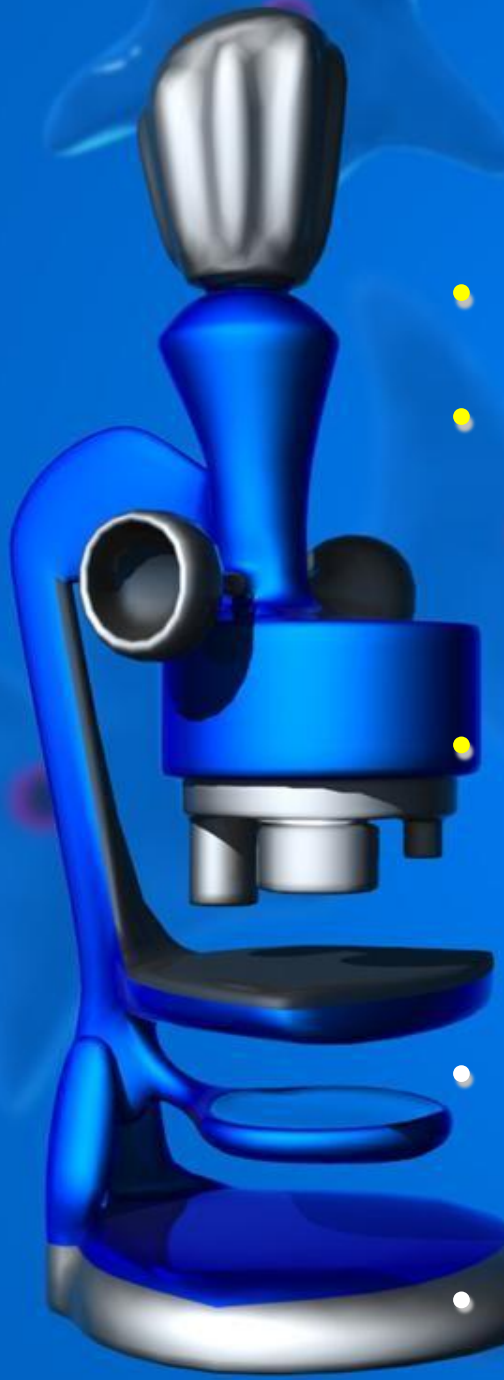
- Retain the stain called Crystal-Violet
- Appear purple under the microscope.



Gram Negative Bacteria

- Do not retain Crystal Violet--when treated with alcohol, they become colourless.
- They are treated with a second red stain, which they do retain.
- Appear pink or reddish under the microscope.

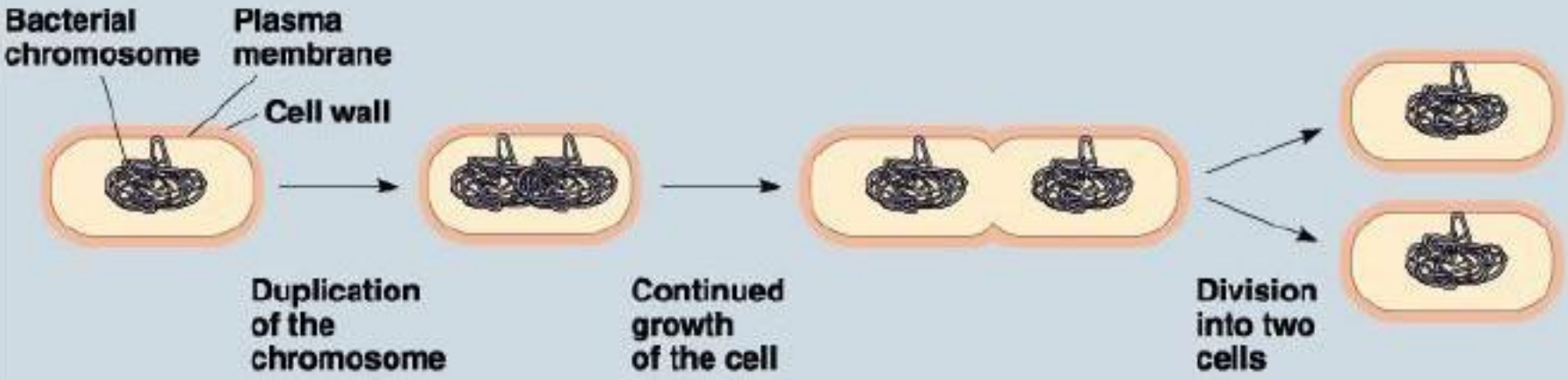
Reproduction, Nutrition, Respiration



Reproduction

- Asexually by binary fission
- DNA attaches itself to the cell membrane, and copies itself.
- The membrane grows, and then the cell divides into two equal parts.
- Each part contains a copy of the DNA
- The cells are identical (clones)

Binary Fission in Bacteria



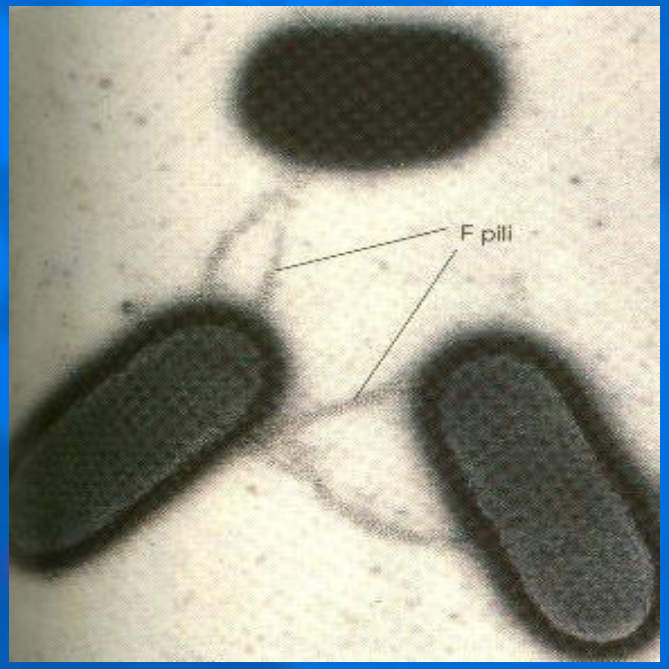
Cellular organism copies it's genetic information then splits into two identical daughter cells

Binary Fission *E. coli*

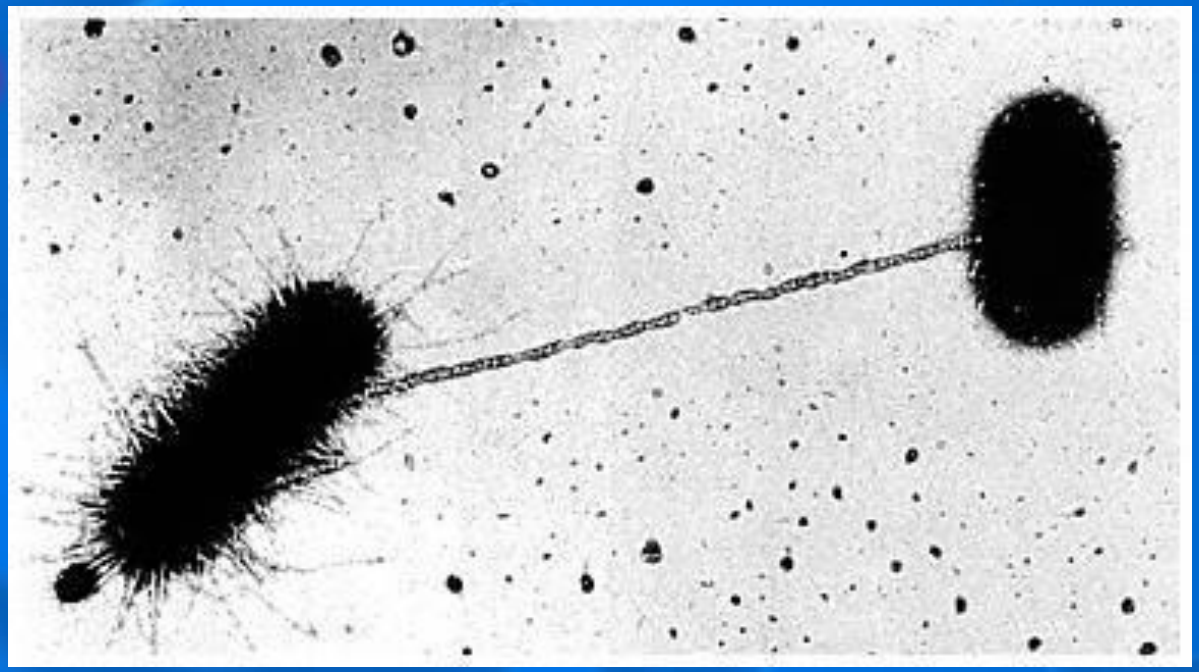
Conjugation

A type of sexual reproduction

Genetic information is transferred between cells which are joined by pili. This produces genetic variation.



Conjugation



Modes of Nutrition

Bacteria can be :

Autotrophic or Heterotrophic

Autotrophic Bacteria

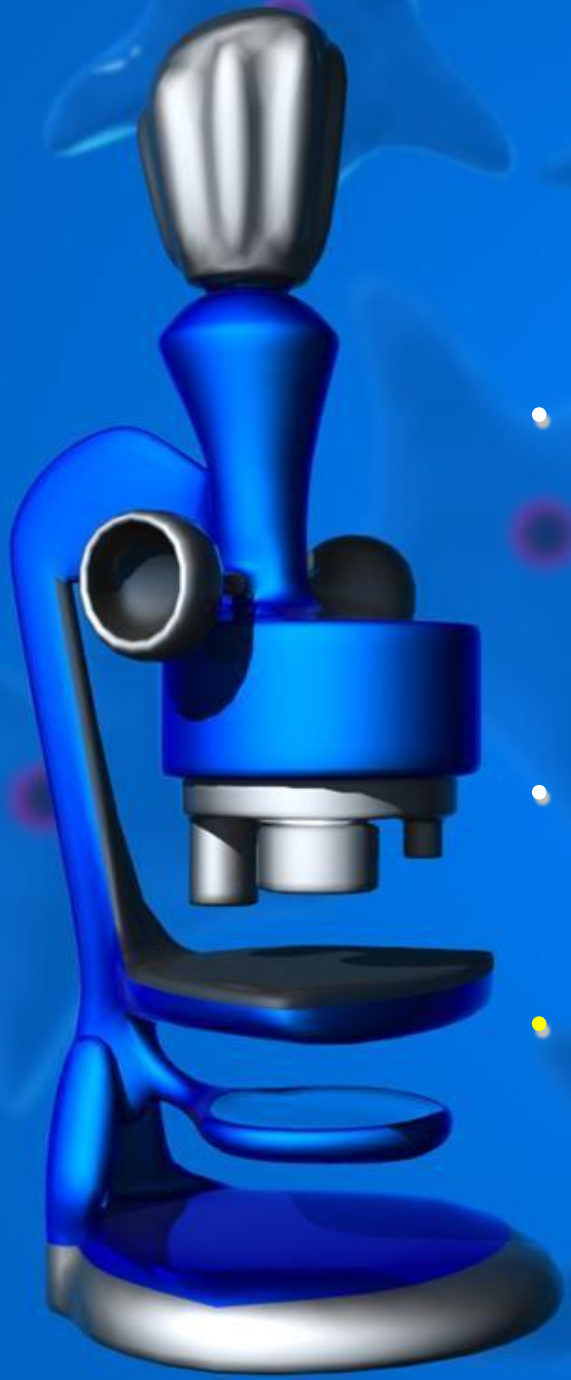
- **Photoautotroph** – use sunlight to make food
- **Chemoautotroph** – make food by reacting inorganic matter such as iron or sulfur

Heterotrophic Bacteria

- **Saprobes** – feed on dead plants or animals.
- **Parasitic Bacteria** – feed on a host cell and cause disease.
- **Mutualistic Bacteria-** live in our gut and aid in digestion. Some even provide vitamins necessary for our health!

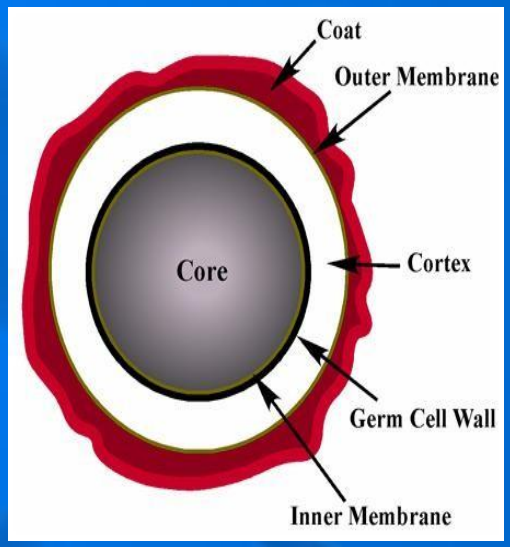
Methods of Respiration: Aerobic or Anaerobic

- **Obligate Aerobes** – require Oxygen
- **Obligate Anaerobes** – die in the presence of Oxygen
- **Facultative Anaerobes** – don't need Oxygen, but aren't killed by it



When stressed: Spore Formation

- Form endospore whenever when habitat conditions become harsh (little food)
- Able to survive for long periods of time as endosperm
- Difficult to destroy (heat resistant)



Thanks Have a Nice Day